



DEPARTMENT OF
ECOLOGY
State of Washington

Final Cost-Benefit and Least Burdensome Alternative Analyses

*Chapter 173-182 WAC
Oil Spill Contingency Plan*

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Final Cost Benefit and Least Burdensome Alternative Analyses

Chapter 173-182 WAC Oil Spill Contingency Plan

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for

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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 rule amendments (chapter 173-182 WAC; the 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.

Adopted rule amendments

The adopted rule amendments:

- Update definitions to ensure clarity and consistency with existing federal regulations.
- Clarify the Worst Case Discharge calculation for pipelines.
- Create a new pipeline geographic information planning standard which will use available geo-referenced data to support preparedness planning and initial decision making during pipeline oil spills.
- Enhance existing air monitoring requirements for pipelines to ensure safety of oil spill responders and the general public.
- Enhance our spills to ground requirements to ensure rapid aggressive and well-coordinated responses to spills to ground which could impact ground water.
- Update our pipeline planning standard requirements to ensure the equipment required is appropriate for the environments pipelines may impact.
- Expand the Best Achievable Protection (BAP) Review Cycle to facilities and pipelines.
- Other changes to clarify language and make any corrections needed.

Estimated costs

Ecology estimated the following quantifiable costs, over 20 years, likely associated with the adopted rule amendments. These costs would be incurred across seven covered existing pipelines.

Table 1: Total 20-year Present Value Costs

Cost	Low	High
Pipeline plan phase in	\$2,200	\$4,300
Contingency plan update for WCD	\$4,300	\$11,900
Planning standards for pipelines carrying crude oil	Minimal	Minimal
Identification of necessary planning points using the crossing of a shoreline of statewide significance	\$2,200	\$13,100
Geographic information planning standards	\$157,500	\$210,000
Planning standards for air quality	\$4,300	\$11,900
TOTAL	\$170,500	\$251,200

The total estimated costs over 20 years due to the adopted rule amendments ranges from \$170,500 to \$251,200.

Estimated benefits

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

- Reducing the degree or duration of impacts to human wellbeing:
 - Health: Fire, explosions, air quality, toxic chemical exposure, drinking water contamination, and subsistence or traditional food source contamination
 - Quality of life: Evacuation, property damage and contamination, Tribal lifeway impairments
- Reducing the degree of impacts to the environment: 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, and Tribal resources and lifeways
- Reducing the duration or degree of economic disruptions: Vessel delay, business interest losses, building damage from fire, expansion of property contamination, lost wages, 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

Conclusions

After evaluating the likely costs and benefits of the adopted rule amendments, Ecology believes that the likely qualitative benefits of the amendments exceed their 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.

Least burdensome analysis

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

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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 rule amendments (chapter 173-182 WAC; the adopted amendments). 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 amendments

The adopted rule amendments:

- Update definitions to ensure clarity and consistency with existing federal regulations.
- Clarify the Worst Case Discharge calculation for pipelines.
- Create a new pipeline geographic information planning standard which will use available geo-referenced data to support preparedness planning and initial decision making during pipeline oil spills.
- Enhance existing air monitoring requirements for pipelines to ensure safety of oil spill responders and the general public.
- Enhance our spills to ground requirements to ensure rapid aggressive and well-coordinated responses to spills to ground which could impact ground water.
- Update our pipeline planning standard requirements to ensure the equipment required is appropriate for the environments pipelines may impact.
- Expand the Best Achievable Protection (BAP) Review Cycle to facilities and pipelines.
- Other changes to clarify language and make any corrections needed.

1.3 Reasons for the rule amendments

The mission of Ecology's Spill Preparedness, Prevention, and Response (SPPR) program is to protect Washington's environment and public health and safety, through a comprehensive spill prevention, preparedness, and response program.

Through preparedness, Ecology focuses on protecting Washington waters by maintaining a continual state of readiness in case of large and small oil spills. Operators of larger commercial vessels and oil handling facilities are required to develop and use state-approved oil spill contingency plans. These plans help to assure that when oil spills occur, the responsible party is able to rapidly mount an immediate, effective response

The contingency plan rule requirements were last updated for pipelines in 2006. At that time the pipeline planning standards were developed to align with the marine oil terminal standards. In Washington pipelines exist in both marine and inland areas. After several years of implementing the rule, we have identified the need to update our standards to ensure that required oil spill response equipment is appropriate for the pipeline risks and operating environments (marine and inland). We also feel the need to better incorporate and embrace available technology and geo-referenced data in our planning requirements.

There are currently seven approved pipeline contingency plans that this rule applies to:

- Kinder Morgan Transmountain Pipeline LLC
- Olympic Pipe Line Company
- Phillips 66 Integrated Contingency Plan
- Tesoro Logistics NW Pipeline
- Tidewater Transportation and Terminals
- U.S. Oil & Refining Co. and McChord Pipeline Co.
- Targa Sound Terminal

Increased crude-by-rail transport has changed the risk picture for oil spills in Washington State. During the 2015 legislative session, the legislature directed Ecology to apply the concept of Best Achievable Protection to facilities. This includes pipelines.

1.4 Oil movement and spill risk in Washington State

It is estimated that over 15.8 billion gallons of oil and hazardous chemicals are transported through Washington State each year, by ship, barge, pipeline, rail, and truck. Washington's waters support some of the most productive and valuable ecosystems in the world. 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 degrade our ecosystems. Washington has been importing crude oil from Alaska's north slope since the 1970s. The Olympic Pipeline was constructed to improve the delivery of refined fuels from the refineries to

other transfer terminals in western Washington. Due to the changes in supply and demand for oil, Washington is now receiving increased supplies of crude oil from Canada and the shale formations in Montana and the Dakotas.

In 2015, Ecology assessed trends in oil transportation in Washington.¹ 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 2: Gallons of Oil Transported in Washington, by Type

Year	Billion Gallons				Percent Total		
	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%

1.5 Oil spill history

The acute and long-term impact of oil spills on any ecosystem varies by the oil type and degree of oiling, season timing, and location of spill, length of exposure, and effectiveness of the response. The same can be said for the cost of cleaning up a spill. Response costs can vary widely, although the lack of pre-spill data makes any post-spill cost analysis complex. At the height of the response to the Exxon Valdez spill, more than 11 thousand personnel, 1,400 vessels, and 85 aircraft were involved in the cleanup.

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

More recent spills include the Deepwater Horizon spill and the Cosco Busan oil spill. The Deepwater Horizon spill involved:

- A reproductive hazard for over 1,700 species during breeding season.
- 1.1 million barrels of oil in the form of unrecovered surface slicks and tar balls, which either sank or washed up on beaches.
- Un-remediated damage to saltwater marshes.
- A minimum of 6 thousand confirmed dead seabirds.
- A minimum of 600 confirmed dead sea turtles.
- 100 dead marine mammals.
- 47 thousand responder personnel.
- Nearly 7 thousand support vessels.
- 4.12 million feet of boom.
- 17.5 thousand National Guard troops.

The Cosco Busan spill in 2007 involved:

- Over 1 million lost recreational use days in the San Francisco Bay.
- Nearly 7 thousand dead seabirds.
- Oiling of 3,400 acres of the Bay.
- Oiling of 300 miles of coastline.
- Nearly 1/3 loss of herring spawning capacity.
- Postponement of crab and sport-fishing seasons that year.
- 58 thousand gallons of oil.

Trajectory computer models and historical experience informs us of what such a spill in Puget Sound, off the Washington coast, or in the Columbia River might entail. The majority of areas within Puget Sound are not subject to large scale flushing, and oil tends to remain in the environment and quickly begin to impact shorelines. Washington has the largest commercial shellfish production in the nation. Intertidal oysters, clams, and mussels are easily contaminated by oil spills.

Spills on the river system tend to flush downstream, and either move out of the river, or strand on shorelines near back eddies of the river. Tidal and river flow influences can cause re-floating and re-oiling above the high-tide area. In addition, oil that strands on the shoreline is often driven into the sediment and continues to be toxic for some time.

Some of the largest spills in Washington's history have occurred off the Washington coast and predominant coastal currents have pushed impacts to both Canada and the Oregon coast. Spills on the coast prove to be a great logistical challenge due to shoreline access and the volatile ocean conditions. It is not an understatement to estimate that the same level of resources needed for the Valdez spill in Alaska would be needed in Washington State as well.

The need to respond as soon as possible, with trained operators and systems of equipment that are enhanced for maximum effectiveness, is critical to increase the opportunity for on-water recovery and reduced shoreline oiling. The amendments to the contingency plan rule set standards that emphasize those effective, early response actions. In addition, the amendments speak to the implementation of Best Achievable Protection for pipeline plans. In the rule update this is achieved through new requirements for a geographic information planning standard and enhanced air monitoring requirement.

The rule amendments require trained people, practice drills, and systemized inspections of equipment and maintenance practices. This ensures that the equipment will work, and that operators have planned how to put these complex recovery systems together under a variety of potential spill scenarios. Drills allow all of the participants in an incident command system to practice working together in advance of an emergency.

All of these things provide for a qualitative benefit to be gained by the citizens of the state. The state is better prepared, with the correct equipment, and with partnerships forged ahead of time. The response communities can more rapidly and effectively clean up oil, minimize impacts, and protect the economy and unique environments of Washington State.

1.6 Emerging risk from potentially sinking oils

Two proposed pipeline expansion projects in Canada are poised to significantly increase vessel traffic carrying Alberta bitumen (tar sands) oil through the waters around the San Juan Islands and the Strait of Juan de Fuca. These vessels may be bound for Washington ports or move through our waters bound for other destinations. It is also expected that the transboundary pipeline between Canada and the United States will significantly increase their capacity and expand their tank farm capability accordingly. Bitumen from Alberta, even once diluted, is uniquely difficult to remove after a spill, because of its properties. Alberta bitumen oils are potentially sinking oils, or some portion may sink after weathering, which renders ineffective conventional techniques to contain and remove 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.

In 2012 our country experienced a large spill of diluted bitumen, from the Enbridge pipeline running through Marshall, Michigan. It is reported that this spill cost nearly \$34 thousand dollars per barrel, to date, to clean up, which makes it the most costly spill (despite not being the largest) in US history². Prior to this incident, the average crude oil spill in the past decade is reported to be \$2 thousand per barrel or more. Ecology notes that this spill is still in the process of being cleaned up at the time of this publication. This means the total cleanup costs of this spill will be larger than those reported here.

² Montreal Gazette; National Transportation Safety Board, 2012.

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 amendments.
- 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 rule amendments.
- Likely benefits of the adopted rule (Chapter 4): Analysis of the types and size of benefits Ecology expects to result from the rule amendments.
- 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 amendments.

Chapter 2: Baseline and the Adopted Rule Amendments

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 rule amendments, and identifies which 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. The existing rule WAC 173-182 and the state statute RCW 90.56 and the federal regulation OPA 90 and 49 CFR 190 make up the baseline. Under OPA 90 states can have more stringent contingency planning regulations than the federal government.

2.2.1 Federal requirements

The federal component of the baseline consists of requirements for pipeline oil spill response plans in 49 CFR Part 190-199.

Table 3: Comparison of Federal Oil Spill Response Plan Requirements to the Adopted Rule Amendments

Content	Federal	Adopted Rule Amendments
Pipeline plan holder phase in.	No	Yes
Updated definition of worst case discharge	No Federal rules contain a definition for WCD that differs from that adopted by the state.	Yes State adopted a 30-minute minimum in the WCD calculations.
Include response zones in plan	Yes	Yes
Planning standards for pipelines carrying crude oil that may weather and sink.	No	Yes
Identification and plan for adequate boom, recovery and storage at pipeline crossings of shorelines of statewide significance	No	Yes
Geographic information planning standards	No	Yes
Planning standards for air quality	No	Yes

2.2.2 State requirements

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 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.

2.3 Analytic scope

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

It is often the case that there is a legal requirement prompting rule contents (in that the law requires rule language to implement it, due to broad authorization or leaving specifics up to Ecology's discretion) that is not entirely separable from the rule requirements. 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 amendments separate from the requirements set by law. In cases where the requirements of the rule amendments 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 amendments:

- Pipeline plan holder phase in.
- General plan content – redefine worst-case discharge (WCD) and include concept of response zone.
- Planning standards for pipelines carrying crude oil that may weather and become non-floating.
- Identification of all locations where pipeline crosses a shoreline of statewide significance to identify planning points and equipment required at those points.
- Geographic information planning standards for pipeline plan holders.
- Pipeline planning standards for air quality monitoring.
- Updating the plan to commit to the best achievable protection review cycle.

2.4.1 Pipeline plan holder phase in

Baseline:

None.

Adopted:

The adopted amendment requires plan holders to submit an update to their existing plan at 12 months and a second update at 24 months.

Analyzed changes:

Updates made to plans and the submission at 12 and 24 months.

2.4.2 General plan content

Baseline:

Current plan requirements include a definition of worst case discharge (WCD) volumes, but does not include response zones.

Adopted:

The adopted rule amendments update the definition of a WCD. Federal regulations carry a similar definition of WCD, however the adopted definition is more stringent than the Federal definition in that it carries a 30 minute minimum time for detection and shutting down of the pipeline while the Federal definition has no minimum time requirement.

The adopted rule amendments also introduce the concept of response zones to contingency planning definitions and WCD definition.

Analyzed change:

Plan holders calculate their WCD volumes based on the new definition. Updating existing plans to account for the updated definition of WCD. Include a narrative description of the response zones in the plan

2.4.3 Planning standards for pipelines carrying crude oil

Baseline:

None.

Adopted:

The adopted rule amendments require planning standards for pipelines carrying crude oil. Plan must have a contract with a Primary Response Contractor that has access to equipment owned or via subcontract.

Analyzed changes:

Obtain a contract with a contractor for non-floating oils response. Plan update to include necessary information.

2.4.4 Identification of all locations where pipeline crosses a shoreline of statewide significance to identify necessary planning points

Baseline:

The existing rule included details for how to identify the length of boom needed for the two hour response planning standard but it did not clearly identify the planning standard locations along the pipeline.

Adopted:

The rule amendments require identification of all locations where pipeline crosses a shoreline of statewide significance in order to identify necessary planning points for boom, storage and recovery equipment requirements.

Analyzed changes:

Identifying planning points.

2.4.5 Geographic information planning standards for pipeline plan holders

Baseline:

None.

Adopted:

Plan holders must create and maintain a geographic information-planning tool.

Analyzed changes:

Creation and maintenance of tool.

2.4.6 Pipeline planning standards for air quality monitoring

Baseline:

None.

Adopted:

The adopted rule amendments require plan holders to describe their resources for conducting air monitoring.

Analyzed changes:

Plan update.

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Chapter 3: Likely Costs of the Adopted Rule Amendments

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 with changes specified in section 2.4 of this document. The baseline is the regulatory circumstances in the absence of the adopted rule. The costs analyzed here include:

- Pipeline plan holder phase in.
- General plan content – redefine WCD and include concept of response zone.
- Planning standards for pipelines carrying crude oil.
- Identification of all locations where pipeline crosses a shoreline of statewide significance to identify necessary planning points.
- Geographic information planning standards for pipeline plan holders.
- Pipeline planning standards for air quality monitoring.

3.2 Affected entities

There are currently seven approved pipeline contingency plans that this rule applies to:

- Kinder Morgan Transmountain Pipeline LLC
- Olympic Pipe Line Company
- Phillips 66 Integrated Contingency Plan
- Tesoro Logistics NW Pipeline
- Tidewater Transportation and Terminals
- U.S. Oil & Refining Co. and McChord Pipeline Co.
- Targa Sound Terminal

3.3 Anticipated costs

Ecology assumed that entities would reduce compliance costs by sharing assets to the maximum extent practicable, via contracts with approved Primary Response Contractors (PRCs), and using existing equipment available in locations that meet the adopted rule amendments' planning standards. This would include the costs of:

- Up to 7 pipelines incurring costs of updating and submitting a contingency plan either internally or via consultant contract.
- Up to 7 pipelines incurring costs of contracting with a PRC for spill response coverage.
- Possible additional costs (to a PRC, if any) of acquiring additional assets to meet the rule amendments' planning standards, in locations that are currently unsupported. These costs would be likely to be passed on to plan holders through increased fees.

3.3.1 Pipeline plan holder phase in

Under the existing rule, plan holders must resubmit their plans every 5 years and annually update their plans. The adopted standard would now require plan holders to submit an update to their plan at 12 months and a second update at 24 months. If one of these submissions corresponds to the 5-year resubmission, the incremental cost of the adopted standard would be minimal for that submission. Ecology conservatively assumed that neither update corresponded to the 5-year resubmission.

The cost of preparing the plan update and submitting it is estimated to range from roughly \$2,200 to \$4,300 (in 2016 present-value dollars, using a 1.18-percent discount rate).³ This range is based on a loaded 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. We estimated that it would take 2 - 4 hours for each submission and each of the seven impacted pipelines would need to submit one update at 12 months and one at 24 months, having two submissions.^{4,5}

This would be a total cost per submission of \$156 to \$311 and a total of 14 submissions (2 for each of 7 plan holders), yielding a discounted total of \$2,200 to \$4,300.

3.3.2 General plan content

The adopted rule amendments would require covered pipelines update their plans based on new planning volumes for WCDs, including methodology and calculations. This is estimated to take 8 – 20 hours. Using the wage rate discussed above estimated costs would range from \$4,300 to \$11,900. This would be a one-time, up-front cost.

³ Historic average real rate of return on US Treasury Department I-Bonds. Associated historic average inflation rate is approximately 2 percent.

⁴ US Bureau of Labor Statistics (2014). May 2015 State Occupational and Wage Estimates for Washington.

⁵ WA Department of Ecology (2015). Washington State assumptions for overhead for legislative estimates of compensation costs for fiscal notes, 2015-16.

3.3.3 Planning standards for pipelines carrying crude oil

The adopted rule amendments would require covered pipelines carrying crude oil to identify a contractor that has access to equipment appropriate for response to oils which may weather and become submerged or sink. If the PRC currently identified in the existing plan already has this equipment the pipeline plan holder would need to ensure they can access the equipment under their existing contract. If they cannot access the equipment under the existing contract they may need to amend their contract to gain access to this type of equipment and update to the plan to cite the PRC for this equipment. The incremental cost would be minimal.

3.3.4 Identification of all locations where pipeline crosses a shoreline of statewide significance to identify necessary planning points.

Currently, the seven covered pipelines have a total of 25 planning points state-wide. However, their siting is not based on shorelines of statewide significance. Ecology estimates that this new requirement will alter that to 24 planning points, however these sites may not necessarily correspond to existing planning points.

Initially, sites will need to be identified. Ecology estimates that this will cost roughly: \$311 to \$1,870 per plan holder. This includes 4 - 24 hours of staff time at \$77.81 per hour, as detailed above, per covered pipeline. This would be a one-time cost.

Estimated total costs aggregated over the 7 covered pipelines range from \$2,200 to \$13,100.

If a new site is identified, the plan holder may need to contract with a PRC, alter an existing contract, or purchase and stage additional response equipment. 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 and pipelines as part of their contingency planning for spills. Some individual firms also own their own equipment, 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. 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, 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.

3.3.5 Geographic information planning standards for pipeline plan holders

The adopted rule amendments require plan holders to create and maintain a geographic information planning tool that supports the plan holder in mapping and tracking spilled oil, decision making, and the recovery and removal operations that are described in the plan.

The tool must include the following:

- Pipeline details.
- Sensitive natural, cultural, and economic area information including applicable Geographic Response Plans.
- Information about public resources, water intakes, sole source aquifers, existing monitoring wells, and drinking water supplies.
- Topography of the area.
- Oil spill response equipment staging information.

The development of a tool that meets all of these requirements is estimated to cost \$157,500 to \$210,000. This estimate uses a loaded wage of \$93.50 for a software engineer⁶ and 240 -320 hours to complete the task for each of the seven pipelines. This is a one-time cost.

3.3.6 Pipeline planning standards for air quality monitoring

The adopted rule amendments require plan holders to update their plan with a narrative description of applicable federal, state, and local air monitoring requirements, identifying local (fire), state, plan holder owned, and contracted (PRC) owned or subcontracted assets that would be used to support air monitoring.

This is estimated to take 8 – 20 hours and using the wage rate for environmental engineers discussed above yields costs of \$4,300 to \$11,900. This would be a one-time, up-front cost.

⁶ US Bureau of Labor Statistics (2015). May 2015 State Occupational and Wage Estimates for Washington.

3.4 Summary of costs

Ecology estimated the following quantifiable costs, over 20 years, likely associated with the adopted rule amendments. These costs would be incurred across seven covered existing pipelines. 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 4: Total 20-year Present Value Costs

Cost	Low	High
Pipeline plan phase in	\$2,200	\$4,300
Contingency plan update for WCD	\$4,300	\$11,900
Planning standards for pipelines carrying crude oil	Minimal	Minimal
Identification of necessary planning points using the crossing of a shoreline of statewide significance	\$2,200	\$13,100
Geographic information planning standards	\$157,500	\$210,000
Planning standards for air quality	\$4,300	\$11,900
TOTAL	\$170,500	\$251,200

The total estimated costs over 20 years due to the adopted rule amendments ranges from \$170,500 to \$251,200.

Chapter 4: Likely Benefits of the Adopted Rule Amendments

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 three effects:

- Immediate cost of cleanup falls because of the broader pre-staging of equipment and people.
- 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.
- Oil is removed more quickly and safely from population-dense locations, reducing fire, air-quality, and oil-exposure risks to people and property.

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 rule amendments 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 spills associated with transporting oil by pipeline. We discuss the reductions in those costs that could be supported by the adopted rule amendments.

The elements supporting better, faster pipeline spill response preparedness in Washington include:

- Appropriate definition of WCD when determining response.
- Planning for potential crude oil spills, particularly the potential for sinking oil.
- Appropriate siting for planning points.
- Geographic information planning standards for pipeline plan holders.
- Pipeline planning standards for air quality monitoring.

4.2 Costs of spills

Spills from pipelines can have a variety of impacts, ranging from relatively mild to severe. While the adopted rule amendments are not intended to prevent such spills, the degree of preparedness they require 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.

4.2.1 Human wellbeing costs

In June 1999, a 16-inch diameter pipeline ruptured near Bellingham, Washington releasing about 237,000 gallons of gasoline into a creek. This ignited and burned a mile and a half along the creek, killing 3 people and causing an estimated \$45million in damages.⁷

The degree to which pipelines 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 human impacts 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

4.2.2 Environmental costs

The adopted rule amendments are designed to help pipelines 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
- Areas prone to wildfire
- Fisheries
- Shellfisheries

⁷ NTSB 2002, PAR 02-02 <http://www.nts.gov/investigations/AccidentReports/Pages/PAR0202.aspx>

- 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.⁸ The spills described in the study focused on the central coastline of California and provided scenarios where 10 miles of coast was oiled and 12,000 birds were killed. By comparison, the adopted rule affects Puget Sound and the Columbia River, as well as numerous freshwater bodies near coasts as well as inland. The California 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.⁹
- Tribal resources and traditional lifeways: 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. 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 amendments' requirement for rapid and comprehensive response to spills are likely to reduce the degree or severity of impacts to tribal resources and traditional lifeways.

⁸ 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 been \$8.74 higher.

⁹ 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.

4.2.3 Economic disruption costs¹⁰

Where pipeline 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 amendments 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 wages
- 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 that company and the other companies in the industry. This can be accompanied by reduced demand for the product of an identifiable company. If a large pipeline spill took place in Washington, there is a potential for a similar reaction. Ecology has already seen this reaction in small spills and would anticipate it would in a worst case scenario. Given pipelines tend to have 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.

¹⁰ For a full discussion of recent spills and their impact, please see: Ecology (2015). Washington State 2014 Marine and Rail Oil Transportation Study. March 1, 2015. Ecology publication no. 15-08-010.

4.3 Summary of benefits

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

- Reducing the degree or duration of impacts to human wellbeing:
 - 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
 - Tribal lifeway impairments
- Reducing the degree of impacts to the environment:
 - 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
- Reducing the duration or degree of economic disruptions:
 - Vessel delay
 - Business interest losses
 - Building damage from fire
 - Expansion of property contamination
 - Lost wages
 - 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

Chapter 5: Cost-Benefit Comparison and Conclusions

5.1 Likely costs of the rule

The adopted rule amendments, through requirements for contingency planning and supporting access to necessary equipment and personnel resources, are likely to impose costs of \$170,50000 to \$251,200 over 20 years.

5.2 Likely benefits of the rule

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

- Reducing the degree or duration of impacts to human wellbeing:
 - 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
 - Tribal lifeway impairments
- Reducing the degree of impacts to the environment:
 - 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
- Reducing the duration or degree of economic disruptions:
 - Vessel delay
 - Business interest losses

- Building damage from fire
- Expansion of property contamination
- Lost wages
- 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

5.3 Conclusion

After evaluating the likely costs and benefits of the adopted rule amendments, Ecology believes that the likely qualitative benefits of the amendments exceed their 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.

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 amendments, 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 amendments 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.

6.3 Alternatives considered

6.3.1 No rulemaking - status quo

Not amending the rule would be less burdensome, however, this would result in missed opportunities to improve our preparedness in Washington State.

6.3.2 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 need time to acquire access to resources meeting the adopted planning standards.

6.3.3 Not changing definition of WCD

Would be less burdensome, however in the previous definition we exempted tanks in containment, did not have a 30 minute minimum for detection and shut down calculations, and did not include the concept of response zones.

6.3.4 No standard for pipeline plan holders that carry crude oil

Recent spills have demonstrated that some crudes (for example diluted bitumen) may weather and sink. Adding this requirement supports a recent National Academy of Sciences study on responding to spills of diluted bitumen from pipelines¹¹.

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 amendments represent the least burdensome requirements meeting those goals.

¹¹ Transportation Research Board (2013), TRB Special Report 311: Effects of Diluted Bitumen on Crude Oil Transmission Pipelines

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