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State of Washington

Final Cost-Benefit and Least Burdensome Alternative Analysis

Chapter 173-182 WAC

Oil Spill Contingency Plan

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For more information contact:
Spill Prevention, Preparedness, and Response Program
P.O. Box 47600
Olympia, WA 98504-7600
Phone: 360-407-6555

Washington State Department of Ecology - <http://www.ecy.wa.gov>

- Headquarters, Olympia 360-407-6000
- Northwest Regional Office, Bellevue 425-649-7000
- Southwest Regional Office, Olympia 360-407-6300
- Central Regional Office, Yakima 509-575-2490
- Eastern Regional Office, Spokane 509-329-3400

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Final Cost Benefit and Least Burdensome Alternative Analysis

Chapter 173-182 WAC Oil Spill Contingency Plan

By
Kasia Patora

for

Spill Prevention, Preparedness, and Response Program
Washington State Department of Ecology
Olympia, Washington

Table of Contents

TABLE OF TABLES	IV
EXECUTIVE SUMMARY	1
CHAPTER 1: BACKGROUND AND INTRODUCTION	4
1.1 INTRODUCTION	4
1.2 DESCRIPTION OF THE RULE AMENDMENTS	4
1.3 REASONS FOR THE RULE AMENDMENTS.....	4
1.4 OIL MOVEMENT AND SPILL RISK IN WASHINGTON STATE	5
1.5 OIL SPILL HISTORY.....	7
1.6 EMERGING RISK FROM POTENTIALLY SINKING OILS.....	8
1.7 DOCUMENT ORGANIZATION	9
CHAPTER 2: BASELINE AND RULE AMENDMENTS.....	10
2.1 INTRODUCTION	10
2.2 BASELINE	10
2.2.1 <i>Specific directives of the statute</i>	10
2.2.2 <i>E2SHB 1186</i>	12
2.2.3 <i>Federal requirements</i>	14
2.3 ANALYTIC SCOPE	14
2.4 ANALYZED CHANGES	14
2.4.1 <i>Aerial surveillance</i>	14
2.4.1.1 Timing of aerial asset arrival	14
2.4.1.2 Best achievable technology	15
2.4.1.3 Communication with incident command post (ICP)	15
2.4.1.4 Data transmission	16
2.4.2 <i>Planning standards</i>	16
2.4.2.1 Four-hour planning standard	16
2.4.2.2 Dedicated on-water storage	16
2.4.2.3 Technical manual	17
2.4.2.4 Shoreline cleanup	17
2.4.3 <i>Vessels of opportunity</i>	18
2.4.3.1 Mobilization	18
2.4.3.2 Vessel vetting.....	18
2.4.3.3 Numbers of VOO.....	18
2.4.3.4 VOO training	19
2.4.3.5 VOO contracting.....	19
2.4.3.6 VOO drills	19
2.4.4 <i>USCG/Ecology General Plan Holders – Umbrella Plan Resources</i>	20
2.4.4.1 Worst-case discharge volume	20
2.4.4.2 Spill management team	20
2.4.4.3 Direct contracting for all resources.....	21
2.4.5 <i>Primary response contractor requirements</i>	21
2.4.5.1 Staff identification and training	21
2.4.5.2 Listing response equipment	22
2.4.5.3 PRC application information	22
2.4.6 <i>Drill requirements</i>	23
2.4.6.1 Large-scale multi-plan holder deployment drills	23
2.4.6.2 VOO deployment drills.....	24
2.4.6.3 Wildlife rehabilitation and response equipment deployment drills	24
2.4.6.4 Emergency response towing vessel drills.....	24
CHAPTER 3: LIKELY COSTS OF THE RULE AMENDMENTS	26

3.1	INTRODUCTION	26
3.2	AFFECTED ENTITIES	26
3.3	EXPECTED COSTS WITH ASSET SHARING	28
3.3.1	<i>Aerial surveillance</i>	28
3.3.1.1	Timing of aerial asset arrival	28
3.3.1.2	Best achievable technology	29
3.3.1.3	Communication with ICP and data transmission	29
3.3.1.4	Additional spotting resources	29
3.3.2	<i>Planning standards</i>	29
3.3.2.1	Four-hour planning standard	29
3.3.2.2	Dedicated on-water storage	29
3.3.2.3	Technical manual	30
3.3.2.4	Shoreline cleanup	30
3.3.3	<i>Vessels of opportunity</i>	31
3.3.3.1	Mobilization	31
3.3.3.2	Vessel vetting.....	31
3.3.3.3	Numbers of VOO.....	31
3.3.3.4	VOO training	31
3.3.3.5	VOO contracting.....	32
3.3.3.6	VOO drills	32
3.3.4	<i>Umbrella plan resources</i>	32
3.3.4.1	Worst-case discharge volume	32
3.3.4.2	Spill management team	32
3.3.4.3	Supplemental Resources.....	32
3.3.5	<i>PRC requirements</i>	33
3.3.5.1	Identification and training of PRC deployed staff	33
3.3.5.2	Listing response equipment	33
3.3.5.3	PRC requirement to listing personnel, training, assets, VOO, and other capabilities in the PRC application	34
3.3.6	<i>Drill requirements</i>	34
3.4	COST SUMMARY WITH ASSET SHARING	34
3.5	EXPECTED COSTS WITH NO COLUMBIA RIVER UMBRELLA PLAN SHARING	35
3.5.1	<i>Aerial surveillance</i>	36
3.5.1.1	Timing of aerial asset arrival	36
3.5.1.2	Best achievable technology	36
3.5.1.3	Communication with ICP and data transmission	36
3.5.1.4	Additional spotting resources	36
3.5.2	<i>Planning standards</i>	37
3.5.2.1	Four-hour planning standard	37
3.5.2.2	Dedicated on-water storage	37
3.5.2.3	Technical manual	37
3.5.2.4	Shoreline cleanup	38
3.5.3	<i>Vessels of opportunity</i>	38
3.5.3.1	Mobilization	38
3.5.3.2	Vessel vetting.....	38
3.5.3.3	Numbers of VOO.....	39
3.5.3.4	VOO training	39
3.5.3.5	VOO contracting.....	39
3.5.3.6	VOO drills	39
3.5.4	<i>Umbrella plan resources</i>	39
3.5.4.1	Worst-case discharge volume	39
3.5.4.2	Spill management team	40
3.5.4.3	Supplemental Resources.....	40
3.5.5	<i>PRC requirements</i>	40
3.5.5.1	Identification and training of PRC deployed staff	40
3.5.5.2	Listing response equipment	41

3.5.5.3	PRC requirement to listing personnel, training, assets, VOO, and other capabilities in the PRC application	41
3.5.6	<i>Drill requirements</i>	41
3.6	COST SUMMARY WITH NO COLUMBIA RIVER UMBRELLA PLAN SHARING	41
CHAPTER 4: LIKELY BENEFITS OF RULE AMENDMENTS		43
4.1	INTRODUCTION	43
4.2	COSTS OF SPILLS IN WASHINGTON	44
4.3	EXPECTED BENEFITS	46
4.3.1	<i>Quantifiable benefits</i>	46
4.3.2	<i>Avoided impacts to Tribal cultural values</i>	47
4.3.3	<i>Passive-use and existence values</i>	48
4.3.4	<i>Avoided losses to endangered species</i>	50
4.3.5	<i>Avoided losses to shareholders</i>	50
4.3.5	<i>Inclusion of potentially sinking oils</i>	50
CHAPTER 5: COST-BENEFIT COMPARISON AND CONCLUSIONS		51
5.1	LIKELY COSTS OF THE RULE	51
5.2	LIKELY BENEFITS OF THE RULE	52
5.3	CONCLUSION	53
CHAPTER 6: LEAST BURDENSOME ALTERNATIVE ANALYSIS		54
6.1	INTRODUCTION	54
6.2	COMPLIANCE DATES	54
6.3	SUPPLEMENTAL RESOURCES	54
6.4	GROUP 5 OILS PLANNING STANDARD	54
6.5	VESSELS OF OPPORTUNITY DATABASE	55
6.6	VESSELS OF OPPORTUNITY AND MULTIPLE PLANS	55
6.7	FLEXIBILITY IN COOPERATION AND COORDINATION	55
6.8	MINIMUM NUMBERS OF VOO ON THE COLUMBIA RIVER AND IN GRAYS HARBOR	55
6.9	TRAINING INTERVALS	55
6.10	AERIAL SURVEILLANCE ASSET AND TIMING	56
6.11	AERIAL OBSERVER TRAINING REQUIREMENTS	56
6.12	TECHNICAL MANUAL PLANNING	56
6.13	SHORELINE CLEANUP STANDARD	56
6.14	SHORELINE TYPE IDENTIFICATION	56
6.15	DEDICATED STORAGE	57
6.16	CONCLUSION	57
REFERENCES		58
APPENDIX A: COMPARISON OF RULE AMENDMENTS TO BASELINE REGULATIONS		59
APPENDIX B: INPUTS FOR QUANTIFIABLE SOCIOECONOMIC DAILY BENEFITS OF REDUCED CLEANUP DURATION		68

Table of Tables

Table 1: Present-Value Costs of the Rule Amendments (asset sharing)	1
Table 2: Present-Value Costs of the Amendments (no Columbia River umbrella plan asset sharing)	2
Table 3: Benefits of the Rule Amendments	3
Table 4: Present-Value Costs of the Amendments (asset sharing)	34
Table 5: Present-Value Costs of the Amendments (no Columbia River umbrella plan sharing) ..	41
Table 6: Average Total Cost of Spills by Region	45
Table 7: Daily and Hourly Cost of Spills by Region (Distributed-Cost Scenario).....	46
Table 8: Daily and Hourly Cost of Spills by Region (Frontloaded-Cost Scenario)	47
Table 9: Present-Value Costs of the Rule Amendments (asset sharing)	51
Table 10: Present-Value Costs of the Amendments (no Columbia River umbrella plan sharing)51	
Table 11: Benefits of the Rule Amendments	52
Table 12: Losses associated with spills in the Strait of Juan de Fuca, for a crude spill, a bunker C spill, and a diesel spill (in thousands of dollars).....	68
Table 13: Losses associated with spills in the San Juan Islands, for a crude spill (in thousands of dollars):	71
Table 14: Losses associated with spills on the Outer Coast, for a crude spill (in thousands of dollars):	72
Table 15: Losses associated with spills in the Lower Columbia, for a bunker C spill (in thousands of dollars):	73
Table 16: Losses associated with spills in the Upper Columbia, for a bunker C spill (in thousands of dollars):.....	74

Executive Summary

The Washington State Department of Ecology (Ecology) is amending Washington Administrative Code (WAC) regulatory chapter 173-182 (Oil Spill Contingency Plans) to implement Chapter 122, 2011 Laws (E2SHB 1186). The rule amendments include changes to:

- Update state oil spill preparedness planning standards to incorporate best achievable protection and best available technology.
- Enhance the state’s current vessels of opportunity system.
- Establish a volunteer coordination system.
- Require joint large-scale equipment deployment drills from tank vessels.
- Enhance the state-required notification process to include potential spill threats as well as actual spills.
- Change contingency plan requirements for nonprofit “umbrella” organizations to allow for a planning structure that supports approval of plans with a tiered approach.
- Update definitions.
- Make other changes related to Ecology’s contingency plan review and approval process.

Ecology last updated the oil spill contingency planning rule in 2007. Since the last update to the rule, two large oil spills – a spill in San Francisco, CA (the Cosco Busan oil spill) and a spill along the Gulf Coast (the Deepwater Horizon oil spill) – have impacted marine waters in the United States. These spills provided valuable lessons learned about our preparedness framework, and influenced a change in the law. The rule amendments are intended to incorporate lessons learned to influence changes to specific spill planning standards and drill standards.

The Cost-Benefit Analysis (CBA) estimates the likely costs and benefits of the rule amendments, as compared to the regulatory framework if the rule was not amended (the baseline). The Washington Administrative Procedure Act (APA; chapter 34.05 RCW) requires that Ecology, “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 objectives of the law being implemented.”

Ecology estimated the likely costs of the rule amendments to be:

Table 1: Present-Value Costs of the Rule Amendments (asset sharing)

Present-Value Costs of the Rule Amendments		
Cost	Low Present Value	High Present Value
FLIR plus additional BAT capability	\$300,000	\$700,000
Additional spotting resources	\$691	\$5,000
Four-hour planning standard	\$350,000	\$1,750,000
Dedicated on-water storage	\$250,000	\$1,000,000
Dedicated on-water storage maintenance	\$205,327	\$821,308
Describe storage and recovery as systems	\$1,727	\$10,000
100 shore cleanup workers and supervisors	\$867	\$4,000
9 miles passive cleanup equipment	\$55,000	\$55,000

Plan update with process to obtain additional resources	\$691	\$4,000
Vessels of Opportunity database (Ecology cost)	\$27,000	\$27,000
VOO database ongoing costs (Ecology cost)	\$303,884	\$303,884
Vetting VOO	\$48,649	\$59,489
VOO training	\$3,566,975	\$3,997,472
VOO deployment drill	\$1,117,595	\$1,252,477
Identify worst-case discharge volume	\$86	\$500
Identify spill management team for all enrolled members	\$86	\$500
Describe process for activating supplemental resources	\$1,727	\$10,000
Identify and list staff to be deployed	\$1,036	\$6,000
Train staff to be deployed	\$158,510	\$504,350
List response equipment on WRRL (or equivalent)	\$1,036	\$6,000
List all staff, training, VOO, communications assets, remedial substances in contracts	\$2,073	\$3,840
TOTAL 20-YEAR PRESENT-VALUE COST	\$6,392,961	\$10,528,981

If assets could not be shared with the Columbia River umbrella plan, Ecology estimated the likely costs of the rule amendments to be:

Table 2: Present-Value Costs of the Amendments (no Columbia River umbrella plan asset sharing)

Present-Value Costs of the Rule Amendments		
Cost	Low Present Value	High Present Value
FLIR plus additional BAT capability	\$300,000	\$700,000
Additional spotting resources	\$691	\$4,000
Four-hour planning standard	\$350,000	\$1,750,000
Dedicated on-water storage	\$250,000	\$1,000,000
Dedicated on-water storage maintenance	\$205,327	\$821,308
Describe storage and recovery as systems	\$1,727	\$10,000
100 shore cleanup workers and supervisors	\$867	\$5,000
9 miles passive cleanup equipment	\$55,000	\$55,000
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Vetting VOO	\$48,649	\$59,489
VOO training	\$3,566,975	\$3,997,472
VOO deployment drill	\$1,117,595	\$1,252,477
Identify worst-case discharge volume	\$86	\$500
Identify spill management team for all enrolled members	\$86	\$500
Describe process for activating supplemental resources	\$1,727	\$10,000
Identify and list staff to be deployed	\$1,036	\$6,000
Train staff to be deployed	\$158,510	\$504,350
List response equipment on WRRL (or equivalent)	\$1,036	\$6,000

List all staff, training, VOO, communications assets, remedial substances in contracts	\$2,073	\$12,000
TOTAL 20-YEAR PRESENT-VALUE COST	\$7,205,016	\$11,323,981

Ecology estimated the likely benefits of the rule amendments to be:

Table 3: Benefits of the Rule Amendments

Benefits of the Rule Amendments (per day of reduced spill response required)		
Benefit	Low Value per Day* (per hour)	High Value per Day* (per hour)
Avoided damages per day of reduced cleanup	\$1,318,478 (\$54,937)	\$3,634,135 (\$151,422)
Avoided damages to tribal cultural values	Qualitative – See Chapter 4	
Avoided losses to passive-use and existence values	Qualitative – See Chapter 4	
Avoided losses to endangered species	Qualitative – See Chapter 4	
Avoided losses to shareholders	Qualitative – See Chapter 4	
Preparedness for potentially sinking oils	Qualitative – See Chapter 4	

* Assumes at least one spill occurs in each of five regions (Juan de Fuca, San Juans, Outer Coast, Lower Columbia, and Upper Columbia) over the next 20 years, and this increased response efficiency occurs in each of them.

Therefore, Ecology concludes that the likely benefits of the rule exceed its likely costs.

The Least Burdensome Alternative Analysis (LBA) documents the alternatives Ecology considered to the content of the rule amendments, and establishes that the amendments represent the least burdensome requirements that achieve the goals and objectives of the governing statute. This analysis is also required by the APA.

The rule amendments incorporate some cost-reducing features, while providing the minimum requirements to improve response to a “worst case spill” as required by law. This includes use of a single plan to meet both the federal and state contingency planning requirements, and allowing plan holders to reference the information, tools, and policies found in each individual plan.

The analyses in this document are intended to be used with the associated Small Business Economic Impact Statement (SBEIS; Ecology publication no. 12-08-015), to understand the full impacts of the rule, and Ecology’s considerations and actions in rulemaking.

Chapter 1: Background and Introduction

1.1 Introduction

This report reviews two of the economic analyses performed by the Washington State Department of Ecology (Ecology) to estimate the incremental expected benefits and costs of the amendments to the Oil Spill Contingency Plans (chapter 173-182 WAC). 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 rule amendments

The rule amendments:

- Update state oil spill preparedness planning standards to incorporate best achievable protection and best achievable technology.
- Enhance the state’s current vessels of opportunity system.
- Establish a volunteer coordination system.
- Require joint large-scale equipment deployment drills from tank vessels.
- Enhance the state-required notification process to include potential spill threats as well as actual spills.
- Change contingency plan requirements for nonprofit “umbrella” organizations to allow for a planning structure that supports approval of plans with a tiered approach.
- Update definitions.
- Make other changes related to Ecology’s contingency plan review and approval process.

1.3 Reasons for the rule amendments

Following the direction of the Washington State Legislature in Enhanced Substitute House Bill 1186, the rule amendments would require response system improvements through a combination of best achievable technology and best achievable protection. The equipment, training, and planning elements required through these rule amendments strive to pair the right equipment with well-trained personnel. These elements are essential in delivering a rapid, aggressive, and well-coordinated response to large spills.

The rule amendments are a step toward building a response system that utilizes best achievable protection to strengthen our ability to operate safely and continuously at night and during inclement weather conditions including rain, fog, waves, and high currents that are often experienced in Washington State waters.

To this end, the rule requires investment in:

- New aerial surveillance capability.
- New four hour planning standard requiring recovery equipment capable in current and at higher encounter rates.
- Enhanced training of oil-spill response personnel.
- Enhanced Vessels of Opportunity program pre-contracted with trained crew.
- Technical manuals as a way to communicate how the plan holder's response capability represents best achievable protection, and can be verified over time using the five-year best achievable protection review cycle.
- Enhanced shoreline clean-up equipment standards.
- Enhanced planning standard for dedicated on-water storage.
- Earlier in time notifications for significant threats of spills.

Ecology last updated the oil spill contingency planning rule in 2007. Since the last update to the rule, two large oil spills – a spill in San Francisco, CA (the Cosco Busan oil spill) and a spill along the Gulf Coast (the Deepwater Horizon oil spill) – have impacted marine waters in the United States. These spills provided valuable lessons learned about our preparedness framework, and influenced a change in the law. The rule amendments are intended to incorporate lessons learned to influence changes to specific spill planning standards and drill standards.

Through the rule amendments, Ecology is enhancing the current vessel of opportunity requirements and strengthening our ability to respond to oil spills. Vessels of Opportunity (VOO) were used extensively during the Deepwater Horizon Spill response and the Cosco Busan Spill response. The lesson learned from these spill events demonstrated the value of partnering with local marine professionals ahead of a large spill to ensure vessels of opportunity participants are well-trained and can operate safely as an effective part of spill response.

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, 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 degrade our ecosystems by a "thousand cuts".

Washington State is one of the most trade-dependent states in the nation. Ports in British Columbia and Washington are conveniently located to provide the shortest *great circle* shipping route to ports in eastern Asia. As such, the state's waterways are heavily used by diverse vessel traffic, and also include the largest ferry fleet in the nation, military ships, commercial and recreational fishing vessels.

- Puget Sound ports are located further from the entrance buoy than other major port in the nation. The trans-boundary waters along the 125 mile long international border shared with Canada are characterized by naturally deep water but often have rocky shoals and headlands.
- Columbia River's major ports are accessed across a breaking bar and vessels must transit between 30 and 110 miles from the entrance along a dredged waterway to reach the key port complexes at Kalama, Longview, Portland, and Vancouver.
- Grays Harbor ports are also accessed across a breaking bar and passage through a shallow dredged waterway.

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. On the Columbia River, oil is transported to supply the needs of eastern 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. Transportation of crude oils by rail is growing rapidly as a practice in this state. The oil is stored and moved across docks to supply our refineries or taken out of state to other refiners.

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.

A major spill in Washington State would impact:

- Economic activity, locally, statewide, interstate, and internationally. It would have significant impact on the coastal economy, estimated at costing 165 thousand jobs, and \$10.8 billion in annual economic activity.
- A large spill would also severely hurt the state's export-dependent economy if it caused restrictions (likely severe from a large spill) to the international shipping industry using Washington State's multiple large ports.
- The movement of critical supplies of food and medicine to the isolated west coast states of Alaska and Hawaii. Supplies are counted in days and traffic disruption could cause significant impacts.
- Animals and the environment. Valued socially, culturally, and economically. Washington's waters support a huge variety of fish, shellfish, seabirds, marine

mammals, and plants. These include a number of species protected under the Endangered Species Act, such as the Southern Resident orcas, and the Chinook salmon.

1.5 Oil spill history

The acute and long-term impact of oil spills on and 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 a 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.

More relevant to spills in Puget Sound may be the recent 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 one 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 down stream, 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.

Short winter days and wet weather create working conditions with limited visibility. 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 believe 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 tracking oil spills in low light or darkness conditions, through the use of best achievable technology and aerial asset support to help guide skimming systems into the thickest concentrations of oil.

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 up¹ which makes it the most costly spill (despite not being the largest) in US history. 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.

1.7 Document organization

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

- Baseline and rule amendments (Chapter 2): Description and comparison of the baseline requirements in state and federal laws and rules, to the rule amendments.
- Likely costs of rule amendments (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 rule amendments (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 comments on the results.
- Least burdensome alternative analysis (Chapter 6): Analysis of considered alternatives to the rule amendments.

¹ Montreal Gazette; National Transportation Safety Board, 2012.

Chapter 2: Baseline and Rule Amendments

2.1 Introduction

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

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 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. In the case of the amendments to the Oil Spill Contingency Plans rule, the existing rule and existing federal requirements comprise the baseline.

2.2.1 Specific directives of the statute

The Washington State Legislature (see RCW 90.48.010) has declared that it is the public policy of the state of Washington *“to maintain the highest possible standards to insure the purity of all waters of the state consistent with public health and public enjoyment thereof, the propagation and protection of wild life, birds, game, fish and other aquatic life, and the industrial development of the state, and to that end require the use of all known available and reasonable methods by industries and others to prevent and control the pollution of the waters of the state of Washington. Consistent with this policy, the state of Washington will exercise its powers, as fully and as effectively as possible, to retain and secure high quality for all waters of the state.”*

In RCW 90.56.005, the Legislature declares further that *“water borne transportation as a source of supply for oil and hazardous substances poses special concern for the state of Washington.”* Additionally, the Legislature found *“that prevention is the best method to protect the unique and special marine environments in the state...the technology for containing and cleaning up a spill of oil or hazardous substances is at best only partially effective...and preventing spills is more protective of the environment and more cost-effective when all the response and damage costs associated with responding to a spill are considered. Therefore, the legislature finds that the primary objective of the state is to achieve a zero spills strategy to prevent any oil or hazardous substances from entering the waters of the state.”*

The Legislature also finds that:

- (b) Even with the best efforts, it is nearly impossible to remove all the oil that is spilled into the water, and average removal rates are only fourteen percent;*
- (c) Washington’s navigable waters are treasured environmental and economic resources that the state cannot afford to place at undue risk from an oil spill;*

(d) The state has a fundamental responsibility, as the trustee of the state's natural resources and the protector of public health and the environment to prevent the spill of oil; and

(e) In section 5002 of the federal oil pollution act of 1990, the United States congress found that many people believed that complacency on the part of industry and government was one of the contributing factors to the Exxon Valdez spill and, further, that one method to combat this complacency is to involve local citizens in the monitoring and oversight of oil spill plans. Congress also found that a mechanism should be established that fosters the long-term partnership of industry, government, and local communities in overseeing compliance with environmental concerns in the operation of crude oil terminals. Moreover, congress concluded that, in addition to Alaska, a program of citizen monitoring and oversight should be established in other major crude oil terminals in the United States because recent oil spills indicate that the safe transportation of oil is a national problem.

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...

(f) To provide broad powers of regulation to the department of ecology relating to spill prevention and response.

Authority to promulgate contingency plan rules is contained in chapters 88.46 RCW (vessels) and 90.56 RCW (facilities). RCW 90.56.040 grants authority to the department which is supplemental to and in no way reduces or otherwise modifies the powers granted to the department by other statutes. In carrying out the purposes of the statutes in the adoption of rules for contingency plans, Ecology is required, to the greatest extent practicable to implement this chapter in a matter consistent with federal law. See RCW 90.56.070 and 88.46.020.

Onshore and offshore facilities and covered vessels are required to have a contingency plan for the containment and cleanup of oil spills and for the protection of fisheries and wildlife, shellfish beds, natural resources, and public and private property from such spills. The department is mandated to adopt, and every five years revise, standards for the preparation of contingency plans.

RCW 88.46.060 states:

(1) Each covered vessel shall have a contingency plan for the containment and cleanup of oil spills from the covered vessel 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 [every five years] revise standards for the preparation of contingency plans ... (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.

Similarly, RCW 90.56.210 states:

(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... (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.

In addition, the 2004 Washington State Legislature (see RCW 90.56005(2), Laws of 2004, ch. 226, section 1(1)) adopted a “zero spill goal” finding that “...the primary objective of the state is to achieve a zero spills strategy to prevent any oil or hazardous substances from entering the waters of the state.”

2.2.2 E2SHB 1186

More recently, the Legislature directed Ecology to make further amendments to contingency planning requirements, in E2SHB 1186. The bill set new requirements for:

- Aerial surveillance capability: *“(1) The department shall evaluate and update planning standards for oil spill response equipment required under contingency plans required by this chapter, including aerial surveillance, in order to ensure access in the state to equipment that represents the best achievable protection to respond to a worst case spill and provide for continuous operation of oil spill response activities to the maximum extent practicable and without jeopardizing crew safety, as determined by the incident commander or the unified command.”*
- Five-year intervals for updating the rule: *“(2) The department shall by rule update the planning standards at five-year intervals to ensure the maintenance of best available protection over time. Rule updates to covered nontank vessels shall minimize potential impacts to discretionary cargo moved through the state.”*
- Large-scale multiple plan equipment deployment drills of tank vessels to determine the adequacy of the owner’s or operator’s compliance:
 - *“(1) The department is responsible for requiring joint large-scale, multiple plan equipment deployment drills of tank vessels to determine the adequacy of the owner’s or operator’s compliance with the contingency plan requirements of this chapter. The department must order at least one drill as outlined in this section every three years.”*
 - *“(2) Drills required under this section must focus on, at a minimum, the following: (a) The functional ability for multiple contingency plans to be simultaneously activated with the purpose of testing the ability for dedicated equipment and trained personnel cited in multiple contingency plans to be activated in a large scale spill; and (b) The operational readiness during both the first six hours of a spill and, at the department’s discretion, over multiple operational periods of response.”*
 - *“(3) Drills required under this section may be incorporated into other drill requirements under this chapter to avoid increasing the number of drills and equipment deployments otherwise required.”*

- *“(4) Each successful drill conducted under this section may be considered by the department as a drill of the underlying contingency plan and credit may be awarded to the plan holder accordingly.”*
- *“(5) The department shall, when practicable, coordinate with applicable federal agencies, the state of Oregon, and the province of British Columbia to establish a drill incident command and to help ensure that lessons learned from the drills are evaluated with the goal of improving the underlying contingency plans.”*
- *Vessels of opportunity: “By December 31, 2012, the department shall complete rule making for purposes of improving the effectiveness of the vessels of opportunity system to participate in spill response.”*
- *Process for accessing supplemental resources:*
 - *“(1) When submitting a contingency plan to the department under RCW 88.46.060, any umbrella plan holder that enrolls both tank vessels and covered vessels that are not tank vessels must, in addition to satisfying the other requirements of this chapter, specify: (a) The maximum worst case discharge volume from covered vessels that are not tank vessels to be covered by the umbrella plan holder’s contingency plan; and (b) The maximum worst case discharge volume from tank vessels to be covered by the umbrella plan holder’s contingency plan.”*
 - *“(2) Any owner or operator of a covered vessel having a worst case discharge volume that exceeds the maximum volume covered by an approved umbrella plan holder may enroll with the umbrella plan holder if the owner or operator of the covered vessel maintains an agreement with another entity to provide supplemental equipment sufficient to meet the requirements of this chapter.”*
 - *“(3) The department must approve an umbrella plan holder that covers vessels having a worst case discharge volume that exceeds the maximum volume if: (a) The department determines that the umbrella plan holder should be approved for a lower discharge volume; (b) The vessel owner or operator provides documentation to the umbrella plan holder authorizing the umbrella plan holder to activate additional resources sufficient to meet the worst case discharge volume of the vessel; and (c) The department has previously approved a plan that provides access to the same resources identified in (3)(b) to meet the requirements of this chapter for worst case discharge volumes equal to or greater than the worst case discharge volumes equal to or greater than the worst case discharge volume of the vessel.”*
 - *“(4) The umbrella plan holder must describe in the plan how the activation of additional resources will be implemented and provide the department the ability to review and inspect any documentation that the umbrella plan holder relies on to enroll a vessel with a worst case discharge that exceeds the plan’s maximum volume.”*
- *Planning to manage oil spill claims: “(1) Any person owning oil or having control over oil that enters the waters of the state in violation of RCW 90.56.320 shall be strictly liable, without regard to fault, for the damages to persons or property, public or private, caused by such entry. (2) Damages for which responsible parties are liable under this section include loss of income, net revenue, the*

means of producing income or revenue, or an economic benefit resulting from an injury to or loss of real or personal property or natural resources.”

2.2.3 Federal requirements

The federal component of the baseline consists of US Coast Guard (USCG) requirements for planning, training, contracting, and drills. For specific discussion of these requirements, see Appendix A. In some cases, USCG requirements were the same as the rule amendments, while in other cases they were not as specific, or not as stringent.

2.3 Analytic scope

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

It is often the case that there is a legal requirement prompting a rule amendment (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 rule amendments outline specific requirements for aerial surveillance, while the authorizing law more broadly requires appropriate aerial surveillance.

Where possible, Ecology evaluated the costs and benefits of the rule amendments separate from the requirements set by rule. In cases where the rule amendments’ 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 rule amendments. For a full listing of elements of the rule amendments, their comparison to the applicable baseline, and indication of whether their costs and benefits were evaluated, see Appendix A.

2.4.1 Aerial surveillance

The amendments include new requirements for aerial surveillance. The baseline for comparison is a combination of existing state aerial planning standards (WAC 173-182-320) and US Coast Guard (USCG) Tracking Resources Vessel Response Plan Regulations (33 CFR 155.1050).

The aerial surveillance requirement is phased in over 48 months (for acquisition or contract), but Ecology chose to maintain straightforward and more conservative estimates by assuming, in cost calculations, that the assets are acquired immediately.

2.4.1.1 Timing of aerial asset arrival

Baseline:

- State requires the aerial asset (fixed wing or helicopter) to arrive within six hours of the spill. This asset is not required to be under contract, but is identified in the plan.
- USCG requires the aerial asset to arrive prior to other assets.

Amendments:

- The contracted fixed wing or helicopter aerial asset must arrive within six hours.
- The contracted best achievable technology (BAT) asset must arrive within 12 hours.

Impacts evaluated:

- The covered vessel owner or operator benefits from separability of the BAT from the aircraft, allowing the BAT to arrive six hours later and prospectively from larger distances.
- This impact is evaluated as a cost mitigation.

2.4.1.2 Best achievable technology

Baseline:

- State does not specifically require a mounted forward-looking infrared (FLIR) camera or other specific BAT.
- Federal regulation does not specifically require a mounted FLIR camera or other specific BAT.

Amendment:

- The covered vessel owner or operator must have or contract a FLIR camera and additional BAT capability. The FLIR does not need to be mounted on the aerial asset or description that the handheld asset is appropriate for use from an aerial platform should be provided.

Impacts evaluated:

- The covered vessel owner or operator incurs the cost of buying or contracting a FLIR and additional BAT capability.
- This impact is evaluated as a cost of the rule amendments.
- This impact is evaluated as supporting a benefit of the rule amendments.

2.4.1.3 Communication with incident command post (ICP)

Baseline:

- State does not require specific communication capability with the incident command post (ICP).
- Federal regulation does not specifically require a communication capability with ICP.

Amendment:

- The covered vessel owner or operator must have communication capability to the command post.

Impacts evaluated:

- This impact is evaluated as a cost of the rule amendments.
- This impact is evaluated as supporting a benefit of the rule amendments.

2.4.1.4 Data transmission

Baseline:

- State does not require specific (almost instantaneous) data transmission.
- Federal regulation does not specify use of data transmission.

Amendment:

- Ability to provide usable data to the command post required. The transmission does not need to be “real time”, or “near real time”, but should integrate into the ICP structure.

Impacts evaluated:

- The covered vessel owner or operator incurs the cost of ensuring data collected using the FLIR and BAT assets can be integrated into the response.
- This impact is evaluated as part of the cost of communication with the ICP (see 2.4.1.3, above).
- This impact is evaluated as supporting a benefit of the rule amendments.

2.4.2 Planning standards

The amendments include new requirements for planning standards. The baseline for comparison is a combination of existing state planning standards and USCG requirements.

2.4.2.1 Four-hour planning standard

Baseline:

- State does not require a four-hour planning standard (WAC 173-182-370, 380, 395, 405, 415).
- USCG requirements do not include a four-hour planning standard.

Amendment:

- Plan holders must plan for one unit of high-speed oil containment per planning standard area (including one resident to Neah Bay; others may be shared across planning standard areas).

Impacts evaluated:

- The plan holder incurs the cost of meeting the four-hour planning standard requirement for an owned or shared high-speed oil containment system. There could be between one and five of these.
- This impact is evaluated as a cost of the rule amendments.
- This impact is evaluated as supporting a benefit of the rule amendments.

2.4.2.2 Dedicated on-water storage

Baseline:

- State has no requirement for dedicated on-water oil storage (WAC 173-182-335).
- USCG requirements do not include dedicated on-water oil storage.

Amendment:

- Plan holders must have access to 25 percent dedicated on-water oil storage for the 24-hour planning standard.

Impacts evaluated:

- The plan holder incurs the cost of having 25 percent dedicated on-water oil storage.
- This impact is evaluated as a cost of the rule amendments.
- This impact is evaluated as supporting a benefit of the rule amendments.

2.4.2.3 Technical manual

Baseline:

- State rule has established criteria to evaluate recovery and storage equipment (WAC 173-182-345).
- USCG requires description of systems, but does not use them to evaluate individual plan holders and with less detail than in technical manuals.

Amendment:

- Formalized systems description requirement into technical manuals applicable for three planning standard areas through hour 48: Neah Bay Staging Area, Cathlamet Staging Area, and San Juan Staging Area.

Impacts evaluated:

- The plan holder incurs the cost of creating and updating technical manual elements describing response systems in three planning standard areas.
- This impact is evaluated as a cost of the rule amendments.
- This impact is evaluated as supporting a benefit of the rule amendments.

2.4.2.4 Shoreline cleanup

Baseline:

- State does not specify number of shoreline cleanup workers, trailers, passive cleanup equipment, or supervisors. (WAC 173-182-520).
- USCG does not explicitly specify the number of shoreline cleanup workers, trailers, passive cleanup equipment, or supervisors (33 CFR Part 155 Appendix B; 33 CFR 154 Appendix C).

Amendments:

- Capable of accessing 100 shoreline cleanup workers within 24 hours of notification.
- One shoreline cleanup mobile cache capable of supporting 80-100 cleanup workers for 3 to 5 days, and available within 24 hours of notification.
- Nine miles of passive cleanup equipment
- Supervisors in a ratio of 1:10, and available within 24 hours of spill notification.
- Required plan updates with process to obtain additional logistical resources to support shoreline clean up for 14 days.

Impacts evaluated:

- Plan holders incur the cost of acquiring or contracting the prescribed shoreline cleanup resources.

- This impact is evaluated as a cost of the rule amendments.
- This impact is evaluated as supporting a benefit of the rule amendments.

2.4.3 Vessels of opportunity

The amendments include new requirements for non-dedicated vessels and vessels of opportunity (VOO). The baseline for comparison is a combination of existing state non-dedicated work boat and operator standards (WAC 173-182-315) and USCG requirements.

2.4.3.1 Mobilization

Baseline:

- State requires non-dedicated vessels to make effort to mobilize within 48 hours of being called on.
- USCG has no requirement for request and mobilization of non-dedicated vessels.

Amendment:

- Contracted VOO must agree if willing and available to make best efforts to mobilize within 12 hours of being called on.

Impacts evaluated:

- Ecology does not believe this requirement has a separable cost from other VOO costs.

2.4.3.2 Vessel vetting

Baseline:

- State has no requirement for vetting VOO or non-dedicated vessels.
- USCG has no requirement for request and mobilization of non-dedicated vessels.

Amendments:

- Ecology will maintain a database of potential VOO (including; vessel and detailed crew information).
- Ecology requires further vetting of VOO by plan holders.

Impacts evaluated:

- Ecology incurs the cost of hosting a VOO database.
- VOO vessels incur the costs of signing up.
- Plan holders incur the costs of vetting VOO suitability.
- These impacts are evaluated as costs of the rule amendments.
- These impacts are evaluated as supporting a benefit of the rule amendments.

2.4.3.3 Numbers of VOO

Baseline:

- State has requirements for non-dedicated vessels to support a worst-case spill response, without requiring a specific number to be available under the plan.
- USCG has no requirements for non-dedicated vessels or VOO.

Amendments:

- Each of six VOO regions must have a minimum number of VOO contracted.
 - Region 1 must have 18 vessels.²
 - Regions 2 – 5 must have a minimum number of 12 vessels each.³
 - Region 6 must have 6 vessels.⁴

Impacts evaluated:

- Plan holders incur the costs of contracting with, and training, VOO in minimum numbers.
- This impact is evaluated as a cost of the rule amendments.
- This impact is evaluated as supporting a benefit of the rule amendments.

2.4.3.4 VOO training

Baseline:

- State does not specify training requirements for non-dedicated vessels.
- USCG does not specify training requirements for non-dedicated vessels.

Amendment:

- VOO must have annual on-water training to support tactics, Hazardous Waste Operations and Emergency Response (HAZWOPER), and basic Incident Command System knowledge.

Impacts evaluated:

- Plan holders incur the cost of VOO training time and operations.
- This impact is evaluated as a cost of the rule amendments.
- This impact is evaluated as supporting a benefit of the rule amendments.

2.4.3.5 VOO contracting

Baseline:

- State does not specify contracting requirements for non-dedicated vessels.
- USCG does not specify contracting requirements for non-dedicated vessels.

Amendment:

- Plan holders must contract for the minimum number of VOO in each region.

Impacts evaluated:

- Plan holders incur the costs of contracting with the minimum number of VOO in each region.
- This impact is evaluated as a cost of the rule amendments.
- This impact is evaluated as supporting a benefit of the rule amendments.

2.4.3.6 VOO drills

Baseline:

- State does not specify drill requirements for non-dedicated vessels.

² VOO Region 1 is Cape Flattery / Strait of Juan de Fuca.

³ VOO Region 2 is San Juan Islands / North Puget Sound; Region 3 is South Puget Sound and Central Puget Sound; Region 4 is Columbia River; Region 5 is Admiralty Inlet, Hood Canal, and North Puget Sound.

⁴ VOO Region 6 is Grays Harbor.

- USCG has no requirement for non-dedicated vessel drills.

Amendments:

- Contracted VOOs must have one deployment drill every three years.
- Contracted VOOs must have simulated deployment in tabletop drills.

Impacts evaluated:

- Plan holders incur the costs of deployment drills and tabletop drills for VOO.
- This impact is evaluated as a cost of the rule amendments.
- This impact is evaluated as supporting a benefit of the rule amendments.

2.4.4 USCG/Ecology General Plan Holders – Umbrella Plan Resources

The amendments include new requirements for general umbrella plan holders. The baseline for comparison is a combination of existing state procedures and standards, and USCG requirements.

2.4.4.1 Worst-case discharge volume

Baseline:

- State requires umbrella plan holders to identify worst-case discharge volume for the largest vessel in each port.
- USCG requirements are not applicable to state umbrella plans.

Amendment:

- Umbrella plan holders must identify worst-case discharge volume in each port for both tank and non-tank members.

Impacts evaluated:

- Umbrella plan holders incur the costs of identifying two types of worst-case discharge volume in each port, instead of just one.
- This impact is evaluated as a cost of the rule amendments.
- This impact is evaluated as supporting a benefit of the rule amendments.

2.4.4.2 Spill management team

Baseline:

- Umbrella plans are not required to identify enrolled vessel spill management teams in the plan. The umbrella plan is required to be capable of standing up the umbrella plan spill management team for 24 hours before transitioning to the enrolled vessel team.
- USCG requirements are not applicable to state umbrella plans. All vessels that enroll with state umbrella plans must identify their spill management teams to support the USCG requirements.

Amendment:

- Umbrella plan holders must identify each enrolled member spill management team and maintain this information in an up-to-date list available through the contingency plan.

Impacts evaluated:

- Umbrella plan holders incur the cost of identifying a spill management team for all enrolled members.
- This impact is evaluated as a cost of the rule amendments.
- This impact is evaluated as supporting a benefit of the rule amendments.

2.4.4.3 Direct contracting for all resources

Baseline:

- State requires direct access for all resources to meet the worst-case discharge through a direct contract, letter of intent, mutual aid agreement or other approved means.
- USCG requirements are not applicable to state umbrella plans. However all vessels with a federal VRP are required to have direct access to all resources to meet the worst-case discharge through a direct contract, letter of intent, mutual aid agreement or other approved means

Amendments:

- Direct contracting is not explicitly required, but access to supplemental resources (resources not under direct contract) to meet the planning standards must be verifiable through the plan.
- Umbrella plan holders must describe the process for activation of the supplemental resources.

Impacts evaluated:

- Umbrella plan holders incur the cost of describing the process for activation of supplemental resources, approval to direct the resources, and documentation of the agreements.
- This impact is evaluated as a cost of the rule amendments.
- This impact is evaluated as supporting a benefit of the rule amendments.

2.4.5 Primary response contractor requirements

The amendments include new requirements for primary response contractor (PRC) requirements. The baseline for comparison is a combination of existing state PRC requirements (WAC 173-182-800 and 810), and USCG requirements (OSRO, 33 CFR Part 154 Appendix C and 33 CFR part 155 Appendix B).

2.4.5.1 Staff identification and training

Baseline:

- State does not specifically require identification and training of staff expected to be deployed for oil spills or to meet planning standards but equipment and personnel readiness was verified once the application was approved and through equipment inspections.
- USCG Oil Spill Removal Organization (ORSO) determines training needed and periodic training on equipment. OSHA training is called out. Records are maintained for three years.

Amendment:

- The training requirement is enhanced to more closely match drill expectations including; safety, environmental conditions assessment, containment and recovery, boom deployment and GRPs.

Impacts evaluated:

- PRCs incur the costs of additional training.
- This impact is evaluated as a cost of the rule amendments.
- This impact is evaluated as supporting a benefit of the rule amendments.

2.4.5.2 Listing response equipment

Baseline:

- State does not require in rule listing response equipment on the Western Response Resource List (WRRL) or equivalent. Use of the WRRL is included in the PRC application as an option for listing and maintaining information about the PRC equipment.
- USCG does not require listing response equipment on the WRRL.

Amendment:

- PRCs are required to list response equipment on the WRRL or equivalent listing.

Impacts evaluated:

- PRCs incur the costs of listing, maintaining and updating response equipment information on the WRRL or equivalent quarterly.
- This impact is evaluated as a cost of the rule amendments.
- This impact is evaluated as supporting a benefit of the rule amendments.

2.4.5.3 PRC application information

Baseline:

- State requires PRCs, as applicable to their capability, to list personnel (full time, part time, supervisors), communication assets, training information, dedicated response equipment, non-dedicated work boats, alternative response technology capability, wildlife rescue and rehabilitation equipment, shoreline clean up equipment, consumables, agreements for fixed storage, and any other resources (aircraft, remote sensing, removal equipment, and non-dedicated on-water storage in the PRC application, but not in law or rule.
- USCG approves Oil Spill Removal Organizations OSRO (the federal version of PRCs) and requires them to attest to and include a list of personnel, retain training records, and describe in-situ burn, dispersants, and bioremediants, but does not require listing communication assets or VOO (or non-dedicated vessels). The USCG approves OSRO's for specific capabilities; operating environments, volumes of recovery, and captain of the port zones.

Amendment:

- PRCs are required in rule, as applicable to their capability, to list personnel (full time, part time, supervisors), communication assets, training information, dedicated response equipment, non-dedicated work boats, alternative response technology capability, wildlife rescue and rehabilitation equipment, shoreline clean up equipment, consumables, agreements for fixed storage, and any other

resources (aircraft, remote sensing, removal equipment, and non-dedicated on-water storage

Impacts evaluated:

- PRCs incur the costs of listing and submitting the above elements as applicable to their capability.
- This impact is evaluated as a cost of the rule amendments.
- This impact is evaluated as supporting a benefit of the rule amendments.

2.4.6 Drill requirements

The amendments include new drill requirements. The baseline for comparison is a combination of existing state drill requirements (WAC 173-182-710), and USCG requirements.

2.4.6.1 Large-scale multi-plan holder deployment drills

Baseline:

- State does not require a large-scale multi-plan holder deployment drill. Each plan holder is required to conduct two deployment drills annually. These deployments are designed and evaluated with Ecology to meet the criteria found in the Ecology Drill Evaluation Checklist.
- USCG does not in law, design, plan or evaluate deployment drills. Plan holders self certify and maintain documentation of the deployment drills required for five years.

Amendment:

- All tank plan holders and umbrella plan holders must participate in one large-scale multi-plan holder deployment drill per triennial cycle. The deployment may include the following objectives; demonstration of
 - Dedicated and non-dedicated equipment.
 - VOO.
 - Multiple simultaneous tactics.
 - Verification of operational readiness over multiple operation periods.
 - Deployment of contracted aerial assets.
- Plan holders may combine this with other drills, and across multiple plans.
- The multi-plan holder deployment drill is not an additional deployment drill required by the plan. It takes the place of one of the six deployment drills required in a triennial cycle.

Impacts evaluated:

- Plan holders may incur additional costs of the demonstration of multiple objectives, but these costs are spread over all participating plan holders and this is not an additional deployment drill.
- This impact is evaluated as a cost of the rule amendments.
- This impact is evaluated as supporting a benefit of the rule amendments.

2.4.6.2 VOO deployment drills

Baseline:

- State does not require a VOO deployment drill.
- USCG does not require VOO deployment drills.

Amendment:

- Tier I VOO must participate in at least one deployment drill per triennial cycle. Plan holders may combine this with other drills, and across multiple plan holders who operate or transit the VOO region and have a contract for the VOO.

Impacts Evaluated:

- Plan holders incur the costs of training Tier I VOO in a deployment drill once per triennial cycle.
- This impact is evaluated as a cost of the rule amendments.
- This impact is evaluated as supporting a benefit of the rule amendments.

2.4.6.3 Wildlife rehabilitation and response equipment deployment drills

Baseline:

- State does not in rule require a wildlife rehabilitation and response equipment deployment drill.
- USCG does not require wildlife rehabilitation and response equipment deployment drills.

Amendment:

- One wildlife equipment deployment drill is required per triennial cycle. Plan holders may combine this with other already required drills, and across multiple plans.

Impacts evaluated:

- Ecology does not believe this requirement represents additional costs, as the drill can be combined with existing drills.
- This drill type is already being conducted as part of the Ecology drill evaluation checklist.
- All plan holders currently comply with this requirement.
- Ecology can call for a drill of any equipment available under a plan holders plan.

2.4.6.4 Emergency response towing vessel drills

Baseline:

- State does not in rule require an Emergency Response Towing Vessel (ERTV) drill.
- State law requires an ERTV deployment drill.
- Drill credit can be given for an actual deployment of the ERTV.
- USCG does not require an ERTV at Neah Bay as part of the Federal Response Plan. Tug capabilities are called out in the salvage requirements.

Amendment:

- One ERTV drill is required per triennial cycle.
- Plan holders may receive credit for an actual deployment of the ERTV.

- Plan holders may combine this with other drills, and across multiple plans.

Impacts evaluated:

- Ecology does not believe this requirement represents additional costs, as the drill can be combined with existing drills, is currently identified in vessel plan holder plans, and in existing law.

Chapter 3: Likely Costs of the Rule Amendments

3.1 Introduction

Ecology estimated the expected costs associated with the rule amendments, as compared to the baseline as described in section 2.2 of this document, and with impacts specified in section 2.4 of this document. The baseline is the regulatory circumstances in the absence of the rule amendments. The costs analyzed here are associated with specific individual amendments falling into the following categories.

- Aerial surveillance
- Planning standards
- Vessels of opportunity
- Umbrella plan resources
- Drill requirements

3.2 Affected entities

Different types of covered vessels, facilities, and entities are affected differently by the rule. Most covered vessels use vessel umbrella plans (two approved non-profit organizations that hold contingency plans for 1,500 vessels in the Columbia River, and 1353 vessels along the outer coast, in the Strait of Juan de Fuca, and in Puget Sound).

- Maritime Fire and Safety Association.
- Washington State Maritime Cooperative

There are 6 individual vessel contingency plan holders:

- Polar Tankers
- Alaska Tanker Co.
- BP Shipping Limited
- Harley Marine Services Inc.
- SeaRiver
- Tidewater Environmental Services Barge Lines INC (covers facilities and barges)

There are 22 additional facility contingency plans (for individual firms or subsidiaries).

- BP Cherry Point Refinery
- BP West Coast Products
- Chevron Pipe Line Co.
- Phillips66 Yellowstone Pipeline
- Phillips66-Ferndale Refinery
- Phillips66 Terminals (Tacoma/Renton)
- Imperium Grays Harbor LLC
- Kinder Morgan Liquids Terminal Harbor Island
- Navy Region Northwest
- NuStar Energy LP (Tacoma/Vancouver Terminals)
- NuStar Energy LP-Pasco Pipeline
- Olympic Pipe Line Co.

- Paramount Petroleum Richmond Beach Asphalt Terminal
- Port Townsend Paper
- Maxum Petroleum Incorporated
- Shell Oil Products US- Seattle Distribution Terminal
- Shell Puget Sound Refinery
- Targa Sound Terminal LLC
- Tesoro Anacortes Refinery
- Tesoro Port Angeles/Vancouver Terminals
- Kinder Morgan Transmountain Pipeline (Puget Sound) LCC
- U.S. Oil & Refining Co. and McCord Pipeline Co.

Plan holders in any of these cases (whether they are vessels, facilities, or umbrella plans) contract with 12 state-approved primary response contractors (PRCs) to plan, prepare for, and execute required actions.

- Able Clean-up Technologies, Inc.
- Big Sky Industrial
- Clean Harbors Environmental
- Clean Rivers Cooperative, Inc.
- Cowlitz Clean Sweep Service, Inc.
- Global Diving and Salvage
- Islands' Oil Spill Association
- Marine Spill Response Corp.
- Matrix Service, Inc.
- National Response Corporation-Environment Services (NRC-ES)
- NWFF Environmental Inc.
- Tidewater Environmental Services

Ecology multiplied unit costs as calculated in the next section by the expected quantities of compliance behavior with the rules, as based on:

- 1,500 vessels in Columbia River umbrella plan (1 umbrella plan).
- 1,353 vessels in outer coast, Strait of Juan de Fuca, and Puget Sound (1 umbrella plan).
- 22 independent approved facility contingency plans.
- 6 independent approved vessel contingency plans.
- 12 PRCs.

All costs are prospectively passed on to plan holders, directly from the contingency plans, or indirectly initiating as PRC costs. Ecology assessed, in addition to the individual business impacts addressed in the SBEIS (Ecology publication #12-08-015), the likely impacts to discretionary cargo through Washington ports. This assessment is available as part of the rulemaking file.

3.3 Expected costs with asset sharing

Ecology assessed – quantitatively or qualitatively – the costs associated with the following elements of the rule amendments.

- Aerial surveillance
 - Timing of aerial asset arrival
 - Contracted aerial asset at 6 hours
 - Contracted aerial asset with BAT at 12 hours
 - Best achievable technology
 - Communication with ICP
- Planning standards
 - Four-hour planning standard
 - Dedicated on-water storage
 - Technical manual
 - Shoreline cleanup
- Vessels of Opportunity
 - Mobilization
 - Vessel vetting
 - Numbers of VOO
 - VOO training
 - VOO contracting
 - VOO drills
- Umbrella plan resources
 - Worst-case discharge volume
 - Spill management team
 - Supplemental resources
- PRC requirements
 - Listing response equipment
 - Listing personnel, training, response assets (communication, equipment, alternative response capability, non-dedicated fixed storage), and VOO
- Drill requirements

Ecology assumed, in this section, that entities would reduce compliance costs by sharing assets to the maximum extent practicable. For an analysis that assumes that sharing would not occur for the Columbia River umbrella plan, see section 3.5.

3.3.1 Aerial surveillance

3.3.1.1 Timing of aerial asset arrival

Ecology is imposing a new requirement specifying that the BAT aerial asset must be able to arrive within 12 hours. This requirement impacts both the likely ownership of the aerial asset, and the location of the asset. Ecology assumed that plan holders would share one non-dedicated aerial asset, but purchase the suite of BAT equipment (including FLIR and another resource) outright (with all support equipment and personnel access) to avoid instances where the asset is in use. (For example, appropriate aerial assets with FLIR capabilities are owned by law enforcement

agencies in the state, but law-enforcement work (such as search and rescue) would be the priority for that equipment if plan holders only contracted for the equipment.) The cost of asset ownership is discussed below, in section 3.3.1.2.

The rule amendments also allow for the aerial asset to be contracted. If plan holders contract the asset (or share contracting) costs may be smaller than estimated in this analysis.

3.3.1.2 Best achievable technology

Ecology estimated the cost of the required mounted FLIR with BAT capability, using a range of costs. The low-end cost of \$300,000 represented the FLIR itself, while the high-end cost of \$700,000 represented potential associated supplemental equipment and capability. Ecology assumed that plan holders would take advantage of cost-sharing, and share one BAT aerial technology suite. This cost is, therefore, a one-time cost.

Conservatively assuming this cost was incurred immediately, this is equivalent to a present-value cost of \$300 thousand to \$700 thousand.

3.3.1.3 Communication with ICP and data transmission

The costs of capability of the aerial surveillance to communicate with the ICP, and to transmit data in real time are included in the range of costs specified above for the FLIR with BAT capability (3.3.1.2). These costs can vary with the degree of support capability, as well as with warranty purchases.

3.3.1.4 Additional spotting resources

Ecology estimated the cost of updating contingency plans to list additional spotting resources. Ecology conservatively assumed updating each of eight plans would take 4 hours each. Using a range of hourly wages of \$22 – \$125⁵, this represents a one-time cost of \$691 – \$4,000, with equivalent present-value if incurred immediately.

3.3.2 Planning standards

3.3.2.1 Four-hour planning standard

Ecology estimated the cost of meeting the four-hour planning standard, of one unit per planning standard area, as \$350 thousand to \$1.75 million. This cost reflects the range of possible sharing of one \$350 thousand asset, across five areas, to five individual assets. Conservatively assuming this one-time cost is incurred immediately, this represents an equivalent present-value cost.

3.3.2.2 Dedicated on-water storage

Ecology estimated the costs of dedicating 25 percent of on-water storage, rather than relying on non-dedicated assets available through letter of intent for up to 100 percent of storage requirements. Ecology assumed plan holders would purchase and share sufficient on-water storage to meet this requirement. The purchase of a barge for

⁵ US Bureau of Labor Statistics mean wages for production/planning/expediting staff, and public comment describing outside contractor rate for plan preparation.

these purposes was estimated to cost between \$250 thousand and \$1 million. This one-time cost incurred immediately represents an equivalent present-value.

A barge would also need to be pulled into dry dock for inspection and any necessary maintenance. Ecology estimated that a barge would require at least two days in dry dock, at a minimum, costing \$19,000. This quote falls in the range that Ecology used, of maintenance of five percent of the barge cost per year. This represents an annual cost of \$12,500 to \$50,000. The present-value of this cost is \$205 thousand to \$821 thousand.

While it is not part of the baseline, Ecology notes that all but one plan holder has access to at least 25 percent on-water storage. In reality, this will mitigate the costs of compliance with this requirement.

3.3.2.3 *Technical manual*

Vessel and umbrella plan holders are required to submit technical manuals that describe recovery and storage equipment as systems for the following planning standard areas (Neah Bay, San Juan Islands, Cathlamet) as applicable to the plan holder. Since plan holders contract PRCs for the equipment to meet these standards Ecology anticipates plan holders will share the costs of having their contracted PRC develop these technical manuals. Ecology assumed that technical manuals will take 40 hours to produce for each PRC.

Ecology assumed each vessel and umbrella plan holder would need to spend 80 hours developing systems descriptions and creating the technical manual. Using a range of hourly wages of \$22 – \$125⁶, this represents a one-time cost of \$1,727- \$10,000 per planning standard area, with equivalent present-value if incurred immediately.

3.3.2.4 *Shoreline cleanup*

Ecology estimated the cost of contracting 100 shoreline cleanup workers and supervisors, based on five hours of contracting employee time, including updating documentation and plans. Using a range of hourly wages of \$22 – \$125⁷, this represents a one-time cost of \$867 – \$4,000, with equivalent present value if incurred immediately. Ecology assumed that shoreline cleanup workers would be pulled from a semi-skilled pool of available workers listed by a PRC, and that access to the PRC's contact lists was free if using other services.

Ecology does not believe the explicit requirement for a shoreline cleanup mobile storage cache represents an additional cost, since at least two PRCs each maintain one such mobile cache which is capable at the level described in the rule and is already accessible to plan holders who maintain these PRCs under contract.

⁶ US Bureau of Labor Statistics mean wages for production/planning/expediting staff, and public comment describing outside contractor rate for plan preparation.

⁷ US Bureau of Labor Statistics mean wages for production/planning/expediting staff, and public comment describing outside contractor rate for plan preparation.

Ecology estimated the cost of nine miles of passive cleanup equipment, based on nine miles of snare boom (“pom poms”), as a one-time cost of \$55 thousand. Ecology assumed this equipment would also be shared across plan holders.

Meeting the requirement of updating plans with procedures for obtaining additional shoreline cleanup resources requires updating contingency plans. Ecology assumed this would take a plan holder four hours, at an hourly wage of \$22 – \$125⁸, this represents a one-time cost of \$691 – \$5,000, with equivalent present value if incurred immediately.

3.3.3 Vessels of opportunity

3.3.3.1 Mobilization

Ecology assumed the costs of having VOO available to arrive within 12 hours (versus 48) were included in the costs of VOO locations and training – prepared and well located VOO making best effort to arrive are more likely to meet the deployment timing standard.

3.3.3.2 Vessel vetting

Ecology estimated the cost of initial setup and subscription of a database for self-submitted VOO descriptions as \$27 thousand. If incurred immediately, this cost represents an equivalent present-value cost. Ongoing subscription to the database is expected to cost \$18,500 each year. This is equivalent to a 20-year present value of \$304 thousand.⁹

Plan holders would also need to vet each vessel. Ecology assumed a fishing vessel administrator or equivalent (with an hourly wage of \$42 to \$52¹⁰) would need to take two work days (16 hours) per each of 72 vessels to gather vessel information, make contact, and inspect the vessel. Conservatively assuming these costs were incurred immediately, this reflects a present-value cost of \$49 thousand to \$59 thousand.

3.3.3.3 Numbers of VOO

Ecology reflected the number of VOO required in the particular cost estimates for training and drills, below. The particular minimum requirements, unless they are contracted and mobilized for training and drills, incur no additional cost. See sections 3.3.3.4 and 3.3.3.6 for associated costs.

3.3.3.4 VOO training

Ecology estimated the costs of annual on-water training for VOO. Ecology used a range of daily costs from non-dedicated support vessels in Alaska, of \$3 thousand to

⁸ US Bureau of Labor Statistics mean wages for production/planning/expediting staff, and public comment describing outside contractor rate for plan preparation.

⁹ Present values account for present and future flows of value, while also accounting for inflation and a subjective social rate of discounting the future. Ecology based discounting of future values on the risk-free rate of return on US Treasury I-Bonds, averaged over the last decade.

¹⁰ US Bureau of Labor Statistics mean wages for transportation, storage, and distribution engineers, and all manager average wage.

\$3.4 thousand per vessel. Ecology conservatively assumed all of the minimum number of 72 vessels (across all regions) would participate, and that costs would be shared across plan holders. This represents a 20-year present-value cost of \$3.6 million to \$4.0 million.

3.3.3.5 VOO contracting

Ecology included the costs of contracting time and effort in overall vessel vetting costs, above, in section 3.3.3.2.

3.3.3.6 VOO drills

Ecology estimated the costs of a VOO deployment drill every three years, based on one day of vessel time for each of the minimum 72 vessels required state-wide. Using a range of daily costs from non-dedicated support vessel in Alaska, of \$3 thousand to \$3.4 thousand per vessel, and the assumption that costs would be shared across plan holders, Ecology estimated a per-drill cost of \$235 thousand to \$264 thousand. This reflects a 20-year present-value cost of \$1.1 million to \$1.3 million.

3.3.4 Umbrella plan resources

3.3.4.1 Worst-case discharge volume

Ecology estimated the cost of identifying worst-case discharge volume for two types of vessel for each port (rather than one per port) based on 2 hours of additional time spent per plan holder. Using a range of hourly wages of \$22 – \$125¹¹, this represents a one-time cost of \$86 to \$500 across the two umbrella plans, with equivalent present value if incurred immediately.

3.3.4.2 Spill management team

Ecology estimated the cost of identifying a spill management team for all enrolled members of the umbrella plans, based 2 hours of additional time spent per plan holder, and on a range of hourly wages of \$22 – \$125¹². This represents a one-time cost of \$86 to \$500 across the two umbrella plans, with equivalent present value if incurred immediately.

3.3.4.3 Supplemental Resources

The authorizing statute formalized the process for umbrella plan holders to allow vessels to enroll under their plans provided they had access to sufficient supplemental resources to meet the planning standards. Previously, under the baseline, umbrella plan holders directly contracted for all resources to meet the worst-case discharge covered by the plan. Currently both umbrella plan holders describe the supplemental resources structure in their plans.

¹¹ US Bureau of Labor Statistics mean wages for production/planning/expediting staff, and public comment describing outside contractor rate for plan preparation.

¹² US Bureau of Labor Statistics mean wages for production/planning/expediting staff, and public comment describing outside contractor rate for plan preparation.

Ecology estimated only the additional cost of further describing the process to activate supplemental resources in their plan based on the formal rule language.

Ecology assumed this would take forty hours. Using a range of hourly wages of \$22 – \$125¹³, this represents a one-time cost of \$1,727 to \$10,000 across the two umbrella plans, with equivalent present value if incurred immediately. While not part of the baseline, existing plans are already structured to accommodate supplemental resources.

3.3.5 PRC requirements

3.3.5.1 Identification and training of PRC deployed staff

Ecology estimated the costs of identifying and providing enhanced training for all PRC staff to be deployed. Ecology could not confidently separate out PRC staff that would be deployed, and so used the maximum number of employees across all PRCs of 2,882. The resulting cost estimate is a likely overestimation of actual costs, as not all employees would be deployed, or be deployed in Washington State.

For identification and listing, Ecology used a range of hourly wages of \$22 – \$125¹⁴, estimating between \$1 thousand and \$6 thousand in administrative/clerical costs to identify and list response equipment, in present value.

Ecology used a cost of each employee based on the rate for various types of staff deployment charged by a PRC, of \$55 to \$175 per hour. This gave a present-value cost (of the one-time payment) of \$159 thousand to \$504 thousand. This cost is **HIGHLY CONSERVATIVE** and includes costs for identifying and training **ALL** staff in this industry in Washington State. The likely real cost will be below this range.

3.3.5.2 Listing response equipment

Ecology estimated the cost of listing all response equipment on the Western Response Resource List (WRRL) based on an assumed four hours of work done for \$22 – \$125¹⁵ per hour. This translates to a present-value cost for 12 approved PRCs of \$1 thousand to \$6 thousand. All PRCs currently voluntarily list their equipment on the WRRL. The new rule requires them to evaluate the WRRL quarterly and ensure that it is maintained up to date.

¹³ US Bureau of Labor Statistics mean wages for production/planning/expediting staff, and public comment describing outside contractor rate for plan preparation.

¹⁴ US Bureau of Labor Statistics mean wages for production/planning/expediting staff, and public comment describing outside contractor rate for plan preparation.

¹⁵ US Bureau of Labor Statistics mean wages for production/planning/expediting staff, and public comment describing outside contractor rate for plan preparation.

3.3.5.3 PRC requirement to listing personnel, training, assets, VOO, and other capabilities in the PRC application

Ecology estimated the costs of listing personnel, training VOO, and other capabilities in their PRC application. This information is now officially required by the rule.

Ecology compared this requirement to the baseline, which does not have this requirement, but this cost may alternatively be zero, as this information is already required on the published PRC application form (ECY form no. 070-216).

Ecology assumed this work would take eight hours, at \$22 – \$125¹⁶ per hour. This translates to a present-value cost of \$2 thousand to \$3.8 thousand.

3.3.6 Drill requirements

Drill requirements in the rule amendments do not represent new drills, except in the case of VOO. This cost is described above, in section 3.3.3.6. Otherwise, drills including, for example, the aerial BAT asset, or wildlife deployment, may be combined with other (already existing) trainings. In the interest of cost-minimization, Ecology believes that plan holders will coordinate and cooperate to the largest extent possible.

3.4 Cost summary with asset sharing

Table 4: Present-Value Costs of the Amendments (asset sharing)

Present-Value Costs of the Rule Amendments		
Cost	Low Present Value	High Present Value
FLIR plus additional BAT capability	\$300,000	\$700,000
Additional spotting resources	\$691	\$4,000
Four-hour planning standard	\$350,000	\$1,750,000
Dedicated on-water storage	\$250,000	\$1,000,000
Dedicated on-water storage maintenance	\$205,327	\$821,308
Describe storage and recovery as systems	\$1,727	\$10,000
100 shore cleanup workers and supervisors	\$867	\$5,000
9 miles passive cleanup equipment	\$55,000	\$55,000
Plan update with process to obtain additional resources	\$691	\$4,000
VOO database (Ecology cost)	\$27,000	\$27,000
VOO database ongoing costs (Ecology cost)	\$303,884	\$303,884
Vetting VOO	\$48,649	\$59,489
VOO training	\$3,566,975	\$3,997,472
VOO deployment drill	\$1,117,595	\$1,252,477
Identify worst-case discharge volume	\$86	\$500
Identify spill management team for all enrolled members	\$86	\$500
Describe process for activating supplemental resources	\$1,727	\$10,000
Identify and list staff to be deployed	\$1,036	\$6,000

¹⁶ US Bureau of Labor Statistics mean wages for production/planning/expediting staff, and public comment describing outside contractor rate for plan preparation.

Train staff to be deployed	\$158,510	\$504,350
List response equipment on WRRL (or equivalent)	\$1,036	\$6,000
List all staff, training, VOO, communications assets, remedial substances in contracts	\$2,073	\$12,000
TOTAL 20-YEAR PRESENT-VALUE COST	\$6,392,961	\$10,528,981

These costs assume that plan holders will cooperate, and that PRCs will cooperate, to reduce the costs of compliance. In many cases, plan holders and PRCs are already compliant with many of these requirements (e.g., on-water storage), but Ecology did not account for that pre-compliance as part of the baseline.

3.5 Expected costs with no Columbia River umbrella plan sharing

Ecology assessed – quantitatively or qualitatively – the costs associated with the following elements of the rule amendments.

- Aerial surveillance
 - Timing of aerial asset arrival
 - Contracted aerial asset at 6 hours
 - Contracted aerial asset with BAT at 12 hours
 - Best achievable technology
 - Communication with ICP
- Planning standards
 - Four-hour planning standard
 - Dedicated on-water storage
 - Technical manual
 - Shoreline cleanup
- Vessels of Opportunity
 - Mobilization
 - Vessel vetting
 - Numbers of VOO
 - VOO training
 - VOO contracting
 - VOO drills
- Umbrella plan resources
 - Worst-case discharge volume
 - Spill management team
 - Supplemental resources
- PRC requirements
 - Listing response equipment
 - Listing personnel, training, response assets (communication, equipment, alternative response capability, non-dedicated fixed storage), and VOO
- Drill requirements

Ecology assumed, in this section, that entities would reduce compliance costs by sharing assets to the maximum extent practicable, except for the Columbia River umbrella plan. For an analysis that assumes that sharing would occur across all regions, see section 3.3, above.

3.5.1 Aerial surveillance

3.5.1.1 Timing of aerial asset arrival

Ecology is imposing a new requirement specifying that the BAT aerial asset must be able to arrive within 12 hours. This requirement impacts both the likely ownership of the aerial asset, and the location of the asset. Ecology assumed that plan holders would share one aerial asset, except for the Columbia River umbrella plan, which would have its own, but purchase one outright (with all support equipment and personnel access) to avoid instances where the asset is in use. (For example, appropriate aerial assets are owned by law enforcement agencies in the state, but law-enforcement work would be the priority for that equipment if plan holders only contracted for the equipment.) The cost of asset ownership is discussed below, in section 3.5.1.2.

The rule amendments also allow for the aerial asset to be contracted. If plan holders contract the asset (or share contracting) costs may be smaller than estimated in this analysis.

3.5.1.2 Best achievable technology

Ecology estimated the cost of the required mounted FLIR with BAT capability, using a range of costs. The low-end cost of \$600,000 represented the FLIR itself, while the high-end cost of \$1,400,000 represented the associated supplemental equipment and capability, including day and night operation. Ecology assumed that plan holders would take advantage of cost-sharing, and share one BAT aerial technology, except for the Columbia River umbrella plan, which would have its own. This cost is, therefore, a one-time cost.

Conservatively assuming this cost was incurred immediately, this is equivalent to a present-value cost of \$600 thousand to \$1.4 million.

3.5.1.3 Communication with ICP and data transmission

The costs of capability of the aerial surveillance to communicate with the ICP, and to transmit data in real time are included in the range of costs specified above for the FLIR with BAT capability (3.5.1.2). These costs can vary with the degree of support capability, as well as with warranty purchases.

3.5.1.4 Additional spotting resources

Ecology estimated the cost of updating contingency plans to list additional spotting resources. Ecology conservatively assumed updating each of eight plans would take 4 hours each. Using a range of hourly wages of \$22 – \$125¹⁷, this represents a one-time cost of \$691 – \$4,000, with equivalent present value if incurred immediately.

¹⁷ US Bureau of Labor Statistics mean wages for production/planning/expediting staff, and public comment describing outside contractor rate for plan preparation.

3.5.2 Planning standards

3.5.2.1 Four-hour planning standard

Ecology estimated the cost of meeting the four-hour planning standard, of one unit per planning standard area, as \$350 thousand to \$1.75 million. This cost reflects the range of possible sharing of two \$350 thousand assets (one on the Columbia River, and the other for remaining areas), to five individual assets. Conservatively assuming this one-time cost is incurred immediately, this represents an equivalent present-value cost. This cost would not be impacted by the non-sharing scenario for the Columbia River umbrella plan.

3.5.2.2 Dedicated on-water storage

Ecology estimated the costs of dedicating 25 percent of on-water storage, rather than contracting for up to 100 percent. Ecology assumed plan holders would purchase and share sufficient on-water storage to meet this requirement, except for the Columbia River umbrella plan. The purchase of a barge for these purposes was estimated to cost between \$500 thousand and \$1 million. This one-time cost incurred immediately represents an equivalent present value.

A barge would also need to be pulled into dry dock for inspection and any necessary maintenance. Ecology estimated that a barge would require at least two days in dry dock, at a minimum, costing \$19,000. This quote falls in the range that Ecology used, of maintenance of five percent of the barge cost per year. This represents an annual cost of \$25,000 to \$50,000. The present value of this cost is \$411 thousand to \$821 thousand. This requirement would not be impacted by the non-sharing scenario for the Columbia River umbrella plan.

While it is not part of the baseline, Ecology notes that all but one plan holder has access to at least 25 percent on-water storage. In reality, this will mitigate the costs of compliance with this requirement.

3.5.2.3 Technical manual

Vessel and umbrella plan holders are required to submit technical manuals that describe recovery and storage equipment as systems for the following planning standard areas (Neah Bay, San Juan Islands, Cathlamet) as applicable to the plan holder. Since plan holders contract PRCs for the equipment to meet these standards, Ecology anticipates plan holders will share the costs between 2 and 5 technical manuals (one on the Columbia River, and up to four in the rest of the state). Ecology assumed that technical manuals will take 40 hours to produce for each PRC.

Ecology assumed each vessel and umbrella plan holder would need to spend 80 hours developing systems descriptions and creating the technical manual. Using a range of

hourly wages of \$22 – \$125¹⁸, this represents a one-time cost of \$3,454- \$50,000 per planning standard area, with equivalent present value if incurred immediately.

3.5.2.4 Shoreline cleanup

Ecology estimated the cost of contracting 100 shoreline cleanup workers and supervisors, based on five hours of contracting employee time, including updating documentation and plans. Using a range of hourly wages of \$22 – \$125¹⁹, this represents a one-time cost of \$867 – \$5,000, (for employees, plus supervisors) with equivalent present value if incurred immediately. Ecology assumed that shoreline cleanup workers would be pulled from a semi-skilled pool of available workers listed by a PRC, and that access to the PRC’s contact lists was free if using other services.

Ecology does not believe the explicit requirement for a cleanup trailer represents an additional cost, since at least two PRCs each maintain one such trailer which is capable at the level described in the rule and is already accessible to plan holders who maintain these PRCs under contract.

Ecology estimated the cost of nine miles of passive cleanup equipment, based on nine miles of snare boom (“pom poms”), as a one-time cost of \$110 thousand. Ecology assumed this equipment would also be shared across plan holders, except for the Columbia River umbrella plan.

Meeting the requirement of updating plans with procedures for obtaining additional shoreline cleanup resources requires updating contingency plans. Ecology assumed this would take a plan holder four hours, at an hourly wage of \$22 – \$125²⁰, this represents a one-time cost of \$691 – \$4,000, with equivalent present value if incurred immediately.

3.5.3 Vessels of opportunity

3.5.3.1 Mobilization

Ecology assumed the costs of having VOO available to arrive within 12 hours (versus 48) were included in the costs of VOO locations and training – prepared and well located VOO making best effort to arrive are more likely to meet the deployment timing standard.

3.5.3.2 Vessel vetting

Ecology estimated the cost of initial setup and subscription of a database for self-submitted VOO descriptions as \$27 thousand. If incurred immediately, this cost

¹⁸ US Bureau of Labor Statistics mean wages for production/planning/expediting staff, and public comment describing outside contractor rate for plan preparation.

¹⁹ US Bureau of Labor Statistics mean wages for production/planning/expediting staff, and public comment describing outside contractor rate for plan preparation.

²⁰ US Bureau of Labor Statistics mean wages for production/planning/expediting staff, and public comment describing outside contractor rate for plan preparation.

represents an equivalent present-value cost. Ongoing subscription to the database is expected to cost \$18,500 each year. This is equivalent to a 20-year present value of \$304 thousand.

Plan holders would also need to vet each vessel. Ecology assumed a fishing vessel administrator or equivalent (with an hourly wage of \$42 to \$52²¹) would need to take two work days (16 hours) per each of 72 vessels to gather vessel information, make contact, and inspect the vessel. Conservatively assuming these costs were incurred immediately, this reflects a present-value cost of \$49 thousand to \$59 thousand.

3.5.3.3 Numbers of VOO

Ecology reflected the number of VOO required in the particular cost estimates for training and drills, below. The particular minimum requirements, unless they are contracted and mobilized for training and drills, incur no additional cost. See sections 3.5.3.4 and 3.5.3.6 for associated costs.

3.5.3.4 VOO training

Ecology estimated the costs of annual on-water training for VOO. Ecology used a range of daily costs from non-dedicated support vessels in Alaska, of \$3 thousand to \$3.4 thousand per vessel. Ecology conservatively assumed all of the minimum number of 72 vessels (across all regions) would participate, and that costs would be shared across plan holders, except for the Columbia River umbrella plan. This represents a 20-year present-value cost of \$3.6 million to \$4.0 million.

3.5.3.5 VOO contracting

Ecology included the costs of contracting time and effort in overall vessel vetting costs, above, in section 3.5.3.2.

3.5.3.6 VOO drills

Ecology estimated the costs of a VOO deployment drill every three years, based on one day of vessel time for each of the minimum 72 vessels required state-wide. Using a range of daily costs from non-dedicated support vessels in Alaska, of \$3 thousand to \$3.4 thousand per vessel, and the assumption that costs would be shared across plan holders regionally, at the minimum levels required for each region, Ecology estimated a per-drill cost of \$235 thousand to \$264 thousand. This reflects a 20-year present-value cost of \$1.1 million to \$1.3 million.

3.5.4 Umbrella plan resources

3.5.4.1 Worst-case discharge volume

Ecology estimated the cost of identifying worst-case discharge volume for two types of vessel for each port (rather than one per port) based on 2 hours of additional time spent per plan holder. Using a range of hourly wages of \$22 – \$125²², this represents

²¹ US Bureau of Labor Statistics mean wages for transportation, storage, and distribution engineers, and all manager average wage.

²² US Bureau of Labor Statistics mean wages for production/planning/expediting staff, and public comment describing outside contractor rate for plan preparation.

a one-time cost of \$86 to \$500 across the two umbrella plans, with equivalent present value if incurred immediately.

3.5.4.2 Spill management team

Ecology estimated the cost of identifying a spill management team for all enrolled members of the umbrella plans, based on 2 hours of additional time spent per plan holder, and on a range of hourly wages of \$22 – \$125²³. This represents a one-time cost of \$86 to \$500 across the two umbrella plans, with equivalent present value if incurred immediately.

3.5.4.3 Supplemental Resources

ESHB 1186 formalized the process for umbrella plan holders to allow vessels to enroll under their plans provided they had access to sufficient supplemental resources to meet the planning standards. Previously, under the baseline, umbrella plan holders directly contracted for all resources to meet the worst-case discharge covered by the plan. Currently both umbrella plan holders describe the supplemental resources structure in their plans.

Ecology estimated only the additional cost of further describing the process to activate supplemental resources in their plan based on the formal rule language.

Ecology assumed this would take forty hours. Using a range of hourly wages of \$22 – \$125²⁴, this represents a one-time cost of \$1,727 to \$10,000 across the two umbrella plans, with equivalent present value if incurred immediately. While not part of the baseline, existing plans are already structured to accommodate supplemental resources.

3.5.5 PRC requirements

3.5.5.1 Identification and training of PRC deployed staff

Ecology estimated the costs of identifying and providing enhanced training for all PRC staff to be deployed. Ecology could not confidently separate out PRC staff that would be deployed, and so used the maximum number of employees across all PRCs of 2,882. The resulting cost estimate is a likely overestimation of actual costs, as not all employees would be deployed, or be deployed in Washington State.

For identification and listing, Ecology used a range of hourly wages of \$22 – \$125²⁵, estimating between \$1 thousand and \$6 thousand in administrative/clerical costs to identify and list response equipment, in present value.

²³ US Bureau of Labor Statistics mean wages for production/planning/expediting staff, and public comment describing outside contractor rate for plan preparation.

²⁴ US Bureau of Labor Statistics mean wages for production/planning/expediting staff, and public comment describing outside contractor rate for plan preparation.

²⁵ US Bureau of Labor Statistics mean wages for production/planning/expediting staff, and public comment describing outside contractor rate for plan preparation.

Ecology used a cost of each employee based on the rate for various types of staff deployment charged by a PRC, of \$55 to \$175 per hour. This gave a present-value cost (of the one-time payment) of \$159 thousand to \$504 thousand. This cost is HIGHLY CONSERVATIVE and includes costs for identifying and training ALL staff in this industry in Washington State. The likely real cost will be below this range.

3.5.5.2 Listing response equipment

Ecology estimated the cost of listing all response equipment on the Western Response Resource List (WRRL) based on an assumed four hours of work done for \$22 – \$125²⁶ per hour. This translates to a present-value cost for 12 approved PRCs of \$1 thousand to \$6 thousand. All PRCs currently voluntarily list their equipment on the WRRL. The new rule requires them to evaluate the WRRL quarterly and ensure that it is maintained up to date.

3.5.5.3 PRC requirement to listing personnel, training, assets, VOO, and other capabilities in the PRC application

Ecology estimated the costs of listing personnel, training VOO, and other capabilities in their PRC application. This information is now officially required by the rule. Ecology compared this requirement to the baseline, which does not have this requirement, but this cost may alternatively be zero, as this information is already required on the published PRC application form (ECY form no. 070-216). Ecology assumed this work would take eight hours, at \$22 – \$125²⁷ per hour. This translates to a present-value cost of \$2 thousand to \$12 thousand.

3.5.6 Drill requirements

Drill requirements in the rule amendments do not represent new drills, except in the case of VOO. This cost is described above, in section 3.5.3.6. Otherwise, drills including, for example, the aerial BAT asset, or wildlife deployment, may be combined with other (already existing) trainings. In the interest of cost-minimization, Ecology believes that plan holders will coordinate and cooperate to the largest extent possible.

3.6 Cost summary with no Columbia River umbrella plan sharing

Table 5: Present-Value Costs of the Amendments (no Columbia River umbrella plan sharing)

Present-Value Costs of the Rule Amendments

²⁶ US Bureau of Labor Statistics mean wages for production/planning/expediting staff, and public comment describing outside contractor rate for plan preparation.

²⁷ US Bureau of Labor Statistics mean wages for production/planning/expediting staff, and public comment describing outside contractor rate for plan preparation.

Cost	Low Present Value	High Present Value
FLIR plus additional BAT capability	\$600,000	\$1,400,000
Additional spotting resources	\$691	\$4,000
Four-hour planning standard	\$700,000	\$1,750,000
Dedicated on-water storage	\$500,000	\$1,000,000
Dedicated on-water storage maintenance	\$410,654	\$821,308
Describe storage and recovery as systems	\$3,454	\$50,000
100 shore cleanup workers and supervisors	\$867	\$5,000
9 miles passive cleanup equipment	\$110,000	\$110,000
Plan update with process to obtain additional resources	\$691	\$4,000
VOO database (Ecology cost)	\$27,000	\$27,000
VOO database ongoing costs (Ecology cost)	\$303,884	\$303,884
Vetting VOO	\$48,649	\$59,489
VOO training	\$3,566,975	\$3,997,472
VOO deployment drill	\$1,117,595	\$1,252,477
Identify worst-case discharge volume	\$86	\$500
Identify spill management team for all enrolled members	\$86	\$500
Describe process for activating supplemental resources	\$1,727	\$10,000
Identify and list staff to be deployed	\$1,036	\$6,000
Train staff to be deployed	\$158,510	\$504,350
List response equipment on WRRL (or equivalent)	\$1,036	\$6,000
List all staff, training, VOO, communications assets, remedial substances in contracts	\$2,073	\$12,000
TOTAL 20-YEAR PRESENT-VALUE COST	\$7,205,016	\$11,323,981

These costs assume that plan holders will cooperate, and that PRCs will cooperate, to reduce the costs of compliance. In many cases, plan holders and PRCs are already compliant with many of these requirements (e.g., on-water storage), but Ecology did not account for that pre-compliance as part of the baseline.

Chapter 4: Likely Benefits of 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 two effects. First, the immediate cost of on-water cleanup rises because of the broader pre-staging of equipment and people. Second, the rapid response removes more oil on the water, which reduces the costs of shoreline cleanup, socio-economic damages, penalties, and long term natural resource damages.

Ecology estimated a range of possible benefits resulting from the rule amendments. The elements of the rule amendments discussed as resulting in costs in Chapter 3 all support faster response to spills, better training and cleanup capability, and more resources (e.g., through VOO). These elements support an overall benefit of avoiding some of the damages of an oil spill.

In this chapter, Ecology describes its estimation of the costs associated with different types of spills in Washington State, and the reductions in those costs that could be supported by the rule amendments.

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

- FLIR at 12 hours distance.
- Communication capability from the aerial asset.
- Data transmission.
- Four-hour planning standard one high-speed oil containment unit minimum in five of the existing planning standard areas.
- 25 percent dedicated on-water storage.
- Technical manual requirement to describe the response systems applicable to three planning standard areas: Neah Bay Staging Area, Cathlamet Staging Area, and San Juan Staging Area.
- 100 shoreline cleanup workers.
- One shoreline cleanup trailer.
- Nine miles of passive cleanup equipment.
- Shoreline cleanup supervisors.
- Process for additional resources.
- VOO best efforts to mobilize within 12 hours.
- Database of VOO.
- Vetted VOO.
- Trained VOO.
- 72 VOO minimum total in all VOO regions.
- VOO deployment drills.

- Planning for WCD for tank and nontank vessels.
- Spill management plan for all enrolled members.
- Verifiable umbrella contracting.
- Umbrella process for activating supplemental resources.
- All PRC equipment listed on WRRL.
- Formalized PRC requirements for listing of personnel, training, assets, etc.
- VOO drills.
- Special attention to potentially sinking oils.

4.2 Costs of spills in Washington

Ecology estimated the quantifiable cost of various spills in Washington State, based on modeling results for various spill scenarios.²⁸ Ecology used estimated costs for spills in five regions:

- Strait of Juan de Fuca
- San Juan Islands
- Outer Coast
- Lower Columbia River
- Upper Columbia River

Ecology used estimated costs across spills of various sizes and types of oil, depending on location appropriateness:

- 25,000 barrels (bbl) of bunker C oil
- 250,000 bbl of crude oil
- 65,000 bbl of diesel

These combined into seven overall scenarios. For each scenario, using variations in shoreline impact and location within each region, Ecology sourced costs for four degrees of severity of a spill:

- National significance
- Regional significance with federal involvement
- Regional significance with state involvement
- Small regional spill.

Ecology estimated the following quantifiable losses associated with spills in Washington, associated with losses to:

- Vessel delays
- Business interest losses
- Lost port wages
- Port business savings
- Marina oiling
- Shellfish population impacts

²⁸ Environmental Research Consulting (2005). Socioeconomic Cost Modeling for Washington State Oil Spill Scenarios. Washington Department of Ecology contract number C040018.

- Shellfish closures
- Fish population impacts
- Commercial fishing income loss
- Commercial fishing boat damage
- Commercial fishing loss on tribal lands (including waters)
- Subsistence fishing health impact
- State parks loss of use
- State parks loss of income
- Recreational boating lost use
- Recreational fishing lost use
- Recreational fishing lost spending
- Wildlife viewing lost spending
- Wildlife hunting lost spending
- Hunting losses from injured waterfowl
- Lost tourist spending and income

Table 6: Average Total Cost of Spills by Region

TOTAL COST AVERAGE	
Juan de Fuca	\$43,077,583
San Juans	\$187,952,000
Outer Coast	\$95,639,750
Lower Columbia	\$4,317,750
Upper Columbia	\$2,937,000
Washington State	\$333,924,083

This quantifiable value is over an order of magnitude larger than the likely costs of the rule.

These values do not account for the unique qualities of potentially sinking oils, in persistence and contamination. These values also do not include losses to non-pecuniary values, or business losses, such as:

- Tribal cultural values of fishing and shellfishing.
- Non-use values for birds, sea mammals, fish, and other wildlife, as well as water quality, coastlines, beaches.²⁹
- Endangered species values.
- Bequeathment values for future generations.
- Shareholder and public relations values.

²⁹ Oil spills – especially persistent spill impacts – impact the value of damaged property (and its business and paid recreation uses, as described above), but may also impact the non-spending value of using that property. These values are not necessarily reflected in payments made for recreation, as they might be enjoyed at home or at nearby beaches and waterways. Examples include enjoyment of waterfront property for sports, kayaking, tidepooling, aesthetics, relaxation, and perhaps just full use of one’s back yard. In order to regain these values in contaminated water and property, however, people could incur greater health risk instead.

To the degree the public is aware of their size, these quantifiable and qualitative values reflect also what the public would be willing to pay to avoid a typical spill. Oil spills are unacceptable to citizens. After the 1989 *Exxon Valdez* oil spill, comprehensive prevention and response laws were passed at the national and the state level. These laws targeted prevention and cleanup of spills and imposed liability for response and damages on the responsible parties (“spiller pays”). These included the Oil Pollution Control Act and the Washington state laws.³⁰ Similarly, the strong public response following the Deepwater Horizon spill in the Gulf of Mexico reflects the strong public aversion to oil spills. The public’s engagement on this issue is an indication of their willingness to pay to avoid oil spills and willingness to pay to clean up after a spill.

4.3 Expected benefits

4.3.1 Quantifiable benefits

Allowing for the total spill action durations allowed for in the modeling document, Ecology estimated the daily and hourly quantifiable losses for a single spill in each region, over the long-run until all spill response is complete. In this highly-conservative uniform-cost scenario, a reduction of eight days of cleanup (in each region over 20 years) would suffice to meet costs.

Table 7: Daily and Hourly Cost of Spills by Region (Distributed-Cost Scenario)

Spill Location	Daily Cost*	Hourly Cost*
Juan de Fuca	\$536,632	\$22,360
San Juans	\$505,247	\$21,052
Outer Coast	\$257,096	\$10,712
Lower Columbia	\$11,607	\$484
Upper Columbia	\$7,895	\$329
TOTAL	\$1,318,478	\$54,937

* Assumes at least one spill occurs in each of five regions (Juan de Fuca, San Juans, Outer Coast, Lower Columbia, and Upper Columbia) over the next 20 years, and this increased response efficiency occurs in each of them.

A more likely scenario is high up-front value losses (closed ports, delayed vessel traffic). Considering specifically those value losses associated with port closures, with the shorter time-spans used in the cost modeling document, Ecology calculated the daily and hourly losses to vessel owners/operators, business interests, and lost wages, below.

These avoided costs are based on average impacts for spills from worst-case discharges, with variance in the severity of the spill (degree of response necessary for cleanup: small; regional with WA-only support; regional with federal support; and federally run). For the

³⁰ 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.

full range of avoided cost impacts for spills modeled for each spill location, see Appendix B. In addition, Ecology did not model the impacts of the rule on very small spills, as the rule is intended to plan for worst case oil volumes, and each of Ecology’s modeled spills is as well (though it does vary in severity; see Environmental Research Consulting, 2005, for more information on spills modeling).

Table 8: Daily and Hourly Cost of Spills by Region (Frontloaded-Cost Scenario)

Spill Location	Daily Cost*	Hourly Cost*
Juan de Fuca	\$2,258,296	\$94,096
San Juans	\$681,833	\$28,410
Outer Coast	\$158,381	\$6,599
Lower Columbia	\$447,500	\$18,646
Upper Columbia	\$88,125	\$3,672
TOTAL	\$3,634,135	\$151,422

* Assumes at least one spill occurs in each of five regions (Juan de Fuca, San Juans, Outer Coast, Lower Columbia, and Upper Columbia) over the next 20 years, and this increased response efficiency occurs in each of them.

If the rule amendments result in a savings of three days of cleanup (in each region over 20 years), they will quantitatively meet cost estimates (for shared assets) sufficiently.³¹

These avoided costs are based on average impacts for spills from worst-case discharges, with variance in the severity of the spill (degree of response necessary for cleanup: small; regional with WA-only support; regional with federal support; and federally run). For the full range of avoided cost impacts for spills modeled for each spill location, see Appendix B. In addition, Ecology did not model the impacts of the rule on very small spills, as the rule is intended to plan for worst case oil volumes, and each of Ecology’s modeled spills is based on worst-case scenarios as well (though it does vary in severity; see Environmental Research Consulting, 2005, for more information on spills modeling).

There are, in addition, many unquantifiable benefits of reducing the duration of cleanup through better technology, equipment, preparedness, and participation. These are discussed in the following sections.

4.3.2 Avoided impacts to Tribal cultural values

Human interest is not concerned with material or financial interest alone, but with beauty and a flourishing natural world as well. Valuing nature means engaging with rich and diverse cultural processes - the meanings, values, knowledge and practices which shape nature. The question is how our moral values for the environment can be articulated and taken into account in making policy decisions.

³¹ For calculation of monthly and daily costs across regions, see Appendix B.

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.

Many of Washington's tribes are located near marine transportation corridors and have exposure to the risks of oil spills. The Makah Tribe, for example, has a *Usual and Accustomed* marine area located at the transportation crossroads of the Strait of Juan de Fuca and the Pacific Ocean. In the Makah language, tribal members refer to themselves as "People who live by the rocks and seagulls." Their cultural resources are placed at the entrance to a United States high volume port complex, Canada's largest port, and the world's third largest Naval complex, a National Marine Sanctuary, a National Park, a National Fish Hatchery and a National Wildlife Refuge. If a spill were to occur in this area it is difficult to assign a monetary value on the loss of the connection of the tribe to its culture, history, environment and heritage.

In another real world example, the Doe-kag-wats estuary, impacted by a moderately sized Foss Maritime oil spill at Point Wells in 2003, is known to the Suquamish tribal nation as the Place of Deer. Although Ecology was able to monetize the impact from the shellfish closures, the marsh and beach, the loss to the tribe, and the spiritual and cultural impact could not be properly compensated.³²

4.3.3 Passive-use and existence values

A 1992 contingent valuation study (a survey asking people directly what values they would assign various scenarios and results) of lost passive use values resulting from the Exxon Valdez oil spill has been updated several times since then.³³ Passive use values are the value people have for a place, thing, or activity without interacting with it in any significant way; for example, many people might value wolves, though they will never encounter one. The revisions and indexing put the passive use value for American citizens at \$11.0 billion in 2006 dollars. In the original study people were asked about their willingness to pay to prevent a single such spill expected to occur within the original spill area only once in the next 10 years. It is interesting to note that one of the problems confronting the economists who analyzed the Exxon Valdez spill was that some survey

³² This cultural and spiritual impact is affected further by existing legal rights. The right to usual and accustomed access would imply a price at which one would be willing to sell that right. In cases where the right would not be for sale at any price, the wedge between the values that can be estimated through typical methods and the actual appropriate value is large.

³³ Literature discussion on both passive use studies in: Evaluation of Probable Costs and Benefits of Proposed Oil Transfer Rules, Entrix, 2006.

respondents believed the spill was closer to Seattle.³⁴ Extrapolating this value to the removal of oil from likely spills in Washington, it would then have a value of \$110 million per 1% of all spills removed for a 10 year period. For a 3.2% reduction, this value would be over \$600 million in a 20 year period.

Passive use is clearly an important component of what is lost in a spill. Decision makers must first consider whether it is appropriate to extrapolate from willingness to pay for prevention, to willingness to pay for improved on-water recovery. The next decision is whether it is appropriate to extrapolate a willingness to pay beyond the borders of Washington for this cleanup. Alternatively, decision makers can look at the values from other settings and ask if they believe that citizens of Washington would be willing to continue to pay \$6 in extra costs per household in order to maintain the current level of response.

For example, 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.³⁵ 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 where this rule affects Puget Sound, the Strait of Juan de Fuca, the outer coast, and the Columbia. Estimated damages to shore birds for some of the scenarios Ecology studied for the adopted rules are far higher. 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.³⁶

It is likely that citizens outside of Washington value the shoreline. The marine shoreline of the state is about two thousand seven hundred miles long, a length greater than the combined coastlines of Oregon and California. There are roughly three million acres of submerged land and more than three hundred islands in our marine waters. People value tide pools, and unspoiled, undeveloped and rugged landscapes. During certain seasons, the shorelines host migratory bird populations of international significance. Puget Sound was one of the first estuaries to be designated by the Environmental Protection Agency as a Estuary of National Significance. The Columbia River is the largest river in volume flowing into the Pacific Ocean in the Western Hemisphere, and is the fourth largest by volume in North America. Like the Grand Canyon, people come from all over the country and world to see the Columbia, the surrounding habitat, environmental beauty, and economic wonder. With the importance of the Columbia to the Pacific Northwest, it has made its way into the culture of the nation.

³⁴ On Designing Constructed Market in Valuation Surveys, Robert Cameron Mitchell, Environmental and Resource Economics, June 2002, 22, pgs 279-321.

³⁵ 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.

³⁶ 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.

4.3.4 Avoided losses to endangered species

Although some cost-benefit methodologies allow us to attach a dollar figure to a particular individual bird, it is not as easy to attach a dollar value to the preservation of an entire endangered species, such as Puget Sound orcas, or preservation of endangered species habitat. A worst case spill has the potential to impact or eliminate endangered species that live in Washington in the water or on land.

Ecology illustratively estimated some of the values of Puget Sound orcas when it estimated the tourism income lost to spills in the San Juan Islands (see Appendix B, Table 10, for Wildlife Viewing Lost Income; \$52 million to \$70 million for the modeled spills) understanding that this is an subset of the total, unquantifiable value of the orca population. (Note that this value may include other wildlife viewing, though whale watching excursions are likely a large component.) Unquantifiable elements include cultural and tribal values, additional values of risking irrevocable damage (inability to renew a species after extinction), and the contribution of orcas to the set of attributes that makes the San Juan Islands an appealing place to live and boat.

4.3.5 Avoided losses to shareholders

In addition to payouts by the responsible party after a spill, there are 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 spill took place in the Columbia River, the Strait of Juan de Fuca, or Puget Sound, there is a potential for a similar reaction.³⁷ Ecology sees this reaction in much smaller spills than a 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.

4.3.5 Inclusion of potentially sinking oils

Up-to-date preparedness for new types of oils is crucial to avoiding unexpected value losses – through an inability to locate and track the oil, longer duration spills, and reduced ability to recover and remediate. By including a Group 5 (potentially sinking) oils planning standard, explicitly in the 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 trained personnel for this special case class of oils.

³⁷ One of the problems confronting the economists who analyzed the Exxon Valdez spill was that some survey respondents believed the spill was closer to Seattle. Pg 306. On Designing Constructed Market in Valuation Surveys, Robert Cameron Mitchell, *Environmental and Resource Economics*, June 2002, 22, pgs 279-321.

Chapter 5: Cost-Benefit Comparison and Conclusions

5.1 Likely costs of the rule

Table 9: Present-Value Costs of the Rule Amendments (asset sharing)

Present-Value Costs of the Rule Amendments		
Cost	Low Present Value	High Present Value
FLIR plus additional BAT capability	\$300,000	\$700,000
Additional spotting resources	\$691	\$5,000
Four-hour planning standard	\$350,000	\$1,750,000
Dedicated on-water storage	\$250,000	\$1,000,000
Dedicated on-water storage maintenance	\$205,327	\$821,308
Describe storage and recovery as systems	\$1,727	\$10,000
100 shore cleanup workers and supervisors	\$867	\$4,000
9 miles passive cleanup equipment	\$55,000	\$55,000
Plan update with process to obtain additional resources	\$691	\$4,000
VOO database (Ecology cost)	\$27,000	\$27,000
VOO database ongoing costs (Ecology cost)	\$303,884	\$303,884
Vetting VOO	\$48,649	\$59,489
VOO training	\$3,566,975	\$3,997,472
VOO deployment drill	\$1,117,595	\$1,252,477
Identify worst-case discharge volume	\$86	\$500
Identify spill management team for all enrolled members	\$86	\$500
Describe process for activating supplemental resources	\$1,727	\$10,000
Identify and list staff to be deployed	\$1,036	\$6,000
Train staff to be deployed	\$158,510	\$504,350
List response equipment on WRRL (or equivalent)	\$1,036	\$6,000
List all staff, training, VOO, communications assets, remedial substances in contracts	\$2,073	\$3,840
TOTAL 20-YEAR PRESENT-VALUE COST	\$6,392,961	\$10,528,981

Table 10: Present-Value Costs of the Amendments (no Columbia River umbrella plan sharing)

Present-Value Costs of the Rule Amendments		
Cost	Low Present Value	High Present Value
FLIR plus additional BAT capability	\$600,000	\$1,400,000
Additional spotting resources	\$691	\$4,000
Four-hour planning standard	\$350,000	\$1,750,000

Dedicated on-water storage	\$700,000	\$1,000,000
Dedicated on-water storage maintenance	\$410,654	\$821,308
Describe storage and recovery as systems	\$3,454	\$50,000
100 shore cleanup workers and supervisors	\$867	\$5,000
9 miles passive cleanup equipment	\$110,000	\$110,000
Plan update with process to obtain additional resources	\$691	\$4,000
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Vetting VOO	\$48,649	\$59,489
VOO training	\$3,566,975	\$3,997,472
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Train staff to be deployed	\$158,510	\$504,350
List response equipment on WRRL (or equivalent)	\$1,036	\$6,000
List all staff, training, VOO, communications assets, remedial substances in contracts	\$2,073	\$12,000
TOTAL 20-YEAR PRESENT-VALUE COST	\$7,205,016	\$11,323,981

5.2 Likely benefits of the rule

Table 11: Benefits of the Rule Amendments

Benefits of the Rule Amendments (per day of reduced spill response required)		
Benefit	Low Value per Day* (per hour)	High Value per Day* (per hour)
Avoided damages per day of reduced cleanup	\$1,318,478 (\$54,937)	\$3,634,135 (\$151,422)
Avoided damages to tribal cultural values	Qualitative – See Chapter 4	
Avoided losses to passive-use and existence values	Qualitative – See Chapter 4	
Avoided losses to endangered species	Qualitative – See Chapter 4	
Avoided losses to shareholders	Qualitative – See Chapter 4	
Preparedness for potentially sinking oils	Qualitative – See Chapter 4	

* Assumes at least one spill occurs in each of five regions (Juan de Fuca, San Juans, Outer Coast, Lower Columbia, and Upper Columbia) over the next 20 years, and this increased response efficiency occurs in each of them.

5.3 Conclusion

After evaluating the likely costs and benefits of the rule, Ecology believes that the likely qualitative and quantitative benefits of the rule 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. Many of the requirements generating these costs and benefits are based on lessons learned from spills in the Gulf of Mexico and San Francisco, and so have demonstrated capacity to be beneficial. In the case of reduced sharing of assets across regions, Ecology expect the additional resources in the state to also increase response quality and timing, while increasing costs somewhat.

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 under (b) and (c) of this subsection, 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 stated under (a) of this subsection.” In other words, Ecology is required to determine that the contents of the 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 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 rule amendments were the least burdensome.

The authorizing law is E2SHB 1186, amending the governing statutes governing chapter 173-182 WAC,³⁸ Oil Spill Contingency Plan Rule. Oil spill contingency planning is also regulated by the USCG.

6.2 Compliance dates

Ecology considered rule amendments with more compliance dates, or retaining the existing rule. These alternatives impose greater burden in terms of the number of compliance dates – and thereby the complexity of compliance and timing – than the rule amendments.

6.3 Supplemental resources

The rule amendments continue to allow more vessels to enroll in umbrella plans instead of submitting and maintaining their own plans. This element of the rule amendments reduces burden on those required to comply with it.

6.4 Group 5 Oils planning standard

Ecology considered writing its own requirements for Group Five (potentially sinking) oil response capability. Instead, Ecology included the federal standards for such oils, with a defined time to have appropriate resources on scene (12 hours). This time limit is shorter than the 24 hours allowed under Environmental Protection Agency (EPA), and 24 hours under the United States Coast Guard (USCG), but Ecology and shareholders believe the longer

³⁸ Amending RCW 88.46.060, 88.46.100, 90.48.366, and 90.56.370; reenacting and amending RCW 88.46.010; adding new sections to chapter 88.46 RCW; creating a new section; prescribing penalties; and providing an expiration date.

standard would not be adequately protective of Washington State's waters. Members of the rule advisory committee supported an even shorter time limit, around 4-6 hours.

6.5 Vessels of opportunity database

Ecology considered requiring plan holders to create their own VOO database(s). The costs of outreach and vetting of VOO faced by plan holders is reduced by Ecology's choice to develop and maintain the database of willing vessels. Ecology chose to centralize the task of maintaining the database to take advantage of centralization and economies of scale. In addition, plan holders do not incur search costs or outreach costs when determining which vessels are willing to participate in a VOO program.

6.6 Vessels of opportunity and multiple plans

Ecology considered requiring plan holders with multiple plans to contract different VOO for each plan. Ecology determined this was unnecessary to meet the goal of protectiveness, and instead allowed for multiple plan holders to contract with the same VOO for each plan. This allows plan holders to share the costs of contracting and training VOO. It is noted that in the formal public comment period comments were received requesting additional VOO regions/smaller VOO regions, larger numbers of minimum VOO requirements, and no sharing of VOO.

6.7 Flexibility in cooperation and coordination

Ecology considered requiring plan holders using VOO to coordinate VOO training. Ecology determined that this requirement was unnecessarily burdensome to meet the goal of protectiveness. Ecology expects that, under the rule amendments, plan holders will cooperate and coordinate VOO actions to the degree they deem appropriate, given internal business operations and decisions. While this will still likely result in plan holders cooperating to share these costs, the flexibility reduces the likelihood of regulation creating unnecessary additional burden in cases where cooperation may not be the preferred business action.

6.8 Minimum numbers of VOO on the Columbia River and in Grays Harbor

Ecology reduced the number of VOO on the Columbia River to 12 VOO (for the Lower Columbia River), from the previously considered 18. Ecology also decreased the minimum number of contracted VOO required for the Grays Harbor VOO region to 6 from the previously considered 12. Ecology determined that based on the absence of any VOO program in those areas the lower number would be protective and allow plan holders sufficient time to build a program for those VOO regions.

6.9 Training intervals

Ecology considered (on the recommendation of rule advisory committee members) requiring two or three annual deployment drills for VOO. Ecology determined that this level of full

deployment was not necessary to meet the goals of protectiveness, and chose instead to require annual on-water training (to annually refresh skills) and one deployment drill every three years (to test those skills), to reduce burden while retaining protectiveness.

6.10 Aerial surveillance asset and timing

Ecology considered requiring two aerial assets with FLIR, but reduced the requirement to one asset without FLIR available within 6 hours of notification, and one aerial asset with FLIR available within 12 hours of notification. The rule allows the resources to be separable (and arrive in different time limits) to reduce burden on those required to comply. Additionally, the 12 hour timeframe for the aerial asset with FLIR allows plan holders to contract existing aerial assets from outside of Washington State.

Ecology also originally proposed specific prescriptive requirements for the aerial asset. As a result of the public comment process, Ecology determined that it could be less burdensome in the specificity of these requirements, without reducing their effectiveness. The final rule was adjusted to reflect this change.

6.11 Aerial observer training requirements

Ecology considered writing its own different, more stringent standards for aerial observer training. Ecology chose, instead, to align aerial observer training requirements with the USCG standard. The USCG currently provides a one-day free training on aerial surveillance that plan holders and PRCs could attend to meet the standard as written.

6.12 Technical manual planning

Ecology considered requiring the technical manual to cover all areas that a vessel transits or operates, as well as in-situ burn, dispersants, shoreline, and other tactical operations. Instead, the rule amendments have a lesser requirement: The technical manual must cover only the recovery and storage tactics for vessels that transit or operate the Neah Bay, Cathlamet, and San Juan Islands planning standard areas through hour 48. The rule is less burdensome because it reduces the areas covered, as well as reducing the topics covered.

6.13 Shoreline cleanup standard

The existing rule requires shoreline cleanup standards that matched the USCG standards. The rule amendments outline more clearly what initial 24-hour capability vessel and umbrella plan holders must plan for. This reduces uncertainty burden by specifying the requirements, but also places increased burden on those required to comply. However, Ecology determined these requirements were necessary to meet the goal of protectiveness of Washington waters, shorelines, and environment.

6.14 Shoreline type identification

Ecology considered requiring vessels to identify the shoreline types they can impact based on where they transit or operate. Instead, Ecology chose to reduce this shoreline-type burden by

allowing vessels to cite the Northwest Area Contingency Plan (NWACP), or other developed tools. This element has reduced burden because these tools and categories already exist, and vessels do not need to create them anew.

6.15 Dedicated storage

Ecology considered both the existing rule's lack of dedicated storage requirement, and high levels (percentages) of dedicated storage. Ecology determined that a 25 percent requirement for dedicated storage was necessary in some areas, for adequate protectiveness of Washington waters, but that the requirement was not necessary in every area at each hourly requirement.

6.16 Conclusion

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

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Appendix A: Comparison of Rule Amendments to Baseline Regulations

Comparison of Aerial Surveillance Planning Standards				
Content/Resource Capability	Current Aerial planning standards (WAC 173-182-320)	Aerial planning standards for covered vessels (WAC 173-182-321)	Change Generating Costs and/or Benefits?	USCG Aerial Oil Spill Tracking Resources Vessel Response Plan Regulations (33 CFR 155.1050)
BAT/BAP called out	No	yes	No	no
Could have arrived	6 hour	6 hours- for the fixed wing or helicopter and 8 hours for the BAT aerial asset	Yes	prior to other assets as required in the tiers
Contracted	No	yes or other approvable means	No	yes or other approved means
Total number of contracted resources prescribed	does not specify	two	No	sufficient numbers to support tactics
Trained aerial observer	does not specify	yes	No	yes
Access to trained personnel including training	No	yes	No	yes
Fixed wing or helicopter for operational mission	does not specify	yes one contracted operational asset	No	does not specify
Fixed wing or helicopter for planning mission	does not specify	yes one contracted planning asset available within 12 hours of notification	No	does not specify
Mounted FLIR plus additional BAT capability	no	yes	Yes	does not specify
Operations for at least 10 hours per day	Yes	yes	No	yes
Day and night operation	No	yes	Yes	does not specify

duration of response	72 hours	72 hours	No	72 hours
Communication with ICP	No	yes	Yes	does not specify
Tactics specified	No	yes	No	yes
Slick location & extent of oiling	No	yes	No	does not specify
Additional spotting resources	No	yes	No	yes
Could operate 50 nm offshore	No	no	No	yes
Near real time data transmission	No	No, data transmission does not need to be “near real time”	Yes	does not specify

Comparison of Planning Standards				
Vessel Planning Standards	Current WAC 173-182-370, 380, 395, 405, 415	Draft updates to WAC 173-182-370, 380, 395, 405, 415	Change Generating Costs and/or Benefits?	USCG Requirements (no planning requirement for equipment with these capabilities at 4 hours from notification)
Four Hour Planning standard	no requirement	1 unit per planning standard area	yes	no requirement
Vessel Storage Planning Standard	Current WAC 173-182-335	Draft updates to WAC 173-182-335	Change Generating Costs and/or Benefits?	USCG Requirements
Dedicated on-water storage	no requirement	plan holders must have 25% dedicated on-water storage for the 24 hour planning standard	yes	no requirement
Dispersant Planning Standard	Current WAC 173-182-325	Draft updates to WAC 173-182-325	Change Generating Costs and/or Benefits?	USCG Requirements

Operational support capability called out	Yes	clarified intent of observers and supporting equipment and operational decision making	no	consistent
Group 5 Oils	General Content WAC 173-182-230	Draft new WAC 173-182-324	Change Generating Costs and/or Benefits?	USCG Requirements
Plan for Group 5 oils	General statement to plan for a spill for all types of oils a plan holder deals with	Adopted the USCG Group V oil standard, resources to be available within 12 hours of notification	no	Consistent, resources to be available within 24 hours of notification
Technical Manual	Determining effectiveness of recovery systems WAC 173-182-345	New Requirement to Submit a Technical Manual WAC 173-182-349	Change Generating Costs and/or Benefits?	USCG Requirements
Describe recovery and storage equipment as systems	Criteria established to evaluate systems	Formalizes the systems requirement applicable to 3 planning standard areas. Neah Bay Staging Area, San Juan Islands Planning Standard Area, and Cathlamet Staging Area	yes	Describe the systems but not as stringent as the technical manual
Emergency Response Towing Vessel Requirement	no requirement in Rule, only in law	Draft New WAC 173-182-242	Change Generating Costs and/or Benefits?	USCG Requirements
Towing vessel staged in Neah Bay	plan holders have already contracted for access and updated plan	formalizes the requirement in Rule	no	no requirement
Shoreline Cleanup	Shoreline Cleanup Planning Standard WAC 173-182-520	New draft Covered Vessel Shoreline Cleanup Planning Standard WAC 173-182-522	Change Generating Costs and/or Benefits?	USCG Requirements 33 CFR Part 155 Appendix B, 33 CFR 154 Appendix C

Identify and ensure cleanup workers and resources evaluated using USCG standard	Adopted the USCG standard. Now applies to facilities only	no new standard applies	no	consistent
100 shoreline cleanup workers	none specified	yes	yes	none specified
1 shoreline cleanup trailer	none specified	yes	yes	none specified
9 miles of passive cleanup equipment	none specified	yes	yes	none specified
Supervisors	none specified	yes	yes	none specified
plan update with process to obtain additional resources	none specified	yes	yes	none specified

Comparison of Non-dedicated/Vessel of Opportunity Program Planning Standards				
Content/Resource Capability	Planning standard for Non-Dedicated Work Boats and operators WAC 173-182-315	Covered Vessel Planning Standard for Vessel of Opportunity Response Systems WAC 173-182-317	Change Generating Costs and/or Benefits?	USCG
Tactics Specified	yes used for GRP's enhanced skimming, skimming platforms and logistical support	yes Tier 1 VOO must be contracted and trained for support of on-water recovery, protection of sensitive areas, and logistical support with no more than 50% to be pre-trained exclusively for logistical support	Costs based on pre-training of VOO for specific tactics.	no requirement
Call out specified	48 hours	12 hours	yes	no requirement
Vessel Vetting	none specified	Data base established and hosted by Ecology, further vetting by plan holder to establish suitability of VOO	yes	no requirement

Numbers of VOO specified	support the worst case spill response	Region 1 -Cape Flattery/ Strait of Juan De Fuca 18 VOO; Region 2- San Juan Islands/North Puget Sound 12 VOO; Region 3 - South Puget Sound and Central Puget Sound 12 VOO; Region 4- Columbia River 12 VOO; Region 5- Admiralty Inlet, Hood Canal and North Puget Sound 12 VOO; Region 6- Grays Harbor 6 VOO	yes	no requirement
Training Specified	none specified	annual on-water training to support tactics VOO may support (recovery, protection or logistics), hazwoper and basic ICS	yes	no requirement
Contracts required	none specified	contracts for the number of VOO in each region	yes	no requirement
Drill requirements specified	none specified	1 deployment drill for each contracted VOO every 3 years and simulated deployment in tabletop drills	yes	no requirement

USCG/Ecology General Plan Holder Requirements

Vessel Notification Requirement	Current Notification and call-out procedures WAC 173-182-260	Vessel Notification Requirements for a Discharge or substantial Threat of Discharge WAC 173-182-262	Change Generating Costs and/or Benefits?	USCG Requirements 33 CFR 160
Notification of spill	yes required	yes	no	Required to notify of any spill
Notification of substantial threat	not specified	yes	no	Required to notify of any SOLAS and spill potential
Facility Notification Requirement	Notification and call-out procedures WAC 173-182-260	Notification requirements for spills to ground or containment at covered facilities WAC 173-182-264	Change Generating Costs and/or Benefits?	USCG Requirements/EPA Requirements
Notification of a spill	yes required	yes	no	yes
Notification of a spill to ground	yes required	yes	no	yes

Umbrella Plan Resources	Umbrella Plan planning standards	Requirements for Vessel Umbrella plans maintain agreements for supplemental equipment WAC 173-182-232	Change Generating Costs and/or Benefits?	USCG
Identify worst case discharge volume	For largest vessel in each port	In each port for tank and non-tank members	yes	not applicable
Identify spill management team	for first 24 hours	For all enrolled members	yes	not applicable
Require direct contract for all resource to meet the worst case discharge	Yes	Not required, but access must be verifiable. Describe the process for activation of the supplemental resources	yes	not applicable

Comparison of Primary Response Contractor Requirements				
Content	Current PRC Requirements WAC 173-182-800	New Updated PRC Requirements WAC 173-182-800	Change Generating Costs and/or Benefits?	USCG OSRO 33 CFR Part 154 appendix C, 33 CFR Part 155 Appendix B
Submit application	yes and use Ecology developed application	yes and use Ecology developed application	no	
Provide process for 24 hour per day contact for spill response	Yes	yes	no	
Commit to begin mobilization efforts immediately but no later than 1 hour from notification	Yes	yes	no	not specified
Maintain equipment in accordance with manufacturer specifications	yes. Maintain records for 5 years	yes. Maintain records for 5 years	no	attest to maintaining in accordance with manufacturer. Maintain records for 3 years

Identify and train staff expected to be deployed for oil spills or to meet planning standards	not specified	enhanced the training requirement to more closely match drill expectations	No (overlaps with overall VOO training requirement)	OSRO determines training needed and periodic training on equipment. OSHA training is called out. Records are maintained for 3 years
Assist plan holders in meeting plan requirements	for planning standards and drills	for planning standards, drills and production of the technical manual	yes	NPREP drill requirements apply to OSRO
List response equipment on WRRL or equivalent	not required	new requirement	yes	not required
Content	Content submittal and review of contractor applications WAC 173-182-810	Updated content submittal and review of contractor applications WAC 173-182-810	Change Generating Costs and/or Benefits?	USCG OSRO 33 CFR Part 154 appendix C, 33 CFR Part 155 Appendix B
List of all personnel, part time, full time, subcontracted. Include home base and roles	on the PRC application, but not specified in the rule	Formalized in the rule language	no	Attest to and include list
List all staff training including subcontractors and frequency of training	on the PRC application, but not specified in the rule	new requirement. Calls out specific training	yes	Records available upon inspection
List all communications assets	on the PRC application, but not specified in the rule	Formalized in the rule language	Yes	not required
Describe VOO if applicable	on the PRC application, but not specified in the rule	Formalized in the rule language	Yes	not required
Describe In-Situ Burn, dispersant and bioremediants	on the PRC application, but not specified in the rule	Formalized in the rule language	Yes	if applicable

Wildlife Rescue and Rehabilitation	on the PRC application, but not specified in the rule	Formalized in the rule language	Yes	if applicable
Shoreline cleanup	on the PRC application, but not specified in the rule	Formalized in the rule language	Yes	if applicable
Agreements for shoreside storage	on the PRC application, but not specified in the rule	Formalized in the rule language	Yes	not required
Agreements for aerial assets	on the PRC application, but not specified in the rule	Formalized in the rule language	Yes	if applicable
Detailed description of remote sensing capability	on the PRC application, but not specified in the rule	Formalized in the rule language	Yes	if applicable

Comparison of Drill Requirements				
Response Capabilities to be drilled	Current WAC 173-182-710	Draft updates to WAC 173-182-710	Change Generating Costs and/or Benefits?	USCG NPREP Requirements
<i>Total Number of Tabletop Drills Required for Vessel Plan Holders</i>	<i>3 Tabletop Drills per triennial cycle- 1 each year</i>	<i>3 Tabletop Drills per triennial cycle- 1 each year</i>	<i>no</i>	<i>3 Tabletop Drills per triennial cycle- 1 each year</i>
Spill Management Team Annual Tabletop	2 in each triennial cycle	2 in each triennial cycle	no	2 in each triennial cycle
Spill Management Team Worst Case Discharge Scenario Tabletop	1 in each triennial cycle at three year intervals	1 in each triennial cycle at three year intervals	no	1 in each triennial cycle at three year intervals
<i>Total Number of Tabletop Drills Required for Vessel Umbrella Plan Holders</i>	<i>3 Tabletop Drills per triennial cycle- 1 each year</i>	<i>3 Tabletop Drills per triennial cycle- 2 each year</i>	<i>no</i>	<i>not applicable</i>

Vessel Umbrella Plan Spill Management Team Worst Case Discharge Scenario Tabletop, with SMT transition to enrolled vessel team.	1 in each triennial cycle at three year intervals	1 in each triennial cycle at three year intervals	no	not applicable
<i>Total Deployment Drills Required</i>	<i>6 done two per year of the triennial cycle</i>	<i>6 done two per year of the triennial cycle</i>	<i>no</i>	<i>6 done two per year of the triennial cycle</i>
GRP Deployment	2 per triennial cycle	2 per triennial cycle	no	not specified
Pre-Booming Deployment	1 per triennial cycle	1 per triennial cycle	no	not specified
Large Scale Deployment		1 per triennial cycle	yes	not specified
VOO Deployment		1 per triennial cycle	yes	not specified
Wildlife Deployment Drill		1 per triennial cycle	yes	not specified
ERTV Deployment Drill		1 per triennial cycle	yes	not specified
Notification Drill	1 per triennial cycle	1 per triennial cycle	no	4 times per year
Safety Drills	1 per triennial cycle	1 per triennial cycle	no	not specified
Containment and Recovery Drills	in all operating environments	in all operating environments	no	all equipment types must be tested
Land Spill Drills	1 per triennial cycle	1 per triennial cycle	no	not applicable
Emergency shutdown procedure drills	1 per triennial cycle- - for all activities conducted	1 per triennial cycle- - for all activities conducted	no	4 times per year
Aerial surveillance deployment drills		1 per triennial cycle	yes	not specified
Unannounced Drills	As necessary	As necessary	no	As necessary

Appendix B: Inputs for Quantifiable Socioeconomic Daily Benefits of Reduced Cleanup Duration

This appendix summarizes the costs associated with various spills modeled for Washington State (Environmental Research Consulting, 2005). These values reflect the best available information for the modeling, but include some zero values where industries or activities (e.g., recreation) certainly have positive nonzero values. For example, national datasets used reflect fishing and recreation (including travel and spending) for marine fishing in Washington State, but not specifically to the Columbia River (versus other freshwater fishing). To maintain conservatively low benefits estimates, Ecology used these zero values. Actual losses associated with a spill would likely be higher than the values reported below.

In other cases, zero values below reflect a lack of comprehensive modeling data for a region. For example, tourist spending was modeled based on the five most-visited tourist areas in the state (these areas had the best data availability). These areas are not on the outer coast on the Columbia River, and so translate to zero tourism values reported in the tables. This does not mean actual tourism in these areas is worth nothing. Actual tourism values impacted by spills are larger than those reported in these tables. To maintain conservatively low benefits estimates, Ecology used these zero values.

Table 12: Losses associated with spills in the Strait of Juan de Fuca, for a crude spill, a bunker C spill, and a diesel spill (in thousands of dollars).

250k bbl crude oil spill	National Response	Regional Response with Federal Support	Regional Response WA Only	Small Regional Spill
Vessel delay	\$1,453	\$1,604	\$1,571	\$1,517
Business interest delay	\$12,805	\$14,147	\$13,854	\$13,365
Lost port wages	\$8,220	\$9,073	\$8,884	\$8,578
Port business savings	(\$10,834)	(\$11,970)	(\$11,721)	(\$11,307)
Marina oiling	\$6,805	\$6,866	\$6,876	\$6,846
Shellfish kill	\$665	\$714	\$601	\$613
Shellfish closure	\$3,589	\$4,655	\$6,728	\$3,149
Pelagic and demersal fish kill	\$2,858	\$3,072	\$2,587	\$2,651
Commercial fishing income loss	\$360	\$390	\$348	\$333
Commercial fishing boat damage	\$83	\$90	\$80	\$76
Tribal commercial fishing loss	\$180	\$195	\$174	\$167

Subsistence tribal IQ loss	\$14,402	\$15,608	\$13,958	\$13,324
State parks loss of use	\$9,609	\$11,148	\$9,586	\$4,711
State parks lost income	\$3,604	\$4,182	\$3,596	\$1,767
Recreational boating lost use	\$1,310	\$1,276	\$1,338	\$1,332
Recreational fishing lost use	\$58	\$63	\$56	\$53
Recreational fishing lost spending	\$2,127	\$2,305	\$2,061	\$1,968
Wildlife viewing lost spending	\$8,777	\$9,511	\$8,506	\$8,119
Wildlife hunting lost spending	\$784	\$849	\$759	\$725
Hunting losses injured waterfowl	\$84	\$84	\$77	\$76
Lost tourist spending and income	\$6,985	\$7,633	\$8,558	\$8,373
25k bbl bunker C spill	National Response	Regional Response with Federal Support	Regional Response WA Only	Small Regional Spill
Vessel delay	\$34	\$24	\$22	\$21
Business interest delay	\$1,048	\$727	\$671	\$643
Lost port wages	\$8,220	\$9,073	\$8,884	\$8,578
Port business savings	(\$253)	(\$176)	(\$162)	(\$155)
Marina oiling	\$9,228	\$9,224	\$9,220	\$1,486
Shellfish kill	\$217	\$212	\$217	\$200
Shellfish closure	\$7	\$3	\$0	\$91
Pelagic and demersal fish kill	\$906	\$884	\$906	\$834
Commercial fishing income loss	\$126	\$121	\$129	\$118
Commercial fishing boat damage	\$100	\$96	\$103	\$94
Tribal commercial fishing loss	\$63	\$61	\$65	\$59
Subsistence tribal IQ loss	\$1,678	\$1,614	\$1,727	\$1,579
State parks loss of use	\$2,457	\$2,496	\$2,169	\$2,301

State parks lost income	\$922	\$936	\$814	\$863
Recreational boating lost use	\$21	\$20	\$12	\$14
Recreational fishing lost use	\$20	\$19	\$21	\$19
Recreational fishing lost spending	\$743	\$715	\$765	\$700
Wildlife viewing lost spending	\$3,067	\$2,951	\$3,157	\$2,887
Wildlife hunting lost spending	\$274	\$264	\$282	\$258
Hunting losses injured waterfowl	\$2,304	\$1,106	\$1,114	\$1,060
Lost tourist spending and income	\$3,099	\$3,076	\$3,099	\$3,053
65k bbl diesel spill	National Response	Regional Response with Federal Support	Regional Response WA Only	Small Regional Spill
Vessel delay	\$17	\$4	\$4	\$3
Business interest delay	\$1,538	\$349	\$336	\$308
Lost port wages	\$8,220	\$9,073	\$8,884	\$8,578
Port business savings	(\$124)	(\$28)	(\$27)	(\$25)
Marina oiling	\$1,498	\$1,486	\$1,486	\$1,486
Shellfish kill	\$391	\$218	\$230	\$262
Shellfish closure	\$10	\$111	\$108	\$29
Pelagic and demersal fish kill	\$1,774	\$1,099	\$1,120	\$1,225
Commercial fishing income loss	\$78	\$69	\$64	\$75
Commercial fishing boat damage	\$50	\$44	\$41	\$48
Tribal commercial fishing loss	\$39	\$35	\$32	\$38
Subsistence tribal IQ loss	\$1,043	\$916	\$860	\$1,001
State parks loss of use	\$2,056	\$2,208	\$2,457	\$1,866
State parks lost income	\$771	\$828	\$922	\$700
Recreational boating lost use	\$23	\$4	\$4	\$4

Recreational fishing lost use	\$13	\$11	\$10	\$12
Recreational fishing lost spending	\$462	\$406	\$381	\$443
Wildlife viewing lost spending	\$1,907	\$1,675	\$1,572	\$1,830
Wildlife hunting lost spending	\$170	\$150	\$140	\$163
Hunting losses injured waterfowl	\$1,980	\$1,920	\$1,835	\$1,843
Lost tourist spending and income	\$2,614	\$1,658	\$1,527	\$2,313

Table 13: Losses associated with spills in the San Juan Islands, for a crude spill (in thousands of dollars):

250k bbl crude spill	National Response	Regional Response with Federal Support	Regional Response WA Only	Small Regional Spill
Vessel delay	\$2,210	\$2,287	\$1,854	\$2,024
Business interest delay	\$19,488	\$20,159	\$17,838	\$17,838
Lost port wages	\$9,476	\$9,256	\$8,611	\$8,696
Port business savings	(\$16,488)	(\$17,056)	(\$13,827)	(\$15,092)
Marina oiling	\$6,597	\$6,669	\$6,518	\$6,604
Shellfish kill	\$869	\$1,226	\$690	\$970
Shellfish closure	\$5,375	\$4,791	\$4,286	\$4,455
Pelagic and demersal fish kill	\$4,627	\$5,012	\$4,991	\$4,314
Commercial fishing income loss	\$2,679	\$2,717	\$2,124	\$2,865
Commercial fishing boat damage	\$616	\$624	\$488	\$658
Tribal commercial fishing loss	\$1,340	\$1,359	\$1,062	\$1,433
Subsistence tribal IQ loss	\$10,211	\$10,356	\$8,098	\$10,924
State parks loss of use	\$6,274	\$5,038	\$4,105	\$3,522
State parks lost income	\$2,353	\$1,890	\$1,540	\$1,321

Recreational boating lost use	\$473	\$413	\$439	\$0
Recreational fishing lost use	\$431	\$437	\$341	\$461
Recreational fishing lost spending	\$15,843	\$16,068	\$12,564	\$16,949
Wildlife viewing lost spending	\$65,379	\$66,307	\$51,847	\$69,941
Wildlife hunting lost spending	\$5,837	\$5,920	\$4,629	\$6,245
Hunting losses injured waterfowl	\$8,267	\$8,223	\$7,495	\$8,103
Lost tourist spending and income	\$46,908	\$42,791	\$42,097	\$38,535

Table 14: Losses associated with spills on the Outer Coast, for a crude spill (in thousands of dollars):

(See introduction at the beginning of this appendix for notes on zero values.)

250k bbl crude spill	National Response	Regional Response with Federal Support	Regional Response WA Only	Small Regional Spill
Vessel delay	\$856	\$526	\$477	\$599
Business interest delay	\$7,549	\$4,641	\$5,284	\$5,284
Lost port wages	\$1,615	\$992	\$2,697	\$1,129
Port business savings	(\$6,387)	(\$3,927)	(\$3,560)	(\$4,471)
Marina oiling	\$5,571	\$5,553	\$6,139	\$5,557
Shellfish kill	\$51	\$43	\$44	\$43
Shellfish closure	\$0	\$0	\$0	\$0
Pelagic and demersal fish kill	\$235	\$218	\$223	\$219
Commercial fishing income loss	\$716	\$269	\$280	\$521
Commercial fishing boat damage	\$165	\$62	\$64	\$120
Tribal commercial fishing loss	\$358	\$135	\$140	\$261
Subsistence tribal IQ loss	\$28,678	\$10,786	\$11,230	\$20,874
State parks loss of use	\$0	\$0	\$0	\$0

State parks lost income	\$0	\$0	\$0	\$0
Recreational boating lost use	\$55	\$34	\$885	\$38
Recreational fishing lost use	\$115	\$43	\$45	\$84
Recreational fishing lost spending	\$4,235	\$1,593	\$1,658	\$3,082
Wildlife viewing lost spending	\$5,825	\$2,191	\$2,281	\$4,240
Wildlife hunting lost spending	\$1,560	\$587	\$611	\$1,136
Hunting losses injured waterfowl	\$68,414	\$59,963	\$54,292	\$57,733
Lost tourist spending and income	\$0	\$0	\$0	\$0

Table 15: Losses associated with spills in the Lower Columbia, for a bunker C spill (in thousands of dollars):

(See introduction at the beginning of this appendix for notes on zero values.)

25k bbl crude spill	National Response	Regional Response with Federal Support	Regional Response WA Only	Small Regional Spill
Vessel delay	\$48	\$48	\$48	\$48
Business interest delay	\$3,467	\$3,467	\$3,467	\$3,467
Lost port wages	\$8	\$8	\$8	\$8
Port business savings	(\$838)	(\$838)	(\$838)	(\$838)
Marina oiling	\$8	\$8	\$8	\$8
Shellfish kill	\$7	\$7	\$7	\$7
Shellfish closure	\$0	\$0	\$0	\$0
Pelagic and demersal fish kill	\$29	\$27	\$30	\$27
Commercial fishing income loss	\$0	\$0	\$0	\$0
Commercial fishing boat damage	\$0	\$0	\$0	\$0
Tribal commercial fishing loss	\$0	\$0	\$0	\$0
Subsistence tribal IQ loss	\$0	\$0	\$0	\$0

State parks loss of use	\$39	\$39	\$39	\$39
State parks lost income	\$3	\$3	\$3	\$3
Recreational boating lost use	\$8	\$8	\$8	\$8
Recreational fishing lost use	\$0	\$0	\$0	\$0
Recreational fishing lost spending	\$0	\$0	\$0	\$0
Wildlife viewing lost spending	\$0	\$0	\$0	\$0
Wildlife hunting lost spending	\$0	\$0	\$0	\$0
Hunting losses injured waterfowl	\$1,699	\$1,632	\$1,458	\$1,369
Lost tourist spending and income	\$0	\$0	\$0	\$0

Table 16: Losses associated with spills in the Upper Columbia, for a bunker C spill (in thousands of dollars):

(See introduction at the beginning of this appendix for notes on zero values.)

25k bbl crude spill	National Response	Regional Response with Federal Support	Regional Response WA Only	Small Regional Spill
Vessel delay	\$9	\$10	\$9	\$9
Business interest delay	\$671	\$685	\$685	\$685
Lost port wages	\$2	\$2	\$2	\$2
Port business savings	(\$162)	(\$166)	(\$162)	(\$166)
Marina oiling	\$2	\$2	\$2	\$2
Shellfish kill	\$0	\$0	\$0	\$0
Shellfish closure	\$0	\$0	\$0	\$0
Pelagic and demersal fish kill	\$906	\$884	\$906	\$834
Commercial fishing income loss	\$0	\$0	\$0	\$0
Commercial fishing boat damage	\$0	\$0	\$0	\$0
Tribal commercial fishing loss	\$0	\$0	\$0	\$0

Subsistence tribal IQ loss	\$0	\$0	\$0	\$0
State parks loss of use	\$0	\$0	\$0	\$0
State parks lost income	\$0	\$0	\$0	\$0
Recreational boating lost use	\$2	\$2	\$2	\$2
Recreational fishing lost use	\$0	\$0	\$0	\$0
Recreational fishing lost spending	\$0	\$0	\$0	\$0
Wildlife viewing lost spending	\$0	\$0	\$0	\$0
Wildlife hunting lost spending	\$0	\$0	\$0	\$0
Hunting losses injured waterfowl	\$5	\$7	\$7	\$7
Lost tourist spending and income	\$1,657	\$1,563	\$1,395	\$1,446

Attachment Q
Exhibit 4018-000082-CWF
Columbia Waterfront LLC