
Chapter 3: Financial Responsibility for Damages Resulting from a Spill at the CEI Hub

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3-1 Introduction

Each of the categories of damages that result from a spill at the CEI Hub occur directly to individuals and businesses.¹ The existing legal frameworks at the state and federal levels are designed to transfer the financial responsibility of those damages to liable parties. While the ultimate determination of liability and potential misconduct that will contribute to the spill at the CEI Hub during a CSZ event is a legal question, the initial incidence of economic harm is relatively unambiguous. Workers who are killed, residents who must evacuate, and citizens nationwide that value the ecological resources of the Lower Columbia River all bear the initial costs of a failure to prevent or contain a spill at the CEI Hub. The ability for those harmed to recover those damages will be laid at the hands of a legal process that will undoubtedly take many years to resolve and may compensate individuals inequitably.

This chapter of the report details the incidence for each category of economic damages, describes some of the legal mechanisms to transfer damages to liable parties, and discusses some of the potential transaction costs and sources of inefficiency that may occur as a result of the spill.

As described in Chapter 2 for calculating damages, the values of damages described herein are expected values net of the greater harms that would be caused by the CSZ earthquake. In other words, the damages and associated liabilities represent those that are attributable to the CEI Hub and could be preventable if actions are taken to reduce the risk of fuel releases.

3-2 Legal Mechanisms to Transfer Damages

Response to fuel releases in navigable waters of the United States are managed by a designated Federal On-Scene Coordinator and governed by Lower Columbia River response plans developed under the Oil Pollution Act of 1990. State and local governments would also participate in the response, while residents in the area would endure economic harm from evacuation, air pollution, and reduction in property values.

3-2.1 Oil Pollution Act

The Oil Pollution Act of 1990 (OPA), passed by Congress and signed into law in the wake of the Exxon Valdez oil spill, sets a framework for preventing oil spills along with a liability structure to recover damages.² The law carries with itself a pre-defined nomenclature, with companies who were transporting oil that spilled called “Responsible Parties” (RPs), any oil or hazardous substance designed to be burned to produce heat or power is called “fuel,” and any discharge

¹ This economic analysis is based in an anthropocentric calculation of total economic value. Accordingly, damages incurred by individuals and businesses include economic harm as a result of injury to natural and cultural resources.

² 33 CFR 138.

or substantial threat of discharge into navigable waters or adjoining shoreline is called an “incident.”³

OPA is primarily designed to prevent oil spills. Under this law, all areas of the U.S. (including the Columbia River) have oil spill contingency plans. Individual tank vessels and certain facilities (including those in the CEI Hub) have response plans that detail how to deal with a worst-case discharge or substantial threat of such a discharge. Additionally, OPA requires the staging of oil spill response and removal equipment.

Aside from aiming to prevent oil spills in the first place, OPA holds RPs liable for certain damages and clean-up costs from a spill. Specific categories of damages include:

- **Natural Resource Damages** – “injury to, destruction of, loss of, loss of use of, natural resources, including the reasonable costs of assessing the damages” is recoverable by federal, state, tribal, and foreign natural resource trustees.⁴ Natural Resource Damage Assessment (NRDA) is the legal process that agencies use to evaluate the impacts of oil spills on public natural resources.
- **Real or Personal Property** – “injury to, or economic losses resulting from destruction of, real or personal property” is claimable by anyone who owns or leases affected property.⁵
- **Loss of Subsistence Use** – “loss of subsistence use of natural resources” is claimable by anyone who “uses natural resources which have been injured, destroyed, or lost.”⁶
- **Lost Profits and Earning Capacity** – “loss of profits or impairment of earning capacity” is claimable by anyone with loss of profits or income.⁷
- **Loss of Government Revenues** – “net loss of taxes, royalties, rents fees, or net profit shares” are recoverable only by the federal government, states, and local governments.⁸
- **Increased Public Services** – the net cost of “increased or additional public services during or after removal activities, including protection from fire, safety, or health hazards” is claimable only by states and local governments.⁹

RPs are liable for removal costs and damages that are attributable to their release of oil. They are not responsible for damages that would have occurred regardless of the fuel releases. This distinction between what is attributable to the fuel releases and what is not is determined by establishing the baseline scenario and calculating damages that are in addition to that baseline. The baseline scenario is what would have occurred but for the CEI Hub fuel releases. In the case

³ 33 CFR 138.20.

⁴ 33 USC 2702(B2a).

⁵ 33 USC 2702(B2b).

⁶ 33 USC 2702(B2c).

⁷ 33 USC 2702(B2e).

⁸ 33 USC 2702(B2d).

⁹ 33 USC 2702(B2f).

of CEI Hub fuel releases due to a CSZ earthquake, all damages caused by the earthquake are included in the baseline scenario, and therefore not the responsibility of the RPs. Establishing the specifics of the baseline scenario will be part of the legal process and likely subject to debate between injured and liable parties. The concept of baseline is critical importance in determining claims in the CSZ event and is likely to complicate the ability to determine the independent harms of the spill.

The baseline scenario will also determine what is covered by existing legal mechanisms and influence who is eligible to receive compensation. OPA is designed to cover only impacts that are net of the baseline scenario. For example, if impacts to navigation are part of the baseline scenario (i.e., they would have occurred regardless of the CEI Hub fuel releases due to other barriers in the rivers caused by the earthquakes) then the navigation operators might not be eligible to pursue claims under OPA. For these reasons the baseline scenario is critical for determining attribution of damages and what parties are eligible to use legal mechanism under OPA to recover damages.

OPA establishes liability limits for damages that vary by the type of facility. RPs at onshore facilities were originally liable for up to \$350 million per spill in 1990. Liability limits are updated annually using the CPI-U, and currently, onshore facilities have liability limits of \$672,514,900 per spill.^{10, 11} While vessels are required to carry certificates of financial responsibility, onshore facilities are not. These liability limits can be waived if the discharge results from gross negligence or willful misconduct.¹²

Occasionally, oil spills cause damages that exceed the statutory liability limits established under OPA. For these situations, OPA established the Oil Spill Liability Trust Fund (OSLTF) managed by the U.S. Coast Guard's National Pollution Fund Center (NPFC). The OSLTF is primarily financed through a 9-cent per-barrel tax levied on refineries and importers/exporters of crude oil.¹³ As of 2020, the OSLTF carries a balance of approximately \$7.3 billion.¹⁴ The OSLTF makes up to \$50 million available per year to Federal On-Scene Coordinators to respond to spills and initiate NRDAs.¹⁵ The remaining balance of the OSLTF is available to any person or entity that incurs removal costs or damages due to a spill.

¹⁰ 33 CFR 138.230.

¹¹ The liability limit applies to the responsible party of the onshore facility, which is defined as "any person owning or operating the facility" in 33 USC 2701 (32).

¹² 33 USC 2704(c).

¹³ National Pollution Fund Center. About the OSLTF. https://www.uscg.mil/Mariners/National-Pollution-Funds-Center/about_npfc/osltf/. Accessed December 7, 2021.

¹⁴ Department of Homeland Security (2020). Agency Financial Report for FY 2020. https://www.dhs.gov/sites/default/files/publications/dhs_agency_financial_report_fy2020_vol2.pdf. Accessed December 7, 2021.

¹⁵ Department of Homeland Security (2006). Oil Spill Liability Trust Fund Funding for Oil Spills. https://www.uscg.mil/Portals/0/NPFC/docs/PDFs/OSLTF_Funding_for_Oil_Spills.pdf. Accessed December 7, 2021.

Any claims not paid by an RP can be submitted directly to the NPFC for payment from the OSLTF after 90 days. RPs are also able to recover certain costs incurred in their defense of claims. Specifically, this refers to costs associated with an "affirmation defense," where the RP is not the cause of the spill due to either an "act of God", "act of war", or a third party, or a "limit of liability defense," where the RP asserts that they have exceeded their liability limits and they are recoverable from the OSLTF.¹⁶

Under OPA, the term "act of God" is defined as "an unanticipated grave natural disaster or other natural phenomenon of an exceptional, inevitable, and irresistible character the effects of which could not have been prevented or avoided by the exercise of due care or foresight".¹⁷ If an earthquake is determined to be an "act of God" then the RPs would not have legal liability under OPA (claims would instead be paid from the OSLTF). However, there is precedence for natural disasters not to be considered an "act of God". Hurricane Ida was not defined as an "act of God" because a hurricane of that magnitude in that area was to be expected with some regularity.¹⁸ A similar argument could be made for a CSZ earthquake, but the determination would be made through the legal process.

Additional punitive measures are also included in OPA, with civil penalties totaling either \$32,500 per day or \$1,100 per barrel spilled. Incidents that are a result of gross negligence or willful misconduct incurs penalties of up to \$4,300 per barrel of oil discharged.¹⁹ These penalties are generally deposited back into the OSLTF. There is no strict definition of when gross negligence occurs,²⁰ and this determination would likely be litigated to see if it applies to the RPs for fuel releases from the CEI Hub.

3-2.2 Oregon DEQ Oil Spill Preparedness Program

States are also permitted under OPA to establish funds to pay for costs or damages arising out of, or directly resulting from, oil pollution or the substantial threat of oil pollution.²¹ ORS 468B.405 establishes fees on "covered vessels and offshore and onshore facilities to recover the costs of reviewing the plans and conducting the inspections, exercises, training activities" required for facility spill contingency plans. These fees total \$15,000 to \$20,000 per year for pipelines (depending on size), \$20,000 per year for onshore facilities, and other fees for vessels

¹⁶ National Pollution Fund Center. Oil Spill Claims. <https://www.uscg.mil/Mariners/National-Pollution-Funds-Center/claims/>. Accessed December 7, 2021.

¹⁷ 33 USC 210(1)

¹⁸ Henry, E.M., and Holden, R. (2021). Hurricane Ida and OPA's Acts of God. *The National Law Review*. September 16.

¹⁹ U.S. Department of Justice, Environment and Natural Resource Division. Water. <https://www.justice.gov/enrd/water>. Accessed December 7, 2021.

²⁰ *Water Quality Insurance Syndicate v. United States of America*, Civil Action No. 15-789 (BAH), December 22, 2016.

²¹ 33 USC 2718(b)

per trip. These fees go into the State Oil Spill Prevention Fund, which generates annual revenue of approximately \$1 million per year.²²

ORS 468B.455 established an Oil Spill Control Fund, which is financed through penalties recovered for violations related to the willful or negligent discharge of oil. The Oil Spill Control Fund can be used to cover costs incurred for cleanup activities, as well as reviewing contingency plans, conducting training, and restoration activities. While an important and necessary resource that supplements the OSLTF, the Oregon Oil Spill Control Fund operates on a much smaller level, with a balance of slightly under \$30,000 at the end of 2020.²³

3-2.3 Oregon State NRDA Statute

The State of Oregon has its own NRDA statute that gives the Oregon Department of Fish and Wildlife (ODFW) the authority to seek damages for the value of fish and wildlife injured or killed due to pollution.²⁴ This law is designed to supplement the federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and provide additional State power to resolve claims. Regulations enacted pursuant to the NRDA statute provide specific detail on how ODFW will “investigate, document and assess the value of natural resource losses.”²⁵ The Oregon State NRDA statute is designed to enable the State to pursue smaller claims that might not be covered under existing federal statutes like CERCLA and OPA. Because fuel releases from the CEI Hub would be claimable under OPA, the State of Oregon would likely become a trustee and would settle through OPA – not the state NRDA process. The State of Oregon needs only to participate in one process to resolve claims.

The regulations are explicit in the methodology to calculate fish kills, fish life history, and survival rates. In addition to guidance on measuring biological harm, the regulations dictate the use of per-fish monetary values to calculate damages along with the replacement costs for fish and wildlife species.²⁶ The net economic value of lost or affected species must consider the “commercial, recreational, nonuse and other values associated with the resource.”²⁷

3-2.4 Civil Claims

Many regulatory and common-law frameworks allow individuals who endure harm to pursue compensation for damages directly. Of all the categories of costs and damages resulting from a spill at the CEI Hub, personal injury claims are the only category not explicitly covered in OPA.

²² Oil Spill Contingency Planning Annual Report. (2020). Oregon Department of Environmental Quality. Available at <https://www.oregon.gov/deq/Hazards-and-Cleanup/Documents/erOilSpillPlan2020.pdf>.

²³ Ibid.

²⁴ ORS 468B.060.

²⁵ OAR 635-410-0000.

²⁶ Ibid.

²⁷ OAR 635-410-0030.

Any claims that directly impact people or human health would need to be brought in the local or state court system and would be subject to Oregon rules and precedent on claims for personal injury and wrongful death.

3-3 Transaction Costs and Inefficiencies

Even a well-designed and efficient legal structure to transfer damages to liable parties will incur additional costs that may ultimately be borne in some manner by the liable/responsible party, the injured party, or society in general. These costs come in the form of transaction costs and the inefficiency of claims.

3-3.1 Claims Process

There are two types of claims that are covered under OPA – claims for removal costs and claims for damages. Removal costs are the costs that are associated with removal of the oil. Anyone may file a claim to the RPs for removal costs, including private parties, a State, and Tribal nations. Removal costs are recoverable as long as they were performed in accordance with the National Contingency Plan.²⁸ Claims are generally first presented to the RPs, then if not paid within 90 days, there is a court action or the claim is submitted directly to the OSLFT.

Claims for damages can be brought by both private and public entities, depending on the category of damages. Some damages are recoverable only by the federal government, Tribes, state governments, or other political subdivisions of states. These categories of damages include natural resource damages, loss of public revenue, and increased public services. The other categories of damages are recoverable by any person affected by the oil spill (see Section 3-2.1 for a summary of all damage types). Private claims can be combined into a class, which must be certified for members of the class to be included. Lawyers will often reach out directly to potential class members to seek their participation to enlarge the size of the class and amount of recoverable funds.

The CSZ earthquake complicates the assessment of harms attributable to fuel releases from the CEI Hub. For example, there will be fuel shortages due to both fuel releases at the CEI Hub as well as damage to transportation infrastructure that will limit the availability of replacement fuel. Similarly, costs to navigation could be incurred by vessel operators if the rivers are blocked from bridge failure(s) or debris upstream or downstream of the CEI Hub – regardless of fuel releases from the CEI Hub. If navigation is impacted from exogenous events other than CEI Hub fuel releases, then that will change the baseline scenario from which damages are calculated, affecting the value of damages attributable to the CEI Hub.

²⁸ 33 USC 2702(b)

3-3.2 Transaction Costs

Transaction costs in the legal system accrue from hiring attorneys, consultants, and experts to develop claims and navigate the adjudication process. These costs can also transfer to the liable parties for many categories of damages. For instance, OPA allows natural resource trustees to recover all reasonable assessment costs, defined as "costs, legal costs, and other costs necessary to carry out this part; monitoring and oversight costs; costs associated with public participation; and indirect costs that are necessary to carry out this part."²⁹ Courts may also sometimes award attorney's fees. In both cases, the transaction costs are borne by the liable parties and are in addition to the costs the liable parties spend on their own defense. However, there may be other instances where plaintiffs hire attorneys with a contingency fee, in which they retain a share of the total damages awarded. In these cases, the plaintiffs bear the transaction costs.

3-3.3 Inefficiencies

Inefficiencies in the legal system primarily arise through the value of time and uncertainty. Even if damages are calculated as a sum certain value, litigation, appeals, and collection of an award can take years or decades. For instance, in 1990, the S/T American Trader oil tanker ran over its anchor off Huntington Beach, California, and spilled nearly 417,000 gallons of oil. The NRDA claims ended up going to trial, and it wasn't until 1997 that the trial was completed, and a jury awarded government agencies \$18.1 million for lost recreational use. The RP appealed, was successful in reducing the award to \$15.4 million, and ultimately settled with state and local governments for \$16 million in 1999.³⁰ This prolonged process introduces a cost and substantial risks inherent in litigation. Damages awarded by a court or jury might not fully capture the total damages claimed. Appeals of verdicts may also further reduce compensation.

3-3.4 Equitable Recovery

Due to transaction costs and inefficiencies, settlements of claims for civil damages – including those for natural resource damages – often are discounted. Following the Deepwater Horizon oil spill, a federal study estimated total economic value lost to natural resources to be at least \$17.2 billion.³¹ However, in 2016 (six years after the spill), federal and state natural resource trustees settled natural resource damage claims for \$8.1 billion.³² A substantial portion of that award has yet to be spent on restoration.³³ Despite making up only 47 percent of the estimated damages, the settlement was widely lauded and upheld by federal courts following an

²⁹ 15 CFR 990.30.

³⁰ Chapman, D. J., & Hagemann, W. M. (2001). Environmental damages in court: the American Trader case. *The law and economics of the environment*, 319.

³¹ Bishop, R. C., Boyle, K. J., Carson, R. T., Chapman, D., Hanemann, W. M., Kanninen, B., ... & Scherer, N. (2017). Putting a value on injuries to natural assets: The BP oil spill. *Science*, 356(6335), 253-254.

³² U.S. Department of Justice. (2016). *Deepwater Horizon*. Available at: <https://www.justice.gov/enrd/deepwater-horizon>. Accessed December 7, 2021.

³³ NOAA, *Gulf Spill Restoration*, available at: <https://www.gulfspillrestoration.noaa.gov/>.

extensive public comment period.³⁴ This suggests that not all damages to parties will be recovered under OPA and some parties will have uncompensated costs resulting from fuel releases at the CEI Hub.

Uncompensated damages are most likely to occur for claimants with damages that are more difficult to prove. For businesses, the quality of their records will be critical to proving lost profits and/or earning capacity. For private individuals, the claims for recovery of damage to personal property and due to medical expenses could be difficult to prove that they are objectively attributable to CEI Hub fuel releases. In the Deepwater Horizon spill, health costs were claimable by coastal residents, first responders, and cleanup workers. Even if they are included in the claim, people with health symptoms are often not fully compensated for all costs they incurred. In the Deepwater Horizon spill, many claimants elected for lump sum payouts of \$900 to \$1,300 – which in some cases is less than the amount of their health care costs due to exposure to petrochemicals.³⁵

The compensation process itself can also erode social capital in the communities that experience fuel releases. Interviews with Gulf Coast residents after Deepwater Horizon found that residents perceived “uncertainty, randomness, and unevenness in the compensation process which led to negative social comparisons and competition among community members”.³⁶ Fuel releases can also damage human capital by making a place a less attractive location to live and work, as evidenced by the impact to property values.

3-4 Incidence of Damages by Category

Each of the categories of damages described in the previous sections of this report are detailed below, along with the individuals or organizations to whom they accrue. Where applicable, a potential legal framework and payment mechanism to transfer damages to liable parties is identified.

3-4.1 Direct Impacts to People

Assuming an explosion occurs, between 0 to 7 people could be killed and 2 to 80 people could be injured. No amount of money can restore the individual lives that would be lost if mortality occurs. The value of a statical life framework provides a potential monetary basis for the economic damages that could be recoverable under civil claims for personal injury and death.

³⁴ NOAA, *Deepwater Horizon Settlements: Where the money went*, available at: <https://www.noaa.gov/explainers/deepwater-horizon-oil-spill-settlements-where-money-went>.

³⁵ *Plaisance, et al. v. BP Exploration & Production Inc., et al*, No. 12-968, U.S. District Court Eastern District of Louisiana Granting Final Approval of the Medical Benefits Class Action Settlement, January 11, 2013.

³⁶ Mayer, B., Running, K., & Bergstrand, K. (2015). Compensation and community corrosion: perceived inequalities, social comparisons, and competition following the Deepwater Horizon oil spill. In *Sociological Forum* (Vol. 30, No. 2, pp. 369-390). June.

The range of costs for mortality and morbidity are between \$49,000 to \$74.1 million, with an expected value of \$37.1 million. Initially, these damages accrue directly to workers injured and killed onsite or their families. Civil claims for personal injury or wrongful death can be filed through the court system, with all or a portion of damages potentially recoverable from liable parties. Compensation would occur via direct payment and may be reduced because of settlement (to account for litigation risk) and attorney's fees (if not awarded to the plaintiffs). The liable parties would incur their own litigation defense costs. Depending on the degree of injury, not all potential claimants might seek recovery of damages due to the transaction costs and risks of doing so.

3-4.2 Property

Assuming fuels in the water travel downstream to the Longview Bridge, the potential short-term impact on residential properties values is up to \$35.4 million. The initial damages accrue to all owners and renters of affected property. The market value reduction is an indication of the loss of economic value, so these damages accrue regardless of whether a property is sold or not. Property value claims can be filed under OPA and can be paid either by the RPs or the NPFC. Compensation would occur via direct payment and may be reduced because of settlement (to account for litigation risk) and attorney's fees. Depending on the degree of injury, not all potential claimants might seek recovery of damages due to the transaction costs. RPs would incur their own defense costs.

3-4.3 Navigation

A one-week closure of the shipping channel between the I-405 bridge and Longview Bridge would result in additional operating costs for commercial vessels of between \$11.8 million and \$17.8 million. The initial damages accrue to shipping companies, businesses relying on shipping, downstream consumers, and residents relying on earthquake response efforts. These losses are recoverable under OPA and can be paid either by the RPs or the NPFC. However, it may prove difficult to calculate losses for individuals or businesses not directly impacted by the navigation closure. For many consumers, these losses may be small, and transaction costs associated with filing a claim may preclude them from doing so. Any damages that are awarded may be reduced because of settlement (to account for litigation risk) and attorney's fees. RPs would incur their own defense costs.

3-4.4 Fisheries

To the extent that fuel releases reduce reproduction or cause direct mortality to aquatic species, there will be a reduction in income to the fishing industry, impacting owners, employees, and suppliers who rely on these funds. Initial damages accrue to the commercial fishing sector, with downstream effects impacting consumers if the losses result in price changes. Compensation would occur via direct payment, and these losses are recoverable under OPA and can be paid either by the RPs or the NPFC. Downstream consumer effects may be small (on a per-consumer

basis), and transaction costs may preclude the filing of claims. Any damages awarded may be reduced because of settlement (to account for litigation risk) and attorney's fees. RPs would incur their own defense costs.

3-4.5 Recreation - Consumer Surplus Values

Average per-trip values of recreation for participants (i.e., consumer surplus) are between \$68 to \$130 per person per day. These values are claimable by natural resource trustees as part of an NRDA claim under OPA. Compensation would occur via restoration projects designed to benefit recreational use in a manner that has a nexus to those activities that were affected. In this manner, lost recreational use is compensated; however, the actual individual recreators that had to change their behavior might not be. The total amount spent on restoration may be reduced because of settlement (to account for litigation risk), but all damages and reasonable assessment costs are claimable under OPA and would be paid either by the RPs or NPFC. RPs would incur their own assessment and defense costs.

3-4.6 Recreation - Consumer Spending

Outdoor recreation contributes spending to local economies at an average value of between \$98 to \$478 per trip. These losses initially accrue to local businesses that support recreation and are claimable under OPA. However, losses to businesses that do not exclusively serve recreators (i.e., gas stations) may be small or difficult to quantify on a per-business basis. Thus, some of these businesses may not file claims due to the associated transaction costs of doing so. Any damages awarded and paid by either the RPs or NPFC may be reduced because of settlement (to account for litigation risk) and attorney's fees. RPs would incur their own assessment and defense costs.

3-4.7 Human Health

The health costs to the population affected by exposure to airborne petrochemicals are approximately \$121 million to \$248 million. The primary health costs are increased risk of heart attack, decreases in productivity, and lost workdays. Initially, these costs accrue to individuals living or working near or downstream from the CEI Hub during the spill. These damages are not recoverable under OPA and would likely be pursued through civil claims for personal injury. Minor effects or those that may be confounded by time or comorbid conditions may be difficult to attribute to the spill and might not be claimed. Compensation would occur via direct payment and may be reduced because of settlement (to account for litigation risk) and attorney's fees (if not awarded to the plaintiffs). The liable parties would incur their own litigation defense costs. Depending on how potential litigation is structured, some injured parties could be left out of receiving settlement funds (see Section 3-3.4 for more information on potential inequities associated with the damage recovery process).

3-4.8 Habitats and Resources

Total damages from injury to habitats and natural resources and required compensation are expected to range between \$87 million in the summer to \$669 million in the winter. These values are claimable by natural resource trustees as part of an NRDA claim under OPA. Initial losses accrue to any citizens nationwide that hold value for the ecological resources and would be pursued on their behalf by natural resource trustees. Compensation would occur via restoration projects designed to replace or restore the ecological services lost because of the spill. Damages and all reasonable assessment costs would be paid for by the RPs or NPFC but may be reduced because of settlement (to account for litigation risk). RPs would incur their own assessment and defense costs.

3-4.9 Clean-up Costs

Total costs to clean up to oil spilled from the CEI Hub may range between \$109 million to \$1.4 billion. These costs are fully recoverable under OPA and would be paid for by the RPs. Should the RPs become financially insolvent following the spill, the remaining costs would be paid for by the NPFC.³⁷

3-4.10 Cultural Values

Fuel releases in the Willamette River and Columbia River would harm cultural resources that are of particular importance to Tribal populations for subsistence, transportation, commerce, and ceremonial purposes. These losses accrue to regional Tribes and are claimable under OPA for federally recognized Tribes. Compensation would occur through restoration designed to replace or enhance these cultural services. Past NRDA settlements have included cultural exchange and apprenticeship programs. For example, the St. Lawrence NRDA settlement included over \$8.3 million in cultural restoration projects, in addition to the nearly \$7.3 million made available for ecological restoration.³⁸ Restoration costs and all reasonable assessment costs would be paid for by the RPs or NPFC but may be reduced because of settlement (to account for litigation risk). RPs would incur their own assessment and defense costs.

3-4.11 Fuel Prices

The total economic cost to consumers of the higher fuel prices and reduction is between \$18.8 million and \$120.8 million. The lost value of consumption from fuel scarcity would be \$11.7

³⁷ Clean-up costs are not subject to liability limits under OPA.

³⁸ St. Lawrence River Environment Natural Resource Damage Assessment: Restoration and Compensation Determination Plan and Environmental Assessment. (2013).

https://www.fws.gov/northeast/nyfo/ec/files/stlawrence/RCDP_Full_Final%20Revised%20May_2013.pdf. Accessed December 13, 2021.

million for a three-day period.³⁹ These costs would accrue to consumers throughout the state. While these costs may conceptually be pursued under OPA (as lost profits or income) or as a set of civil claims, they are unlikely to be. Price increases are an efficient response to scarcity, and the transaction costs associated with pursuing a large number of relatively small individual claims complicate the ability to quantify and recover these damages. Furthermore, past incidents that led to price shocks (e.g., the 1973 Arab oil embargo, the 1991 Persian Gulf war, and the 2020 Colonial Pipeline shutoff) have not resulted in substantial awarded damages. These economic costs are likely to be ultimately borne by consumers in the state.

3-5 Ultimate Financial Responsibility

The total damages of a spill at the CEI Hub will ultimately be borne by a large swath of the Oregon economy. Legal mechanisms will place a large portion of these damages at the responsibility of the firms operating CEI Hub facilities, should they be found liable. They should expect to ultimately shoulder a large portion of the damages, assessment costs, and civil penalties in addition to funds expended in their own defense.

The expected damages from a spill at the CEI Hub covered on the OPA are \$435 million, but this value could be as high as \$803 million and does not include impacts to commercial fisheries, cultural losses, impacts to fuel prices, and RP expenditures on legal defenses.⁴⁰ Expected cleanup costs total \$701 million but could be as large as \$1.4 billion. Expected civil penalties under OPA total \$1.6 billion but could be as high as \$8.4 billion if it is determined that the spill is the result of gross negligence or willful misconduct. The expected value of civil claims from personal injury/wrongful death is \$46 million.⁴¹

Even though legal frameworks are designed to allow full compensation of damages, transaction costs and inefficiencies in the claims process mean that there is a likelihood that individuals, businesses, and Tribal governments may remain partially uncompensated. Uncompensated damages may be distributed inequitably across injured parties due to existing structural inequities in the legal system (see Section 3-3.4 for more information on potential inequities associated with the damage recovery process).

³⁹ Fuel scarcity in Oregon following the CSZ earthquake would likely extend for much longer than three days – however, the three-day estimate is what is likely attributable to CEI Hub fuel releases alone and not due to other effects of damage to transportation and pipeline infrastructure due to the earthquake.

⁴⁰ Attorney fees of claimants can be awarded under OPA. Non-monetary transaction costs to file and monitor claims cannot be awarded.

⁴¹ The \$46 million value is the sum of the expected value of direct impacts to people (\$37.1 million) and human health impacts (\$8.9 million).

3-6 Legal Mechanisms to Increase Financial Responsibilities

All categories of damages outlined in this report – apart from personal injury/wrongful death – are potentially recoverable under OPA.⁴² Any damages incurred to individuals through personal injury/wrongful death would be potentially recoverable under separate civil action. RPs could end up not paying the full amount of their damage liability under three circumstances:⁴³

- They exceed their liability limits;
- They are not the cause of the spill; or
- They become insolvent.

Under these scenarios, damages and costs claimable under OPA may be paid by the OSLTF. The expected damages claimable under OPA do not exceed the liability limits imposed by OPA for all potential RPs at the CEI Hub. Should any of the operators at the CEI Hub become financially insolvent following the CSZ event, all OPA damages and cleanup costs can potentially be paid by the OSLTF. Ignoring transaction costs and inefficiencies, the only category of damages at risk of incomplete coverage due to financial insolvency are personal injury/wrongful death claims.

While the vast majority of damages and costs associated with a spill at the CEI Hub are recoverable through the OSLTF, the availability of external funds may still serve as an economic externality. The availability of the OSLTF, while beneficial in paying damages and costs, may be a source of unaddressed moral hazard. Moral hazard arises when parties face a lack of incentives to fully guard against risk. While common in insurance markets, moral hazard is minimized through the implementation of co-payments or deductibles that align an individual's incentives with that of the insurer. Liability limits, while beneficial in providing certainty for business operating decisions, can be a source of moral hazard.⁴⁴ While the CSZ event presents a relatively uncertain risk, there may be decisions that a CEI Hub facility operator can make to minimize the likelihood of catastrophic harm. Older tanks or those closer to the water can be retrofitted, reinforced, or retired.

Economic efficiency dictates that operators at the CEI Hub should fully internalize the probability of a spill and its potential costs into operations. Local policy mechanisms could be

⁴² Personal injury/wrongful death claims would be submitted through the civil claims process, not OPA.

⁴³ Note that damage liability is the value that is established through the claims process. Damage liability will likely be lower than total economic damages because of transaction costs, inefficiencies, and inherent inequities in the legal and claims process, as described in Section 3.

⁴⁴ Biais, B., Mariotti, T., Rochet, J. C., & Villeneuve, S. (2010). Large risks, limited liability, and dynamic moral hazard. *Econometrica*, 78(1), 73-118.

designed that bypass a reliance on liability limits or bankruptcy proceedings. In this manner, operators may face incentives to minimize the chance of a spill by retrofitting tanks or reinforcing spill containment structures.

Certain vessels operating in U.S. waters are required under OPA to carry certificates of financial responsibility that operate similarly to a proof of insurance.⁴⁵ Onshore facilities are not required to provide certificates of financial responsibility. A market-based mechanism available to encourage operators at the CEI Hub to internalize the probability of a spill and its potential costs is to require operators to provide similar certificates of financial responsibility up to the expected value of all damages, cleanup costs, and penalties, allocated to operators by volume. The total expected value of OPA damages, civil penalties under OPA, cleanup costs, and civil claims from fuel releases at the CEI Hub is \$2.8 billion. Certificates of financial responsibility would provide evidence of a firm's ability to pay their share of this value, should a spill occur. These certificates of financial responsibility can be provided through self-insurance or an insurance market, which would actuarially price the risk of a spill and potentially provide discounts for efforts to minimize its likelihood or impacts.

The State of Oregon could also increase the fee-structure for onshore facilities collected under ORS 468B.405 to cover the annualized expected value of all damages and cleanup costs of a catastrophic spill from the CEI Hub.⁴⁶ This pricing mechanism would increase the costs of operating facilities at the CEI Hub, while also potentially incentivizing operators to reduce the reliance on older or outdated infrastructure.

Economic tools provide incentives to optimize behavior. While regulatory inspections are a critical component of spill preparedness planning, they work best when complemented with financial structures that align both public and private incentives. These tools are ultimately not necessary for the recovery of most costs and damages (due to the liability structure provided under OPA), but they can provide mechanisms to minimize the likelihood of a spill, which would be the preferred scenario for all parties.

⁴⁵ The form to apply for a certificate of financial responsibility, demonstrating the information that the certificate requires to determine financial responsibility, is available at: <https://www.uscg.mil/Mariners/National-Pollution-Funds-Center/Forms/>

⁴⁶ See Section 3-2.2 for more information on ORS 468B.405.

3-7 Opportunities for Future Research

The purpose of this analysis is to describe the likely effects of a CSZ earthquake on the fuel stored at the CEI Hub. This research provides qualitative and quantitative descriptions of the potential amount of fuel releases, the costs that those releases could impose on society, and descriptions of if and how those costs will be reimbursed through current legal structures. This research demonstrated that there is sufficient information to determine that fuel releases are likely to occur and would impose large costs to society and the CEI Hub operators. However, there are opportunities to refine the information that was available for the analysis to provide more certainty and additional detail. The opportunities for additional research in the future fall into three categories: **refinement of the analysis, analysis of prevention actions, and expanded analysis beyond the CEI Hub facilities and CSZ earthquake scenario.**

There are numerous ways that additional research could refine the analysis in this report to provide additional information about releases and more specific damage estimates. However, all damage estimates rest on the assumptions about the amount and type of fuel that would be released. Because the likelihood of releases and materials that could be released is the basis of the research, having more accurate and complete information about the storage tanks is the first step for a more refined analysis. This research uncovered the paucity of information about the storage facilities at the CEI Hub. Some properties did not have tank storage capacity or contents information available through any government source, including the State Fire Marshal. This analysis did not conduct onsite assessments of the seismic integrity of the tanks or the soils through soil sampling or any other on the ground data collection method. Additional research working directly with the CEI Hub operators would allow for more precise information about individual tanks, their contents, and their seismic risks, all of which would lead to better estimates of what would potentially be released due to a CSZ earthquake. This information would also better prepare government agencies to respond to fuel releases or other emergency events like fires.

Once more information is available and there are more refined estimates of fuel releases from the CEI Hub, follow up studies could refine the analysis of the effects of fuel releases. These analyses could include refinement of impacts by:

- Evaluating the likelihood of fuel ignition and potential extent of fire spread under various scenarios. Having this analysis would allow for understanding of properties and public resources that are at risk of fire, such as Forest Park, businesses, and residences.
- Modeling human health impacts under ignition and non-ignition scenarios. This research would provide the information to identify the scale of needed evacuations.
- Evaluating the impacts of fuel releases on aquatic species under various response timeline and seasonality scenarios. This research would correct for the scarcity of information about impacts of fuels on aquatic species present in the Pacific Northwest, such as salmon, and could be used to model impacts to commercial and recreational fisheries.

- Studying the impact that fuel releases would have on the area’s ability to attract and retain talent and investments. In other words, evaluate if and how fuel releases would affect the brand of the Portland metro region and the area’s attractiveness as a place to live and work.
- Modeling and planning for how replacement fuel could be supplied to replace fuel released at the CEI Hub and to account for disruptions in supply chains due to earthquake damage.
- Assessing if and how fuel releases and any associated fires or other activities requiring emergency response would detract from other emergency response operations in the aftermath of the CSZ earthquake and what those costs would be.
- Conducting further legal analysis to gain clarity of CEI Hub operator responsibility under OPA, particularly with regard to the “Act of God” provision.

Many types of analyses could be conducted to inform policy responses aimed at preventing or reducing the risk of fuel releases. Studies could be conducted to better understand the costs of taking any prevention actions, such as making seismic retrofits, replacing tank infrastructure, decommissioning tanks, and other actions. A broader study could then compare the costs and benefits of taking any actions to prevent fuel releases. This type of study should also evaluate the distributions of benefits and costs to understand who would incur costs and who would experience benefits compared to current conditions. Policy responses to prevent fuel releases would likely also require additional legal analyses or planning. For example, although there is a fuel response plan for the Lower Columbia River, that plan does not include contingencies for how to perform the response after a major earthquake.

CEI Hub tanks is not the only location that is at risk during a CSZ earthquake or other event. The network of pipelines and rail infrastructure also pose risks of fuel releases. In addition, there are other fuel and hazardous material storage in Oregon and Southwest Washington that pose threats to natural resources and human health in Oregon in the event of a CSZ earthquake. Additional research could be conducted to better understand the cumulative effects from fuels and hazardous materials in the region. This analysis could be performed for a CSZ earthquake, as well as other events such as a Portland Hills earthquake or smaller spill event.