**APPENDIX A**

# Model Discharge Burden Scenarios

The Agency performed an analysis of historical discharges – documented in the final rule RIA – to estimate the frequency of discharges to which the rule’s requirements may apply. These data inform the subsequent analyses of annual burden and costs by providing the frequency of applicable discharges. The Agency consulted and examined three data sources describing historical incidents:

* U.S. Coast Guard (USCG) National Response Center (NRC) database[[1]](#footnote-1);
* U.S. Department of Transportation’s (DOT) Pipeline and Hazardous Material Safety Administration (PHMSA) database[[2]](#footnote-2); and,
* U.S. Department of the Interior's (DOI) Natural Resource Damage Assessment and Restoration Program (NRDAR Program) case map and document library.[[3]](#footnote-3)

The Agency’s analysis found that the final rule will apply to discharges that occur rarely based on historical data; an estimated two discharges every 10 years.

For a discharge that meets the rule’s applicability criteria and for which dispersant use is authorized, the characteristics of the discharge will determine the use of dispersants, the corresponding extent of the monitoring effort and, consequently, the cost of compliance. The estimated costs are discharge-specific; for relatively small discharges, the RP’s compliance cost may be relatively small in comparison to very large discharges, where the estimated compliance costs can be substantially higher.

The analysis includes costs for a range of hypothetical discharge scenarios. These scenarios exceed the volume and duration criteria specified in the rule: surface use of dispersants in response to oil discharges of more than 100,000 U.S. gallons occurring within 24 hours, and surface use of dispersants for more than 96 hours in response to an oil discharge, as directed by the OSC. The model discharges are designed to produce a reasonable and realistic scenario for each individual scenario, and to cover a range of discharge types and magnitudes across the scenarios. Each model discharge scenario is hypothetical and does not reflect specific parameters of individual historical incidents. The scenarios include two surface discharges and two subsurface discharges. Exhibit A-1 summarizes the characteristics for the scenarios.

Exhibit A-1: General Model Discharge Assumptions

| **General Assumptions** | **Scenario 1** | **Scenario 2** | **Scenario 3** | **Scenario 4** |
| --- | --- | --- | --- | --- |
| Discharge Type | Surface | Surface | Subsurface | Subsurface |
| Discharge Size (U.S .gallons) | 150,000 | 8.0 million | 170 million | 1 - 3 billion |
| Duration of active oil discharge, days | 1 | 22 | 60 | 85 |
| Oil discharge rate (gallons/day)1 | ~ 20,000 | 300,000 to 400,000 | 1.2 to 1.4 million | 10 to 20 million |
| **Dispersant Application** | | | | |
| Duration of dispersant application, days | 3 | 24 | 65 | 90 |
| Quantity of dispersants applied,2 gallons | 5,000 | 425,000 | 1.8 million | 10 to 12 million |
| Location of dispersant application | Surface | Surface | Surface & Subsurface | Surface & Subsurface |
| **Dispersant** **Monitoring** | | | | |
| Duration of dispersant monitoring, days | 5 | 27 | 65 | 90 |
| Notes:   1. Sources include Buchholz et al. 2016 (Buchholz, Kurt, and et al. 2016. “Worst Case Discharge Analysis (Volume I).” Washington D.C.: U.S. Department of the Interior Bureau of Safety and Environmental Enforcement (BSEE), and USCG 2016 (U.S. Coast Guard, National Oceanic and Atmospheric Administration, U.S. Environmental Protection Agency, Centers for Disease Control and Prevention, Minerals Management Service (USCG 2016). Special Monitoring of Applied Response Technologies). 2. In past discharges such as the Deepwater Horizon oil spill, approximately 40 percent of dispersants were applied to the subsurface (USCG 2011). | | | | |

# Unit Burden and Cost

This section presents unit burden and unit cost estimates on a per discharge basis for each discharge scenario. Burden estimates for data collection and reporting are then converted into annual and three-year total values.

## Information on Dispersant Application

EPA assumes the burden associated with these requirements includes labor (hours) throughout the event to produce and revise the documentation. This includes an initial, one-time hourly burden to develop the required documentation, as well as potentially daily revisions and adjustments. The hour estimates below are based on EPA’s best professional judgment.

EPA differentiates the effort required for this section of the rule slightly across the scenarios. Because the requirements and nature of the documentation are the same in all cases, the effort is similar for all four scenarios, but with scenarios 3 and 4 warranting additional hours given the scope and complexity of the model discharges (Exhibit A-2).

Exhibit A-2: Dispersant Application Documentation Labor Requirements (hours)

| **Dispersant Application Requirement** | **Scenario 1** | | **Scenario 2** | | **Scenario 3** | | **Scenario 4** | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **One-Time** | **Daily** | **One-Time** | **Daily** | **One-Time** | **Daily** | **One-Time** | **Daily** |
| Document the characteristics of the source oil | 8 | -- | 8 | -- | 8 | -- | 10 | -- |
| Document dispersant choice, application method and procedures, and required equipment | 8 | 1 | 8 | 1 | 8 | 1 | 10 | 1 |
| Document the oil discharge flow rate and the results of any efficacy and toxicity tests | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 3 |
| Document the discharge flow rate for volatile petroleum hydrocarbons | N/A | N/A | N/A | N/A | 4 | 2 | 6 | 6 |
| **Total Hours** | **18** | **3** | **18** | **3** | **22** | **5** | **30** | **10** |

EPA used occupation-specific labor rates from the U.S. Bureau of Labor Statistics (BLS), Occupational Employment Statistics survey (OES) to develop labor costs. The Agency assumes the labor required for the dispersant application documentation is provided by the Emergency Management Director occupation in the oil and gas extraction industry, (NAICS 211100). The total labor rate is comprised of the hourly wage, obtained from BLS OES[[4]](#footnote-4), and the cost of benefits/overhead obtained from the BLS Employee Cost of Compensation (ECC) survey.[[5]](#footnote-5) According to the ECC data for oil and gas extraction, wages comprise 68.6 percent of total hourly labor cost; therefore, the Agency inflated the raw BLS wage by 1/.686 to estimate the fully-loaded labor rate reported in Exhibit A-3.

Exhibit A-3: Labor Rates for Dispersant Application Documentation ($2019)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **BLS OCC Code** | **Occupation Description** | **NAICS** | **NAICS Description** | **Fully-Loaded Labor Rate ($/hr)** |
| 11-9160 | Emergency Management Directors | 211100 | Oil and Gas Extraction | $120.19 |
| Note: To estimate the wage rate, the Agency used Employer Cost of Compensation to estimate total value of benefits. The original wage rate of $82.45 was divided by BLS estimated component of private sector wages and salaries (68.6%) to account for the additional 31.4 percent of benefits usually paid as part of compensation. | | | | |

Exhibit A-4 presents the resulting unit costs for preparation of the dispersant application documentation.

Exhibit A-4: Unit Cost per Respondent for Dispersant Application Documentation ($2019)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Dispersant Application Requirement** | **Scenario 1** | | **Scenario 2** | | **Scenario 3** | | **Scenario 4** | |
| **One-Time** | **Daily** | **One-Time** | **Daily** | **One-Time** | **Daily** | **One-Time** | **Daily** |
| Document the characteristics of the source oil | $962 | $0 | $962 | $0 | $962 | $0 | $1,202 | $0 |
| Document dispersant choice, application method and procedures, and required equipment | $962 | $120 | $962 | $120 | $962 | $120 | $1,202 | $120 |
| Document the oil discharge flow rate and the results of any efficacy and toxicity tests | $240 | $240 | $240 | $240 | $240 | $240 | $481 | $361 |
| Document the discharge flow rate for volatile petroleum hydrocarbons | $0 | $0 | $0 | $0 | $481 | $240 | $721 | $721 |
| **Unit Cost** | **$2,163** | **$361** | **$2,163** | **$361** | **$2,644** | **$601** | **$3,606** | **$1,202** |

## Water Column Sampling

EPA assumes that water column sampling occurs daily for the duration of the monitoring period defined previously for each scenario. Sampling will be conducted in a locations informed, daily, by trajectory modeling describing the likely transport of oil considering surface and subsurface currents and the oil properties in affected areas.

The results of daily water column sampling are required to be reported as part of the Daily Reporting compliance activities. Here, EPA estimates the cost for the respondent to collect and analyze the daily water samples in order to comply with the daily reporting requirements. Water sample collection and analysis activities that result in respondent burden and cost include:

* **Daily review and consultation using the latest results of trajectory modeling to determine locations to sample.** The costs analysis assumes that the RP will hire a contractor to perform trajectory modeling. Costs for this trajectory modeling as part of the oil distribution analysis are captured in the next section. EPA assumes that the RP incurs daily labor costs as part of the sampling requirements to review the trajectory modeling results to establish the day’s sampling plan;
* **Daily collection of water column samples.** EPA assumes the RP collects background and in-plume water column samples daily by vessel. The cost for daily sample collection is driven by the cost of procuring an appropriately equipped vessel, including associated labor cost for staff/technicians operating the vessel and collecting the samples. Cost is also a function of the number of vessels deployed per day to collect samples. EPA assumes each event requires at least one vessel per day, though as indicated below, Scenario 2, 3 and 4 are assumed to require more than this minimum quantity; and,
* **Daily testing of water column samples.** Information on most sampling metrics can be obtained in real-time; however, some constituents require additional laboratory testing. These include: Heavy metals, polycyclic aromatic hydrocarbons (PAHs), and total petroleum hydrocarbons (TPHs).EPA therefore includes additional daily laboratory testing costs for these specific constituents. Sample testing costs are a function of the cost per test per constituent, and the number of samples tested per day.

### Labor Burden and Cost

Exhibit A-5 presents EPA’s estimated labor burden hours required for daily oil distribution modeling review and daily analysis of sampling results.

Exhibit A-5: Daily Labor Requirements for Trajectory Modeling Review (hours per day)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Compliance Action** | **Scenario 1** | **Scenario 2** | **Scenario 3** | **Scenario 4** |
| Review trajectory modeling and determine daily sampling plan/locations | 2 | 2 | 2 | 2 |
| Analyze fluorometer and water sampling results | 5 | 10 | 15 | 20 |
| Notes: Cost for performing trajectory modeling as part of the oil distribution analysis is captured in Section 6.2.3. | | | | |

To monetize these labor costs, EPA used an Environmental Scientist fully-loaded labor rate from BLS data, and the same methodology described for labor rates presented in Exhibit A-3.

Exhibit A-6: Labor Rates for Water Column Sample Analysis ($2019)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **BLS OCC Code** | **Occupation Description** | **NAICS** | **NAICS Description** | **Fully-Loaded Labor Rate ($/hr)** |
| 19-2040 | Environmental Scientists and Geoscientists | 211100 | Oil and Gas Extraction | $110.83 |
| Note: The Agency used Employer Cost of Compensation wage rate to calculate the total value of benefits. The wage rate of $76.03 was divided by BLS estimated component of private sector wages and salaries (68.6%) to account for the additional 31.4 percent of benefits usually paid as part of compensation (BLS 2020a; BLS 2020b). | | | | |

Exhibit A-7 presents the unit cost per day for review and analysis of sampling and trajectory modeling.

Exhibit A-7: Unit Cost per Day for Respondent Analysis & Trajectory Modeling Review ($2019)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Compliance Action** | **Scenario 1** | **Scenario 2** | **Scenario 3** | **Scenario 4** |
| Review trajectory modeling and determine daily sampling plan/locations | $222 | $222 | $222 | $222 |
| Analyze fluorometer and water sampling results | $554 | $1,108 | $1,662 | $2,217 |
| Total | $776 | $1,330 | $1,884 | $2,438 |

### Other Equipment and Laboratory Costs

EPA assumes the RP will use an oil response vessel, the cost for which includes both the cost of the vessel itself and required crew capable of collecting water samples used for dispersant monitoring. Costs for additional equipment include one fluorometer and one water meter per vessel. The combined cost for these two instruments is $835 per day, per vessel.[[6]](#footnote-6) EPA also assumes that additional sampling equipment, beyond equipment already present on the collection vessels, may be required. Costs also include procuring two submersible laser-diffraction based particle size analyzers (e.g. LISST-Deep, LISST-Halo2), at an assumed cost of $1,000 per instrument per day. EPA assumes that the use of two LISST instruments is needed to cover the rule’s required droplet size distribution analysis.

The Agency assumed the RP monitoring vessel conducts real-time water column monitoring and water-sample collection for later analysis. The cost of $21,600 per day, per vessel, is for a 20 meters EARL oil spill response vessel or equivalent, including crew, converted to USD from British Pounds.[[7]](#footnote-7)

The Agency also consulted data from Water Testing Labs for unit costs per sample for laboratory testing of certain sample constituents.[[8]](#footnote-8)

The extent of sampling depends on the area of the discharge, the depth of the oil plume, currents, and other factors. Therefore, the number of water samples collected specifically for dispersant monitoring is difficult to generalize because it will be unique for each individual discharge and largely dependent on the area of the discharge (see Exhibit 29). For the RP monitoring vessel, EPA assumes:

* Scenario 1: The RP utilizes one vessel per day for surface monitoring;
* Scenario 2: The RP utilizes two vessels per day for surface monitoring;
* Scenario 3: The RP utilizes one vessel per day for subsurface monitoring, and three vessels per day for surface monitoring, for a total of four vessels per day; and,
* Scenario 4: The RP utilizes two vessels per day for subsurface, and five vessels per day for surface monitoring, for a total of seven vessels per day.

Exhibit A-8 presents these assumptions and the daily equipment cost based on the number of vessels utilized per day in each scenario.

Exhibit A-8: Equipment Unit Costs for Water Column Sampling ($2019)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Equipment** | **Scenario 1** | **Scenario 2** | **Scenario 3** | **Scenario 4** |
| RP Monitoring Vessel, cost per day | 1 vessel | 2 vessels | 4 vessels | 7 vessels |
| Surface monitoring only | Surface monitoring only | Surface and Subsurface monitoring | Surface and Subsurface monitoring |
| $21,600 | $43,200 | $86,400 | $151,200 |
| Fluorometer and Water Quality Meter (one per vessel), cost per day | $835 | $1,584 | $3,168 | $5,544 |
| LISST (two instruments), cost per day | $2,000 | $2,000 | $2,000 | $2,000 |
| Dispersant Water Column Samples | 25 | 50 | 250 | 400 |
| Source: USCG 2011, Oil Spill Response Limited 2020[[9]](#footnote-9).  Notes: Assumes the RP monitoring vessel conducts real-time water column monitoring and water-sample collection for later analysis. The cost is for a 20 meters EARL oil spill response vessel or equivalent, including crew, converted to USD from British Pounds (Oil Spill Response Limited 2020) based on total inventory of USCG during the Deepwater Horizon oil spill. | | | | |

As noted above, the number of samples collected daily is a required input. The RP can complete some tests with equipment on-hand in the sampling vessels. The RP will also transport a subset of additional tests to an onshore testing facility to complete the water quality tests. Exhibit 30 presents the unit cost per sample for this analysis.

Exhibit A-9: Off-Site Water Column Sampling Testing Unit Costs

| **Parameter Description** | **Cost per Test** | **Notes / Source** |
| --- | --- | --- |
| Oil & Grease | $150 | EPA 1664 |
| Heavy Metals | $72 | This is the average of $48 and $95. The Agency’s research found heavy metal water sampling tests generally fall within this range. |
| Polycyclic aromatic hydrocarbons (PAH) | $400 | For subset of water samples. |
| Total petroleum hydrocarbons, or Total extractable hydrocarbons (THE) | $320 | Analyzed all water samples. |
| Source: Abt Associates, and Water Testing Labs. 2020. “Price List Wastewater Testing Water Analysis Maryland, Virginia, Delaware, Washington DC.” Accessed April 16, 2020. <https://www.wtlmd.com/wastewater-testing-pricing-maryland-md-va-dc-de.php> | | |

## Oil Distribution Analysis

EPA estimates the cost of obtaining access to and running trajectory and related oil distribution model(s). This modeling and analysis will allow the RP to characterize the boundaries of the dispersed oil, tailor, or optimize sampling design and characterize the dispersant effectiveness to evaluate the changes in the condition of the oil due to weathering. EPA assumes the cost includes hiring a modeling contractor who has this modeling capability, and the associated labor for between one and three consultants per day. These labor requirements are presented in Exhibit A-10.

Exhibit A-10: Daily Oil Distribution Analyses Labor Burden (hours)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter Description** | **Scenario 1** | **Scenario 2** | **Scenario 3** | **Scenario 4** |
| Characterize the boundaries of the dispersed oil. | 2 | 2 | 4 | 6 |
| Tailor or optimize sampling design. | 2 | 2 | 4 | 6 |
| Characterize the dispersant effectiveness to determine the changes in the condition of the oil due to weathering. | 4 | 4 | 8 | 12 |
| **Total Hours per Day** | **8** | **8** | **16** | **24** |

EPA developed labor costs using occupation-specific fully-loaded rates from the U.S. Bureau of Labor Statistics. EPA assumes the oil distribution analysis labor is provided by the Environmental Scientists and Geoscientists occupation in the management, scientific, and technical consulting services industry (NAICS 541600).

Exhibit A-11: Labor Rates for Oil Distribution Analysis ($2019)

| **BLS OCC Code** | **Occupation Description** | **NAICS** | **NAICS Description** | **Fully-Loaded Labor Rate ($/hr)** |
| --- | --- | --- | --- | --- |
| 19-2040 | Environmental Scientists and Geoscientists | 541600 | Management, Scientific, and Technical Consulting Services | $57.46 |
| Source: EPA calculated the fully-loaded wage rate using the Employer Cost of Compensation to estimate total value of benefits. The original wage rate of $39.42 was divided by BLS estimated component of private sector wages and salaries (68.6%) to account for the additional 31.4 percent of benefits usually paid as part of compensation (BLS 2020a and BLS 2020b). | | | | |

Exhibit A-12 presents respondent daily unit costs for the oil distribution analysis.

Exhibit A-12: Daily Oil Distribution Analyses Unit Cost ($2019)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter Description** | **Scenario 1** | **Scenario 2** | **Scenario 3** | **Scenario 4** |
| Characterize the boundaries of the dispersed oil. | $115 | $115 | $230 | $345 |
| Tailor or optimize sampling design. | $115 | $115 | $230 | $345 |
| Characterize the dispersant effectiveness to determine the changes in the condition of the oil due to weathering. | $230 | $230 | $460 | $690 |
| **Unit Cost per Day** | **$460** | **$460** | **$919** | **$1,379** |

## Ecological Characterization

EPA assumes that the characterization of ecological receptors requires a one-time use of labor to conduct the study based on existing sources of information. The ecological characterization analysis is performed by an Environmental Scientist employed by the RP. In addition, the RP is tasked with determining an acute toxicity level of concern. The Agency assumes that toxicity analysis and monitoring occurs as part of the previously described water column sampling, including background sampling, and therefore, no additional costs are associated with this activity (Exhibit A-13).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Parameter Description** | **Scenario 1** | | **Scenario 2** | | **Scenario 3** | | **Scenario 4** | |
| One-Time | Daily | One-Time | Daily | One-Time | Daily | One-Time | Daily |
| Develop Ecological Characterization Study | 24 | - | 40 | - | 80 | - | 100 | - |

Exhibit A-13: Ecological Characterization Labor Burden (hours)

Exhibit A-14 presents the correspondingfully-loaded labor rate for an Environmental Scientists/Geoscientists in the oil and gas extraction industry, (NAICS 211100).

Exhibit A-14: Labor Rate for Ecological Characterization Study ($2019)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **BLS OCC Code** | **Occupation Description** | **NAICS** | **NAICS Description** | **Fully-Loaded Labor Rate ($/hr)** |
| 19-2040 | Environmental Scientists and Geoscientists | 211100 | Oil and Gas Extraction | $110.83 |
| Source: EPA calculated the fully-loaded wage rate using the Employer Cost of Compensation to estimate total value of benefits. The original wage rate of $76.03 was divided by BLS estimated component of private sector wages and salaries (68.6%) to account for the additional 31.4 percent of benefits usually paid as part of compensation BLS 2020a and BLS 2020b. | | | | |

Exhibit A-15 presents the per-respondent unit cost for developing the ecological characterization.

Exhibit A-15: Unit Costs for Ecological Characterization ($2019)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter Description** | **Scenario 1** | **Scenario 2** | **Scenario 3** | **Scenario 4** |
| Develop Ecological Characterization Study. | $2,660 | $4,433 | $8,866 | $11,083 |

## Immediate Reporting

EPA assumes the immediate reporting will require an Emergency Response Manager to spend one hour per day to fulfill the immediate reporting requirements across all scenarios. EPA assumes the same labor requirements apply across all scenarios (Exhibit A-16).

Exhibit A-16: Immediate Reporting Labor Burden (hours per day)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter Description** | **Scenario 1** | **Scenario 2** | **Scenario 3** | **Scenario 4** |
| Immediate reporting of ecological receptors. | 0.5 | 0.5 | 0.5 | 0.5 |
| Immediately report to the OSC any deviation of more than 10 percent. | 0.5 | 0.5 | 0.5 | 0.5 |
| **Total** | **1** | **1** | **1** | **1** |

Exhibit A-17 presents the respondents’ daily unit cost for immediate reporting.

Exhibit A-17: Unit Cost per Day for Immediate Reporting ($2019)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter Description** | **Scenario 1** | **Scenario 2** | **Scenario 3** | **Scenario 4** |
| Immediate reporting of ecological receptors. | $60 | $60 | $60 | $60 |
| Immediately report to the OSC any deviation of more than 10 percent. | $60 | $60 | $60 | $60 |
| **Total** | **$120** | **$120** | **$120** | **$120** |

## Daily Reporting

EPA assumes that daily reporting will require 2.5 hours per day of an Emergency Response Manager’s time across all scenarios (Exhibit A-18).

Exhibit A-18: Daily Reporting Labor Burden (hours per day)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter description** | **Scenario 1** | **Scenario 2** | **Scenario 3** | **Scenario 4** |
| Daily reporting of sampling and data analyses | 0.5 | 0.5 | 0.5 | 0.5 |
| Reporting total amount of dispersant used for the previous reporting period | 1 | 1 | 1 | 1 |
| Report the estimated daily transport of dispersed and non-dispersed oil | 1 | 1 | 1 | 1 |
| **Total** | **2.5** | **2.5** | **2.5** | **2.5** |

Exhibit A-19 presents the respondents’ daily unit cost for daily reporting.

Exhibit A-19: Unit Cost per Day for Daily Reporting ($2019)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter description** | **Scenario 1** | **Scenario 2** | **Scenario 3** | **Scenario 4** |
| Daily reporting of sampling and data analyses | $60 | $60 | $60 | $60 |
| Reporting total amount of dispersant used for the previous reporting period | $120 | $120 | $120 | $120 |
| Report the estimated daily transport of dispersed and non-dispersed oil | $120 | $120 | $120 | $120 |
| **Total** | **$300** | **$300** | **$300** | **$300** |

## Summary of Total Unit Costs per Respondent, by Discharge Scenario

The unit labor burden and costs for each respondent to comply with the information collection requirements are presented in Exhibit A-20 and Exhibit A-21.

Exhibit A-20: Summary of Respondent Unit Labor Burden (hours)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Information Collection Activity** | **Burden Hours** | | | | | | | |
| **Scenario 1** | | **Scenario 2** | | **Scenario 3** | | **Scenario 4** | |
| **One-Time** | **Per- Day** | **One-Time** | **Per-Day** | **One-Time** | **Per- Day** | **One-Time** | **Per- Day** |
| **Dispersant Application Documentation** | **18** | **3** | **18** | **3** | **22** | **5** | **30** | **10** |
| Document the characteristics of the source oil | 8 | 0 | 8 | 0 | 8 | 0 | 10 | 0 |
| Document dispersant choice, application method and procedures, and required equipment | 8 | 1 | 8 | 1 | 8 | 1 | 10 | 1 |
| Document the oil discharge flow rate and the results of any efficacy and toxicity tests | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 3 |
| Document the discharge flow rate for volatile petroleum hydrocarbons | 0 | 0 | 0 | 0 | 4 | 2 | 6 | 6 |
| **Water Column Sampling** | **0** | **7** | **0** | **12** | **0** | **17** | **0** | **22** |
| Review trajectory modeling and determine daily sampling plan/locations | 0 | 2 | 0 | 2 | 0 | 2 | 0 | 2 |
| Analyze fluorometer and water sampling results | 0 | 5 | 0 | 10 | 0 | 15 | 0 | 20 |
| **Oil Distribution Analysis** | **0** | **8** | **0** | **8** | **0** | **16** | **0** | **24** |
| Characterize the boundaries of the dispersed oil. | 0 | 2 | 0 | 2 | 0 | 4 | 0 | 6 |
| Tailor or optimize sampling design. | 0 | 2 | 0 | 2 | 0 | 4 | 0 | 6 |
| Characterize the dispersant effectiveness to determine the changes in the condition of the oil due to weathering. | 0 | 4 | 0 | 4 | 0 | 8 | 0 | 12 |
| **Ecological Characterization** | **24** | **0** | **40** | **0** | **80** | **0** | **100** | **0** |
| **Immediate Reporting** | **0** | **1** | **0** | **1** | **0** | **1** | **0** | **1** |
| Immediate reporting of ecological receptors. | 0 | 0.5 | 0 | 0.5 | 0 | 0.5 | 0 | 0.5 |
| Immediately report to the OSC any deviation of more than 10 percent. | 0 | 0.5 | 0 | 0.5 | 0 | 0.5 | 0 | 0.5 |
| **Daily Reporting** | **0** | **2.5** | **0** | **2.5** | **0** | **2.5** | **0** | **2.5** |
| Daily reporting of sampling and data analyses | 0 | 0.5 | 0 | 0.5 | 0 | 0.5 | 0 | 0.5 |
| Reporting total amount of dispersant used for the previous reporting period | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| Report the estimated daily transport of dispersed and non-dispersed oil | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| **Total Labor Burden per Respondent per Discharge** | **42** | **21.5** | **58** | **26.5** | **102** | **41.5** | **130** | **59.5** |

Exhibit A-21: Summary of Respondent Unit Cost ($2019)

| **Information Collection Activity** | **Unit Cost** | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Scenario 1** | | **Scenario 2** | | **Scenario 3** | | **Scenario 4** | |
| **One-Time** | **Per- Day** | **One-Time** | **Per-Day** | **One-Time** | **Per- Day** | **One-Time** | **Per- Day** |
| **Dispersant Application Documentation** | **$2,163** | **$361** | **$2,163** | **$361** | **$2,644** | **$601** | **$3,606** | **$1,202** |
| Document the characteristics of the source oil | $962 | $0 | $962 | $0 | $962 | $0 | $1,202 | $0 |
| Document dispersant choice, application method and procedures, and required equipment | $962 | $120 | $962 | $120 | $962 | $120 | $1,202 | $120 |
| Document the oil discharge flow rate and the results of any efficacy and toxicity tests | $240 | $240 | $240 | $240 | $240 | $240 | $481 | $361 |
| Document the discharge flow rate for volatile petroleum hydrocarbons | $0 | $0 | $0 | $0 | $481 | $240 | $721 | $721 |
| **Water Column Sampling** | **$0** | **$26,152** | **$0** | **$49,055** | **$0** | **$94,394** | **$0** | **$162,124** |
| *Labor Burden* | *$0* | *$776* | *$0* | *$1,330* | *$0* | *$1,884* | *$0* | *$2,438* |
| Review trajectory modeling and determine daily sampling plan/locations | $0 | $222 | $0 | $222 | $0 | $222 | $0 | $222 |
| Analyze fluorometer and water sampling results | $0 | $554 | $0 | $1,108 | $0 | $1,662 | $0 | $2,217 |
| *Other Equipment and Laboratory Testing* | *$0* | *$25,377* | *$0* | *$47,726* | *$0* | *$92,510* | *$0* | *$159,686* |
| RP Monitoring Vessel | $0 | $21,600 | $0 | $43,200 | $0 | $86,400 | $0 | $151,200 |
| Fluorometer and Water Quality Meter (one per vessel) | $0 | $835 | $0 | $1,584 | $0 | $3,168 | $0 | $5,544 |
| LISST (two instruments) | $0 | $2,000 | $0 | $2,000 | $0 | $2,000 | $0 | $2,000 |
| Dispersant Water Column Sample Testing per Sample | $0 | $942 | $0 | $942 | $0 | $942 | $0 | $942 |
| **Oil Distribution Analysis** | $0 | **$460** | $0 | **$460** |  | **$919** | $0 | **$1,379** |
| Characterize the boundaries of the dispersed oil. | $0 | $115 | $0 | $115 | $0 | $230 | $0 | $345 |
| Tailor or optimize sampling design. | $0 | $115 | $0 | $115 | $0 | $230 | $0 | $345 |
| Characterize the dispersant effectiveness to determine the changes in the condition of the oil due to weathering. | $0 | $230 | $0 | $230 | $0 | $460 | $0 | $690 |
| **Ecological Characterization** | **$2,660** | **$0** | **$4,433** | **$0** | **$8,866** | **$0** | **$11,083** | **$0** |
| **Immediate Reporting** | **$0** | **$120** | **$0** | **$120** | **$0** | **$120** | **$0** | **$120** |
| Immediate reporting of ecological receptors. | $0 | $60 | $0 | $60 | $0 | $60 | $0 | $60 |
| Immediately report to the OSC any deviation of more than 10 percent. | $0 | $60 | $0 | $60 | $0 | $60 | $0 | $60 |
| **Daily Reporting** | **$0** | **$300** | **$0** | **$300** | **$0** | **$300** | **$0** | **$300** |
| Daily reporting of sampling and data analyses | $0 | $60 | $0 | $60 | $0 | $60 | $0 | $60 |
| Reporting total amount of dispersant used for the previous reporting period | $0 | $120 | $0 | $120 | $0 | $120 | $0 | $120 |
| Report the estimated daily transport of dispersed and non-dispersed oil | $0 | $120 | $0 | $120 | $0 | $120 | $0 | $120 |
| **Total Labor Burden per Respondent per Discharge** | **$4,823** | **$27,393** | **$6,597** | **$50,296** | **$11,511** | **$96,335** | **$14,689** | **$165,125** |

# Total Costs for Respondents

## Information on Dispersant Application

Total estimated dispersant application cost for each model discharge scenario is calculated by multiplying the estimated hours by task by the fully-loaded labor rate for an Emergency Manager in the Oil and Gas Extraction industry. Then, per-day costs, where applicable, are estimated based on the model discharge’s number of monitoring days, from Exhibit A-1.

Exhibit A-22: Total Dispersant Application Labor Burden Hours and Cost ($2019)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Labor Requirement** | **Scenario 1** | | **Scenario 2** | | **Scenario 3** | | **Scenario 4** | |
|  | **Cost** | **Hours** | **Cost** | **Hours** | **Cost** | **Hours** | **Cost** | **Hours** |
| Document the characteristics of the source oil | $962 | 8 | $962 | 8 | $962 | 8 | $1,202 | 10 |
| Document dispersant choice, application method and procedures, and required equipment | $1,562 | 13 | $4,207 | 13 | $8,774 | 13 | $12,019 | 15 |
| Document the oil discharge flow rate and the results of any efficacy and toxicity tests | $1,442 | 12 | $6,731 | 12 | $15,865 | 12 | $32,932 | 19 |
| Document the discharge flow rate for volatile petroleum hydrocarbons | $0 | 0 | $0 | - | $16,105 | 14 | $65,623 | 36 |
| **Total** | **$3,966** | **33** | **$11,899** | **33** | **$41,706** | **47** | **$111,776** | **80** |

## Water Column Sampling

Total labor-related costs are calculated by multiplying the estimated hours by the fully-loaded labor rate for an Environmental Scientist in the Oil and Gas Extraction industry, and each scenario’s number of monitoring days. Equipment and offsite sample testing costs are similarly estimated based on the unit costs for equipment and number of monitoring days associated with each scenario; and, for offsite sample testing, the total number of samples.

Exhibit A-23: Total Water Sampling Labor Burden Hours and Cost ($2019)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Labor Requirement** | **Scenario 1** | | **Scenario 2** | | **Scenario 3** | | **Scenario 4** | |
| **Cost** | **Hours** | **Cost** | **Hours** | **Cost** | **Hours** | **Cost** | **Hours** |
| Analyze water sampling results (per day) | $554 | 5 | $1,108 | 10 | $1,662 | 15 | $2,217 | 20 |
| Review trajectory modeling and determine daily sampling plan/locations (per day) | $222 | 2 | $222 | 2 | $222 | 2 | $222 | 2 |
| Total per Day | $776 | 7 | $1,330 | 12 | $1,884 | 17 | $2,438 | 22 |
| *Number of monitoring days* | *5* | | *27* | | *65* | | *90* | |
| **Total** | **$3,879** | **35** | **$35,909** | **324** | **$122,468** | **1,105** | **$219,445** | **1,980** |

Exhibit A-24: Total Estimated Water Sampling Equipment and Testing Costs ($2019)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Equipment** | **Scenario 1** | **Scenario 2** | **Scenario 3** | **Scenario 4** |
| SMART Tier III fluorometry vessels | $108,000 | $1,166,400 | $5,616,000 | $13,608,000 |
| Fluorometers & Water Meters | $4,175 | $42,768 | $205,920 | $498,960 |
| LISSTs | $10,000 | $54,000 | $130,000 | $180,000 |
| Offsite water sample testing | $23,538 | $47,075 | $235,375 | $376,600 |
| **Total Cost** | **$145,713** | **$1,310,243** | **$6,187,295** | **$14,663,560** |

## Oil Distribution Analyses

Total costs for oil distribution analyses are calculated by multiplying the estimated hours by the fully-loaded labor rate for an Environmental Scientist in the Management, Scientific, and Technical Consulting Services industry, and by the number of dispersant monitoring days assumed for each scenario.

Exhibit A-25: Total Oil Distribution Analysis Labor Burden Hours and Cost ($2019)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Labor Requirement** | **Scenario 1** | | **Scenario 2** | | **Scenario 3** | | **Scenario 4** | |
| **Cost** | **Hours** | **Cost** | **Hours** | **Cost** | **Hours** | **Cost** | **Hours** |
| Characterize the boundaries of the dispersed oil. | $575 | 10 | $7,470 | 54 | $14,941 | 260 | $31,030 | 540 |
| Tailor or optimize sampling design. | $575 | 10 | $7,470 | 54 | $14,941 | 260 | $31,030 | 540 |
| Characterize the dispersant effectiveness to determine the changes in the condition of the oil due to weathering. | $1,149 | 20 | $14,941 | 108 | $29,881 | 520 | $62,061 | 1,080 |
| **Total** | **$2,299** | **40** | **$29,881** | **216** | **$59,762** | **1,040** | **$124,121** | **2,160** |

## Ecological Characterization

Total estimated ecological characterization cost are calculated by multiplying the estimated hours by the fully-loaded labor rate for an Environmental Scientist in the Oil and Gas Extraction industry.

Exhibit A-26: Total Ecological Characterization Labor Burden Hours and Cost ($2019)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Labor Requirement** | **Scenario 1** | | **Scenario 2** | | **Scenario 3** | | **Scenario 4** | |
| **Cost** | **Hours** | **Cost** | **Hours** | **Cost** | **Hours** | **Cost** | **Hours** |
| Develop Ecological Characterization Study | $2,660 | 24 | $4,433 | 40 | $8,866 | 80 | $11,083 | 100 |

## Immediate Reporting

Total estimated immediate reporting costs for dispersant monitoring are calculated by multiplying the estimated hours by the fully-loaded labor rate for an Emergency Manager in the Oil and Gas Extraction industry, and the number of monitoring days for each scenario.

Exhibit A-27: Total Immediate Reporting Labor Burden Hours and Cost ($2019)

| **Labor Requirement** | **Scenario 1** | | **Scenario 2** | | **Scenario 3** | | **Scenario 4** | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Cost** | **Hours** | **Cost** | **Hours** | **Cost** | **Hours** | **Cost** | **Hours** |
| Immediate reporting of ecological receptors. | $300 | 2.5 | $1,623 | 13.5 | $3,906 | 32.5 | $5,409 | 45 |
| Immediately report to the OSC any deviation of more than 10 percent. | $300 | 2.5 | $1,623 | 13.5 | $3,906 | 32.5 | $5,409 | 45 |
| **Total** | **$601** | **5** | **$3,245** | **27** | **$7,812** | **65** | **$10,817** | **90** |

## Daily Reporting

Total daily reporting costs are calculated based on the number of hours per day, the fully-loaded labor rate for an Emergency Manager in the Oil and Gas Extraction industry, and the number of monitoring days for each scenario.

Exhibit A-28: Total Daily Reporting Labor Burden and Cost ($2019)

| **Labor Requirement** | **Scenario 1** | | **Scenario 2** | | **Scenario 3** | | **Scenario 4** | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Cost** | **Hours** | **Cost** | **Hours** | **Cost** | **Hours** | **Cost** | **Hours** |
| Daily reporting of sampling and data analyses | $300 | 2.5 | $1,623 | 13.5 | $3,906 | 32.5 | $5,409 | 45 |
| Reporting total amount of dispersant used for the previous reporting period | $601 | 5.0 | $3,245 | 27 | $7,812 | 65 | $10,817 | 90 |
| Report the estimated daily transport of dispersed and non-dispersed oil | $601 | 5.0 | $3,245 | 27 | $7,812 | 65 | $10,817 | 90 |
| **Total** | **$1,502** | **12.5** | **$8,113** | **67.5** | **$19,531** | **162.5** | **$27,043** | **225** |

## Total Respondent Cost

Exhibit A-29 summarizes the total labor burden and cost per respondent, per discharge scenario. Total costs are disaggregated for labor, O&M, and equipment costs. Costs range from $160,000 in Scenario 1 to $15 million in Scenario 4 (i.e., Scenario 4 costs exceed Scenario 1 costs by a factor of approximately 100x). EPA estimates costs of $1.4 million and $6.4 million for Scenarios 2 and 3, respectively.[[10]](#footnote-10)

Exhibit A-29: Total Estimated Respondent Labor Burden and Cost, by Discharge Scenario ($2019)

| **Rule Requirement** | **Labor** | | **O&M** | **Equipment** |
| --- | --- | --- | --- | --- |
| **Hours** | **Cost** |
| **Scenario 1** | | | | |
| **1. Information on Dispersant Application** | 33 | $3,966 | $0 | $0 |
| **2. Water Column Sampling** |  |  |  |  |
| Sampling Equipment | 0 | $0 | $0 | $122,175 |
| Sample Testing | 0 | $0 | $23,538 | 0 |
| Sampling Labor Costs | 35 | $3,879 | $0 | 0 |
| **3. Oil Distribution Analysis** | 40 | $2,299 | $0 | 0 |
| **4. Ecological Characterization** | 24 | $2,660 | $0 | 0 |
| **5. Immediate Reporting** | 5 | $601 | $0 | 0 |
| **6. Daily Reporting** | 12.5 | $1,502 | $0 | 0 |
| *Total Costs by Type* | *150* | *$14,907* | *$23,538* | *$122,175* |
| **Total Scenario Cost** | **$160,620** | | | |
| **Total Scenario Labor Burden Hours** | **150** | | | |
| **Scenario 2** | | | | |
| **1. Information on Dispersant Application** | 33 | $11,899 | $0 | $0 |
| **2. Water Column Sampling** |  |  |  |  |
| Sampling Equipment | 0 | $0 | $0 | $1,263,168 |
| Sample Testing | 0 | $0 | $47,075 | 0 |
| Sampling Labor Costs | 324 | $35,909 | $0 | 0 |
| **3. Oil Distribution Analysis** | 216 | $12,412 | $0 | 0 |
| **4. Ecological Characterization** | 40 | $4,433 | $0 | 0 |
| **5. Immediate Reporting** | 27 | $3,245 | $0 | 0 |
| **6. Daily Reporting** | 67.5 | $8,113 | $0 | 0 |
| *Total Costs by Type* | *708* | *$76,011* | *$47,075* | *$1,263,168* |
| **Total Scenario Cost** | **$1,386,254** | | | |
| **Total Scenario Labor Burden Hours** | **708** | | | |
| **Scenario 3** | | | | |
| 1. **Information on Dispersant Application** | 47 | $41,706 | $0 | $0 |
| **2. Water Column Sampling** |  |  |  |  |
| Sampling Equipment | 0 | $0 | $0 | $5,951,920 |
| Sample Testing | 0 | $0 | $235,375 | 0 |
| Sampling Labor Costs | 1105 | $122,468 | $0 | 0 |
| **3. Oil Distribution Analysis** | 1,040 | $59,762 | $0 | 0 |
| **4. Ecological Characterization** | 80 | $8,866 | $0 | 0 |
| **5. Immediate Reporting** | 65 | $7,812 | $0 | 0 |
| **6. Daily Reporting** | 162.5 | $19,531 | $0 | 0 |
| *Total Costs by Type* | *2,500* | *$260,146* | *$235,375* | *$5,951,920* |
| **Total Scenario Cost** | **$6,447,441** | | | |
| **Total Scenario Labor Burden Hours** | **2,500** | | | |
| **Scenario 4** | | | | |
| **1. Information on Dispersant Application** | 80 | $111,776 | $0 | $0 |
| **2. Water Column Sampling** |  |  |  |  |
| Sampling Equipment | 0 | $0 | $0 | $14,286,960 |
| Sample Testing | 0 | $0 | $376,600 | 0 |
| Sampling Labor Costs | 1980 | $219,445 | $0 | 0 |
| **3. Oil Distribution Analysis** | 2,160 | $124,121 | $0 | 0 |
| **4. Ecological Characterization** | 100 | $11,083 | $0 | 0 |
| **5. Immediate Reporting** | 90 | $10,817 | $0 | 0 |
| **6. Daily Reporting** | 225 | $27,043 | $0 | 0 |
| *Total Costs by Type* | *4,635* | *$504,285* | *$376,600* | *$14,286,960* |
| **Total Scenario Cost** | **$15,167,845** | | | |
| **Total Scenario Labor Burden Hours** | **4,635** | | | |

Given a 0.2 probability of an applicable incident in any given year, based on EPA’s analysis of historical discharges, Exhibit A-30 presents the annual expected value for labor burden and cost for respondents. Estimated annualized costs range from $32,000 per year for Scenario 1 to $3.0 million per year for Scenario 4.

Exhibit A-30: Annual and Three-Year Labor Burden and Cost for Respondents ($2019)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Scenario** | | | |
| **Scenario 1** | **Scenario 2** | **Scenario 3** | **Scenario 4** |
| Annual Number of Respondents and Responses | 0.2 | 0.2 | 0.2 | 0.2 |
| Annual Burden (hours) | 30 | 142 | 500 | 927 |
| Annual Cost | $32,124 | $277,251 | $1,289,488 | $3,033,569 |
| Three-Year Total Number of Respondents and Responses | 0.6 | 0.6 | 0.6 | 0.6 |
| Three-Year Total Burden (hours) | 90 | 425 | 1,500 | 2,781 |
| Three-Year Total Cost | $96,372 | $831,753 | $3,868,464 | $9,100,707 |

1. U.S. Coast Guard, National Response Center Incident Database. 2020. <http://nrc.uscg.mil/> [↑](#footnote-ref-1)
2. U.S. Department of Transportation (DOT), 2019a. Pipeline and Hazardous Material Safety Administration (PHMSA) Incident Database, <https://www.phmsa.dot.gov/data-and-statistics/pipeline/distribution-transmission-gathering-lng-and-liquid-accident-and-incident-data> [↑](#footnote-ref-2)
3. U.S. Department of the Interior (DOI), Natural Resource Damage Assessment and Restoration Program (NRDAR Program) incident reports, <https://www.cerc.usgs.gov/orda_docs/> [↑](#footnote-ref-3)
4. Bureau of Labor Statistics. 2020a. “May 2019 National Industry-Specific Occupational Employment and Wage Estimates.” Accessed June 8, 2020. <https://www.bls.gov/oes/current/oessrci.htm> [↑](#footnote-ref-4)
5. Bureau of Labor Statistics. 2020b. “Employer Costs For Employee Compensation – December 2019.” Accessed June 8, 2020. <https://www.bls.gov/news.release/ecec.nr0.htm> [↑](#footnote-ref-5)
6. Oil Spill Response Limited. 2020. “Scale OF Fees 2020.” Oil Spill Response. <https://www.oilspillresponse.com/globalassets/activate-us/scale-of-fees/scale-of-fees-2020.pdf> [↑](#footnote-ref-6)
7. Ibid. [↑](#footnote-ref-7)
8. Water Testing Labs. 2020. “Price List Wastewater Testing Water Analysis Maryland, Virginia, Delaware, Washington DC.” Accessed April 16, 2020. <https://www.wtlmd.com/wastewater-testing-pricing-maryland-md-va-dc-de.php> [↑](#footnote-ref-8)
9. This data source, along with the Water Testing Labs source referenced in Exhibit 30, was also used by the American Petroleum Institute (API) and the National Ocean Industries Association (NOIA) in the monitoring cost estimate provided in their public comment submission following the 2015 NPRM (comment docket ID # EPA–HQ–OPA–2006–0090–0518–A1). [↑](#footnote-ref-9)
10. For reference, EPA’s 2015 NPRM assumed a single representative value of $500,000 per spill. In public comments submitted in response to the NPRM, the American Petroleum Institute (API) and the National Ocean Industries Association (NOIA) provided an estimate for a single scenario, with a cost of $850,000. The API/NOIA’s analysis was based on a spill with a 21-day active monitoring period and is closest in concept to Scenario 2 in this RIA, for which EPA estimates costs of $1.4 million. [↑](#footnote-ref-10)