# Deepwater Port License Application
# Blue Marlin Offshore Port (BMOP) Project

***Volume IIb – Appendix E***

***Submitted to:***

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# Deepwater Port License Application
# Blue Marlin Offshore Port (BMOP) Project

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|---|---|
| Volume I: | General (Public), including Deepwater Port License Application and Appendices<br>(*under separate cover*) |
| Volume IIa: | Offshore Project Components Environmental Evaluation (Public)<br>(*under separate cover*) |
| **Volume IIb:** | **Onshore Project Components, Environmental Evaluation (Public)**<br>**(*herein*)** |
| Volume III: | Technical Information<br>[*Confidential*]<br>(*under separate cover*) |
| Volume IV: | Company and Financial Information<br>[*Confidential*]<br>(*under separate cover*) |

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# APPENDIX E

## ONSHORE AIR QUALITY CALCULATIONS

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# ONSHORE EMISSIONS CALCULATIONS

## Onshore Construction and Stationary Source Air Emissions Calculations

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# 1. ONSHORE CONSTRUCTION EMISSIONS

Blue Marlin Offshore Port, LLC (BMOP) estimated onshore construction-related emissions of criteria pollutants, Hazardous Air Pollutants (HAPs), and greenhouse gases (GHGs) for the proposed Deepwater Port (Project). The Project entails several above-ground facilities such as onshore pipeline, BMOP pump station, and mainline valves. In addition, the proposed Project will affect the existing facilities such as Stations 501 and 701. These above-ground facilities are located in Jefferson and Orange County, TX and Cameron Parish, LA.

Air quality impacts associated with onshore construction of the Project will include emissions from the use of equipment powered by gasoline or diesel engines as well as engine emissions from marine vessels. Onshore construction activities will also result in engine emissions from workers commuting and construction vehicles. Fugitive dust may also be generated by construction activities and vehicular traffic on paved roads. The onshore construction emissions will be temporary in nature and will not significantly affect regional air quality. BMOP anticipates the onshore construction activities will begin in December 2021 and will be completed in April 2023. Detailed onshore construction emission calculations along with the methodology, emission factors, and associated references are provided in Appendix A. Table 1-1 provides the summary of onshore construction emissions for the proposed Project.

**Table 1-1. Summary of Total Onshore Pipeline Construction Emissions**

| Construction Activity | CO | $NO_X$ | $PM_{10}$ | $PM_{2.5}$ | $SO_2$ | VOC | Total HAPs | $CO_2e$ |
|---|---|---|---|---|---|---|---|---|
| **2021 Emissions** | | | | | | | | |
| Diesel non-road equipment[1] | 0.39 | 1.73 | 0.07 | 0.07 | <0.01 | 0.06 | 0.18 | 508 |
| Diesel and gas on-road equipment | 0.30 | 0.48 | 0.02 | 0.02 | <0.01 | 0.03 | 0.18 | 291 |
| Construction activity fugitive dust[2] | -- | -- | 2.01 | 0.20 | -- | -- | -- | -- |
| **2021 Total** | **0.69** | **2.21** | **2.10** | **0.29** | **0.02** | **0.09** | **0.36** | **799** |
| **2022 Emissions** | | | | | | | | |
| Diesel non-road equipment[1] | 22.56 | 96.23 | 3.80 | 3.74 | 0.14 | 4.18 | 1.37 | 17,765 |
| Diesel and gas on-road equipment | 13.81 | 45.49 | 1.56 | 1.43 | 0.25 | 2.26 | 0.56 | 29,621 |
| Construction activity fugitive dust[2] | -- | -- | 24.16 | 2.45 | -- | -- | -- | -- |
| **2022 Total** | **36.38** | **141.73** | **29.51** | **7.62** | **0.38** | **6.44** | **1.93** | **47,386** |
| **2023 Emissions** | | | | | | | | |
| Diesel non-road equipment[1] | 1.69 | 10.31 | 0.31 | 0.31 | 0.01 | 0.30 | 0.18 | 870 |
| Diesel and gas on-road equipment | 1.35 | 2.91 | 0.10 | 0.09 | <0.01 | 0.15 | 0.18 | 2,158 |
| Construction activity fugitive dust[2] | -- | -- | 8.05 | 0.82 | -- | -- | -- | -- |
| **2023 Total** | **3.04** | **13.22** | **8.46** | **1.22** | **0.03** | **0.45** | **0.36** | **3,028** |

[1] Include emissions from marine vessels

[2] Include fugitive emissions from construction activities and paved road.

## 1.1 Onshore Construction Activities

Construction equipment are predicted to be powered by diesel engines, which emit combustion-related emissions, including carbon monoxide (CO), oxides of nitrogen ($NO_X$), particulate matter ($PM_{10}/PM_{2.5}$), sulfur dioxide ($SO_2$), volatile organic compounds (VOCs), GHGs, and minimal amounts of HAPs. Emission estimates for construction equipment are based on the equipment that is expected to be utilized (type, fuel type, capacity, and operational schedule). The marine vessels (assist tugboats, crew boats, etc…) associated with the onshore construction activities are included under non-road engines. Construction-related equipment that would generate air emissions includes the following:

- Air Compressors;
- Bore/Drill Rigs;
- Cranes;
- Crawler Tractor/Dozers;
- Side Boom;
- Marooka;
- Excavators;
- Generator Sets;
- Other Construction Equipment;
- Tractors/Loaders/Backhoes;
- Welders;
- Air Boat;
- Tugboat;
- Crew Boat; and
- Dredge.

The following sections provides a summary of the emissions calculation methodologies, emission factors, and operating parameter assumptions used in estimating the onshore construction-related emissions from the construction equipment utilized for the proposed Project.

### 1.1.1 Marine Vessels for Onshore Construction Activities

BMOP expects to utilize several marine vessels such as tugboats, crew boats, air boats, and dredgers for various onshore construction activities. Per the information received from BMOP, Table 1-2 shows the marine vessels that are expected to be used for the proposed Project. The operating hours for the marine vessels are provided by BMOP. Typical engine rating for each marine vessels are utilized to estimate air emissions. The load factors for the marine vessels are obtained from Table 3-4 of US Environmental Protection Agency (USEPA) *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* final report.

**Table 1-2. Marine Vessels – Equipment Data**

| Equipment Type | Fuel Type | Engine Rating (hp) | Load Factor (%) |
|---|---|---|---|
| Air Boat | Diesel | 225 | 43% |
| Tugboat | Diesel | 900 | 31% |
| Crew Boat | Diesel | 225 | 45% |
| Dredge | Diesel | 535 | 69% |

#### *1.1.1.1 Emission Calculation Methodology for Marine Vessels*

The emission factors utilized for estimating emissions from the above listed marine vessels and the calculation methodology are discussed below:

- **Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009** - $PM_{10}/PM_{2.5}$, CO, $NO_X$, $SO_2$, VOCs, carbon dioxide ($CO_2$), methane ($CH_4$), and nitrous oxide ($N_2O$) emission factors are based on Tier 0 engines (Category 1) emission factors from Table 3-8 of USEPA *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* final report. A fuel correction factor of 0.005 was applied to $SO_2$ emission factors (Ultra Low Sulfur Diesel) per Table 3-9 of USEPA *Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories* final report.

- **AP-42, Section 3.4. Large Stationary Diesel and All Stationary Dual-fuel Engines** - The HAP emission factors for engines greater than 600 hp are based on Tables 3.4-3 and 3.4-4 of AP-42, Section 3.4. Large Stationary Diesel and All Stationary Dual-fuel Engines. An average Brake-specific fuel consumption (BSFC) of 7,000 Btu/hp-hr has been used to convert emission factors from lb/MMBtu to lb/hp-hr.

- **AP-42, Section 3.3. Gasoline and Diesel Industrial Engines** - The HAP emission factors for engines less than 600 hp are based on Table 3.3-2 of AP-42, Section 3.3. Gasoline and Diesel Industrial Engines. An average BSFC of 7,000 Btu/hp-hr has been used to convert emission factors from lb/MMBtu to lb/hp-hr.

#### *1.1.1.2 Operating Parameters*

The annual emissions from the above listed marine vessels are calculated based on the following operating parameters:

- **Annual Emissions** - The marine vessel total emissions are based on hours of operation data provided by BMOP. The selected emission factors used for these pollutants are shown in the emission calculations included in Appendix A.

### 1.1.2 Construction Equipment Emissions

Per the information received from BMOP, the construction equipment shown in Table 1-3 are expected to be used for onshore construction activities. Typical engine rating for each onshore construction equipment are utilized to estimate air emissions. The operating hours for each onshore construction equipment are provided by BMOP. The Source Classification Code (SCC) and load factors are based on USEPA's Motor Vehicle Emission Simulator (MOVES) version 2014b.

**Table 1-3. Construction Equipment – Equipment Data**

| Equipment Type | Fuel Type | SCC | Engine Rating (hp) | Load Factor (%) |
|---|---|---|---|---|
| Air Compressors | Diesel | 2270006015 | 180 | 43% |
| Horizontal Directional Drilling Equipment | Diesel | 2270002033 | 300 | 43% |
| Cranes | Diesel | 2270002045 | 625 | 43% |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% |
| Side Boom | Diesel | 2270002069 | 335 | 59% |
| Marooka | Diesel | 2270002069 | 335 | 59% |
| Excavators | Diesel | 2270002036 | 250 | 59% |
| Generator Sets | Diesel | 2270006005 | 200 | 43% |
| Bending Machine | Diesel | 2270002081 | 265 | 59% |
| Tractors/Loaders/Backhoes | Diesel | 2270002066 | 160 | 21% |
| Welders | Diesel | 2270006025 | 50 | 21% |

#### *1.1.2.1 Emission Calculation Methodology for Construction Equipment*

The emission factors for the construction equipment listed in Table 1-3 are estimated using USEPA MOVES2014b as discussed below:

- **USEPA MOVES Modeling System, version 2014b** - Emission factors in "g/hp-hr" for $NO_X$, CO, $PM_{10}$, $PM_{2.5}$, $SO_2$, VOC, $CH_4$, $CO_2$, and HAPs for the construction equipment listed in Table 1-3 were obtained using the most recent version of the USEPA MOVES modeling system, version 2014b. The MOVES modeling system will not generate emission factors for $N_2O$ for non-road engines. Therefore, the $N_2O$ emission factors were obtained from the "2020 Climate Registry Default Emission Factors" and apportioned based on $CO_2$ emissions. The emission factors were generated using the MOVES in-built SQL script "emissionfactors_per_hphr_by_equipment_and_horsepower". This script generates emission factors for each SCC for various engine ratings for all selected pollutants and fuel type in the model. For non-road equipment utilized for the onshore construction activities, emission factors, via MOVES, were developed for the following on-shore project locations, as provided in Section 1.3 of Volume IIb:

  - Jefferson County, Texas
  - Orange County, Texas
  - Cameron Parish, Louisiana

  The worst-case factors were utilized for each construction year to be conservative. Table 1-4 provides the summary of key MOVES inputs utilized for developing the emission factors.

**Table 1-4. Summary of Key MOVES Input for Construction Equipment**

| Moves Input | Description |
|---|---|
| Scale | Model: Nonroad<br>Domain/Scale: National<br>Calculation Type: Inventory |
| Time Spans | Calendar Year(s): 2021, 2022, 2023<br>Months: All<br>Days: Weekdays/Weekends<br>Hours: All |
| Geographic Bounds | Region: County (Jefferson County, TX; Orange County, TX; and Cameron Parish, LA) |
| Vehicles/ Equipment | All valid fuel and source use type combinations |
| Pollutants and Processes | Criteria and HAPs (all processes) |
| Output - Output Emissions | SCC, HP Class, Fuel Type, and Emission Process. |

#### *1.1.2.2 Operating Parameters*

The annual emissions from the above listed equipment are calculated based on the following operating parameters:

- **Annual Emissions** - The total emissions from construction equipment are based on hours of operation data provided by BMOP. The selected emission factors used for these pollutants are shown in the emission calculations included in Appendix A.

### 1.1.3 Construction Vehicle Emissions

BMOP quantified criteria pollutants, HAPs, and GHG emissions from construction vehicle emissions. Emissions are quantified based on the hours of operations provided by BMOP and a 50-mile round trip/vehicle.

#### *1.1.3.1 Emission Calculation Methodology for Construction Vehicle Emissions*

The emission factors for the construction vehicular emissions from construction activity are estimated using USEPA MOVES2014b as discussed below:

- **USEPA MOVES Modeling System, version 2014b** - Emission factors in "g/vehicle miles traveled (g/VMT)" for $NO_X$, CO, $PM_{10}$, $PM_{2.5}$, $SO_2$, VOC, $CH_4$, $N_2O$, $CO_2$, and HAPs for the construction vehicles were obtained using the most recent version of the USEPA MOVES modeling system, version 2014b. Table 1-5 provides the summary of key MOVES inputs utilized for developing the emission factors. The emission factors were generated using the MOVES in-built SQL script "EmissionRates.sql". This script generates emission factors for each source type, selected pollutants, and fuel type in the model. The MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions conservatively.

**Table 1-5. Summary of Key MOVES Input for On-road and Onsite Vehicles**

| Moves Input | Description |
|---|---|
| Scale | Model: Onroad<br>Domain/Scale: National<br>Calculation Type: Inventory |
| Time Spans | Calendar Year(s): 2021, 2022, 2023<br>Months: All<br>Days: Weekdays/Weekends<br>Hours: All |
| Geographic Bounds | Region: County (Jefferson County, TX; Orange County, TX; and Cameron Parish, LA) |
| Vehicles/ Equipment | All valid fuel and source use type combinations |
| Pollutants and Processes | Criteria and HAPs (all processes) |
| Output – General Output /Output Emissions Detail | Enabled Activity Outputs for Onroad: Distance Traveled, Population<br>Units: Grams (Mass), Joules (Energy), Miles (Distance)<br>Output Emissions Detail: SCC, Fuel Type, Emission Process, Road Type and Source Use Type |

#### *1.1.3.2 Operating Parameters*

The annual emissions from construction vehicular emissions are calculated based on the following operating parameters:

- **Annual Emissions** - The construction vehicles total emissions are based on the vehicle miles traveled per year (VMT/yr). The selected emission factors used for these pollutants are shown in the emission calculations included in Appendix A.

### 1.1.4 Worker Commuting (Vehicular) Emissions

BMOP expects minimal emissions for the on-road vehicular emissions from worker commuting. BMOP estimated the criteria pollutants, HAPs, and GHG emissions from on-road worker commuting during the construction period based on a conservative estimate. Emissions are based on a 30-mile round trip and vehicle trips that are shown Table 1-6.

**Table 1-6. Worker Commuting Vehicles Data**

| Vehicle Type | No. of Trips/Year | | |
|---|---|---|---|
| | 2021 | 2022 | 2023 |
| Gasoline Passenger Cars | 518 | 5,850 | 1,913 |
| Gasoline Passenger Trucks | 1,553 | 17,550 | 5,738 |

#### *1.1.4.1 Emission Calculation Methodology for Worker Commuting*

The emission factors for the on-road vehicular emissions from work commuting are estimated using USEPA MOVES2014b as discussed below:

**USEPA MOVES Modeling System, version 2014b** - Emission factors in "g/VMT" for $NO_X$, CO, $PM_{10}$, $PM_{2.5}$, $SO_2$, VOC, $CH_4$, $N_2O$, $CO_2$, and HAPs for the worker commuting vehicles were obtained using the most recent version of the USEPA MOVES modeling system, version 2014b. Table 1-7 provides the

summary of key MOVES inputs utilized for developing the emission factors. The emission factors were generated using the MOVES in-built SQL script "EmissionRates.sql". This script generates emission factors for each source type, selected pollutants, and fuel type in the model. The MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions conservatively.

**Table 1-7. Summary of Key MOVES Input for Worker Commuting**

| Moves Input | Description |
|---|---|
| Scale | Model: Onroad<br>Domain/Scale: National<br>Calculation Type: Inventory |
| Time Spans | Calendar Year(s): 2021, 2022, 2023<br>Months: All<br>Days: Weekdays/Weekends<br>Hours: All |
| Geographic Bounds | Region: County (Jefferson County, TX; Orange County, TX; and Cameron Parish, LA) |
| Vehicles/ Equipment | All valid fuel and source use type combinations |
| Pollutants and Processes | Criteria and HAPs (all processes) |
| Output - General Output/Output Emissions Detail | Enabled Activity Outputs for Onroad: Distance Traveled, Population<br>Units: Grams (Mass), Joules (Energy), Miles (Distance)<br>Output Emissions Detail: SCC, Fuel Type, Emission Process, Road Type and Source Use Type |

#### *1.1.4.2 Operating Parameters*

The annual emissions from vehicular worker commuting emissions are calculated based on the following operating parameters:

- **Annual Emissions** - The on-road vehicle worker commuting total emissions are based on the VMT/yr. The selected emission factors used for these pollutants are shown in the emission calculations included in Appendix A.

### 1.1.5 Fugitive Dust – Construction

The onshore construction area is expected to have some particulate emissions related to various construction activities for the duration of the construction period. BMOP estimated fugitive emissions based on the duration of the construction period and a conservative estimate of the area of land disturbance expected to occur during the construction period.

#### *1.1.5.1 Emission Calculation Methodology for Fugitive Dust – Paved Road*

The sources of emission factors used to estimate particulate emissions for this activity are summarized below:

- **WRAP Fugitive Dust Handbook, September 2006** - The $PM_{10}$ uncontrolled emission factors are based on WRAP Fugitive Dust Handbook, Countess Environmental, September 2006, Table 3-2, level 1, average conditions. The $PM_{2.5}$ emission factors are based on 10% of $PM_{10}$ emissions according to the WRAP Fugitive Dust Handbook, Countess Environmental, September 2006, Section 3.4.1. Emissions are

quantified based on assuming 50% control from water and other approved dust suppressants (WRAP Fugitive Dust Handbook, Countess Environmental, September 2006, Section 3.4.1).

#### *1.1.5.2 Operating Parameters*

The annual emissions are calculated based on the following operating parameters:

- **Annual Emissions** - The fugitive dust total emissions are based on the duration of the construction activity and the area of land disturbed during the construction. The selected emission factors used for these pollutants are shown in the emission calculations included in Appendix A.

### 1.1.6 Fugitive Dust – Paved Road Emissions

BMOP conservatively estimated fugitive emissions from paved road based on the VMT/yr utilized to quantify on-road worker commuting vehicular emissions.

#### *1.1.6.1 Emission Calculation Methodology for Fugitive Dust – Paved Road*

The sources of emission factors used to estimate particulate emissions for this activity are summarized below:

- **AP-42, Section 13.2.1, Paved Roads** - The particulate emission factors are based on AP-42, Section 13.2.1, Paved Roads, January 2011. For silt loading, no site-specific data is available. Thus, BMOP utilized the value from Table 13.2.1-2 for ubiquitous baseline with average daily traffic (ADT) ranging between 500 to 5,000 vehicles.

#### *1.1.6.2 Operating Parameters*

The annual emissions are calculated based on the following operating parameters:

- **Annual Emissions** - The fugitive dust total emissions are based on the vehicle miles traveled. The selected emission factors used for these pollutants are shown in the emission calculations included in Appendix A.

# 2. ONSHORE STATIONARY SOURCE EMISSIONS

There are three onshore stations proposed for the BMOP Project:

- Pump Station at the Nederland Terminal
- Station 501
- Station 701

The emissions for each have been calculated as discussed in the following subsections.

## 2.1 Pump Station at the Nederland Terminal

The pump station is located at the Nederland Terminal in Jefferson County, Texas. The purpose of the pump station will be to boost internal pipeline pressure and provide the driving force for the pipeline via the use of electric pumps. Associated air emissions from the pump station will include emissions generated from the sump tank, maintenance activities (such as pigging), and fugitive components. Specifically, the pump station will include the following:

- Six 9,000 hp horizontal centrifugal mainline pumps,
- 42" suction and discharge valves and piping for the mainline pumps,
- 42" bypass piping and check valves,
- 42" pig trap and bypass valve,
- Interconnecting pipes, valves, and PRVs,
- Sump tank and pump,
- Outbound meter skid with 4 meters runs,
- 4-pot Jiskoot CoJetix sampler skid, and
- Small volume prover.

With this proposed equipment, potential air emissions will result from pigging activities, the sump tank, and fugitive components.

### 2.1.1 Pigging and Sump Tank

The pump station will include pigging activities, and a sump tank (for the pigging activities). Potential emissions from both have been calculated in accordance with AP-42, Section 7.1.3.1, June 2020, and the following dimension and usage assumptions.

**Table 2-1. Pigging Activities**

| Tank | Tank Dimensions | | Volume (gal) | Activity (per yr) | Annual Throughput (gal/yr) | Orientation |
|---|---|---|---|---|---|---|
| | L (ft) | Dia. (ft) | | | | |
| Pigging | 63 | 3 | 3,329 | 24 Launch/Receipt | 79,888 | Horizontal |
| Sump Tank | 21 | 6 | 4,442 | 6 Turnovers | 26,650 | Horizontal |

The organic liquid contents were based on crude oil, and a potential HAP profile consistent with the offshore loading terminal. The vessels were assumed to operate continuously with fixed roofs.

### 2.1.2 Fugitive Emissions

Fugitive emissions were calculated based on the marketing terminal average emission factor (in pounds per hour [lb/hr])[1], using the following equation.

$$E_{VOC} = F_A \times WF_{VOC} \times N$$

Where:

$E_{VOC} = Emission\ rate\ of\ VOC\ from\ all\ equipment\ in\ the\ stream, \frac{lb}{hr}$

$F_A = average\ emission\ factor, \frac{lb}{hr}$

$WF_{VOC} = Weight\ fraction\ of\ VOC\ in\ the\ stream, \%$

$N = number\ of\ components\ in\ the\ stream$

This factor was chosen for consistency with the Nederland Terminal and as identified in Texas Commission on Environmental Quality's (TCEQ's) guidance document, *Air Permit Technical Guidance for Chemical Sources – Fugitive Guidance* (APDG 6422, June 2018).[2] It should be noted that no reduction from these average emissions factors has been applied for these estimates, to ensure a conservative representation.

The total number of piping components are based on current design estimates. All components are considered in light liquid service, handling crude oil. It is assumed that the factor represents total VOC (no non-VOC components present, which is consistent with recent sampling at the Nederland Terminal).

HAP emissions for the fugitive components were calculated from the weight percent in vapor of each speciated HAP, consistent with the marine loading evaluation for the offshore facility. Annual emissions for all fugitive emissions are based on continuous operation (i.e. 8,760 hours of operation).

### 2.1.3 Pump Station Potential Operating Emissions

Based on the methodology described above, the following table presents the potential emissions for the proposed pump station.

**Table 2-2. Pump Station Potential Operating Emissions**

| Source | Material | VOC Emissions (tpy) | HAP Emissions (tpy) |
|---|---|---|---|
| Sump Tank | Crude Oil (from pigging) | 0.11 | 0.01 |
| Pigging Activities | Crude Oil | 0.81 | 0.05 |
| Fugitive Components | Crude Oil (light liquid) | 0.28 | 0.02 |
| **Total:** | | **1.19** | **0.07** |

[1] As provided in EPA's Protocol for Equipment Leak Emission Estimates, EPA-453/R-95-017 https://www3.epa.gov/ttnchie1/efdocs/equiplks.pdf

[2] Memorandum from Richard A. Hyde, P.E., Director, Air Permits Division, TCEQ, to Interested Parties, "Use of Petroleum Marketing Terminal Fugitive Factors for Pipeline Breakout Stations," December 5, 2005.

## 2.2 Station 501

Crude oil will be routed from the pump station at Nederland, through a new 42-inch outer diameter (OD) onshore pipeline to the existing Stingray Mainline at Station 501 in Cameron Parish, Louisiana. Associated air emissions from Station 501 will include emissions from maintenance activities (such as pigging) and fugitive components. Specifically, the Station 501 will include the following:

- 42" pipeline tie-in with pig receiver,
- 36" tie-in to existing Mainline with pig launcher, and
- Mainline valve.

With this proposed equipment, potential air emissions will result from pigging activities and fugitive components. The methodology for calculating emissions from these activities is consistent with the pump station as described above,[3] and results in the following potential emissions.

**Table 2-3. Station 501 Potential Operating Emissions**

| Source | Material | VOC Emissions (tpy) | HAP Emissions (tpy) |
|---|---|---|---|
| Pig Receiver Barrel | Crude Oil | 1.01 | 0.06 |
| Pig Launcher Barrel | Crude Oil | 0.72 | 0.04 |
| Fugitive Components | Crude Oil (light liquid) | 0.10 | 0.01 |
| **Total:** | | **1.83** | **0.10** |

Even with the use of conservative methodology for calculating potential emissions, Station 501 meets the exemption criteria of LAC 33:III.501.B.2.d.i.

## 2.3 Station 701

Station 701 is located near Holly Beach in Cameron Parish, Louisiana. The facility is an existing onshore natural gas compressor station for the Stingray Pipeline. For the BMOP Project, the existing natural gas separation facility will be demolished, with all existing natural gas equipment removed, with the exception of two 10,000-barrel storage tanks to be converted to surge relief vessels. Under the Project, Station 701 will include the following:

- Two 10,000 barrel fixed roof surge vessels and valves,
- Approximately 1,500 feet of new mainline pipe, and
- Mainline valve.

[3] For Louisiana stations, fugitive component emissions based on the more conservative SOCMI average emissions factors, to demonstrate that permitting threshold are not triggered, even with very conserative emissions estimates.

Potential air emissions during operations will result from fugitive components. Fugitive component emissions have been calculated consistent with the methodology presented previously for the pump station and Station 501.

During upsets on the pipeline system that result in a surge event, Station 701 will provide surge relief with the 10,000 barrel surge vessels. These vessels will not be utilized as storage tanks. In order to conservatively represent potential emissions from the surge vessels, it is assumed that some crude oil will be present in the surge vessels the entire year, to provide a conservative estimate of standing losses. TankESP™ software was utilized to estimate potential annual emissions from the surge vessels consistent with the methodology of U.S. EPA's AP-42 Chapter 7.1.

Potential operating emissions at Station 701 are presented in the following table.

**Table 2-4. Station 701 Potential Operating Emissions**

| Source | Material | VOC Emissions (tpy) | HAP Emissions (tpy) |
|---|---|---|---|
| Surge Tank No. 1 | Crude Oil | 19.69 | 1.10 |
| Surge Tank No. 2 | Crude Oil | 19.69 | 1.10 |
| Fugitive Components | Crude Oil (light liquid) | 0.13 | 0.01 |
| **Total:** | | **39.51** | **2.21** |

The existing Stingray Onshore Facility is currently authorized to operate under the Louisiana Minor Source Air General Permit Crude Oil and Natural Gas Production (MSOG)(Facility specific AI Number 13837 and General Permit AI Number 158873). Louisiana Department of Environmental Quality (LDEQ) approved the facility's request for authorization under the MSOG permit on January 18, 2013. The general permit is intended to cover numerous similar sources or activities under one permit.

Facilities eligible for coverage under this general permit include:

- Crude oil and natural gas production and field facilities classified under Standard Industrial Classification (SIC) Code 1311 – Crude Petroleum and Natural Gas (North American Industry Classification System (NAICS) 211111); and
- "Midstream" facilities, contracted facilities which generally compress and/or process natural gas between the producing property and a natural gas processing plant or sales gas pipeline compressor station. Midstream facilities may be classified under SIC Code 1389 – Oil and Gas Field Services, Not Elsewhere Classified (NAICS 213112).

Furthermore, in order to be eligible for coverage, potential emissions of criteria pollutants and toxic air pollutants (TAPs) from the facility must be less than MSOG thresholds (in tons per year).[4] The conservative potential emissions calculations remain within the authorization for the MSOG of the existing Stingray Onshore Facility.

[4] Relevant TAPs for BMOP project include the HAP emissions summarized, as well as $H_2S$, with potential emissions presented in Appendix B.

**Table 2-5. Current Station 701 MSOG Permit Emission Limits**

| Pollutants | Emissions Limits | BMOP PTE Compliant? |
|---|---|---|
| Total VOCs | 90 tpy | Yes |
| Total TAPs | 20 tpy | Yes |
| Any Individual TAP | 8 tpy | Yes |

The Station 701 will continue to be an industrial category covered by the MSOG. Once the existing site and assets are transferred to BMOP, BMOP intends to maintain eligibility with MSOG permit. BMOP will notify LDEQ of its intent to transfer the MSOG permit from Stingray to BMOP within 45 days after the effective date of the transfer in accordance with LAC 33:I.1905.

# APPENDIX A. DETAILED ONSHORE CONSTRUCTION EMISSIONS

**Table 1 - BMOP - Onshore Pipeline Construction Emissions**
**2021 -Road Construction Equipment Exhaust Criteria Pollutant Emissions**

| Equipment Type | Fuel | Source Category[1] | Engine Rating[3] (hp) | Load Factor[1] | Pollutant Emission Factor[2] (g/hp-hr) | | | | | | Hours of Operation[3] | Pollutant Emissions (tons/year) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | CO | $NO_x$ | $SO_2$ | VOC | $PM_{10}$ | $PM_{2.5}$ | | CO | $NO_x$ | $SO_2$ | VOC | $PM_{10}$ | $PM_{2.5}$ |
| Air Compressors | Diesel | 2270006015 | 180 | 43% | 0.33 | 1.30 | 0.004 | 0.10 | 0.07 | 0.07 | 25 | 7.09E-04 | 2.78E-03 | 8.54E-06 | 2.08E-04 | 1.45E-04 | 1.4E-04 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.03 | 4.17 | 0.005 | 0.33 | 0.22 | 0.21 | 0 | - | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.03 | 4.17 | 0.005 | 0.33 | 0.22 | 0.21 | 0 | - | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.03 | 4.17 | 0.005 | 0.33 | 0.22 | 0.21 | 0 | - | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.03 | 4.17 | 0.005 | 0.33 | 0.22 | 0.21 | 0 | - | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.03 | 4.17 | 0.005 | 0.33 | 0.22 | 0.21 | 0 | - | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.03 | 4.17 | 0.005 | 0.33 | 0.22 | 0.21 | 0 | - | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.03 | 4.17 | 0.005 | 0.33 | 0.22 | 0.21 | 0 | - | - | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 0.73 | 2.03 | 0.004 | 0.11 | 0.09 | 0.09 | 0 | - | - | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 0.73 | 2.03 | 0.004 | 0.11 | 0.09 | 0.09 | 0 | - | - | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 0.73 | 2.03 | 0.004 | 0.11 | 0.09 | 0.09 | 0 | - | - | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 0.39 | 0.94 | 0.004 | 0.05 | 0.07 | 0.06 | 0 | - | - | - | - | - | - |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 0.39 | 0.94 | 0.004 | 0.05 | 0.07 | 0.06 | 0 | - | - | - | - | - | - |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 0.39 | 0.94 | 0.004 | 0.05 | 0.07 | 0.06 | 538 | 0.05 | 0.11 | 4.53E-04 | 0.01 | 0.01 | 0.01 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 0.39 | 0.94 | 0.004 | 0.05 | 0.07 | 0.06 | 675 | 0.06 | 0.14 | 5.68E-04 | 0.01 | 0.01 | 0.01 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 0.39 | 0.94 | 0.004 | 0.05 | 0.07 | 0.06 | 0 | - | - | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 0.39 | 0.94 | 0.004 | 0.05 | 0.07 | 0.06 | 104 | 0.01 | 0.02 | 8.75E-05 | 1.24E-03 | 1.48E-03 | 1.4E-03 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 0.39 | 0.94 | 0.004 | 0.05 | 0.07 | 0.06 | 122 | 0.01 | 0.02 | 1.03E-04 | 1.46E-03 | 1.73E-03 | 1.7E-03 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 0.39 | 0.94 | 0.004 | 0.05 | 0.07 | 0.06 | 0 | - | - | - | - | - | - |
| Excavators | Diesel | 2270002036 | 250 | 59% | 0.13 | 0.38 | 0.004 | 0.03 | 0.03 | 0.03 | 2,838 | 0.06 | 0.17 | 1.68E-03 | 0.01 | 0.01 | 0.01 |
| Excavators | Diesel | 2270002036 | 250 | 59% | 0.13 | 0.38 | 0.004 | 0.03 | 0.03 | 0.03 | 0 | - | - | - | - | - | - |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 0.89 | 3.74 | 0.004 | 0.30 | 0.20 | 0.19 | 0 | - | - | - | - | - | - |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 0.89 | 3.74 | 0.004 | 0.30 | 0.20 | 0.19 | 0 | - | - | - | - | - | - |
| Other Construction Equipment | Diesel | 2270002081 | 265 | 59% | 0.36 | 0.99 | 0.004 | 0.08 | 0.07 | 0.07 | 0 | - | - | - | - | - | - |
| Tractors/Loaders/Backhoes | Diesel | 2270002066 | 160 | 21% | 2.12 | 3.82 | 0.005 | 0.67 | 0.41 | 0.40 | 0 | - | - | - | - | - | - |
| Welders | Diesel | 2270006025 | 50 | 21% | 2.92 | 3.90 | 0.005 | 0.76 | 0.47 | 0.46 | 0 | - | - | - | - | - | - |
| Welders | Diesel | 2270006025 | 50 | 21% | 2.92 | 3.90 | 0.005 | 0.76 | 0.47 | 0.46 | 75 | 2.54E-03 | 3.4E-03 | 4.74E-06 | 6.64E-04 | 4.09E-04 | 4.0E-04 |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 1.12 | 7.46 | 0.005 | 0.20 | 0.22 | 0.22 | 69 | 0.01 | 0.05 | 3.57E-05 | 1.48E-03 | 1.65E-03 | 1.6E-03 |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 1.12 | 7.46 | 0.005 | 0.20 | 0.22 | 0.22 | 81 | 0.01 | 0.06 | 4.19E-05 | 1.74E-03 | 1.93E-03 | 1.9E-03 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | 1.86 | 9.69 | 0.005 | 0.20 | 0.22 | 0.22 | 41 | 0.02 | 0.12 | 6.11E-05 | 2.54E-03 | 2.82E-03 | 2.8E-03 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | 1.86 | 9.69 | 0.005 | 0.20 | 0.22 | 0.22 | 35 | 0.02 | 0.10 | 5.22E-05 | 2.17E-03 | 2.41E-03 | 2.4E-03 |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 1.12 | 7.46 | 0.005 | 0.20 | 0.22 | 0.22 | 0 | - | - | - | - | - | - |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 1.12 | 7.46 | 0.005 | 0.20 | 0.22 | 0.22 | 0 | - | - | - | - | - | - |
| Dredge[4,5] | Diesel | - | 535 | 69% | 1.12 | 7.46 | 0.005 | 0.20 | 0.22 | 0.22 | 0 | - | - | - | - | - | - |
| Dredge[4,5] | Diesel | - | 535 | 69% | 1.12 | 7.46 | 0.005 | 0.20 | 0.22 | 0.22 | 0 | - | - | - | - | - | - |
| Dredge[4,5] | Diesel | - | 535 | 69% | 1.12 | 7.46 | 0.005 | 0.20 | 0.22 | 0.22 | 300 | 0.14 | 0.91 | 5.92E-04 | 0.02 | 0.03 | 0.03 |
| **Total** | | | | | | | | | | | | **0.39** | **1.73** | **<0.01** | **0.06** | **0.07** | **0.07** |

1. Based on EPA MOVES2014b.
2. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
3. Based on data provided by Blue Marlin Offshore Port, LLC and analysis of construction equipment data from similar projects.
4. Load factor from Table 3-4 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009. A fuel correction factor of 0.005 was applied to $SO_2$ emission factors (Ultra Low Sulfur Diesel) per Table 3-9 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
5. Tier 0 emission factors from Tables 3-8 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.

**Table 2 - BMOP - Onshore Pipeline Construction Emissions**
**2021 Non-Road Construction Equipment Exhaust Greenhouse Gas Emissions**

| Equipment Type | Fuel | Source Category[1] | Engine Rating[3] (hp) | Load Factor[1] | Pollutant Emission Factor[2] (g/hp-hr) | | | Equipment Operating Duration[3] | Pollutant Emissions (tons/year) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | $CO_2$ | $CH_4$ | $N_2O$[6] | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$[7] |
| Air Compressors | Diesel | 2270006015 | 180 | 43% | 530.84 | 0.01 | 0.02 | 25 | 1 | 1.59E-05 | 5.20E-05 | 1 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 530.50 | 0.01 | 0.02 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 530.50 | 0.01 | 0.02 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 530.50 | 0.01 | 0.02 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 530.50 | 0.01 | 0.02 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 530.50 | 0.01 | 0.02 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 530.50 | 0.01 | 0.02 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 530.50 | 0.01 | 0.02 | 0 | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 530.77 | 0.01 | 0.02 | 0 | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 530.77 | 0.01 | 0.02 | 0 | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 530.77 | 0.01 | 0.02 | 0 | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 536.69 | 0.005 | 0.02 | 0 | - | - | - | - |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 536.69 | 0.005 | 0.02 | 0 | - | - | - | - |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 536.69 | 0.005 | 0.02 | 538 | 63 | 5.61E-04 | 2.89E-03 | 64 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 536.69 | 0.005 | 0.02 | 675 | 79 | 7.04E-04 | 3.63E-03 | 80 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 536.69 | 0.005 | 0.02 | 0 | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 536.69 | 0.005 | 0.02 | 104 | 12 | 1.08E-04 | 5.59E-04 | 12 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 536.69 | 0.005 | 0.02 | 122 | 14 | 1.27E-04 | 6.55E-04 | 14 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 536.69 | 0.005 | 0.02 | 0 | - | - | - | - |
| Excavators | Diesel | 2270002036 | 250 | 59% | 536.75 | 0.002 | 0.02 | 2,838 | 248 | 1.03E-03 | 0.01 | 251 |
| Excavators | Diesel | 2270002036 | 250 | 59% | 536.75 | 0.002 | 0.02 | 0 | - | - | - | - |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 530.51 | 0.01 | 0.02 | 0 | - | - | - | - |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 530.51 | 0.01 | 0.02 | 0 | - | - | - | - |
| Other Construction Equipment | Diesel | 2270002081 | 265 | 59% | 536.63 | 0.01 | 0.02 | 0 | - | - | - | - |
| Tractors/Loaders/Backhoes | Diesel | 2270002066 | 160 | 21% | 625.47 | 0.03 | 0.03 | 0 | - | - | - | - |
| Welders | Diesel | 2270006025 | 50 | 21% | 694.26 | 0.03 | 0.03 | 0 | - | - | - | - |
| Welders | Diesel | 2270006025 | 50 | 21% | 694.26 | 0.03 | 0.03 | 75 | 1 | 2.55E-05 | 2.77E-05 | 1 |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 514.54 | 0.07 | 0.01 | 69 | 4 | 4.94E-04 | 1.10E-04 | 4 |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 514.54 | 0.07 | 0.01 | 81 | 4 | 5.80E-04 | 1.29E-04 | 4 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | 514.54 | 0.07 | 0.01 | 41 | 6 | 8.46E-04 | 1.88E-04 | 7 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | 514.54 | 0.07 | 0.01 | 35 | 6 | 7.22E-04 | 1.61E-04 | 6 |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 514.54 | 0.07 | 0.01 | 0 | - | - | - | - |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 514.54 | 0.07 | 0.01 | 0 | - | - | - | - |
| Dredge[4,5] | Diesel | - | 535 | 69% | 514.54 | 0.07 | 0.01 | 0 | - | - | - | - |
| Dredge[4,5] | Diesel | - | 535 | 69% | 514.54 | 0.07 | 0.01 | 0 | - | - | - | - |
| Dredge[4,5] | Diesel | - | 535 | 69% | 514.54 | 0.07 | 0.01 | 300 | 63 | 0.01 | 1.82E-03 | 64 |
| **Total** | | | | | | | | | **501** | **0.01** | **0.02** | **508** |

1. Based on EPA MOVES2014b.
2. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
3. Based on data provided by Blue Marlin Offshore Port, LLC and analysis of construction equipment data from similar projects.
4. Load factor from Table 3-4 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
5. Tier 0 emission factors from Tables 3-8 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
6. 2020 Climate Registry Default Emission Factors, Released: April 2020, Tables 2.1 and 2.7, ratioed based on $CO_2$ emission factor from EPA MOVES2014b (except for marine vessels). https://www.theclimateregistry.org/wp-content/uploads/2020/04/The-Climate-Registry-2020-Default-Emission-Factor-Document.pdf
7. The global warming potentials of $CO_2$, $CH_4$, and $N_2O$ are assumed to be 1, 25, and 298, respectively.

**Table 3 - BMOP - Onshore Pipeline Construction Emissions**
**2021 Non-Road Construction Equipment Exhaust Hazardous Air Pollutant Emissions**

| Equipment Type | Fuel | Source Category[1] | Engine Rating[3] (hp) | Load Factor[1] | Pollutant Emission Factor[2] (g/hp-hr) | | | | Equipment Operating Duration[3] | Pollutant Emissions (tons/year) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1,3-Butadiene | 2,2,4-Trimethylpentane | Acetaldehyde | Acrolein | | 1,3-Butadiene | 2,2,4-Trimethylpentane | Acetaldehyde | Acrolein |
| Air Compressors | Diesel | 2270006015 | 180 | 43% | 1.76E-04 | 7.43E-04 | 9.51E-03 | 1.74E-03 | 25 | 3.76E-07 | 1.59E-06 | 2.03E-05 | 3.72E-06 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 6.17E-04 | 2.56E-03 | 2.87E-02 | 7.23E-03 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 6.17E-04 | 2.56E-03 | 2.87E-02 | 7.23E-03 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 6.17E-04 | 2.56E-03 | 2.87E-02 | 7.23E-03 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 6.17E-04 | 2.56E-03 | 2.87E-02 | 7.23E-03 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 6.17E-04 | 2.56E-03 | 2.87E-02 | 7.23E-03 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 6.17E-04 | 2.56E-03 | 2.87E-02 | 7.23E-03 | 0 | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 1.95E-04 | 8.26E-04 | 9.99E-03 | 2.15E-03 | 0 | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 1.95E-04 | 8.26E-04 | 9.99E-03 | 2.15E-03 | 0 | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 1.95E-04 | 8.26E-04 | 9.99E-03 | 2.15E-03 | 0 | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 9.52E-05 | 4.15E-04 | 5.34E-03 | 9.56E-04 | 0 | - | - | - | - |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 9.52E-05 | 4.15E-04 | 5.34E-03 | 9.56E-04 | 0 | - | - | - | - |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 9.52E-05 | 4.15E-04 | 5.34E-03 | 9.56E-04 | 538 | 1.12E-05 | 4.86E-05 | 6.26E-04 | 1.12E-04 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 9.52E-05 | 4.15E-04 | 5.34E-03 | 9.56E-04 | 675 | 1.40E-05 | 6.10E-05 | 7.85E-04 | 1.41E-04 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 9.52E-05 | 4.15E-04 | 5.34E-03 | 9.56E-04 | 0 | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 9.52E-05 | 4.15E-04 | 5.34E-03 | 9.56E-04 | 104 | 2.16E-06 | 9.40E-06 | 1.21E-04 | 2.17E-05 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 9.52E-05 | 4.15E-04 | 5.34E-03 | 9.56E-04 | 122 | 2.53E-06 | 1.10E-05 | 1.42E-04 | 2.54E-05 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 9.52E-05 | 4.15E-04 | 5.34E-03 | 9.56E-04 | 0 | - | - | - | - |
| Excavators | Diesel | 2270002036 | 250 | 59% | 4.20E-05 | 1.98E-04 | 2.54E-03 | 4.39E-04 | 2,838 | 1.94E-05 | 9.13E-05 | 1.17E-03 | 2.02E-04 |
| Excavators | Diesel | 2270002036 | 250 | 59% | 4.20E-05 | 1.98E-04 | 2.54E-03 | 4.39E-04 | 0 | - | - | - | - |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 5.46E-04 | 2.24E-03 | 2.44E-02 | 6.31E-03 | 0 | - | - | - | - |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 5.46E-04 | 2.24E-03 | 2.44E-02 | 6.31E-03 | 0 | - | - | - | - |
| Other Construction Equipment | Diesel | 2270002081 | 265 | 59% | 1.39E-04 | 5.88E-04 | 7.35E-03 | 1.36E-03 | 0 | - | - | - | - |
| Tractors/Loaders/Backhoes | Diesel | 2270002066 | 160 | 21% | 1.25E-03 | 5.17E-03 | 6.09E-02 | 1.38E-02 | 0 | - | - | - | - |
| Welders | Diesel | 2270006025 | 50 | 21% | 1.42E-03 | 6.07E-03 | 6.42E-02 | 1.96E-02 | 0 | - | - | - | - |
| Welders | Diesel | 2270006025 | 50 | 21% | 1.42E-03 | 6.07E-03 | 6.42E-02 | 1.96E-02 | 75 | 1.23E-06 | 5.27E-06 | 5.57E-05 | 1.71E-05 |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 1.24E-04 | - | 2.44E-03 | 2.94E-04 | 69 | 9.14E-07 | - | 1.79E-05 | 2.16E-06 |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 1.24E-04 | - | 2.44E-03 | 2.94E-04 | 81 | 1.07E-06 | - | 2.10E-05 | 2.54E-06 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | - | - | 8.00E-05 | 2.50E-05 | 41 | - | - | 1.01E-06 | 3.15E-07 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | - | - | 8.00E-05 | 2.50E-05 | 35 | - | - | 8.61E-07 | 2.69E-07 |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 1.24E-04 | - | 2.44E-03 | 2.94E-04 | 0 | - | - | - | - |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 1.24E-04 | - | 2.44E-03 | 2.94E-04 | 0 | - | - | - | - |
| Dredge[4,5] | Diesel | - | 535 | 69% | 1.24E-04 | - | 2.44E-03 | 2.94E-04 | 0 | - | - | - | - |
| Dredge[4,5] | Diesel | - | 535 | 69% | 1.24E-04 | - | 2.44E-03 | 2.94E-04 | 0 | - | - | - | - |
| Dredge[4,5] | Diesel | - | 535 | 69% | 1.24E-04 | - | 2.44E-03 | 2.94E-04 | 300 | 1.52E-05 | - | 2.97E-04 | 3.59E-05 |
| **Total** | | | | | | | | | | **<0.01** | **<0.01** | **<0.01** | **<0.01** |

1. Based on EPA MOVES2014b.
2. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
3. Based on data provided by Blue Marlin Offshore Port, LLC and analysis of construction equipment data from similar projects.
4. Load factor from Table 3-4 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
5. Emission factors for engines greater than 600 hp are based on Section 3.4. Large Stationary Diesel and All Stationary Dual-fuel Engines, Tables 3.4-3 and 3.4-4. For engines less than 600 hp, emission factors are based on AP-42, Section 3.3. Gasoline and Diesel Industrial Engines, Table 3.3-2.

**Table 3 - BMOP - Onshore Pipeline Construction Emissions**
**2021 Road Construction Equipment Exhaust Hazardous Air Pollutant Emissions**
**(Continued)**

| Equipment Type | Fuel | Source Category[1] | Engine Rating[3] (hp) | Load Factor[1] | Pollutant Emission Factor[2] (g/hp-hr) | | | | | Equipment Operating Duration[3] | Pollutant Emissions (tons/year) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Benzene | Ethyl Benzene | Formaldehyde | Hexane | Naphthalene | | Benzene | Ethyl Benzene | Formaldehyde | Hexane | Naphthalene |
| Air Compressors | Diesel | 2270006015 | 180 | 43% | 4.55E-03 | 4.43E-04 | 2.65E-02 | 5.40E-05 | 8.68E-09 | 25 | 9.70E-06 | 9.45E-07 | 5.65E-05 | 1.15E-07 | 1.85E-11 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.10E-02 | 1.98E-03 | 8.06E-02 | 5.34E-04 | 6.33E-09 | 0 | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.10E-02 | 1.98E-03 | 8.06E-02 | 5.34E-04 | 6.33E-09 | 0 | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.10E-02 | 1.98E-03 | 8.06E-02 | 5.34E-04 | 6.33E-09 | 0 | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.10E-02 | 1.98E-03 | 8.06E-02 | 5.34E-04 | 6.33E-09 | 0 | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.10E-02 | 1.98E-03 | 8.06E-02 | 5.34E-04 | 6.33E-09 | 0 | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.10E-02 | 1.98E-03 | 8.06E-02 | 5.34E-04 | 6.33E-09 | 0 | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.10E-02 | 1.98E-03 | 8.06E-02 | 5.34E-04 | 6.33E-09 | 0 | - | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 4.44E-03 | 5.84E-04 | 2.78E-02 | 9.60E-05 | 8.54E-09 | 0 | - | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 4.44E-03 | 5.84E-04 | 2.78E-02 | 9.60E-05 | 8.54E-09 | 0 | - | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 4.44E-03 | 5.84E-04 | 2.78E-02 | 9.60E-05 | 8.54E-09 | 0 | - | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 2.59E-03 | 2.63E-04 | 1.47E-02 | 2.40E-05 | 1.29E-08 | 0 | - | - | - | - | - |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 2.59E-03 | 2.63E-04 | 1.47E-02 | 2.40E-05 | 1.29E-08 | 0 | - | - | - | - | - |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 2.59E-03 | 2.63E-04 | 1.47E-02 | 2.40E-05 | 1.29E-08 | 538 | 3.04E-04 | 3.09E-05 | 1.73E-03 | 2.81E-06 | 1.51E-09 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 2.59E-03 | 2.63E-04 | 1.47E-02 | 2.40E-05 | 1.29E-08 | 675 | 3.82E-04 | 3.87E-05 | 2.16E-03 | 3.53E-06 | 1.89E-09 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 2.59E-03 | 2.63E-04 | 1.47E-02 | 2.40E-05 | 1.29E-08 | 0 | - | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 2.59E-03 | 2.63E-04 | 1.47E-02 | 2.40E-05 | 1.29E-08 | 104 | 5.88E-05 | 5.97E-06 | 3.34E-04 | 5.43E-07 | 2.92E-10 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 2.59E-03 | 2.63E-04 | 1.47E-02 | 2.40E-05 | 1.29E-08 | 122 | 6.90E-05 | 7.00E-06 | 3.91E-04 | 6.37E-07 | 3.42E-10 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 2.59E-03 | 2.63E-04 | 1.47E-02 | 2.40E-05 | 1.29E-08 | 0 | - | - | - | - | - |
| Excavators | Diesel | 2270002036 | 250 | 59% | 1.21E-03 | 1.52E-04 | 6.72E-03 | 5.94E-06 | 1.52E-08 | 2,838 | 5.60E-04 | 7.02E-05 | 3.10E-03 | 2.74E-06 | 7.02E-09 |
| Excavators | Diesel | 2270002036 | 250 | 59% | 1.21E-03 | 1.52E-04 | 6.72E-03 | 5.94E-06 | 1.52E-08 | 0 | - | - | - | - | - |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 8.37E-03 | 1.75E-03 | 6.84E-02 | 5.90E-04 | 4.66E-09 | 0 | - | - | - | - | - |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 8.37E-03 | 1.75E-03 | 6.84E-02 | 5.90E-04 | 4.66E-09 | 0 | - | - | - | - | - |
| Other Construction Equipment | Diesel | 2270002081 | 265 | 59% | 3.30E-03 | 3.66E-04 | 2.03E-02 | 6.96E-05 | 1.25E-08 | 0 | - | - | - | - | - |
| Tractors/Loaders/Backhoes | Diesel | 2270002066 | 160 | 21% | 2.56E-02 | 3.61E-03 | 1.71E-01 | 8.37E-04 | 1.39E-09 | 0 | - | - | - | - | - |
| Welders | Diesel | 2270006025 | 50 | 21% | 2.33E-02 | 5.75E-03 | 1.79E-01 | 1.25E-03 | 0.00E+00 | 0 | - | - | - | - | - |
| Welders | Diesel | 2270006025 | 50 | 21% | 2.33E-02 | 5.75E-03 | 1.79E-01 | 1.25E-03 | 0.00E+00 | 75 | 2.02E-05 | 4.99E-06 | 1.56E-04 | 1.08E-06 | - |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 2.96E-03 | - | 3.75E-03 | - | 2.69E-04 | 69 | 2.18E-05 | - | 2.76E-05 | - | 1.98E-06 |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 2.96E-03 | - | 3.75E-03 | - | 2.69E-04 | 81 | 2.56E-05 | - | 3.24E-05 | - | 2.33E-06 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | 2.46E-03 | - | 2.51E-04 | - | 4.13E-04 | 41 | 3.11E-05 | - | 3.16E-06 | - | 5.20E-06 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | 2.46E-03 | - | 2.51E-04 | - | 4.13E-04 | 35 | 2.65E-05 | - | 2.70E-06 | - | 4.44E-06 |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 2.96E-03 | - | 3.75E-03 | - | 2.69E-04 | 0 | - | - | - | - | - |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 2.96E-03 | - | 3.75E-03 | - | 2.69E-04 | 0 | - | - | - | - | - |
| Dredge[4,5] | Diesel | - | 535 | 69% | 2.96E-03 | - | 3.75E-03 | - | 2.69E-04 | 0 | - | - | - | - | - |
| Dredge[4,5] | Diesel | - | 535 | 69% | 2.96E-03 | - | 3.75E-03 | - | 2.69E-04 | 0 | - | - | - | - | - |
| Dredge[4,5] | Diesel | - | 535 | 69% | 2.96E-03 | - | 3.75E-03 | - | 2.69E-04 | 300 | 3.62E-04 | - | 4.57E-04 | - | 3.29E-05 |
| **Total** | | | | | | | | | | | **<0.01** | **<0.01** | **0.01** | **<0.01** | **<0.01** |

1. Based on EPA MOVES2014b.
2. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
3. Based on data provided by Blue Marlin Offshore Port, LLC and analysis of construction equipment data from similar projects.
4. Load factor from Table 3-4 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
5. Emission factors for engines greater than 600 hp are based on Section 3.4. Large Stationary Diesel and All Stationary Dual-fuel Engines, Tables 3.4-3 and 3.4-4. For engines less than 600 hp, emission factors are based on AP-42, Section 3.3. Gasoline and Diesel Industrial Engines, Table 3.3-2.

**Table 3 - BMOP - Onshore Pipeline Construction Emissions**
**2021 Non-Road Construction Equipment Exhaust Hazardous Air Pollutant Emissions**
**(Continued)**

| Equipment Type | Fuel | Source Category[1] | Engine Rating[3] (hp) | Load Factor[1] | Pollutant Emission Factor[2] (g/hp-hr) | | | | Equipment Operating Duration[3] | Pollutant Emissions (tons/year) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PAH | Propionaldehyde | Toluene | Xylenes | | PAH | Propionaldehyde | Toluene | Xylenes |
| Air Compressors | Diesel | 2270006015 | 180 | 43% | 4.10E-04 | 2.37E-03 | 3.34E-03 | 1.44E-03 | 25 | 8.74E-07 | 5.06E-06 | 7.11E-06 | 3.07E-06 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.41E-03 | 8.06E-03 | 8.09E-03 | 5.65E-03 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.41E-03 | 8.06E-03 | 8.09E-03 | 5.65E-03 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.41E-03 | 8.06E-03 | 8.09E-03 | 5.65E-03 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.41E-03 | 8.06E-03 | 8.09E-03 | 5.65E-03 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.41E-03 | 8.06E-03 | 8.09E-03 | 5.65E-03 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.41E-03 | 8.06E-03 | 8.09E-03 | 5.65E-03 | 0 | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 4.71E-04 | 2.44E-03 | 3.23E-03 | 1.76E-03 | 0 | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 4.71E-04 | 2.44E-03 | 3.23E-03 | 1.76E-03 | 0 | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 4.71E-04 | 2.44E-03 | 3.23E-03 | 1.76E-03 | 0 | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 2.43E-04 | 1.22E-03 | 1.92E-03 | 9.26E-04 | 0 | - | - | - | - |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 2.43E-04 | 1.22E-03 | 1.92E-03 | 9.26E-04 | 0 | - | - | - | - |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 2.43E-04 | 1.22E-03 | 1.92E-03 | 9.26E-04 | 538 | 2.85E-05 | 1.43E-04 | 2.25E-04 | 1.09E-04 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 2.43E-04 | 1.22E-03 | 1.92E-03 | 9.26E-04 | 675 | 3.57E-05 | 1.79E-04 | 2.82E-04 | 1.36E-04 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 2.43E-04 | 1.22E-03 | 1.92E-03 | 9.26E-04 | 0 | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 2.43E-04 | 1.22E-03 | 1.92E-03 | 9.26E-04 | 104 | 5.51E-06 | 2.76E-05 | 4.35E-05 | 2.10E-05 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 2.43E-04 | 1.22E-03 | 1.92E-03 | 9.26E-04 | 122 | 6.46E-06 | 3.24E-05 | 5.10E-05 | 2.46E-05 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 2.43E-04 | 1.22E-03 | 1.92E-03 | 9.26E-04 | 0 | - | - | - | - |
| Excavators | Diesel | 2270002036 | 250 | 59% | 1.11E-04 | 5.13E-04 | 9.35E-04 | 6.51E-04 | 2,838 | 5.14E-05 | 2.37E-04 | 4.31E-04 | 3.01E-04 |
| Excavators | Diesel | 2270002036 | 250 | 59% | 1.11E-04 | 5.13E-04 | 9.35E-04 | 6.51E-04 | 0 | - | - | - | - |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 1.18E-03 | 7.79E-03 | 6.47E-03 | 5.27E-03 | 0 | - | - | - | - |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 1.18E-03 | 7.79E-03 | 6.47E-03 | 5.27E-03 | 0 | - | - | - | - |
| Other Construction Equipment | Diesel | 2270002081 | 265 | 59% | 3.18E-04 | 2.04E-03 | 2.52E-03 | 1.33E-03 | 0 | - | - | - | - |
| Tractors/Loaders/Backhoes | Diesel | 2270002066 | 160 | 21% | 2.83E-03 | 1.65E-02 | 1.87E-02 | 1.03E-02 | 0 | - | - | - | - |
| Welders | Diesel | 2270006025 | 50 | 21% | 3.58E-03 | 1.38E-02 | 1.59E-02 | 1.44E-02 | 0 | - | - | - | - |
| Welders | Diesel | 2270006025 | 50 | 21% | 3.58E-03 | 1.38E-02 | 1.59E-02 | 1.44E-02 | 75 | 3.11E-06 | 1.20E-05 | 1.38E-05 | 1.25E-05 |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 5.33E-04 | - | 1.30E-03 | 9.05E-04 | 69 | 3.93E-06 | - | 9.56E-06 | 6.66E-06 |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 5.33E-04 | - | 1.30E-03 | 9.05E-04 | 81 | 4.61E-06 | - | 1.12E-05 | 7.82E-06 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | 6.73E-04 | - | 8.92E-04 | 6.13E-04 | 41 | 8.49E-06 | - | 1.13E-05 | 7.73E-06 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | 6.73E-04 | - | 8.92E-04 | 6.13E-04 | 35 | 7.25E-06 | - | 9.60E-06 | 6.60E-06 |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 5.33E-04 | - | 1.30E-03 | 9.05E-04 | 0 | - | - | - | - |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 5.33E-04 | - | 1.30E-03 | 9.05E-04 | 0 | - | - | - | - |
| Dredge[4,5] | Diesel | - | 535 | 69% | 5.33E-04 | - | 1.30E-03 | 9.05E-04 | 0 | - | - | - | - |
| Dredge[4,5] | Diesel | - | 535 | 69% | 5.33E-04 | - | 1.30E-03 | 9.05E-04 | 0 | - | - | - | - |
| Dredge[4,5] | Diesel | - | 535 | 69% | 5.33E-04 | - | 1.30E-03 | 9.05E-04 | 300 | 6.51E-05 | - | 1.59E-04 | 1.10E-04 |
| **Total** | | | | | | | | | | **<0.01** | **<0.01** | **<0.01** | **<0.01** |

1. Based on EPA MOVES2014b.
2. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
3. Based on data provided by Blue Marlin Offshore Port, LLC and analysis of construction equipment data from similar projects.
4. Load factor from Table 3-4 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
5. Emission factors for engines greater than 600 hp are based on Section 3.4. Large Stationary Diesel and All Stationary Dual-fuel Engines, Tables 3.4-3 and 3.4-4. For engines less than 600 hp, emission factors are based on AP-42, Section 3.3. Gasoline and Diesel Industrial Engines, Table 3.3-2.

**Table 3 - BMOP - Onshore Pipeline Construction Emissions**
**2021 Non-Road Construction Equipment Exhaust Hazardous Air Pollutant Emissions**
**(Continued)**

| Equipment Type | Fuel | Source Category[1] | Engine Rating[3] (hp) | Load Factor[1] | Pollutant Emission Factor[2] (g/hp-hr) | | | | | Equipment Operating Duration[3] | Pollutant Emissions (tons/year) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Arsenic | Chromium VI | Manganese | Mercury | Nickel | | Arsenic | Chromium VI | Manganese | Mercury | Nickel |
| Air Compressors | Diesel | 2270006015 | 180 | 43% | 8.32E-07 | 2.91E-09 | 1.21E-06 | 1.11E-08 | 2.10E-06 | 25 | 1.78E-09 | 6.21E-12 | 2.58E-09 | 2.36E-11 | 4.47E-09 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 8.32E-07 | 3.60E-09 | 1.57E-06 | 1.11E-08 | 2.75E-06 | 0 | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 8.32E-07 | 3.60E-09 | 1.57E-06 | 1.11E-08 | 2.75E-06 | 0 | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 8.32E-07 | 3.60E-09 | 1.57E-06 | 1.11E-08 | 2.75E-06 | 0 | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 8.32E-07 | 3.60E-09 | 1.57E-06 | 1.11E-08 | 2.75E-06 | 0 | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 8.32E-07 | 3.60E-09 | 1.57E-06 | 1.11E-08 | 2.75E-06 | 0 | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 8.32E-07 | 3.60E-09 | 1.57E-06 | 1.11E-08 | 2.75E-06 | 0 | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 8.32E-07 | 3.60E-09 | 1.57E-06 | 1.11E-08 | 2.75E-06 | 0 | - | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 8.32E-07 | 2.99E-09 | 1.27E-06 | 1.11E-08 | 2.21E-06 | 0 | - | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 8.32E-07 | 2.99E-09 | 1.27E-06 | 1.11E-08 | 2.21E-06 | 0 | - | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 8.32E-07 | 2.99E-09 | 1.27E-06 | 1.11E-08 | 2.21E-06 | 0 | - | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 8.41E-07 | 2.65E-09 | 1.06E-06 | 1.12E-08 | 1.83E-06 | 0 | - | - | - | - | - |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 8.41E-07 | 2.65E-09 | 1.06E-06 | 1.12E-08 | 1.83E-06 | 0 | - | - | - | - | - |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 8.41E-07 | 2.65E-09 | 1.06E-06 | 1.12E-08 | 1.83E-06 | 538 | 9.86E-08 | 3.11E-10 | 1.24E-07 | 1.31E-09 | 2.14E-07 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 8.41E-07 | 2.65E-09 | 1.06E-06 | 1.12E-08 | 1.83E-06 | 675 | 1.24E-07 | 3.90E-10 | 1.56E-07 | 1.64E-09 | 2.69E-07 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 8.41E-07 | 2.65E-09 | 1.06E-06 | 1.12E-08 | 1.83E-06 | 0 | - | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 8.41E-07 | 2.65E-09 | 1.06E-06 | 1.12E-08 | 1.83E-06 | 104 | 1.91E-08 | 6.00E-11 | 2.40E-08 | 2.53E-10 | 4.14E-08 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 8.41E-07 | 2.65E-09 | 1.06E-06 | 1.12E-08 | 1.83E-06 | 122 | 2.24E-08 | 7.04E-11 | 2.81E-08 | 2.97E-10 | 4.86E-08 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 8.41E-07 | 2.65E-09 | 1.06E-06 | 1.12E-08 | 1.83E-06 | 0 | - | - | - | - | - |
| Excavators | Diesel | 2270002036 | 250 | 59% | 8.41E-07 | 2.40E-09 | 9.57E-07 | 1.12E-08 | 1.66E-06 | 2,838 | 3.88E-07 | 1.11E-09 | 4.41E-07 | 5.16E-09 | 7.64E-07 |
| Excavators | Diesel | 2270002036 | 250 | 59% | 8.41E-07 | 2.40E-09 | 9.57E-07 | 1.12E-08 | 1.66E-06 | 0 | - | - | - | - | - |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 8.32E-07 | 3.44E-09 | 1.50E-06 | 1.11E-08 | 2.61E-06 | 0 | - | - | - | - | - |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 8.32E-07 | 3.44E-09 | 1.50E-06 | 1.11E-08 | 2.61E-06 | 0 | - | - | - | - | - |
| Other Construction Equipment | Diesel | 2270002081 | 265 | 59% | 8.41E-07 | 2.69E-09 | 1.09E-06 | 1.12E-08 | 1.88E-06 | 0 | - | - | - | - | - |
| Tractors/Loaders/Backhoes | Diesel | 2270002066 | 160 | 21% | 9.82E-07 | 4.44E-09 | 1.95E-06 | 1.31E-08 | 3.41E-06 | 0 | - | - | - | - | - |
| Welders | Diesel | 2270006025 | 50 | 21% | 1.09E-06 | 4.54E-09 | 1.86E-06 | 1.45E-08 | 3.21E-06 | 0 | - | - | - | - | - |
| Welders | Diesel | 2270006025 | 50 | 21% | 1.09E-06 | 4.54E-09 | 1.86E-06 | 1.45E-08 | 3.21E-06 | 75 | 9.47E-10 | 3.94E-12 | 1.62E-09 | 1.26E-11 | 2.78E-09 |
| Air Boat[4,5] | Diesel | - | 225 | 43% | - | - | - | - | - | 69 | - | - | - | - | - |
| Air Boat[4,5] | Diesel | - | 225 | 43% | - | - | - | - | - | 81 | - | - | - | - | - |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | - | - | - | - | - | 41 | - | - | - | - | - |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | - | - | - | - | - | 35 | - | - | - | - | - |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | - | - | - | - | - | 0 | - | - | - | - | - |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | - | - | - | - | - | 0 | - | - | - | - | - |
| Dredge[4,5] | Diesel | - | 535 | 69% | - | - | - | - | - | 0 | - | - | - | - | - |
| Dredge[4,5] | Diesel | - | 535 | 69% | - | - | - | - | - | 0 | - | - | - | - | - |
| Dredge[4,5] | Diesel | - | 535 | 69% | - | - | - | - | - | 300 | - | - | - | - | - |
| **Total** | | | | | | | | | | | **<0.01** | **<0.01** | **<0.01** | **<0.01** | **<0.01** |

1. Based on EPA MOVES2014b.
2. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
3. Based on data provided by Blue Marlin Offshore Port, LLC and analysis of construction equipment data from similar projects.
4. Load factor from Table 3-4 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
5. Emission factors for engines greater than 600 hp are based on Section 3.4. Large Stationary Diesel and All Stationary Dual-fuel Engines, Tables 3.4-3 and 3.4-4. For engines less than 600 hp, emission factors are based on AP-42, Section 3.3. Gasoline and Diesel Industrial Engines, Table 3.3-2.

**Table 4 - BMOP - Onshore Pipeline Construction Emissions**
**2022 Non-Road Construction Equipment Exhaust Criteria Pollutant Emissions**

| Equipment Type | Fuel | Source Category[1] | Engine Rating[3] (hp) | Load Factor[1] | Pollutant Emission Factor[2] (g/hp-hr) | | | | | | Equipment Operating Duration[3] | Pollutant Emissions (tons/year) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | CO | $NO_x$ | $SO_2$ | VOC | $PM_{10}$ | $PM_{2.5}$ | | CO | $NO_x$ | $SO_2$ | VOC | $PM_{10}$ | $PM_{2.5}$ |
| Air Compressors | Diesel | 2270006015 | 180 | 43% | 0.29 | 1.13 | 0.004 | 0.08 | 0.06 | 0.06 | 8,388 | 0.21 | 0.81 | 0.003 | 0.06 | 0.04 | 0.04 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 0.94 | 3.82 | 0.004 | 0.31 | 0.20 | 0.19 | 1,050 | 0.14 | 0.57 | 6.70E-04 | 0.05 | 0.03 | 0.03 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 0.94 | 3.82 | 0.004 | 0.31 | 0.20 | 0.19 | 1,050 | 0.14 | 0.57 | 6.70E-04 | 0.05 | 0.03 | 0.03 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 0.94 | 3.82 | 0.004 | 0.31 | 0.20 | 0.19 | 1,050 | 0.14 | 0.57 | 6.70E-04 | 0.05 | 0.03 | 0.03 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 0.94 | 3.82 | 0.004 | 0.31 | 0.20 | 0.19 | 1,050 | 0.14 | 0.57 | 6.70E-04 | 0.05 | 0.03 | 0.03 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 0.94 | 3.82 | 0.004 | 0.31 | 0.20 | 0.19 | 1,050 | 0.14 | 0.57 | 6.70E-04 | 0.05 | 0.03 | 0.03 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 0.94 | 3.82 | 0.004 | 0.31 | 0.20 | 0.19 | 1,050 | 0.14 | 0.57 | 6.70E-04 | 0.05 | 0.03 | 0.03 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 0.94 | 3.82 | 0.004 | 0.31 | 0.20 | 0.19 | 438 | 0.06 | 0.24 | 2.79E-04 | 0.02 | 0.01 | 0.01 |
| Cranes | Diesel | 2270002045 | 625 | 43% | 0.59 | 1.59 | 0.004 | 0.09 | 0.07 | 0.07 | 464 | 0.08 | 0.22 | 5.51E-04 | 0.01 | 0.01 | 0.01 |
| Cranes | Diesel | 2270002045 | 625 | 43% | 0.59 | 1.59 | 0.004 | 0.09 | 0.07 | 0.07 | 8,453 | 1.49 | 3.97 | 0.01 | 0.21 | 0.18 | 0.17 |
| Cranes | Diesel | 2270002045 | 625 | 43% | 0.59 | 1.59 | 0.004 | 0.09 | 0.07 | 0.07 | 8,071 | 1.42 | 3.79 | 0.01 | 0.20 | 0.17 | 0.17 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 0.32 | 0.80 | 0.004 | 0.05 | 0.05 | 0.05 | 1,688 | 0.12 | 0.29 | 1.40E-03 | 0.02 | 0.02 | 0.02 |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 0.32 | 0.80 | 0.004 | 0.05 | 0.05 | 0.05 | 900 | 0.06 | 0.16 | 7.46E-04 | 0.01 | 0.01 | 0.01 |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 0.32 | 0.80 | 0.004 | 0.05 | 0.05 | 0.05 | 20,763 | 1.46 | 3.60 | 0.02 | 0.21 | 0.25 | 0.24 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 0.32 | 0.80 | 0.004 | 0.05 | 0.05 | 0.05 | 3,825 | 0.27 | 0.66 | 3.17E-03 | 0.04 | 0.05 | 0.04 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 0.32 | 0.80 | 0.004 | 0.05 | 0.05 | 0.05 | 1,050 | 0.07 | 0.18 | 8.70E-04 | 0.01 | 0.01 | 0.01 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 0.32 | 0.80 | 0.004 | 0.05 | 0.05 | 0.05 | 2,277 | 0.16 | 0.39 | 1.89E-03 | 0.02 | 0.03 | 0.03 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 0.32 | 0.80 | 0.004 | 0.05 | 0.05 | 0.05 | 2,673 | 0.19 | 0.46 | 2.21E-03 | 0.03 | 0.03 | 0.03 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 0.32 | 0.80 | 0.004 | 0.05 | 0.05 | 0.05 | 4,275 | 0.30 | 0.74 | 3.54E-03 | 0.04 | 0.05 | 0.05 |
| Excavators | Diesel | 2270002036 | 250 | 59% | 0.09 | 0.28 | 0.004 | 0.02 | 0.02 | 0.02 | 43,400 | 0.67 | 2.00 | 0.03 | 0.15 | 0.15 | 0.15 |
| Excavators | Diesel | 2270002036 | 250 | 59% | 0.09 | 0.28 | 0.004 | 0.02 | 0.02 | 0.02 | 900 | 0.01 | 0.04 | 5.28E-04 | 3.11E-03 | 3.13E-03 | 3.0E-03 |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 0.80 | 3.38 | 0.004 | 0.27 | 0.18 | 0.17 | 3,623 | 0.28 | 1.16 | 1.49E-03 | 0.09 | 0.06 | 0.06 |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 0.80 | 3.38 | 0.004 | 0.27 | 0.18 | 0.17 | 4,253 | 0.32 | 1.36 | 1.75E-03 | 0.11 | 0.07 | 0.07 |
| Other Construction Equipment | Diesel | 2270002081 | 265 | 59% | 0.30 | 0.84 | 0.004 | 0.06 | 0.06 | 0.06 | 277 | 0.01 | 0.04 | 1.83E-04 | 3.07E-03 | 2.96E-03 | 2.9E-03 |
| Tractors/Loaders/Backhoes | Diesel | 2270002066 | 160 | 21% | 1.88 | 3.37 | 0.005 | 0.60 | 0.36 | 0.35 | 19,038 | 1.32 | 2.38 | 3.6E-03 | 0.42 | 0.26 | 0.25 |
| Welders | Diesel | 2270006025 | 50 | 21% | 2.60 | 3.75 | 0.005 | 0.68 | 0.42 | 0.41 | 900 | 0.03 | 0.04 | 5.62E-05 | 0.01 | 4.37E-03 | 4.2E-03 |
| Welders | Diesel | 2270006025 | 50 | 21% | 2.60 | 3.75 | 0.005 | 0.68 | 0.42 | 0.41 | 71,800 | 2.16 | 3.11 | 4.49E-03 | 0.56 | 0.35 | 0.34 |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 1.12 | 7.46 | 0.005 | 0.20 | 0.22 | 0.22 | 3,255 | 0.39 | 2.59 | 1.68E-03 | 0.07 | 0.08 | 0.08 |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 1.12 | 7.46 | 0.005 | 0.20 | 0.22 | 0.22 | 3,821 | 0.46 | 3.04 | 1.98E-03 | 0.08 | 0.09 | 0.09 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | 1.86 | 9.69 | 0.005 | 0.20 | 0.22 | 0.22 | 4,050 | 2.32 | 12.07 | 0.01 | 0.25 | 0.28 | 0.28 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | 1.86 | 9.69 | 0.005 | 0.20 | 0.22 | 0.22 | 3,450 | 1.98 | 10.29 | 0.01 | 0.21 | 0.24 | 0.24 |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 1.12 | 7.46 | 0.005 | 0.20 | 0.22 | 0.22 | 9,092 | 1.14 | 7.57 | 4.92E-03 | 0.20 | 0.23 | 0.23 |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 1.12 | 7.46 | 0.005 | 0.20 | 0.22 | 0.22 | 7,745 | 0.97 | 6.45 | 4.19E-03 | 0.17 | 0.19 | 0.19 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 1.12 | 7.46 | 0.005 | 0.20 | 0.22 | 0.22 | 2,369 | 1.08 | 7.19 | 4.67E-03 | 0.19 | 0.22 | 0.22 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 1.12 | 7.46 | 0.005 | 0.20 | 0.22 | 0.22 | 2,018 | 0.92 | 6.12 | 3.98E-03 | 0.17 | 0.18 | 0.18 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 1.12 | 7.46 | 0.005 | 0.20 | 0.22 | 0.22 | 3,900 | 1.78 | 11.83 | 0.01 | 0.32 | 0.36 | 0.36 |
| **Total** | | | | | | | | | | | | **22.56** | **96.23** | **0.14** | **4.18** | **3.80** | **3.74** |

1. Based on EPA MOVES2014b.
2. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
3. Based on data provided by Blue Marlin Offshore Port, LLC and analysis of construction equipment data from similar projects.
4. Load factor from Table 3-4 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009. A fuel correction factor of 0.005 was applied to $SO_2$ emission factors (Ultra Low Sulfur Diesel) per Table 3-9 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
5. Tier 0 emission factors from Tables 3-8 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.

**Table 5 - BMOP - Onshore Pipeline Construction Emissions**
**2022 Non-Road Construction Equipment Exhaust Greenhouse Gas Emissions**

| Equipment Type | Fuel | Source Category[1] | Engine Rating[3] (hp) | Load Factor[1] | Pollutant Emission Factor[2] (g/hp-hr) | | | Equipment Operating Duration[3] | Pollutant Emissions (tons/year) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | $CO_2$ | $CH_4$ | $N_2O$[6] | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$[7] |
| Air Compressors | Diesel | 2270006015 | 180 | 43% | 530.87 | 0.01 | 0.02 | 8,388 | 380 | 4.74E-03 | 0.02 | 385 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 530.54 | 0.01 | 0.02 | 1,050 | 79 | 1.90E-03 | 3.64E-03 | 80 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 530.54 | 0.01 | 0.02 | 1,050 | 79 | 1.90E-03 | 3.64E-03 | 80 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 530.54 | 0.01 | 0.02 | 1,050 | 79 | 1.90E-03 | 3.64E-03 | 80 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 530.54 | 0.01 | 0.02 | 1,050 | 79 | 1.90E-03 | 3.64E-03 | 80 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 530.54 | 0.01 | 0.02 | 1,050 | 79 | 1.90E-03 | 3.64E-03 | 80 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 530.54 | 0.01 | 0.02 | 1,050 | 79 | 1.90E-03 | 3.64E-03 | 80 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 530.54 | 0.01 | 0.02 | 438 | 33 | 7.91E-04 | 1.52E-03 | 34 |
| Cranes | Diesel | 2270002045 | 625 | 43% | 530.81 | 0.01 | 0.02 | 464 | 73 | 8.35E-04 | 3.35E-03 | 74 |
| Cranes | Diesel | 2270002045 | 625 | 43% | 530.81 | 0.01 | 0.02 | 8,453 | 1,329 | 0.02 | 0.06 | 1,348 |
| Cranes | Diesel | 2270002045 | 625 | 43% | 530.81 | 0.01 | 0.02 | 8,071 | 1,269 | 0.01 | 0.06 | 1,287 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 536.71 | 0.004 | 0.02 | 1,688 | 197 | 1.51E-03 | 0.01 | 200 |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 536.71 | 0.004 | 0.02 | 900 | 105 | 8.04E-04 | 4.83E-03 | 107 |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 536.71 | 0.004 | 0.02 | 20,763 | 2,428 | 0.02 | 0.11 | 2,462 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 536.71 | 0.004 | 0.02 | 3,825 | 447 | 3.42E-03 | 0.02 | 453 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 536.71 | 0.004 | 0.02 | 1,050 | 123 | 9.38E-04 | 0.01 | 124 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 536.71 | 0.004 | 0.02 | 2,277 | 266 | 2.03E-03 | 0.01 | 270 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 536.71 | 0.004 | 0.02 | 2,673 | 313 | 2.39E-03 | 0.01 | 317 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 536.71 | 0.004 | 0.02 | 4,275 | 500 | 3.82E-03 | 0.02 | 507 |
| Excavators | Diesel | 2270002036 | 250 | 59% | 536.77 | 0.002 | 0.02 | 43,400 | 3,788 | 0.01 | 0.17 | 3,840 |
| Excavators | Diesel | 2270002036 | 250 | 59% | 536.77 | 0.002 | 0.02 | 900 | 79 | 2.30E-04 | 3.61E-03 | 80 |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 530.56 | 0.01 | 0.02 | 3,623 | 182 | 2.86E-03 | 0.01 | 185 |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 530.56 | 0.01 | 0.02 | 4,253 | 214 | 3.35E-03 | 0.01 | 217 |
| Other Construction Equipment | Diesel | 2270002081 | 265 | 59% | 536.66 | 0.005 | 0.02 | 277 | 26 | 2.29E-04 | 1.18E-03 | 26 |
| Tractors/Loaders/Backhoes | Diesel | 2270002066 | 160 | 21% | 625.55 | 0.03 | 0.03 | 19,038 | 441 | 0.02 | 0.02 | 448 |
| Welders | Diesel | 2270006025 | 50 | 21% | 694.43 | 0.03 | 0.03 | 900 | 7 | 2.95E-04 | 3.32E-04 | 7 |
| Welders | Diesel | 2270006025 | 50 | 21% | 694.43 | 0.03 | 0.03 | 71,800 | 577 | 0.02 | 0.03 | 586 |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 514.54 | 0.07 | 0.01 | 3,255 | 179 | 0.02 | 0.01 | 181 |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 514.54 | 0.07 | 0.01 | 3,821 | 210 | 0.03 | 0.01 | 212 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | 514.54 | 0.07 | 0.01 | 4,050 | 641 | 0.08 | 0.02 | 649 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | 514.54 | 0.07 | 0.01 | 3,450 | 546 | 0.07 | 0.02 | 552 |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 514.54 | 0.07 | 0.01 | 9,092 | 522 | 0.07 | 0.02 | 528 |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 514.54 | 0.07 | 0.01 | 7,745 | 445 | 0.06 | 0.01 | 450 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 514.54 | 0.07 | 0.01 | 2,369 | 496 | 0.06 | 0.01 | 502 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 514.54 | 0.07 | 0.01 | 2,018 | 423 | 0.06 | 0.01 | 428 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 514.54 | 0.07 | 0.01 | 3,900 | 817 | 0.11 | 0.02 | 826 |
| **Total** | | | | | | | | | **17,529** | **0.70** | **0.73** | **17,765** |

1. Based on EPA MOVES2014b.
2. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
3. Based on data provided by Blue Marlin Offshore Port, LLC and analysis of construction equipment data from similar projects.
4. Load factor from Table 3-4 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
5. Tier 0 emission factors from Tables 3-8 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
6. 2020 Climate Registry Default Emission Factors, Released: April 2020, Tables 2.1 and 2.7, ratioed based on $CO_2$ emission factor from EPA MOVES2014b (except for marine vessels). https://www.theclimateregistry.org/wp-content/uploads/2020/04/The-Climate-Registry-2020-Default-Emission-Factor-Document.pdf
7. The global warming potentials of $CO_2$, $CH_4$, and $N_2O$ are assumed to be 1, 25, and 298, respectively.

**Table 6 - BMOP - Onshore Pipeline Construction Emissions**
**2022 Non-Road Construction Equipment Exhaust Hazardous Air Pollutant Emissions**

| Equipment Type | Fuel | Source Category[1] | Engine Rating[3] (hp) | Load Factor[1] | Pollutant Emission Factor[2] (g/hp-hr) | | | | Equipment Operating Duration[3] | Pollutant Emissions (tons/year) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1,3-Butadiene | 2,2,4-Trimethylpentane | Acetaldehyde | Acrolein | | 1,3-Butadiene | 2,2,4-Trimethylpentane | Acetaldehyde | Acrolein |
| Air Compressors | Diesel | 2270006015 | 180 | 43% | 1.52E-04 | 6.45E-04 | 8.28E-03 | 1.50E-03 | 8,388 | 1.09E-04 | 4.61E-04 | 0.01 | 1.07E-03 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 5.67E-04 | 2.35E-03 | 2.66E-02 | 6.59E-03 | 1,050 | 8.46E-05 | 3.51E-04 | 3.97E-03 | 9.85E-04 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 5.67E-04 | 2.35E-03 | 2.66E-02 | 6.59E-03 | 1,050 | 8.46E-05 | 3.51E-04 | 3.97E-03 | 9.85E-04 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 5.67E-04 | 2.35E-03 | 2.66E-02 | 6.59E-03 | 1,050 | 8.46E-05 | 3.51E-04 | 3.97E-03 | 9.85E-04 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 5.67E-04 | 2.35E-03 | 2.66E-02 | 6.59E-03 | 1,050 | 8.46E-05 | 3.51E-04 | 3.97E-03 | 9.85E-04 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 5.67E-04 | 2.35E-03 | 2.66E-02 | 6.59E-03 | 1,050 | 8.46E-05 | 3.51E-04 | 3.97E-03 | 9.85E-04 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 5.67E-04 | 2.35E-03 | 2.66E-02 | 6.59E-03 | 438 | 3.53E-05 | 1.47E-04 | 1.66E-03 | 4.11E-04 |
| Cranes | Diesel | 2270002045 | 625 | 43% | 1.53E-04 | 6.51E-04 | 7.95E-03 | 1.68E-03 | 464 | 2.10E-05 | 8.95E-05 | 1.09E-03 | 2.30E-04 |
| Cranes | Diesel | 2270002045 | 625 | 43% | 1.53E-04 | 6.51E-04 | 7.95E-03 | 1.68E-03 | 8,453 | 3.82E-04 | 1.63E-03 | 0.02 | 4.20E-03 |
| Cranes | Diesel | 2270002045 | 625 | 43% | 1.53E-04 | 6.51E-04 | 7.95E-03 | 1.68E-03 | 8,071 | 3.65E-04 | 1.56E-03 | 0.02 | 4.01E-03 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 7.90E-05 | 3.49E-04 | 4.49E-03 | 7.98E-04 | 1,688 | 2.90E-05 | 1.28E-04 | 1.65E-03 | 2.93E-04 |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 7.90E-05 | 3.49E-04 | 4.49E-03 | 7.98E-04 | 900 | 1.55E-05 | 6.84E-05 | 8.79E-04 | 1.56E-04 |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 7.90E-05 | 3.49E-04 | 4.49E-03 | 7.98E-04 | 20,763 | 3.57E-04 | 1.58E-03 | 0.02 | 3.61E-03 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 7.90E-05 | 3.49E-04 | 4.49E-03 | 7.98E-04 | 3,825 | 6.58E-05 | 2.91E-04 | 3.74E-03 | 6.65E-04 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 7.90E-05 | 3.49E-04 | 4.49E-03 | 7.98E-04 | 1,050 | 1.81E-05 | 7.98E-05 | 1.03E-03 | 1.83E-04 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 7.90E-05 | 3.49E-04 | 4.49E-03 | 7.98E-04 | 2,277 | 3.92E-05 | 1.73E-04 | 2.23E-03 | 3.96E-04 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 7.90E-05 | 3.49E-04 | 4.49E-03 | 7.98E-04 | 2,673 | 4.60E-05 | 2.03E-04 | 2.61E-03 | 4.65E-04 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 7.90E-05 | 3.49E-04 | 4.49E-03 | 7.98E-04 | 4,275 | 7.35E-05 | 3.25E-04 | 4.18E-03 | 7.43E-04 |
| Excavators | Diesel | 2270002036 | 250 | 59% | 3.04E-05 | 1.50E-04 | 1.90E-03 | 3.23E-04 | 43,400 | 2.15E-04 | 1.06E-03 | 0.01 | 2.28E-03 |
| Excavators | Diesel | 2270002036 | 250 | 59% | 3.04E-05 | 1.50E-04 | 1.90E-03 | 3.23E-04 | 900 | 4.45E-06 | 2.20E-05 | 2.79E-04 | 4.73E-05 |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 4.94E-04 | 2.03E-03 | 2.22E-02 | 5.69E-03 | 3,623 | 1.70E-04 | 6.97E-04 | 0.01 | 1.95E-03 |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 4.94E-04 | 2.03E-03 | 2.22E-02 | 5.69E-03 | 4,253 | 1.99E-04 | 8.18E-04 | 0.01 | 2.29E-03 |
| Other Construction Equipment | Diesel | 2270002081 | 265 | 59% | 1.12E-04 | 4.77E-04 | 5.97E-03 | 1.09E-03 | 277 | 5.33E-06 | 2.28E-05 | 2.85E-04 | 5.20E-05 |
| Tractors/Loaders/Backhoes | Diesel | 2270002066 | 160 | 21% | 1.11E-03 | 4.59E-03 | 5.46E-02 | 1.22E-02 | 19,038 | 7.80E-04 | 3.24E-03 | 0.04 | 0.01 |
| Welders | Diesel | 2270006025 | 50 | 21% | 1.26E-03 | 5.39E-03 | 5.75E-02 | 1.73E-02 | 900 | 1.31E-05 | 5.61E-05 | 5.99E-04 | 1.80E-04 |
| Welders | Diesel | 2270006025 | 50 | 21% | 1.26E-03 | 5.39E-03 | 5.75E-02 | 1.73E-02 | 71,800 | 1.05E-03 | 4.48E-03 | 0.05 | 0.01 |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 1.24E-04 | - | 2.44E-03 | 2.94E-04 | 3,255 | 4.31E-05 | - | 8.45E-04 | 1.02E-04 |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 1.24E-04 | - | 2.44E-03 | 2.94E-04 | 3,821 | 5.06E-05 | - | 9.92E-04 | 1.20E-04 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | - | - | 8.00E-05 | 2.50E-05 | 4,050 | - | - | 9.97E-05 | 3.12E-05 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | - | - | 8.00E-05 | 2.50E-05 | 3,450 | - | - | 8.49E-05 | 2.65E-05 |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 1.24E-04 | - | 2.44E-03 | 2.94E-04 | 9,092 | 1.26E-04 | - | 2.47E-03 | 2.98E-04 |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 1.24E-04 | - | 2.44E-03 | 2.94E-04 | 7,745 | 1.07E-04 | - | 2.11E-03 | 2.54E-04 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 1.24E-04 | - | 2.44E-03 | 2.94E-04 | 2,369 | 1.20E-04 | - | 2.35E-03 | 2.83E-04 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 1.24E-04 | - | 2.44E-03 | 2.94E-04 | 2,018 | 1.02E-04 | - | 2.00E-03 | 2.41E-04 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 1.24E-04 | - | 2.44E-03 | 2.94E-04 | 3,900 | 1.97E-04 | - | 0.004 | 4.66E-04 |
| **Total** | | | | | | | | | | **0.01** | **0.02** | **0.24** | **0.05** |

1. Based on EPA MOVES2014b.
2. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
3. Based on data provided by Blue Marlin Offshore Port, LLC and analysis of construction equipment data from similar projects.
4. Load factor from Table 3-4 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
5. Emission factors for engines greater than 600 hp are based on Section 3.4. Large Stationary Diesel and All Stationary Dual-fuel Engines, Tables 3.4-3 and 3.4-4. For engines less than 600 hp, emission factors are based on AP-42, Section 3.3. Gasoline and Diesel Industrial Engines, Table 3.3-2.

**Table 6 - BMOP - Onshore Pipeline Construction Emissions**
**2022 Non-Road Construction Equipment Exhaust Hazardous Air Pollutant Emissions**
**(Continued)**

| Equipment Type | Fuel | Source Category[1] | Engine Rating[3] (hp) | Load Factor[1] | Pollutant Emission Factor[2] (g/hp-hr) | | | | | Equipment Operating Duration[3] | Pollutant Emissions (tons/year) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Benzene | Ethyl Benzene | Formaldehyde | Hexane | Naphthalene | | Benzene | Ethyl Benzene | Formaldehyde | Hexane | Naphthalene |
| Air Compressors | Diesel | 2270006015 | 180 | 43% | 4.00E-03 | 3.88E-04 | 2.30E-02 | 4.09E-05 | 9.69E-09 | 8,388 | 2.86E-03 | 2.77E-04 | 0.02 | 2.93E-05 | 6.94E-09 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.03E-02 | 1.80E-03 | 7.46E-02 | 4.72E-04 | 6.93E-09 | 1,050 | 1.54E-03 | 2.69E-04 | 0.01 | 7.05E-05 | 1.03E-09 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.03E-02 | 1.80E-03 | 7.46E-02 | 4.72E-04 | 6.93E-09 | 1,050 | 1.54E-03 | 2.69E-04 | 0.01 | 7.05E-05 | 1.03E-09 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.03E-02 | 1.80E-03 | 7.46E-02 | 4.72E-04 | 6.93E-09 | 1,050 | 1.54E-03 | 2.69E-04 | 0.01 | 7.05E-05 | 1.03E-09 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.03E-02 | 1.80E-03 | 7.46E-02 | 4.72E-04 | 6.93E-09 | 1,050 | 1.54E-03 | 2.69E-04 | 0.01 | 7.05E-05 | 1.03E-09 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.03E-02 | 1.80E-03 | 7.46E-02 | 4.72E-04 | 6.93E-09 | 1,050 | 1.54E-03 | 2.69E-04 | 0.01 | 7.05E-05 | 1.03E-09 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.03E-02 | 1.80E-03 | 7.46E-02 | 4.72E-04 | 6.93E-09 | 438 | 6.43E-04 | 1.12E-04 | 4.64E-03 | 2.94E-05 | 4.32E-10 |
| Cranes | Diesel | 2270002045 | 625 | 43% | 3.71E-03 | 4.66E-04 | 2.21E-02 | 7.63E-05 | 1.02E-08 | 464 | 5.10E-04 | 6.41E-05 | 3.03E-03 | 1.05E-05 | 1.41E-09 |
| Cranes | Diesel | 2270002045 | 625 | 43% | 3.71E-03 | 4.66E-04 | 2.21E-02 | 7.63E-05 | 1.02E-08 | 8,453 | 0.01 | 1.17E-03 | 0.06 | 1.91E-04 | 2.56E-08 |
| Cranes | Diesel | 2270002045 | 625 | 43% | 3.71E-03 | 4.66E-04 | 2.21E-02 | 7.63E-05 | 1.02E-08 | 8,071 | 0.01 | 1.11E-03 | 0.05 | 1.82E-04 | 2.45E-08 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 2.17E-03 | 2.29E-04 | 1.23E-02 | 1.83E-05 | 1.38E-08 | 1,688 | 7.99E-04 | 8.42E-05 | 4.52E-03 | 6.73E-06 | 5.09E-09 |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 2.17E-03 | 2.29E-04 | 1.23E-02 | 1.83E-05 | 1.38E-08 | 900 | 4.26E-04 | 4.49E-05 | 2.41E-03 | 3.59E-06 | 2.71E-09 |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 2.17E-03 | 2.29E-04 | 1.23E-02 | 1.83E-05 | 1.38E-08 | 20,763 | 0.01 | 1.04E-03 | 0.06 | 8.28E-05 | 6.26E-08 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 2.17E-03 | 2.29E-04 | 1.23E-02 | 1.83E-05 | 1.38E-08 | 3,825 | 1.81E-03 | 1.91E-04 | 0.01 | 1.53E-05 | 1.15E-08 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 2.17E-03 | 2.29E-04 | 1.23E-02 | 1.83E-05 | 1.38E-08 | 1,050 | 4.97E-04 | 5.24E-05 | 2.81E-03 | 4.19E-06 | 3.17E-09 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 2.17E-03 | 2.29E-04 | 1.23E-02 | 1.83E-05 | 1.38E-08 | 2,277 | 1.08E-03 | 1.14E-04 | 0.01 | 9.08E-06 | 6.86E-09 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 2.17E-03 | 2.29E-04 | 1.23E-02 | 1.83E-05 | 1.38E-08 | 2,673 | 1.27E-03 | 1.33E-04 | 0.01 | 1.07E-05 | 8.06E-09 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 2.17E-03 | 2.29E-04 | 1.23E-02 | 1.83E-05 | 1.38E-08 | 4,275 | 2.02E-03 | 2.13E-04 | 0.01 | 1.71E-05 | 1.29E-08 |
| Excavators | Diesel | 2270002036 | 250 | 59% | 8.82E-04 | 1.28E-04 | 4.91E-03 | 5.34E-06 | 1.64E-08 | 43,400 | 0.01 | 9.06E-04 | 0.03 | 3.77E-05 | 1.16E-07 |
| Excavators | Diesel | 2270002036 | 250 | 59% | 8.82E-04 | 1.28E-04 | 4.91E-03 | 5.34E-06 | 1.64E-08 | 900 | 1.29E-04 | 1.88E-05 | 7.19E-04 | 7.81E-07 | 2.40E-09 |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 7.72E-03 | 1.58E-03 | 6.22E-02 | 5.22E-04 | 5.62E-09 | 3,623 | 2.65E-03 | 5.41E-04 | 0.02 | 1.79E-04 | 1.93E-09 |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 7.72E-03 | 1.58E-03 | 6.22E-02 | 5.22E-04 | 5.62E-09 | 4,253 | 3.11E-03 | 6.35E-04 | 0.03 | 2.10E-04 | 2.27E-09 |
| Other Construction Equipment | Diesel | 2270002081 | 265 | 59% | 2.74E-03 | 3.05E-04 | 1.64E-02 | 5.34E-05 | 1.36E-08 | 277 | 1.31E-04 | 1.45E-05 | 7.84E-04 | 2.55E-06 | 6.50E-10 |
| Tractors/Loaders/Backhoes | Diesel | 2270002066 | 160 | 21% | 2.34E-02 | 3.18E-03 | 1.53E-01 | 6.81E-04 | 1.49E-09 | 19,038 | 0.02 | 2.24E-03 | 0.11 | 4.80E-04 | 1.05E-09 |
| Welders | Diesel | 2270006025 | 50 | 21% | 2.13E-02 | 5.02E-03 | 1.61E-01 | 1.06E-03 | 0.00E+00 | 900 | 2.22E-04 | 5.23E-05 | 1.67E-03 | 1.11E-05 | - |
| Welders | Diesel | 2270006025 | 50 | 21% | 2.13E-02 | 5.02E-03 | 1.61E-01 | 1.06E-03 | 0.00E+00 | 71,800 | 0.02 | 4.17E-03 | 0.13 | 8.82E-04 | - |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 2.96E-03 | - | 3.75E-03 | - | 2.69E-04 | 3,255 | 0.001 | - | 1.30E-03 | - | 9.35E-05 |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 2.96E-03 | - | 3.75E-03 | - | 2.69E-04 | 3,821 | 1.21E-03 | - | 1.53E-03 | - | 1.10E-04 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | 2.46E-03 | - | 2.51E-04 | - | 4.13E-04 | 4,050 | 3.07E-03 | - | 3.12E-04 | - | 5.1E-04 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | 2.46E-03 | - | 2.51E-04 | - | 4.13E-04 | 3,450 | 2.61E-03 | - | 2.66E-04 | - | 4.4E-04 |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 2.96E-03 | - | 3.75E-03 | - | 2.69E-04 | 9,092 | 3.01E-03 | - | 3.80E-03 | - | 2.73E-04 |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 2.96E-03 | - | 3.75E-03 | - | 2.69E-04 | 7,745 | 2.56E-03 | - | 3.24E-03 | - | 2.33E-04 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 2.96E-03 | - | 3.75E-03 | - | 2.69E-04 | 2,369 | 2.86E-03 | - | 3.61E-03 | - | 2.60E-04 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 2.96E-03 | - | 3.75E-03 | - | 2.69E-04 | 2,018 | 2.43E-03 | - | 3.08E-03 | - | 2.21E-04 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 2.96E-03 | - | 3.75E-03 | - | 2.69E-04 | 3,900 | 4.70E-03 | - | 0.01 | - | 4.27E-04 |
| **Total** | | | | | | | | | | | **0.12** | **0.01** | **0.65** | **<0.01** | **<0.01** |

1. Based on EPA MOVES2014b.
2. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
3. Based on data provided by Blue Marlin Offshore Port, LLC and analysis of construction equipment data from similar projects.
4. Load factor from Table 3-4 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
5. Emission factors for engines greater than 600 hp are based on Section 3.4. Large Stationary Diesel and All Stationary Dual-fuel Engines, Tables 3.4-3 and 3.4-4. For engines less than 600 hp, emission factors are based on AP-42, Section 3.3. Gasoline and Diesel Industrial Engines, Table 3.3-2.

**Table 6 - BMOP - Onshore Pipeline Construction Emissions**
**2022 Non-Road Construction Equipment Exhaust Hazardous Air Pollutant Emissions**
**(Continued)**

| Equipment Type | Fuel | Source Category[1] | Engine Rating[3] (hp) | Load Factor[1] | Pollutant Emission Factor[2] (g/hp-hr) | | | | Equipment Operating Duration[3] | Pollutant Emissions (tons/year) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PAH | Propionaldehyde | Toluene | Xylenes | | PAH | Propionaldehyde | Toluene | Xylenes |
| Air Compressors | Diesel | 2270006015 | 180 | 43% | 3.57E-04 | 2.02E-03 | 2.93E-03 | 1.28E-03 | 8,388 | 2.55E-04 | 1.44E-03 | 2.10E-03 | 9.17E-04 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.30E-03 | 7.39E-03 | 7.60E-03 | 5.16E-03 | 1,050 | 1.94E-04 | 1.10E-03 | 1.13E-03 | 7.71E-04 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.30E-03 | 7.39E-03 | 7.60E-03 | 5.16E-03 | 1,050 | 1.94E-04 | 1.10E-03 | 1.13E-03 | 7.71E-04 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.30E-03 | 7.39E-03 | 7.60E-03 | 5.16E-03 | 1,050 | 1.94E-04 | 1.10E-03 | 1.13E-03 | 7.71E-04 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.30E-03 | 7.39E-03 | 7.60E-03 | 5.16E-03 | 1,050 | 1.94E-04 | 1.10E-03 | 1.13E-03 | 7.71E-04 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.30E-03 | 7.39E-03 | 7.60E-03 | 5.16E-03 | 1,050 | 1.94E-04 | 1.10E-03 | 1.13E-03 | 7.71E-04 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.30E-03 | 7.39E-03 | 7.60E-03 | 5.16E-03 | 438 | 8.09E-05 | 4.60E-04 | 4.73E-04 | 3.22E-04 |
| Cranes | Diesel | 2270002045 | 625 | 43% | 3.75E-04 | 1.93E-03 | 2.71E-03 | 1.47E-03 | 464 | 5.15E-05 | 2.66E-04 | 3.72E-04 | 2.03E-04 |
| Cranes | Diesel | 2270002045 | 625 | 43% | 3.75E-04 | 1.93E-03 | 2.71E-03 | 1.47E-03 | 8,453 | 9.38E-04 | 4.84E-03 | 6.78E-03 | 3.69E-03 |
| Cranes | Diesel | 2270002045 | 625 | 43% | 3.75E-04 | 1.93E-03 | 2.71E-03 | 1.47E-03 | 8,071 | 8.96E-04 | 4.62E-03 | 6.48E-03 | 3.52E-03 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 2.03E-04 | 1.00E-03 | 1.62E-03 | 8.45E-04 | 1,688 | 7.47E-05 | 3.69E-04 | 5.95E-04 | 3.11E-04 |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 2.03E-04 | 1.00E-03 | 1.62E-03 | 8.45E-04 | 900 | 3.98E-05 | 1.97E-04 | 3.17E-04 | 1.66E-04 |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 2.03E-04 | 1.00E-03 | 1.62E-03 | 8.45E-04 | 20,763 | 9.19E-04 | 4.54E-03 | 7.32E-03 | 3.82E-03 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 2.03E-04 | 1.00E-03 | 1.62E-03 | 8.45E-04 | 3,825 | 1.69E-04 | 8.36E-04 | 1.35E-03 | 7.04E-04 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 2.03E-04 | 1.00E-03 | 1.62E-03 | 8.45E-04 | 1,050 | 4.65E-05 | 2.29E-04 | 3.70E-04 | 1.93E-04 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 2.03E-04 | 1.00E-03 | 1.62E-03 | 8.45E-04 | 2,277 | 1.01E-04 | 4.97E-04 | 8.03E-04 | 4.19E-04 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 2.03E-04 | 1.00E-03 | 1.62E-03 | 8.45E-04 | 2,673 | 1.18E-04 | 5.84E-04 | 9.43E-04 | 4.92E-04 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 2.03E-04 | 1.00E-03 | 1.62E-03 | 8.45E-04 | 4,275 | 1.89E-04 | 9.34E-04 | 1.51E-03 | 7.87E-04 |
| Excavators | Diesel | 2270002036 | 250 | 59% | 8.14E-05 | 3.74E-04 | 7.07E-04 | 6.02E-04 | 43,400 | 5.74E-04 | 2.64E-03 | 4.99E-03 | 4.25E-03 |
| Excavators | Diesel | 2270002036 | 250 | 59% | 8.14E-05 | 3.74E-04 | 7.07E-04 | 6.02E-04 | 900 | 1.19E-05 | 5.47E-05 | 1.03E-04 | 8.80E-05 |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 1.07E-03 | 7.02E-03 | 5.95E-03 | 4.77E-03 | 3,623 | 3.67E-04 | 2.41E-03 | 2.05E-03 | 1.64E-03 |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 1.07E-03 | 7.02E-03 | 5.95E-03 | 4.77E-03 | 4,253 | 4.31E-04 | 2.83E-03 | 2.40E-03 | 1.92E-03 |
| Other Construction Equipment | Diesel | 2270002081 | 265 | 59% | 2.59E-04 | 1.63E-03 | 2.06E-03 | 1.15E-03 | 277 | 1.24E-05 | 7.76E-05 | 9.83E-05 | 5.51E-05 |
| Tractors/Loaders/Backhoes | Diesel | 2270002066 | 160 | 21% | 2.53E-03 | 1.44E-02 | 1.70E-02 | 9.03E-03 | 19,038 | 1.79E-03 | 0.01 | 0.01 | 0.01 |
| Welders | Diesel | 2270006025 | 50 | 21% | 3.18E-03 | 1.23E-02 | 1.46E-02 | 1.26E-02 | 900 | 3.31E-05 | 1.28E-04 | 1.52E-04 | 1.31E-04 |
| Welders | Diesel | 2270006025 | 50 | 21% | 3.18E-03 | 1.23E-02 | 1.46E-02 | 1.26E-02 | 71,800 | 2.64E-03 | 0.01 | 0.01 | 0.01 |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 5.33E-04 | - | 1.30E-03 | 9.05E-04 | 3,255 | 1.85E-04 | - | 4.51E-04 | 3.14E-04 |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 5.33E-04 | - | 1.30E-03 | 9.05E-04 | 3,821 | 2.17E-04 | - | 5.29E-04 | 3.69E-04 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | 6.73E-04 | - | 8.92E-04 | 6.13E-04 | 4,050 | 8.38E-04 | - | 1.11E-03 | 7.63E-04 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | 6.73E-04 | - | 8.92E-04 | 6.13E-04 | 3,450 | 7.14E-04 | - | 9.47E-04 | 6.50E-04 |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 5.33E-04 | - | 1.30E-03 | 9.05E-04 | 9,092 | 5.41E-04 | - | 1.32E-03 | 9.18E-04 |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 5.33E-04 | - | 1.30E-03 | 9.05E-04 | 7,745 | 4.61E-04 | - | 1.12E-03 | 7.82E-04 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 5.33E-04 | - | 1.30E-03 | 9.05E-04 | 2,369 | 5.14E-04 | - | 1.25E-03 | 8.72E-04 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 5.33E-04 | - | 1.30E-03 | 9.05E-04 | 2,018 | 4.38E-04 | - | 1.07E-03 | 7.43E-04 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 5.33E-04 | - | 1.30E-03 | 9.05E-04 | 3,900 | 8.47E-04 | - | 2.06E-03 | 1.44E-03 |
| **Total** | | | | | | | | | | **0.02** | **0.05** | **0.08** | **0.05** |

1. Based on EPA MOVES2014b.
2. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
3. Based on data provided by Blue Marlin Offshore Port, LLC and analysis of construction equipment data from similar projects.
4. Load factor from Table 3-4 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
5. Emission factors for engines greater than 600 hp are based on Section 3.4. Large Stationary Diesel and All Stationary Dual-fuel Engines, Tables 3.4-3 and 3.4-4. For engines less than 600 hp, emission factors are based on AP-42, Section 3.3. Gasoline and Diesel Industrial Engines, Table 3.3-2.

**Table 6 - BMOP - Onshore Pipeline Construction Emissions**
**2022 Non-Road Construction Equipment Exhaust Hazardous Air Pollutant Emissions**
**(Continued)**

| Equipment Type | Fuel | Source Category[1] | Engine Rating[3] (hp) | Load Factor[1] | Pollutant Emission Factor[2] (g/hp-hr) | | | | | Equipment Operating Duration[3] | Pollutant Emissions (tons/year) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Arsenic | Chromium VI | Manganese | Mercury | Nickel | | Arsenic | Chromium VI | Manganese | Mercury | Nickel |
| Air Compressors | Diesel | 2270006015 | 180 | 43% | 8.32E-07 | 2.82E-09 | 1.16E-06 | 1.11E-08 | 2.01E-06 | 8,388 | 5.96E-07 | 2.02E-09 | 8.31E-07 | 7.92E-09 | 1.44E-06 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 8.32E-07 | 3.49E-09 | 1.52E-06 | 1.11E-08 | 2.65E-06 | 1,050 | 1.24E-07 | 5.21E-10 | 2.27E-07 | 1.65E-09 | 3.96E-07 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 8.32E-07 | 3.49E-09 | 1.52E-06 | 1.11E-08 | 2.65E-06 | 1,050 | 1.24E-07 | 5.21E-10 | 2.27E-07 | 1.65E-09 | 3.96E-07 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 8.32E-07 | 3.49E-09 | 1.52E-06 | 1.11E-08 | 2.65E-06 | 1,050 | 1.24E-07 | 5.21E-10 | 2.27E-07 | 1.65E-09 | 3.96E-07 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 8.32E-07 | 3.49E-09 | 1.52E-06 | 1.11E-08 | 2.65E-06 | 1,050 | 1.24E-07 | 5.21E-10 | 2.27E-07 | 1.65E-09 | 3.96E-07 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 8.32E-07 | 3.49E-09 | 1.52E-06 | 1.11E-08 | 2.65E-06 | 1,050 | 1.24E-07 | 5.21E-10 | 2.27E-07 | 1.65E-09 | 3.96E-07 |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 8.32E-07 | 3.49E-09 | 1.52E-06 | 1.11E-08 | 2.65E-06 | 438 | 5.18E-08 | 2.17E-10 | 9.47E-08 | 6.89E-10 | 1.65E-07 |
| Cranes | Diesel | 2270002045 | 625 | 43% | 8.32E-07 | 2.87E-09 | 1.18E-06 | 1.11E-08 | 2.05E-06 | 464 | 1.14E-07 | 3.95E-10 | 1.63E-07 | 1.52E-09 | 2.82E-07 |
| Cranes | Diesel | 2270002045 | 625 | 43% | 8.32E-07 | 2.87E-09 | 1.18E-06 | 1.11E-08 | 2.05E-06 | 8,453 | 2.08E-06 | 7.19E-09 | 2.97E-06 | 2.77E-08 | 5.14E-06 |
| Cranes | Diesel | 2270002045 | 625 | 43% | 8.32E-07 | 2.87E-09 | 1.18E-06 | 1.11E-08 | 2.05E-06 | 8,071 | 1.99E-06 | 6.86E-09 | 2.83E-06 | 2.64E-08 | 4.91E-06 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 8.41E-07 | 2.56E-09 | 1.02E-06 | 1.12E-08 | 1.76E-06 | 1,688 | 3.09E-07 | 9.43E-10 | 3.74E-07 | 4.11E-09 | 6.49E-07 |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 8.41E-07 | 2.56E-09 | 1.02E-06 | 1.12E-08 | 1.76E-06 | 900 | 1.65E-07 | 5.03E-10 | 1.99E-07 | 2.19E-09 | 3.46E-07 |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 8.41E-07 | 2.56E-09 | 1.02E-06 | 1.12E-08 | 1.76E-06 | 20,763 | 3.81E-06 | 1.16E-08 | 4.60E-06 | 5.06E-08 | 7.98E-06 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 8.41E-07 | 2.56E-09 | 1.02E-06 | 1.12E-08 | 1.76E-06 | 3,825 | 7.01E-07 | 2.14E-09 | 8.47E-07 | 9.32E-09 | 1.47E-06 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 8.41E-07 | 2.56E-09 | 1.02E-06 | 1.12E-08 | 1.76E-06 | 1,050 | 1.92E-07 | 5.87E-10 | 2.33E-07 | 2.56E-09 | 4.04E-07 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 8.41E-07 | 2.56E-09 | 1.02E-06 | 1.12E-08 | 1.76E-06 | 2,277 | 4.17E-07 | 1.27E-09 | 5.04E-07 | 5.55E-09 | 8.75E-07 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 8.41E-07 | 2.56E-09 | 1.02E-06 | 1.12E-08 | 1.76E-06 | 2,673 | 4.90E-07 | 1.49E-09 | 5.92E-07 | 6.51E-09 | 1.03E-06 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 8.41E-07 | 2.56E-09 | 1.02E-06 | 1.12E-08 | 1.76E-06 | 4,275 | 7.84E-07 | 2.39E-09 | 9.47E-07 | 1.04E-08 | 1.64E-06 |
| Excavators | Diesel | 2270002036 | 250 | 59% | 8.41E-07 | 2.32E-09 | 9.20E-07 | 1.12E-08 | 1.59E-06 | 43,400 | 5.94E-06 | 1.64E-08 | 6.49E-06 | 7.89E-08 | 1.12E-05 |
| Excavators | Diesel | 2270002036 | 250 | 59% | 8.41E-07 | 2.32E-09 | 9.20E-07 | 1.12E-08 | 1.59E-06 | 900 | 1.23E-07 | 3.40E-10 | 1.35E-07 | 1.64E-09 | 2.33E-07 |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 8.32E-07 | 3.33E-09 | 1.44E-06 | 1.11E-08 | 2.51E-06 | 3,623 | 2.86E-07 | 1.14E-09 | 4.93E-07 | 3.80E-09 | 8.61E-07 |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 8.32E-07 | 3.33E-09 | 1.44E-06 | 1.11E-08 | 2.51E-06 | 4,253 | 3.36E-07 | 1.34E-09 | 5.79E-07 | 4.46E-09 | 1.01E-06 |
| Other Construction Equipment | Diesel | 2270002081 | 265 | 59% | 8.41E-07 | 2.61E-09 | 1.04E-06 | 1.12E-08 | 1.80E-06 | 277 | 4.02E-08 | 1.25E-10 | 4.98E-08 | 5.34E-10 | 8.60E-08 |
| Tractors/Loaders/Backhoes | Diesel | 2270002066 | 160 | 21% | 9.82E-07 | 4.37E-09 | 1.92E-06 | 1.31E-08 | 3.35E-06 | 19,038 | 6.92E-07 | 3.08E-09 | 1.35E-06 | 9.20E-09 | 2.36E-06 |
| Welders | Diesel | 2270006025 | 50 | 21% | 1.09E-06 | 4.50E-09 | 1.83E-06 | 1.45E-08 | 3.15E-06 | 900 | 1.14E-08 | 4.69E-11 | 1.91E-08 | 1.51E-10 | 3.28E-08 |
| Welders | Diesel | 2270006025 | 50 | 21% | 1.09E-06 | 4.50E-09 | 1.83E-06 | 1.45E-08 | 3.15E-06 | 71,800 | 9.06E-07 | 3.74E-09 | 1.52E-06 | 1.20E-08 | 2.62E-06 |
| Air Boat[4,5] | Diesel | - | 225 | 43% | - | - | - | - | - | 3,255 | - | - | - | - | - |
| Air Boat[4,5] | Diesel | - | 225 | 43% | - | - | - | - | - | 3,821 | - | - | - | - | - |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | - | - | - | - | - | 4,050 | - | - | - | - | - |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | - | - | - | - | - | 3,450 | - | - | - | - | - |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | - | - | - | - | - | 9,092 | - | - | - | - | - |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | - | - | - | - | - | 7,745 | - | - | - | - | - |
| Dredge[4,5] | Diesel | - | 535 | 69% | - | - | - | - | - | 2,369 | - | - | - | - | - |
| Dredge[4,5] | Diesel | - | 535 | 69% | - | - | - | - | - | 2,018 | - | - | - | - | - |
| Dredge[4,5] | Diesel | - | 535 | 69% | - | - | - | - | - | 3,900 | - | - | - | - | - |
| **Total** | | | | | | | | | | | **<0.01** | **<0.01** | **<0.01** | **<0.01** | **<0.01** |

1. Based on EPA MOVES2014b.
2. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
3. Based on data provided by Blue Marlin Offshore Port, LLC and analysis of construction equipment data from similar projects.
4. Load factor from Table 3-4 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
5. Emission factors for engines greater than 600 hp are based on Section 3.4. Large Stationary Diesel and All Stationary Dual-fuel Engines, Tables 3.4-3 and 3.4-4. For engines less than 600 hp, emission factors are based on AP-42, Section 3.3. Gasoline and Diesel Industrial Engines, Table 3.3-2.

**Table 7 - BMOP - Onshore Pipeline Construction Emissions**
**2023 Non-Road Construction Equipment Exhaust Criteria Pollutant Emissions**

| Equipment Type | Fuel | Source Category[1] | Engine Rating[3] (hp) | Load Factor[1] | Pollutant Emission Factor[2] (g/hp-hr) | | | | | | Equipment Operating Duration[3] | Pollutant Emissions (tons/year) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | CO | $NO_x$ | $SO_2$ | VOC | $PM_{10}$ | $PM_{2.5}$ | | CO | $NO_x$ | $SO_2$ | VOC | $PM_{10}$ | $PM_{2.5}$ |
| Air Compressors | Diesel | 2270006015 | 180 | 43% | 0.23 | 0.90 | 0.004 | 0.07 | 0.05 | 0.05 | 0 | - | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 0.85 | 3.48 | 0.004 | 0.28 | 0.18 | 0.17 | 0 | - | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 0.85 | 3.48 | 0.004 | 0.28 | 0.18 | 0.17 | 0 | - | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 0.85 | 3.48 | 0.004 | 0.28 | 0.18 | 0.17 | 0 | - | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 0.85 | 3.48 | 0.004 | 0.28 | 0.18 | 0.17 | 0 | - | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 0.85 | 3.48 | 0.004 | 0.28 | 0.18 | 0.17 | 0 | - | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 0.85 | 3.48 | 0.004 | 0.28 | 0.18 | 0.17 | 0 | - | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 0.85 | 3.48 | 0.004 | 0.28 | 0.18 | 0.17 | 925 | 0.11 | 0.46 | 5.80E-04 | 0.04 | 0.02 | 0.02 |
| Cranes | Diesel | 2270002045 | 625 | 43% | 0.48 | 1.26 | 0.004 | 0.07 | 0.06 | 0.06 | 0 | - | - | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 0.48 | 1.26 | 0.004 | 0.07 | 0.06 | 0.06 | 0 | - | - | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 0.48 | 1.26 | 0.004 | 0.07 | 0.06 | 0.06 | 0 | - | - | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 0.27 | 0.67 | 0.004 | 0.04 | 0.05 | 0.04 | 0 | - | - | - | - | - | - |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 0.27 | 0.67 | 0.004 | 0.04 | 0.05 | 0.04 | 0 | - | - | - | - | - | - |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 0.27 | 0.67 | 0.004 | 0.04 | 0.05 | 0.04 | 0 | - | - | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 0.27 | 0.67 | 0.004 | 0.04 | 0.05 | 0.04 | 0 | - | - | - | - | - | - |
| Marooka | Diesel | 2270002069 | 335 | 59% | 0.27 | 0.67 | 0.004 | 0.04 | 0.05 | 0.04 | 0 | - | - | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 0.27 | 0.67 | 0.004 | 0.04 | 0.05 | 0.04 | 449 | 0.03 | 0.07 | 3.67E-04 | 3.83E-03 | 4.44E-03 | 4.30E-03 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 0.27 | 0.67 | 0.004 | 0.04 | 0.05 | 0.04 | 527 | 0.03 | 0.08 | 4.31E-04 | 4.49E-03 | 0.01 | 0.01 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 0.27 | 0.67 | 0.004 | 0.04 | 0.05 | 0.04 | 0 | - | - | - | - | - | - |
| Excavators | Diesel | 2270002036 | 250 | 59% | 0.07 | 0.23 | 0.004 | 0.02 | 0.02 | 0.02 | 338 | 0.00 | 0.01 | 1.97E-04 | 9.42E-04 | 8.98E-04 | 8.71E-04 |
| Excavators | Diesel | 2270002036 | 250 | 59% | 0.07 | 0.23 | 0.004 | 0.02 | 0.02 | 0.02 | 0 | - | - | - | - | - | - |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 0.72 | 3.04 | 0.004 | 0.24 | 0.16 | 0.16 | 0 | - | - | - | - | - | - |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 0.72 | 3.04 | 0.004 | 0.24 | 0.16 | 0.16 | 0 | - | - | - | - | - | - |
| Other Construction Equipment | Diesel | 2270002081 | 265 | 59% | 0.25 | 0.71 | 0.004 | 0.05 | 0.05 | 0.05 | 0 | - | - | - | - | - | - |
| Tractors/Loaders/Backhoes | Diesel | 2270002066 | 160 | 21% | 1.60 | 2.88 | 0.005 | 0.51 | 0.31 | 0.30 | 0 | - | - | - | - | - | - |
| Welders | Diesel | 2270006025 | 50 | 21% | 2.22 | 3.55 | 0.005 | 0.58 | 0.35 | 0.34 | 0 | - | - | - | - | - | - |
| Welders | Diesel | 2270006025 | 50 | 21% | 2.22 | 3.55 | 0.005 | 0.58 | 0.35 | 0.34 | 0 | - | - | - | - | - | - |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 1.12 | 7.46 | 0.005 | 0.20 | 0.22 | 0.22 | 449 | 0.05 | 0.36 | 2.32E-04 | 9.64E-03 | 1.07E-02 | 0.01 |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 1.12 | 7.46 | 0.005 | 0.20 | 0.22 | 0.22 | 527 | 0.06 | 0.42 | 2.72E-04 | 1.13E-02 | 1.26E-02 | 0.01 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | 1.86 | 9.69 | 0.005 | 0.20 | 0.22 | 0.22 | 263 | 0.15 | 0.78 | 3.92E-04 | 1.63E-02 | 1.81E-02 | 0.02 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | 1.86 | 9.69 | 0.005 | 0.20 | 0.22 | 0.22 | 224 | 0.13 | 0.67 | 3.34E-04 | 1.39E-02 | 1.54E-02 | 0.02 |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 1.12 | 7.46 | 0.005 | 0.20 | 0.22 | 0.22 | 1,964 | 0.25 | 1.63 | 1.06E-03 | 4.41E-02 | 4.90E-02 | 0.05 |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 1.12 | 7.46 | 0.005 | 0.20 | 0.22 | 0.22 | 1,673 | 0.21 | 1.39 | 9.05E-04 | 3.76E-02 | 4.18E-02 | 0.04 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 1.12 | 7.46 | 0.005 | 0.20 | 0.22 | 0.22 | 446 | 0.20 | 1.35 | 8.80E-04 | 3.65E-02 | 4.06E-02 | 0.04 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 1.12 | 7.46 | 0.005 | 0.20 | 0.22 | 0.22 | 380 | 0.17 | 1.15 | 7.50E-04 | 3.11E-02 | 3.46E-02 | 0.03 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 1.12 | 7.46 | 0.005 | 0.20 | 0.22 | 0.22 | 638 | 0.29 | 1.94 | 1.26E-03 | 5.23E-02 | 5.81E-02 | 0.06 |
| **Total** | | | | | | | | | | | | **1.69** | **10.31** | **0.01** | **0.30** | **0.31** | **0.31** |

1. Based on EPA MOVES2014b.
2. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
3. Based on data provided by Blue Marlin Offshore Port, LLC and analysis of construction equipment data from similar projects.
4. Load factor from Table 3-4 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009. A fuel correction factor of 0.005 was applied to SO2 emission factors (Ultra Low Sulfur Diesel) per Table 3-9 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
5. Tier 0 emission factors from Tables 3-8 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.

**Table 8 - BMOP - Onshore Pipeline Construction Emissions**
**2023 Non-Road Construction Equipment Exhaust Greenhouse Gas Emissions**

| Equipment Type | Fuel | Source Category[1] | Engine Rating[3] (hp) | Load Factor[1] | Pollutant Emission Factor[2] (g/hp-hr) | | | Equipment Operating Duration[3] | Pollutant Emissions (tons/year) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | $CO_2$ | $CH_4$ | $N_2O$[6] | | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$[7] |
| Air Compressors | Diesel | 2270006015 | 180 | 43% | 530.90 | 0.01 | 0.02 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 530.59 | 0.01 | 0.02 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 530.59 | 0.01 | 0.02 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 530.59 | 0.01 | 0.02 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 530.59 | 0.01 | 0.02 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 530.59 | 0.01 | 0.02 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 530.59 | 0.01 | 0.02 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 530.59 | 0.01 | 0.02 | 925 | 70 | 1.60E-03 | 3.21E-03 | 71 |
| Cranes | Diesel | 2270002045 | 625 | 43% | 530.85 | 0.00 | 0.02 | 0 | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 530.85 | 0.00 | 0.02 | 0 | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 530.85 | 0.00 | 0.02 | 0 | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 536.73 | 0.003 | 0.02 | 0 | - | - | - | - |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 536.73 | 0.003 | 0.02 | 0 | - | - | - | - |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 536.73 | 0.003 | 0.02 | 0 | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 536.73 | 0.003 | 0.02 | 0 | - | - | - | - |
| Marooka | Diesel | 2270002069 | 335 | 59% | 536.73 | 0.003 | 0.02 | 0 | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 536.73 | 0.003 | 0.02 | 449 | 53 | 3.40E-04 | 2.41E-03 | 53 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 536.73 | 0.003 | 0.02 | 527 | 62 | 3.99E-04 | 2.83E-03 | 62 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 536.73 | 0.003 | 0.02 | 0 | - | - | - | - |
| Excavators | Diesel | 2270002036 | 250 | 59% | 536.78 | 0.001 | 0.02 | 338 | 29 | 6.39E-05 | 1.36E-03 | 30 |
| Excavators | Diesel | 2270002036 | 250 | 59% | 536.78 | 0.001 | 0.02 | 0 | - | - | - | - |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 530.61 | 0.01 | 0.02 | 0 | - | - | - | - |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 530.61 | 0.01 | 0.02 | 0 | - | - | - | - |
| Other Construction Equipment | Diesel | 2270002081 | 265 | 59% | 536.69 | 0.004 | 0.02 | 0 | - | - | - | - |
| Tractors/Loaders/Backhoes | Diesel | 2270002066 | 160 | 21% | 625.63 | 0.03 | 0.03 | 0 | - | - | - | - |
| Welders | Diesel | 2270006025 | 50 | 21% | 694.60 | 0.03 | 0.03 | 0 | - | - | - | - |
| Welders | Diesel | 2270006025 | 50 | 21% | 694.60 | 0.03 | 0.03 | 0 | - | - | - | - |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 514.54 | 0.07 | 0.01 | 449 | 25 | 3.21E-03 | 7.14E-04 | 25 |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 514.54 | 0.07 | 0.01 | 527 | 29 | 3.77E-03 | 8.38E-04 | 29 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | 514.54 | 0.07 | 0.01 | 263 | 42 | 0.01 | 1.21E-03 | 42 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | 514.54 | 0.07 | 0.01 | 224 | 35 | 4.62E-03 | 1.03E-03 | 36 |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 514.54 | 0.07 | 0.01 | 1,964 | 113 | 0.01 | 3.27E-03 | 114 |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 514.54 | 0.07 | 0.01 | 1,673 | 96 | 0.01 | 2.78E-03 | 97 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 514.54 | 0.07 | 0.01 | 446 | 93 | 0.01 | 2.71E-03 | 94 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 514.54 | 0.07 | 0.01 | 380 | 80 | 0.01 | 2.31E-03 | 81 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 514.54 | 0.07 | 0.01 | 638 | 134 | 0.02 | 3.87E-03 | 135 |
| **Total** | | | | | | | | | **859** | **0.09** | **0.03** | **870** |

1. Based on EPA MOVES2014b.
2. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
3. Based on data provided by Blue Marlin Offshore Port, LLC and analysis of construction equipment data from similar projects.
4. Load factor from Table 3-4 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
5. Tier 0 emission factors from Tables 3-8 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
6. 2020 Climate Registry Default Emission Factors, Released: April 2020, Tables 2.1 and 2.7, ratioed based on $CO_2$ emission factor from EPA MOVES2014b (except for marine vessels). https://www.theclimateregistry.org/wp-content/uploads/2020/04/The-Climate-Registry-2020-Default-Emission-Factor-Document.pdf
7. The global warming potentials of $CO_2$, $CH_4$, and $N_2O$ are assumed to be 1, 25, and 298, respectively.

## Table 9 - BMOP - Onshore Pipeline Construction Emissions
## 2023 Non-Road Construction Equipment Exhaust Hazardous Air Pollutant Emissions

| Equipment Type | Fuel | Source Category[1] | Engine Rating[3] (hp) | Load Factor[1] | Pollutant Emission Factor[2] (g/hp-hr) | | | | Equipment Operating Duration[3] | Pollutant Emissions (tons/year) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1,3-Butadiene | 2,2,4-Trimethylpentane | Acetaldehyde | Acrolein | | 1,3-Butadiene | 2,2,4-Trimethylpentane | Acetaldehyde | Acrolein |
| Air Compressors | Diesel | 2270006015 | 180 | 43% | 1.18E-04 | 5.08E-04 | 6.52E-03 | 1.18E-03 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 5.17E-04 | 2.15E-03 | 2.45E-02 | 5.98E-03 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 5.17E-04 | 2.15E-03 | 2.45E-02 | 5.98E-03 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 5.17E-04 | 2.15E-03 | 2.45E-02 | 5.98E-03 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 5.17E-04 | 2.15E-03 | 2.45E-02 | 5.98E-03 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 5.17E-04 | 2.15E-03 | 2.45E-02 | 5.98E-03 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 5.17E-04 | 2.15E-03 | 2.45E-02 | 5.98E-03 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 5.17E-04 | 2.15E-03 | 2.45E-02 | 5.98E-03 | 925 | 6.80E-05 | 2.83E-04 | 3.22E-03 | 7.87E-04 |
| Cranes | Diesel | 2270002045 | 625 | 43% | 1.19E-04 | 5.13E-04 | 6.42E-03 | 1.28E-03 | 0 | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 1.19E-04 | 5.13E-04 | 6.42E-03 | 1.28E-03 | 0 | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 1.19E-04 | 5.13E-04 | 6.42E-03 | 1.28E-03 | 0 | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 6.49E-05 | 2.91E-04 | 3.74E-03 | 6.61E-04 | 0 | - | - | - | - |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 6.49E-05 | 2.91E-04 | 3.74E-03 | 6.61E-04 | 0 | - | - | - | - |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 6.49E-05 | 2.91E-04 | 3.74E-03 | 6.61E-04 | 0 | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 6.49E-05 | 2.91E-04 | 3.74E-03 | 6.61E-04 | 0 | - | - | - | - |
| Marooka | Diesel | 2270002069 | 335 | 59% | 6.49E-05 | 2.91E-04 | 3.74E-03 | 6.61E-04 | 0 | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 6.49E-05 | 2.91E-04 | 3.74E-03 | 6.61E-04 | 449 | 6.35E-06 | 2.85E-05 | 3.66E-04 | 6.47E-05 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 6.49E-05 | 2.91E-04 | 3.74E-03 | 6.61E-04 | 527 | 7.46E-06 | 3.35E-05 | 4.30E-04 | 7.59E-05 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 6.49E-05 | 2.91E-04 | 3.74E-03 | 6.61E-04 | 0 | - | - | - | - |
| Excavators | Diesel | 2270002036 | 250 | 59% | 2.24E-05 | 1.17E-04 | 1.47E-03 | 2.44E-04 | 338 | 1.23E-06 | 6.46E-06 | 8.06E-05 | 1.34E-05 |
| Excavators | Diesel | 2270002036 | 250 | 59% | 2.24E-05 | 1.17E-04 | 1.47E-03 | 2.44E-04 | 0 | - | - | - | - |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 4.45E-04 | 1.83E-03 | 2.01E-02 | 5.13E-03 | 0 | - | - | - | - |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 4.45E-04 | 1.83E-03 | 2.01E-02 | 5.13E-03 | 0 | - | - | - | - |
| Other Construction Equipment | Diesel | 2270002081 | 265 | 59% | 9.21E-05 | 3.99E-04 | 5.00E-03 | 9.06E-04 | 0 | - | - | - | - |
| Tractors/Loaders/Backhoes | Diesel | 2270002066 | 160 | 21% | 9.38E-04 | 3.90E-03 | 4.64E-02 | 1.03E-02 | 0 | - | - | - | - |
| Welders | Diesel | 2270006025 | 50 | 21% | 1.08E-03 | 4.63E-03 | 4.98E-02 | 1.47E-02 | 0 | - | - | - | - |
| Welders | Diesel | 2270006025 | 50 | 21% | 1.08E-03 | 4.63E-03 | 4.98E-02 | 1.47E-02 | 0 | - | - | - | - |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 1.24E-04 | - | 2.44E-03 | 2.94E-04 | 449 | 5.94E-06 | - | 1.17E-04 | 1.41E-05 |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 1.24E-04 | - | 2.44E-03 | 2.94E-04 | 527 | 6.98E-06 | - | 1.37E-04 | 1.65E-05 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | - | - | 8.00E-05 | 2.50E-05 | 263 | - | - | 6.47E-06 | 2.02E-06 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | - | - | 8.00E-05 | 2.50E-05 | 224 | - | - | 5.51E-06 | 1.72E-06 |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 1.24E-04 | - | 2.44E-03 | 2.94E-04 | 1,964 | 2.72E-05 | - | 5.34E-04 | 6.44E-05 |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 1.24E-04 | - | 2.44E-03 | 2.94E-04 | 1,673 | 2.32E-05 | - | 4.55E-04 | 5.48E-05 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 1.24E-04 | - | 2.44E-03 | 2.94E-04 | 446 | 2.25E-05 | - | 4.42E-04 | 5.33E-05 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 1.24E-04 | - | 2.44E-03 | 2.94E-04 | 380 | 1.92E-05 | - | 3.77E-04 | 4.54E-05 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 1.24E-04 | - | 2.44E-03 | 2.94E-04 | 638 | 3.22E-05 | - | 0.001 | 7.62E-05 |
| **Total** | | | | | | | | | | **<0.01** | **<0.01** | **0.01** | **<0.01** |

1. Based on EPA MOVES2014b.
2. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
3. Based on data provided by Blue Marlin Offshore Port, LLC and analysis of construction equipment data from similar projects.
4. Load factor from Table 3-4 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009
5. Emission factors for engines greater than 600 hp are based on Section 3.4. Large Stationary Diesel and All Stationary Dual-fuel Engines, Tables 3.4-3 and 3.4-4. For engines less than 600 hp, emission factors are based on AP-42, Section 3.3. Gasoline and Diesel Industrial Engines, Table 3.3-2.

**Table 9 - BMOP - Onshore Pipeline Construction Emissions**
**2023 Non-Road Construction Equipment Exhaust Hazardous Air Pollutant Emissions**
**(Continued)**

| Equipment Type | Fuel | Source Category[1] | Engine Rating[3] (hp) | Load Factor[1] | Pollutant Emission Factor[2] (g/hp-hr) | | | | | Equipment Operating Duration[3] | Pollutant Emissions (tons/year) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Benzene | Ethyl Benzene | Formaldehyde | Hexane | Naphthalene | | Benzene | Ethyl Benzene | Formaldehyde | Hexane | Naphthalene |
| Air Compressors | Diesel | 2270006015 | 180 | 43% | 3.14E-03 | 3.16E-04 | 1.80E-02 | 3.13E-05 | 1.12E-08 | 0 | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 9.65E-03 | 1.63E-03 | 6.86E-02 | 4.13E-04 | 7.61E-09 | 0 | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 9.65E-03 | 1.63E-03 | 6.86E-02 | 4.13E-04 | 7.61E-09 | 0 | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 9.65E-03 | 1.63E-03 | 6.86E-02 | 4.13E-04 | 7.61E-09 | 0 | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 9.65E-03 | 1.63E-03 | 6.86E-02 | 4.13E-04 | 7.61E-09 | 0 | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 9.65E-03 | 1.63E-03 | 6.86E-02 | 4.13E-04 | 7.61E-09 | 0 | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 9.65E-03 | 1.63E-03 | 6.86E-02 | 4.13E-04 | 7.61E-09 | 925 | 1.27E-03 | 2.14E-04 | 0.01 | 5.43E-05 | 1.00E-09 |
| Cranes | Diesel | 2270002045 | 625 | 43% | 2.99E-03 | 3.68E-04 | 1.77E-02 | 5.96E-05 | 1.17E-08 | 0 | - | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 2.99E-03 | 3.68E-04 | 1.77E-02 | 5.96E-05 | 1.17E-08 | 0 | - | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 2.99E-03 | 3.68E-04 | 1.77E-02 | 5.96E-05 | 1.17E-08 | 0 | - | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 1.80E-03 | 1.99E-04 | 1.02E-02 | 1.40E-05 | 1.47E-08 | 0 | - | - | - | - | - |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 1.80E-03 | 1.99E-04 | 1.02E-02 | 1.40E-05 | 1.47E-08 | 0 | - | - | - | - | - |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 1.80E-03 | 1.99E-04 | 1.02E-02 | 1.40E-05 | 1.47E-08 | 0 | - | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 1.80E-03 | 1.99E-04 | 1.02E-02 | 1.40E-05 | 1.47E-08 | 0 | - | - | - | - | - |
| Marooka | Diesel | 2270002069 | 335 | 59% | 1.80E-03 | 1.99E-04 | 1.02E-02 | 1.40E-05 | 1.47E-08 | 0 | - | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 1.80E-03 | 1.99E-04 | 1.02E-02 | 1.40E-05 | 1.47E-08 | 449 | 1.76E-04 | 1.95E-05 | 9.95E-04 | 1.37E-06 | 1.44E-09 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 1.80E-03 | 1.99E-04 | 1.02E-02 | 1.40E-05 | 1.47E-08 | 527 | 2.07E-04 | 2.29E-05 | 1.17E-03 | 1.60E-06 | 1.69E-09 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 1.80E-03 | 1.99E-04 | 1.02E-02 | 1.40E-05 | 1.47E-08 | 0 | - | - | - | - | - |
| Excavators | Diesel | 2270002036 | 250 | 59% | 6.52E-04 | 1.12E-04 | 3.66E-03 | 5.14E-06 | 1.73E-08 | 338 | 3.58E-05 | 6.16E-06 | 2.01E-04 | 2.83E-07 | 9.52E-10 |
| Excavators | Diesel | 2270002036 | 250 | 59% | 6.52E-04 | 1.12E-04 | 3.66E-03 | 5.14E-06 | 1.73E-08 | 0 | - | - | - | - | - |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 7.11E-03 | 1.42E-03 | 5.64E-02 | 4.58E-04 | 6.56E-09 | 0 | - | - | - | - | - |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 7.11E-03 | 1.42E-03 | 5.64E-02 | 4.58E-04 | 6.56E-09 | 0 | - | - | - | - | - |
| Other Construction Equipment | Diesel | 2270002081 | 265 | 59% | 2.28E-03 | 2.63E-04 | 1.37E-02 | 4.13E-05 | 1.45E-08 | 0 | - | - | - | - | - |
| Tractors/Loaders/Backhoes | Diesel | 2270002066 | 160 | 21% | 2.00E-02 | 2.69E-03 | 1.30E-01 | 5.68E-04 | 1.60E-09 | 0 | - | - | - | - | - |
| Welders | Diesel | 2270006025 | 50 | 21% | 1.87E-02 | 4.26E-03 | 1.39E-01 | 8.89E-04 | - | 0 | - | - | - | - | - |
| Welders | Diesel | 2270006025 | 50 | 21% | 1.87E-02 | 4.26E-03 | 1.39E-01 | 8.89E-04 | - | 0 | - | - | - | - | - |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 2.96E-03 | - | 3.75E-03 | - | 2.69E-04 | 449 | 1.42E-04 | - | 1.79E-04 | - | 1.29E-05 |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 2.96E-03 | - | 3.75E-03 | - | 2.69E-04 | 527 | 1.66E-04 | - | 2.11E-04 | - | 1.51E-05 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | 2.46E-03 | - | 2.51E-04 | - | 4.13E-04 | 263 | 1.99E-04 | - | 2.03E-05 | - | 3.3E-05 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | 2.46E-03 | - | 2.51E-04 | - | 4.13E-04 | 224 | 1.70E-04 | - | 1.73E-05 | - | 2.8E-05 |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 2.96E-03 | - | 3.75E-03 | - | 2.69E-04 | 1,964 | 6.49E-04 | - | 8.21E-04 | - | 5.90E-05 |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 2.96E-03 | - | 3.75E-03 | - | 2.69E-04 | 1,673 | 5.53E-04 | - | 7.00E-04 | - | 5.03E-05 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 2.96E-03 | - | 3.75E-03 | - | 2.69E-04 | 446 | 5.38E-04 | - | 6.80E-04 | - | 4.89E-05 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 2.96E-03 | - | 3.75E-03 | - | 2.69E-04 | 380 | 4.58E-04 | - | 5.79E-04 | - | 4.16E-05 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 2.96E-03 | - | 3.75E-03 | - | 2.69E-04 | 638 | 0.001 | - | 9.73E-04 | - | 6.99E-05 |
| **Total** | | | | | | | | | | | **0.01** | **<0.01** | **0.02** | **<0.01** | **<0.01** |

1. Based on EPA MOVES2014b.
2. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
3. Based on data provided by Blue Marlin Offshore Port, LLC and analysis of construction equipment data from similar projects.
4. Load factor from Table 3-4 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009
5. Emission factors for engines greater than 600 hp are based on Section 3.4. Large Stationary Diesel and All Stationary Dual-fuel Engines, Tables 3.4-3 and 3.4-4. For engines less than 600 hp, emission factors are based on AP-42, Section 3.3. Gasoline and Diesel Industrial Engines, Table 3.3-2.

**Table 9 - BMOP - Onshore Pipeline Construction Emissions**
**2023 Non-Road Construction Equipment Exhaust Hazardous Air Pollutant Emissions**
**(Continued)**

| Equipment Type | Fuel | Source Category[1] | Engine Rating[3] (hp) | Load Factor[1] | Pollutant Emission Factor[2] (g/hp-hr) | | | | Equipment Operating Duration[3] | Pollutant Emissions (tons/year) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | PAH | Propionaldehyde | Toluene | Xylenes | | PAH | Propionaldehyde | Toluene | Xylenes |
| Air Compressors | Diesel | 2270006015 | 180 | 43% | 2.80E-04 | 1.57E-03 | 2.32E-03 | 1.09E-03 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.19E-03 | 6.72E-03 | 7.09E-03 | 4.69E-03 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.19E-03 | 6.72E-03 | 7.09E-03 | 4.69E-03 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.19E-03 | 6.72E-03 | 7.09E-03 | 4.69E-03 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.19E-03 | 6.72E-03 | 7.09E-03 | 4.69E-03 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.19E-03 | 6.72E-03 | 7.09E-03 | 4.69E-03 | 0 | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 1.19E-03 | 6.72E-03 | 7.09E-03 | 4.69E-03 | 925 | 1.56E-04 | 8.83E-04 | 9.33E-04 | 6.17E-04 |
| Cranes | Diesel | 2270002045 | 625 | 43% | 2.92E-04 | 1.53E-03 | 2.20E-03 | 1.23E-03 | 0 | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 2.92E-04 | 1.53E-03 | 2.20E-03 | 1.23E-03 | 0 | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 2.92E-04 | 1.53E-03 | 2.20E-03 | 1.23E-03 | 0 | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 1.68E-04 | 8.18E-04 | 1.36E-03 | 7.79E-04 | 0 | - | - | - | - |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 1.68E-04 | 8.18E-04 | 1.36E-03 | 7.79E-04 | 0 | - | - | - | - |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 1.68E-04 | 8.18E-04 | 1.36E-03 | 7.79E-04 | 0 | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 1.68E-04 | 8.18E-04 | 1.36E-03 | 7.79E-04 | 0 | - | - | - | - |
| Marooka | Diesel | 2270002069 | 335 | 59% | 1.68E-04 | 8.18E-04 | 1.36E-03 | 7.79E-04 | 0 | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 1.68E-04 | 8.18E-04 | 1.36E-03 | 7.79E-04 | 449 | 1.65E-05 | 8.00E-05 | 1.33E-04 | 7.62E-05 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 1.68E-04 | 8.18E-04 | 1.36E-03 | 7.79E-04 | 527 | 1.93E-05 | 9.39E-05 | 1.56E-04 | 8.94E-05 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 1.68E-04 | 8.18E-04 | 1.36E-03 | 7.79E-04 | 0 | - | - | - | - |
| Excavators | Diesel | 2270002036 | 250 | 59% | 6.04E-05 | 2.79E-04 | 5.49E-04 | 5.69E-04 | 338 | 3.32E-06 | 1.54E-05 | 3.02E-05 | 3.13E-05 |
| Excavators | Diesel | 2270002036 | 250 | 59% | 6.04E-05 | 2.79E-04 | 5.49E-04 | 5.69E-04 | 0 | - | - | - | - |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 9.69E-04 | 6.28E-03 | 5.46E-03 | 4.31E-03 | 0 | - | - | - | - |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 9.69E-04 | 6.28E-03 | 5.46E-03 | 4.31E-03 | 0 | - | - | - | - |
| Other Construction Equipment | Diesel | 2270002081 | 265 | 59% | 2.16E-04 | 1.32E-03 | 1.74E-03 | 1.03E-03 | 0 | - | - | - | - |
| Tractors/Loaders/Backhoes | Diesel | 2270002066 | 160 | 21% | 2.15E-03 | 1.22E-02 | 1.45E-02 | 7.65E-03 | 0 | - | - | - | - |
| Welders | Diesel | 2270006025 | 50 | 21% | 2.72E-03 | 1.07E-02 | 1.28E-02 | 1.07E-02 | 0 | - | - | - | - |
| Welders | Diesel | 2270006025 | 50 | 21% | 2.72E-03 | 1.07E-02 | 1.28E-02 | 1.07E-02 | 0 | - | - | - | - |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 5.33E-04 | - | 1.30E-03 | 9.05E-04 | 449 | 2.55E-05 | - | 6.22E-05 | 4.33E-05 |
| Air Boat[4,5] | Diesel | - | 225 | 43% | 5.33E-04 | - | 1.30E-03 | 9.05E-04 | 527 | 3.00E-05 | - | 7.30E-05 | 5.09E-05 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | 6.73E-04 | - | 8.92E-04 | 6.13E-04 | 263 | 5.44E-05 | - | 7.22E-05 | 4.96E-05 |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | 6.73E-04 | - | 8.92E-04 | 6.13E-04 | 224 | 4.64E-05 | - | 6.15E-05 | 4.22E-05 |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 5.33E-04 | - | 1.30E-03 | 9.05E-04 | 1,964 | 1.17E-04 | - | 2.85E-04 | 1.98E-04 |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | 5.33E-04 | - | 1.30E-03 | 9.05E-04 | 1,673 | 9.96E-05 | - | 2.42E-04 | 1.69E-04 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 5.33E-04 | - | 1.30E-03 | 9.05E-04 | 446 | 9.68E-05 | - | 2.36E-04 | 1.64E-04 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 5.33E-04 | - | 1.30E-03 | 9.05E-04 | 380 | 8.25E-05 | - | 2.01E-04 | 1.40E-04 |
| Dredge[4,5] | Diesel | - | 535 | 69% | 5.33E-04 | - | 1.30E-03 | 9.05E-04 | 638 | 1.38E-04 | - | 3.37E-04 | 2.35E-04 |
| **Total** | | | | | | | | | | **<0.01** | **<0.01** | **<0.01** | **<0.01** |

1. Based on EPA MOVES2014b.
2. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
3. Based on data provided by Blue Marlin Offshore Port, LLC and analysis of construction equipment data from similar projects.
4. Load factor from Table 3-4 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
5. Emission factors for engines greater than 600 hp are based on Section 3.4. Large Stationary Diesel and All Stationary Dual-fuel Engines, Tables 3.4-3 and 3.4-4. For engines less than 600 hp, emission factors are based on AP-42, Section 3.3. Gasoline and Diesel Industrial Engines, Table 3.3-2.

**Table 9 - BMOP - Onshore Pipeline Construction Emissions**
**2023 Non-Road Construction Equipment Exhaust Hazardous Air Pollutant Emissions**
**(Continued)**

| Equipment Type | Fuel | Source Category[1] | Engine Rating[3] (hp) | Load Factor[1] | Pollutant Emission Factor[2] (g/hp-hr) | | | | | Equipment Operating Duration[3] | Pollutant Emissions (tons/year) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Arsenic | Chromium VI | Manganese | Mercury | Nickel | | Arsenic | Chromium VI | Manganese | Mercury | Nickel |
| Air Compressors | Diesel | 2270006015 | 180 | 43% | 8.32E-07 | 2.67E-09 | 1.09E-06 | 1.1062E-08 | 1.89E-06 | 0 | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 8.32E-07 | 3.39E-09 | 1.47E-06 | 1.1062E-08 | 2.56E-06 | 0 | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 8.32E-07 | 3.39E-09 | 1.47E-06 | 1.1062E-08 | 2.56E-06 | 0 | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 8.32E-07 | 3.39E-09 | 1.47E-06 | 1.1062E-08 | 2.56E-06 | 0 | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 8.32E-07 | 3.39E-09 | 1.47E-06 | 1.1062E-08 | 2.56E-06 | 0 | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 8.32E-07 | 3.39E-09 | 1.47E-06 | 1.1062E-08 | 2.56E-06 | 0 | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 8.32E-07 | 3.39E-09 | 1.47E-06 | 1.1062E-08 | 2.56E-06 | 0 | - | - | - | - | - |
| Bore/Drill Rigs | Diesel | 2270002033 | 300 | 43% | 8.32E-07 | 3.39E-09 | 1.47E-06 | 1.1062E-08 | 2.56E-06 | 925 | 1.09E-07 | 4.45E-10 | 1.93E-07 | 1.45E-09 | 3.37E-07 |
| Cranes | Diesel | 2270002045 | 625 | 43% | 8.32E-07 | 2.72E-09 | 1.11E-06 | 1.1062E-08 | 1.93E-06 | 0 | - | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 8.32E-07 | 2.72E-09 | 1.11E-06 | 1.1062E-08 | 1.93E-06 | 0 | - | - | - | - | - |
| Cranes | Diesel | 2270002045 | 625 | 43% | 8.32E-07 | 2.72E-09 | 1.11E-06 | 1.1062E-08 | 1.93E-06 | 0 | - | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 8.41E-07 | 2.49E-09 | 9.86E-07 | 1.1182E-08 | 1.71E-06 | 0 | - | - | - | - | - |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 8.41E-07 | 2.49E-09 | 9.86E-07 | 1.1182E-08 | 1.71E-06 | 0 | - | - | - | - | - |
| Side Boom | Diesel | 2270002069 | 335 | 59% | 8.41E-07 | 2.49E-09 | 9.86E-07 | 1.1182E-08 | 1.71E-06 | 0 | - | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 8.41E-07 | 2.49E-09 | 9.86E-07 | 1.1182E-08 | 1.71E-06 | 0 | - | - | - | - | - |
| Marooka | Diesel | 2270002069 | 335 | 59% | 8.41E-07 | 2.49E-09 | 9.86E-07 | 1.1182E-08 | 1.71E-06 | 0 | - | - | - | - | - |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 8.41E-07 | 2.49E-09 | 9.86E-07 | 1.1182E-08 | 1.71E-06 | 449 | 8.23E-08 | 2.44E-10 | 9.64E-08 | 1.09E-09 | 1.67E-07 |
| Crawler Tractor/Dozers | Diesel | 2270002069 | 335 | 59% | 8.41E-07 | 2.49E-09 | 9.86E-07 | 1.1182E-08 | 1.71E-06 | 527 | 9.66E-08 | 2.86E-10 | 1.13E-07 | 1.28E-09 | 1.96E-07 |
| Marooka | Diesel | 2270002069 | 335 | 59% | 8.41E-07 | 2.49E-09 | 9.86E-07 | 1.1182E-08 | 1.71E-06 | 0 | - | - | - | - | - |
| Excavators | Diesel | 2270002036 | 250 | 59% | 8.41E-07 | 2.26E-09 | 8.89E-07 | 1.1182E-08 | 1.54E-06 | 338 | 4.62E-08 | 1.24E-10 | 4.89E-08 | 6.15E-10 | 8.46E-08 |
| Excavators | Diesel | 2270002036 | 250 | 59% | 8.41E-07 | 2.26E-09 | 8.89E-07 | 1.1182E-08 | 1.54E-06 | 0 | - | - | - | - | - |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 8.32E-07 | 3.21E-09 | 1.38E-06 | 1.1062E-08 | 2.41E-06 | 0 | - | - | - | - | - |
| Generator Sets | Diesel | 2270006005 | 200 | 43% | 8.32E-07 | 3.21E-09 | 1.38E-06 | 1.1062E-08 | 2.41E-06 | 0 | - | - | - | - | - |
| Other Construction Equipment | Diesel | 2270002081 | 265 | 59% | 8.41E-07 | 2.53E-09 | 1.01E-06 | 1.1182E-08 | 1.74E-06 | 0 | - | - | - | - | - |
| Tractors/Loaders/Backhoes | Diesel | 2270002066 | 160 | 21% | 9.82E-07 | 4.29E-09 | 1.88E-06 | 1.3051E-08 | 3.28E-06 | 0 | - | - | - | - | - |
| Welders | Diesel | 2270006025 | 50 | 21% | 1.09E-06 | 4.44E-09 | 1.79E-06 | 1.4498E-08 | 3.08E-06 | 0 | - | - | - | - | - |
| Welders | Diesel | 2270006025 | 50 | 21% | 1.09E-06 | 4.44E-09 | 1.79E-06 | 1.4498E-08 | 3.08E-06 | 0 | - | - | - | - | - |
| Air Boat[4,5] | Diesel | - | 225 | 43% | - | - | - | - | - | 449 | - | - | - | - | - |
| Air Boat[4,5] | Diesel | - | 225 | 43% | - | - | - | - | - | 527 | - | - | - | - | - |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | - | - | - | - | - | 263 | - | - | - | - | - |
| Tug Boat[4,5] | Diesel | - | 900 | 31% | - | - | - | - | - | 224 | - | - | - | - | - |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | - | - | - | - | - | 1,964 | - | - | - | - | - |
| Crew Boat[4,5] | Diesel | - | 225 | 45% | - | - | - | - | - | 1,673 | - | - | - | - | - |
| Dredge[4,5] | Diesel | - | 535 | 69% | - | - | - | - | - | 446 | - | - | - | - | - |
| Dredge[4,5] | Diesel | - | 535 | 69% | - | - | - | - | - | 380 | - | - | - | - | - |
| Dredge[4,5] | Diesel | - | 535 | 69% | - | - | - | - | - | 638 | - | - | - | - | - |
| **Total** | | | | | | | | | | | **<0.01** | **<0.01** | **<0.01** | **<0.01** | **<0.01** |

1. Based on EPA MOVES2014b.
2. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
3. Based on data provided by Blue Marlin Offshore Port, LLC and analysis of construction equipment data from similar projects.
4. Load factor from Table 3-4 of Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories, ICF International, April 2009.
5. Emission factors for engines greater than 600 hp are based on Section 3.4. Large Stationary Diesel and All Stationary Dual-fuel Engines, Tables 3.4-3 and 3.4-4. For engines less than 600 hp, emission factors are based on AP-42, Section 3.3. Gasoline and Diesel Industrial Engines, Table 3.3-2.

## Table 10 - BMOP - Onshore Pipeline Construction Emissions
## On-Road On-Site Construction Vehicle Tailpipe Criteria and Greenhouse Gas Emission Factors

| Vehicle | Emission Factor (g/VMT)[1] | | | | | | | | | Onsite Travel (miles/vehicle)[2] | No. of Vehicle Trips/Year[2] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | CO | $NO_x$ | $SO_2$ | VOC | $PM_{10}$ | $PM_{2.5}$ | $CO_2$ | $CH_4$ | $N_2O$ | | |
| **2021** | | | | | | | | | | | |
| Diesel Heavy Trucks | 0.73 | 2.83 | 0.01 | 0.14 | 0.10 | 0.09 | 1,618 | 0.04 | 0.002 | 50 | 3,001 |
| Diesel Buses | 1.63 | 4.36 | 0.01 | 0.30 | 0.10 | 0.09 | 1,317 | 0.03 | 0.002 | 50 | 0 |
| **2022** | | | | | | | | | | | |
| Diesel Heavy Trucks | 0.65 | 2.48 | 0.01 | 0.12 | 0.09 | 0.08 | 1,608 | 0.04 | 0.002 | 50 | 330,874 |
| Diesel Buses | 1.45 | 3.90 | 0.01 | 0.27 | 0.09 | 0.08 | 1,313 | 0.03 | 0.002 | 50 | 236 |
| **2023** | | | | | | | | | | | |
| Diesel Heavy Trucks | 0.59 | 2.21 | 0.01 | 0.11 | 0.07 | 0.07 | 1,599 | 0.04 | 0.002 | 50 | 23,551 |
| Diesel Buses | 1.29 | 3.50 | 0.01 | 0.24 | 0.081 | 0.07 | 1,308 | 0.03 | 0.002 | 50 | 0 |

1. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
2. Conservative estimate and based on data provided by Blue Marlin Offshore Port, LLC.

## Table 11 - BMOP - Onshore Pipeline Construction Emissions
## On-Road On-Site Construction Vehicle Tailpipe Criteria and Greenhouse Gas Emissions

| Vehicle | Vehicle Miles Traveled (VMT/year) | Emissions (tons/yr) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CO | $NO_x$ | $SO_2$ | VOC | $PM_{10}$ | $PM_{2.5}$ | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$[1] |
| **2021** | | | | | | | | | | | |
| Diesel Heavy Trucks | 150,050 | 0.12 | 0.47 | 2.25E-03 | 0.02 | 0.02 | 0.02 | 268 | 6.26E-03 | 2.95E-04 | 268 |
| Diesel Buses | 0 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| **Total** | | **0.12** | **0.47** | **2.25E-03** | **0.02** | **0.02** | **0.02** | **268** | **0.01** | **2.95E-04** | **268** |
| **2022** | | | | | | | | | | | |
| Diesel Heavy Trucks | 16,543,700 | 11.88 | 45.32 | 2.46E-01 | 2.22 | 1.55 | 1.43 | 29,320 | 0.70 | 3.25E-02 | 29,347 |
| Diesel Buses | 11,800 | 0.02 | 0.05 | 1.45E-04 | 3.50E-03 | 1.17E-03 | 1.08E-03 | 17 | 4.08E-04 | 2.32E-05 | 17 |
| **Total** | | **11.90** | **45.37** | **2.46E-01** | **2.23** | **1.55** | **1.43** | **29,337** | **0.70** | **3.25E-02** | **29,365** |
| **2023** | | | | | | | | | | | |
| Diesel Heavy Trucks | 1,177,550 | 0.76 | 2.87 | 1.74E-02 | 0.14 | 0.10 | 0.09 | 2,076 | 0.05 | 2.31E-03 | 2,077 |
| Diesel Buses | 0 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| **Total** | | **0.76** | **2.87** | **1.74E-02** | **0.14** | **0.10** | **0.09** | **2,076** | **0.05** | **2.31E-03** | **2,077** |

1. The global warming potentials of $CO_2$, $CH_4$, and $N_2O$ are assumed to be 1, 25, and 298, respectively.

## Table 12 - BMOP - Onshore Pipeline Construction Emissions
## On-Road On-Site Construction Vehicle Tailpipe Hazardous Air Pollutant Emission Factors

| Vehicle | Emission Factor (g/VMT)[1] | | | | | | Onsite Travel (miles/vehicle)[2] | No. of Vehicle Trips/Year[2] |
|---|---|---|---|---|---|---|---|---|
| | 1,3-Butadiene | 2,2,4-Trimethylpentane | Acetaldehyde | Acrolein | Benzene | Ethyl Benzene | | |
| **2021** | | | | | | | | |
| Diesel Heavy Trucks | 2.89E-04 | 6.65E-04 | 5.60E-03 | 9.42E-04 | 1.24E-03 | 5.31E-04 | 50 | 3,001 |
| Diesel Buses | 8.01E-04 | 8.89E-04 | 1.14E-02 | 2.05E-03 | 2.50E-03 | 9.37E-04 | 50 | 0 |
| **2022** | | | | | | | | |
| Diesel Heavy Trucks | 2.40E-04 | 6.37E-04 | 5.03E-03 | 8.33E-04 | 1.11E-03 | 4.89E-04 | 50 | 330,874 |
| Diesel Buses | 7.01E-04 | 8.33E-04 | 1.02E-02 | 1.83E-03 | 2.24E-03 | 8.52E-04 | 50 | 236 |
| **2023** | | | | | | | | |
| Diesel Heavy Trucks | 2.02E-04 | 6.15E-04 | 4.59E-03 | 7.51E-04 | 1.02E-03 | 4.57E-04 | 50 | 23,551 |
| Diesel Buses | 6.11E-04 | 7.84E-04 | 9.20E-03 | 1.63E-03 | 2.01E-03 | 7.76E-04 | 50 | 0 |

1. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
2. Conservative estimate and based on data provided by Blue Marlin Offshore Port, LLC.

**Table 12 - BMOP - Onshore Pipeline Construction Emissions**
**On-Road On-Site Construction Vehicle Tailpipe Hazardous Air Pollutant Emissions**
**(Continued)**

| Vehicle | Vehicle Miles Traveled (VMT/year) | Emissions (tons/yr) | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1,3-Butadiene | 2,2,4-Trimethylpentane | Acetaldehyde | Acrolein | Benzene | Ethyl Benzene |
| **2021** | | | | | | | |
| Diesel Heavy Trucks | 150,050 | 4.78E-05 | 1.10E-04 | 9.27E-04 | 1.56E-04 | 2.05E-04 | 8.78E-05 |
| Diesel Buses | 0 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| **Total** | | **4.78E-05** | **1.10E-04** | **9.27E-04** | **1.56E-04** | **2.05E-04** | **8.78E-05** |
| **2022** | | | | | | | |
| Diesel Heavy Trucks | 16,543,700 | 4.37E-03 | 1.16E-02 | 9.17E-02 | 1.52E-02 | 2.03E-02 | 8.92E-03 |
| Diesel Buses | 11,800 | 9.12E-06 | 1.08E-05 | 1.33E-04 | 2.37E-05 | 2.91E-05 | 1.11E-05 |
| **Total** | | **4.38E-03** | **1.16E-02** | **9.18E-02** | **1.52E-02** | **2.03E-02** | **8.93E-03** |
| **2023** | | | | | | | |
| Diesel Heavy Trucks | 1,177,550 | 2.62E-04 | 7.98E-04 | 5.96E-03 | 9.75E-04 | 1.32E-03 | 5.93E-04 |
| Diesel Buses | 0 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| **Total** | | **2.62E-04** | **7.98E-04** | **5.96E-03** | **9.75E-04** | **1.32E-03** | **5.93E-04** |

## Table 12 - BMOP - Onshore Pipeline Construction Emissions
## On-Road On-Site Construction Vehicle Tailpipe Hazardous Air Pollutant Emission Factors
## (Continued)

| Vehicle | Emission Factor (g/VMT)[1] | | | | | | | Onsite Travel (miles/vehicle)[2] | No. of Vehicle Trips/Year[2] |
|---|---|---|---|---|---|---|---|---|---|
| | Formaldehyde | Hexane | PAH | Propionaldehyde | Styrene | Toluene | Xylenes | | |
| **2021** | | | | | | | | | |
| Diesel Heavy Trucks | 1.46E-02 | 6.20E-04 | 4.21E-04 | 5.27E-04 | 1.17E-04 | 1.77E-03 | 1.95E-03 | 50 | 3,001 |
| Diesel Buses | 2.69E-02 | 8.85E-04 | 1.04E-03 | 1.34E-03 | 3.50E-04 | 2.26E-03 | 2.30E-03 | 50 | 0 |
| **2022** | | | | | | | | | |
| Diesel Heavy Trucks | 1.34E-02 | 5.88E-04 | 3.51E-04 | 4.49E-04 | 9.50E-05 | 1.71E-03 | 1.91E-03 | 50 | 330,874 |
| Diesel Buses | 2.44E-02 | 8.22E-04 | 9.09E-04 | 1.18E-03 | 3.05E-04 | 2.14E-03 | 2.20E-03 | 50 | 236 |
| **2023** | | | | | | | | | |
| Diesel Heavy Trucks | 1.24E-02 | 5.63E-04 | 2.98E-04 | 3.89E-04 | 7.80E-05 | 1.66E-03 | 1.87E-03 | 50 | 23,551 |
| Diesel Buses | 2.22E-02 | 7.66E-04 | 7.95E-04 | 1.03E-03 | 2.64E-04 | 2.03E-03 | 2.11E-03 | 50 | 0 |

1. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
2. Conservative estimate and based on data provided by Blue Marlin Offshore Port, LLC.

## Table 12 - BMOP - Onshore Pipeline Construction Emissions
## On-Road On-Site Construction Vehicle Tailpipe Hazardous Air Pollutant Emissions
## (Continued)

| Vehicle | Vehicle Miles Traveled (VMT/year) | Emissions (tons/yr) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Formaldehyde | Hexane | PAH | Propionaldehyde | Styrene | Toluene | Xylenes |
| **2021** | | | | | | | | |
| Diesel Heavy Trucks | 150,050 | 2.41E-03 | 1.03E-04 | 6.97E-05 | 8.72E-05 | 1.94E-05 | 2.93E-04 | 3.23E-04 |
| Diesel Buses | 0 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| **Total** | | **2.41E-03** | **1.03E-04** | **6.97E-05** | **8.72E-05** | **1.94E-05** | **2.93E-04** | **3.23E-04** |
| **2022** | | | | | | | | |
| Diesel Heavy Trucks | 16,543,700 | 2.44E-01 | 1.07E-02 | 6.40E-03 | 8.18E-03 | 1.73E-03 | 3.12E-02 | 3.48E-02 |
| Diesel Buses | 11,800 | 3.17E-04 | 1.07E-05 | 1.18E-05 | 1.53E-05 | 3.97E-06 | 2.78E-05 | 2.86E-05 |
| **Total** | | **2.44E-01** | **1.07E-02** | **6.41E-03** | **8.20E-03** | **1.74E-03** | **3.12E-02** | **3.48E-02** |
| **2023** | | | | | | | | |
| Diesel Heavy Trucks | 1,177,550 | 1.61E-02 | 7.30E-04 | 3.87E-04 | 5.05E-04 | 1.01E-04 | 2.15E-03 | 2.42E-03 |
| Diesel Buses | 0 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| **Total** | | **1.61E-02** | **7.30E-04** | **3.87E-04** | **5.05E-04** | **1.01E-04** | **2.15E-03** | **2.42E-03** |

## Table 12 - BMOP - Onshore Pipeline Construction Emissions
## On-Road On-Site Construction Vehicle Tailpipe Hazardous Air Pollutant Emission Factors
## (Continued)

| Vehicle | Emission Factor (g/VMT)[1] | | | | Onsite Travel (miles/vehicle)[2] | No. of Vehicle Trips/Year[2] |
|---|---|---|---|---|---|---|
| | Arsenic | Chromium VI | Mercury | Nickel | | |
| **2021** | | | | | | |
| Diesel Heavy Trucks | 2.30E-06 | 7.25E-09 | 1.10E-08 | 2.01E-06 | 50 | 3,001 |
| Diesel Buses | 2.30E-06 | 9.39E-09 | 1.10E-08 | 4.02E-06 | 50 | 0 |
| **2022** | | | | | | |
| Diesel Heavy Trucks | 2.30E-06 | 6.97E-09 | 1.10E-08 | 1.75E-06 | 50 | 330,874 |
| Diesel Buses | 2.30E-06 | 8.94E-09 | 1.10E-08 | 3.61E-06 | 50 | 236 |
| **2023** | | | | | | |
| Diesel Heavy Trucks | 2.30E-06 | 6.77E-09 | 1.10E-08 | 1.57E-06 | 50 | 23,551 |
| Diesel Buses | 2.30E-06 | 8.54E-09 | 1.10E-08 | 3.23E-06 | 50 | 0 |

1. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
2. Conservative estimate and based on data provided by Blue Marlin Offshore Port, LLC.

**Table 12 - BMOP - Onshore Pipeline Construction Emissions**
**On-Road On-Site Construction Vehicle Tailpipe Hazardous Air Pollutant Emissions**
**(Continued)**

| Vehicle | Vehicle Miles Traveled (VMT/year) | Emissions (tons/yr) | | | |
|---|---|---|---|---|---|
| | | Arsenic | Chromium VI | Mercury | Nickel |
| **2021** | | | | | |
| Diesel Heavy Trucks | 150,050 | 3.80E-07 | 1.20E-09 | 1.82E-09 | 3.33E-07 |
| Diesel Buses | 0 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| **Total** | | **3.80E-07** | **1.20E-09** | **1.82E-09** | **3.33E-07** |
| **2022** | | | | | |
| Diesel Heavy Trucks | 16,543,700 | 4.19E-05 | 1.27E-07 | 2.01E-07 | 3.20E-05 |
| Diesel Buses | 11,800 | 2.99E-08 | 1.16E-10 | 1.43E-10 | 4.69E-08 |
| **Total** | | **4.20E-05** | **1.27E-07** | **2.01E-07** | **3.20E-05** |
| **2023** | | | | | |
| Diesel Heavy Trucks | 1,177,550 | 2.99E-06 | 8.79E-09 | 1.43E-08 | 2.03E-06 |
| Diesel Buses | 0 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| **Total** | | **2.99E-06** | **8.79E-09** | **1.43E-08** | **2.03E-06** |

## Table 13 - BMOP - Onshore Pipeline Construction Emissions
## On-Road Worker Commuting Criteria and Greenhouse Gas Emission Factors

| Vehicle | Emission Factor (g/VMT)[1] | | | | | | | | | Onsite Travel (miles/vehicle)[2] | No. of Vehicle Trips/Year[2] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | CO | $NO_x$ | $SO_2$ | VOC | $PM_{10}$ | $PM_{2.5}$ | $CO_2$ | $CH_4$ | $N_2O$ | | |
| **2021** | | | | | | | | | | | |
| Gasoline Passenger Cars | 1.80 | 0.10 | 0.002 | 0.02 | 0.004 | 0.003 | 273.62 | 0.003 | 0.001 | 30 | 518 |
| Gasoline Passenger Trucks | 2.91 | 0.22 | 0.002 | 0.05 | 0.005 | 0.004 | 363.96 | 0.004 | 0.002 | 30 | 1,553 |
| **2022** | | | | | | | | | | | |
| Gasoline Passenger Cars | 1.71 | 0.08 | 0.002 | 0.02 | 0.003 | 0.003 | 264.57 | 0.002 | 0.001 | 30 | 5,850 |
| Gasoline Passenger Trucks | 2.72 | 0.19 | 0.002 | 0.04 | 0.005 | 0.004 | 352.43 | 0.004 | 0.001 | 30 | 17,550 |
| **2023** | | | | | | | | | | | |
| Gasoline Passenger Cars | 1.61 | 0.07 | 0.002 | 0.02 | 0.003 | 0.003 | 255.34 | 0.002 | 0.001 | 30 | 1,913 |
| Gasoline Passenger Trucks | 2.54 | 0.16 | 0.002 | 0.04 | 0.005 | 0.004 | 340.89 | 0.004 | 0.001 | 30 | 5,738 |

1. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
2. Conservative estimate and based on data provided by Blue Marlin Offshore Port, LLC.

## Table 14 - BMOP - Onshore Pipeline Construction Emissions
## On-Road Worker Commuting Criteria and Greenhouse Gas Emissions

| Vehicle | Vehicle Miles Traveled (VMT/year) | Emissions (tons/yr) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CO | $NO_x$ | $SO_2$ | VOC | $PM_{10}$ | $PM_{2.5}$ | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e^1$ |
| **2021** | | | | | | | | | | | |
| Gasoline Passenger Cars | 15,540 | 0.03 | 1.63E-03 | 3.12E-05 | 3.65E-04 | 6.20E-05 | 5.48E-05 | 5 | 4.30E-05 | 1.62E-05 | 5 |
| Gasoline Passenger Trucks | 46,590 | 0.15 | 0.01 | 1.24E-04 | 2.49E-03 | 2.52E-04 | 2.23E-04 | 19 | 2.11E-04 | 7.95E-05 | 19 |
| **Total** | | **0.18** | **0.01** | **1.55E-04** | **2.85E-03** | **3.14E-04** | **2.78E-04** | **23** | **2.54E-04** | **9.57E-05** | **23** |
| **2022** | | | | | | | | | | | |
| Gasoline Passenger Cars | 175,500 | 0.33 | 0.02 | 3.40E-04 | 0.004 | 6.65E-04 | 5.88E-04 | 51 | 4.60E-04 | 1.76E-04 | 51 |
| Gasoline Passenger Trucks | 526,500 | 1.58 | 0.11 | 1.36E-03 | 0.02 | 2.74E-03 | 2.42E-03 | 205 | 2.23E-03 | 8.27E-04 | 205 |
| **Total** | | **1.91** | **0.12** | **1.70E-03** | **0.03** | **3.40E-03** | **3.01E-03** | **256** | **2.69E-03** | **1.00E-03** | **256** |
| **2023** | | | | | | | | | | | |
| Gasoline Passenger Cars | 57,390 | 0.10 | 0.004 | 1.07E-04 | 0.001 | 2.07E-04 | 1.83E-04 | 16 | 1.42E-04 | 5.62E-05 | 16 |
| Gasoline Passenger Trucks | 172,140 | 0.48 | 0.03 | 4.30E-04 | 0.01 | 0.001 | 0.001 | 65 | 0.001 | 2.51E-04 | 65 |
| **Total** | | **0.58** | **0.04** | **5.38E-04** | **0.01** | **0.001** | **0.001** | **81** | **0.001** | **3.08E-04** | **81** |

1. The global warming potentials of $CO_2$, $CH_4$, and $N_2O$ are assumed to be 1, 25, and 298, respectively.

## Table 15 - BMOP - Onshore Pipeline Construction Emissions
## On-Road Worker Commuting Hazardous Air Pollutant Emission Factors

| Vehicle | Emission Factor (g/VMT)[1] | | | | | | Onsite Travel (miles/vehicle)[2] | No. of Vehicle Trips/Year[2] |
|---|---|---|---|---|---|---|---|---|
| | 1,3-Butadiene | 2,2,4-Trimethylpentane | Acetaldehyde | Acrolein | Benzene | Ethyl Benzene | | |
| **2021** | | | | | | | | |
| Gasoline Passenger Cars | 5.07E-05 | 4.22E-04 | 1.72E-04 | 1.21E-05 | 6.77E-04 | 3.77E-04 | 30 | 518 |
| Gasoline Passenger Trucks | 1.44E-04 | 9.39E-04 | 4.45E-04 | 2.91E-05 | 1.60E-03 | 8.77E-04 | 30 | 1,553 |
| **2022** | | | | | | | | |
| Gasoline Passenger Cars | 3.53E-05 | 3.65E-04 | 1.39E-04 | 1.05E-05 | 5.99E-04 | 3.24E-04 | 30 | 5,850 |
| Gasoline Passenger Trucks | 1.10E-04 | 8.05E-04 | 3.67E-04 | 2.52E-05 | 1.40E-03 | 7.49E-04 | 30 | 17,550 |
| **2023** | | | | | | | | |
| Gasoline Passenger Cars | 2.40E-05 | 3.19E-04 | 1.13E-04 | 9.30E-06 | 5.37E-04 | 2.82E-04 | 30 | 1,913 |
| Gasoline Passenger Trucks | 8.35E-05 | 6.95E-04 | 3.05E-04 | 2.21E-05 | 1.24E-03 | 6.47E-04 | 30 | 5,738 |

1. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
2. Conservative estimate and based on data provided by Blue Marlin Offshore Port, LLC.

**Table 15 - BMOP - Onshore Pipeline Construction Emissions**
**On-Road Worker Commuting Hazardous Air Pollutant Emissions**
**(Continued)**

| Vehicle | Vehicle Miles Traveled (VMT/year) | Emissions (tons/yr) | | | | | |
|---|---|---|---|---|---|---|---|
| | | 1,3-Butadiene | 2,2,4-Trimethylpentane | Acetaldehyde | Acrolein | Benzene | Ethyl Benzene |
| **2021** | | | | | | | |
| Gasoline Passenger Cars | 15,540 | 8.68E-07 | 7.23E-06 | 2.95E-06 | 2.07E-07 | 1.16E-05 | 6.46E-06 |
| Gasoline Passenger Trucks | 46,590 | 7.42E-06 | 4.82E-05 | 2.29E-05 | 1.50E-06 | 8.23E-05 | 4.50E-05 |
| **Total** | | **8.28E-06** | **5.54E-05** | **2.58E-05** | **1.70E-06** | **9.39E-05** | **5.15E-05** |
| **2022** | | | | | | | |
| Gasoline Passenger Cars | 175,500 | 6.84E-06 | 7.06E-05 | 2.69E-05 | 2.04E-06 | 1.16E-04 | 6.27E-05 |
| Gasoline Passenger Trucks | 526,500 | 6.40E-05 | 4.67E-04 | 2.13E-04 | 1.46E-05 | 8.13E-04 | 4.35E-04 |
| **Total** | | **7.09E-05** | **5.38E-04** | **2.40E-04** | **1.67E-05** | **9.29E-04** | **4.97E-04** |
| **2023** | | | | | | | |
| Gasoline Passenger Cars | 57,390 | 1.52E-06 | 2.02E-05 | 7.16E-06 | 5.88E-07 | 3.40E-05 | 1.79E-05 |
| Gasoline Passenger Trucks | 172,140 | 1.58E-05 | 1.32E-04 | 5.78E-05 | 4.19E-06 | 2.35E-04 | 1.23E-04 |
| **Total** | | **1.74E-05** | **1.52E-04** | **6.50E-05** | **4.78E-06** | **2.69E-04** | **1.41E-04** |

## Table 15 - BMOP - Onshore Pipeline Construction Emissions
## On-Road Worker Commuting Hazardous Air Pollutant Emission Factors
## (Continued)

| Vehicle | Emission Factor (g/VMT)[1] | | | | | | | | Onsite Travel (miles/vehicle)[2] | No. of Vehicle Trips/Year[2] |
|---|---|---|---|---|---|---|---|---|---|---|
| | Formaldehyde | Hexane | Naphthalene | PAH | Propionaldehyde | Styrene | Toluene | Xylenes | | |
| **2021** | | | | | | | | | | |
| Gasoline Passenger Cars | 2.49E-04 | 4.75E-04 | 2.39E-07 | 2.39E-05 | 1.21E-05 | 1.94E-05 | 1.99E-03 | 1.39E-03 | 30 | 518 |
| Gasoline Passenger Trucks | 6.08E-04 | 9.90E-04 | 3.25E-07 | 4.66E-05 | 3.15E-05 | 4.84E-05 | 4.40E-03 | 3.23E-03 | 30 | 1,553 |
| **2022** | | | | | | | | | | |
| Gasoline Passenger Cars | 2.15E-04 | 4.28E-04 | 2.27E-07 | 2.15E-05 | 9.92E-06 | 1.70E-05 | 1.72E-03 | 1.20E-03 | 30 | 5,850 |
| Gasoline Passenger Trucks | 5.22E-04 | 8.75E-04 | 3.12E-07 | 4.15E-05 | 2.63E-05 | 4.26E-05 | 3.78E-03 | 2.76E-03 | 30 | 17,550 |
| **2023** | | | | | | | | | | |
| Gasoline Passenger Cars | 1.88E-04 | 3.89E-04 | 2.16E-07 | 1.96E-05 | 8.28E-06 | 1.49E-05 | 1.52E-03 | 1.04E-03 | 30 | 1,913 |
| Gasoline Passenger Trucks | 4.54E-04 | 7.84E-04 | 3.01E-07 | 3.73E-05 | 2.21E-05 | 3.72E-05 | 3.28E-03 | 2.39E-03 | 30 | 5,738 |

1. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
2. Conservative estimate and based on data provided by Blue Marlin Offshore Port, LLC.

## Table 15 - BMOP - Onshore Pipeline Construction Emissions
## On-Road Worker Commuting Hazardous Air Pollutant Emissions
## (Continued)

| Vehicle | Vehicle Miles Traveled (VMT/year) | Emissions (tons/yr) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Formaldehyde | Hexane | Naphthalene | PAH | Propionaldehyde | Styrene | Toluene | Xylenes |
| **2021** | | | | | | | | | |
| Gasoline Passenger Cars | 15,540 | 4.27E-06 | 8.13E-06 | 4.10E-09 | 4.09E-07 | 2.07E-07 | 3.32E-07 | 3.40E-05 | 2.38E-05 |
| Gasoline Passenger Trucks | 46,590 | 3.12E-05 | 5.08E-05 | 1.67E-08 | 2.39E-06 | 1.62E-06 | 2.49E-06 | 2.26E-04 | 1.66E-04 |
| **Total** | | **3.55E-05** | **5.90E-05** | **2.08E-08** | **2.80E-06** | **1.82E-06** | **2.82E-06** | **2.60E-04** | **1.90E-04** |
| **2022** | | | | | | | | | |
| Gasoline Passenger Cars | 175,500 | 4.16E-05 | 8.27E-05 | 4.40E-08 | 4.16E-06 | 1.92E-06 | 3.30E-06 | 3.34E-04 | 2.31E-04 |
| Gasoline Passenger Trucks | 526,500 | 3.03E-04 | 5.08E-04 | 1.81E-07 | 2.41E-05 | 1.52E-05 | 2.47E-05 | 2.19E-03 | 1.60E-03 |
| **Total** | | **3.45E-04** | **5.91E-04** | **2.25E-07** | **2.82E-05** | **1.72E-05** | **2.80E-05** | **2.53E-03** | **1.83E-03** |
| **2023** | | | | | | | | | |
| Gasoline Passenger Cars | 57,390 | 1.19E-05 | 2.46E-05 | 1.37E-08 | 1.24E-06 | 5.24E-07 | 9.44E-07 | 9.59E-05 | 6.59E-05 |
| Gasoline Passenger Trucks | 172,140 | 8.61E-05 | 1.49E-04 | 5.70E-08 | 7.07E-06 | 4.20E-06 | 7.06E-06 | 6.23E-04 | 4.53E-04 |
| **Total** | | **9.80E-05** | **1.73E-04** | **7.07E-08** | **8.31E-06** | **4.72E-06** | **8.00E-06** | **7.18E-04** | **5.19E-04** |

## Table 15 - BMOP - Onshore Pipeline Construction Emissions
## On-Road Worker Commuting Hazardous Air Pollutant Emission Factors
## (Continued)

| Vehicle | Emission Factor (g/VMT)[1] | | | | Onsite Travel (miles/vehicle)[2] | No. of Vehicle Trips/Year[2] |
|---|---|---|---|---|---|---|
| | Arsenic | Chromium VI | Mercury | Nickel | | |
| **2021** | | | | | | |
| Gasoline Passenger Cars | 2.30E-06 | 1.20E-08 | 1.20E-07 | 1.50E-06 | 30 | 518 |
| Gasoline Passenger Trucks | 2.30E-06 | 1.20E-08 | 1.20E-07 | 1.50E-06 | 30 | 1,553 |
| **2022** | | | | | | |
| Gasoline Passenger Cars | 2.30E-06 | 1.20E-08 | 1.20E-07 | 1.50E-06 | 30 | 5,850 |
| Gasoline Passenger Trucks | 2.30E-06 | 1.20E-08 | 1.20E-07 | 1.50E-06 | 30 | 17,550 |
| **2023** | | | | | | |
| Gasoline Passenger Cars | 2.30E-06 | 1.20E-08 | 1.20E-07 | 1.50E-06 | 30 | 1,913 |
| Gasoline Passenger Trucks | 2.30E-06 | 1.20E-08 | 1.20E-07 | 1.50E-06 | 30 | 5,738 |

1. EPA MOVES2014b. To be conservative, MOVES models were run for Jefferson County, TX, Orange County, TX, and Cameron Parish, LA and the worst-case emission factors (maximum) were utilized to quantify emissions.
2. Conservative estimate and based on

**Table 15 - BMOP - Onshore Pipeline Construction Emissions**
**On-Road Worker Commuting Hazardous Air Pollutant Emissions**
**(Continued)**

| Vehicle | Vehicle Miles Traveled (VMT/year) | Emissions (tons/yr) | | | |
|---|---|---|---|---|---|
| | | Arsenic | Chromium VI | Mercury | Nickel |
| **2021** | | | | | |
| Gasoline Passenger Cars | 15,540 | 3.94E-08 | 2.06E-10 | 2.06E-09 | 2.57E-08 |
| Gasoline Passenger Trucks | 46,590 | 1.18E-07 | 6.16E-10 | 6.18E-09 | 7.70E-08 |
| **Total** | | **1.58E-07** | **8.22E-10** | **8.24E-09** | **1.03E-07** |
| **2022** | | | | | |
| Gasoline Passenger Cars | 175,500 | 4.45E-07 | 2.32E-09 | 2.33E-08 | 2.90E-07 |
| Gasoline Passenger Trucks | 526,500 | 1.33E-06 | 6.96E-09 | 6.98E-08 | 8.71E-07 |
| **Total** | | **1.78E-06** | **9.29E-09** | **9.31E-08** | **1.16E-06** |
| **2023** | | | | | |
| Gasoline Passenger Cars | 57,390 | 1.46E-07 | 7.59E-10 | 7.61E-09 | 9.49E-08 |
| Gasoline Passenger Trucks | 172,140 | 4.36E-07 | 2.28E-09 | 2.28E-08 | 2.85E-07 |
| **Total** | | **5.82E-07** | **3.04E-09** | **3.04E-08** | **3.80E-07** |

## Table 16 - BMOP - Onshore Pipeline Construction Emissions

## Fugitive Dust from Construction Activity

| Year | Construction Area[4] (acres) | Emission Factor (ton/acre-month) | | Duration[4] (months) | Uncontrolled Emissions (tons/year) | | Controlled Emissions[3] (tons/year) | |
|---|---|---|---|---|---|---|---|---|
| | | $PM_{10}$[1] | $PM_{2.5}$[2] | | $PM_{10}$ | $PM_{2.5}$ | $PM_{10}$ | $PM_{2.5}$ |
| 2021 | 36.22 | 0.11 | 0.011 | 1 | 3.98 | 0.40 | 1.99 | 0.20 |
| 2022 | 36.22 | 0.11 | 0.011 | 12 | 47.80 | 4.78 | 23.90 | 2.39 |
| 2023 | 36.22 | 0.11 | 0.011 | 4 | 15.93 | 1.59 | 7.97 | 0.80 |

1. WRAP Fugitive Dust Handbook, Countess Environmental, September 2006, Table 3-2, level 1, average conditions.
2. $PM_{2.5}/PM_{10}$ = 0.10 (WRAP Fugitive Dust Handbook, Countess Environmental, September 2006, Section 3.4.1)
3. Assume 50% control from water and other approved dust suppressants. (WRAP Fugitive Dust Handbook, Countess Environmental, September 2006, Section 3.4.1)
4. Conservative estimate based on the construction area of a comparable site.

## Table 17 - BMOP - Onshore Pipeline Construction Emissions
## Fugitive Dust from Paved Roads

**Paved Road Data[1]**

| | | |
|---|---|---|
| Road surface silt loading[1], g/m$^2$ | 0.2 | |
| Particle size multiplier (k)[1] | $PM_{10}$ | 0.0022 |
| | $PM_{2.5}$ | 0.00054 |

| Type of Vehicle | Vehicle Miles Traveled[4], (VMT)/year | | | Average Vehicle Weight[2], tons | Emission Factor[3], lb/VMT | |
|---|---|---|---|---|---|---|
| | 2021 | 2022 | 2023 | | $PM_{10}$ | $PM_{2.5}$ |
| Gasoline Passenger Cars | 15,540 | 175,500 | 57,390 | 1 | 7.26E-04 | 1.78E-04 |
| Gasoline Passenger Trucks | 46,590 | 526,500 | 172,140 | 1 | 7.26E-04 | 1.78E-04 |

**Emissions Summary**

| Activity | Total Emissions, tons/year | |
|---|---|---|
| | $PM_{10}$ | $PM_{2.5}$ |
| 2021 | 0.02 | 0.01 |
| 2022 | 0.25 | 0.06 |
| 2023 | 0.08 | 0.02 |

1. Based on AP-42, Section 13.2.1, Paved Roads, January 2011. For silt loading, no site-specific data is available. Thus, BMOP utilized the value from Table 13.2.1-2 for ubiquitous baseline with average daily traffic (ADT) ranging between 500 to 5,000 vehicles.
2. Based on Update Heavy-Duty Engine Emission Conversion Factors for MOBILE6: Analysis of BSFCs and Calculation of Heavy-Duty Engine Emission Conversion Factors, EPA420-P-98-015, May 1998.
3. PM emission factors determined by methodology from AP-42, Section 13.2.1, *Paved Roads,* Equation 1 (January, 2011).

$E = k * (sL)^{0.91} * W^{1.02}$

E= particulate emission factor, (lb/VMT)
k= Particle size multiplier for particle size range and units of interest from Table 13.2.1-1
sL= road surface silt loading from Table 13.2.1-2, grams per square meter (g/m$^2$)
W= average weight of the vehicles traveling the road, tons

4. Conservative estimate based on work force data from a comparable site.

## Table 18 - BMOP - Onshore Pipeline Construction Emissions
## Construction Emissions Totals

| Nonroad Exhaust Emissions - Hazardous Air Pollutant Emissions | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Annual Emissions (tons) | | | | | | | | | | |
| Year | CO | NOx | $SO_2$ | VOC | $PM_{10}$ | $PM_{2.5}$ | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| **2021** | 0.39 | 1.73 | <0.01 | 0.06 | 0.07 | 0.07 | 501 | 0.01 | 0.02 | 508 |
| **2022** | 22.56 | 96.23 | 0.14 | 4.18 | 3.80 | 3.74 | 17,529 | 0.70 | 0.73 | 17,765 |
| **2023** | 1.69 | 10.31 | 0.01 | 0.30 | 0.31 | 0.31 | 859 | 0.09 | 0.03 | 870 |
| **Total** | **24.64** | **108.27** | **0.15** | **4.55** | **4.18** | **4.12** | **18,890** | **0.80** | **0.78** | **19,143** |

| Nonroad Exhaust Emissions - Hazardous Air Pollutant Emissions | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Annual Emissions (tons) | | | | | | | | | | |
| Year | 1,3-Butadiene | 2,2,4-Trimethylpentane | Acetaldehyde | Acrolein | Benzene | Ethyl Benzene | Formaldehyde | Hexane | Naphthalene | PAH |
| **2021** | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 |
| **2022** | 0.01 | 0.02 | 0.24 | 0.05 | 0.12 | 0.01 | 0.65 | 0.00 | <0.01 | 0.02 |
| **2023** | <0.01 | <0.01 | 0.01 | <0.01 | 0.01 | <0.01 | 0.02 | <0.01 | <0.01 | <0.01 |
| **Total** | **0.03** | **0.04** | **0.26** | **0.07** | **0.13** | **0.03** | **0.67** | **0.03** | **0.03** | **0.04** |

| Nonroad Exhaust Emissions - Hazardous Air Pollutant Emissions | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Annual Emissions (tons) | | | | | | | | | |
| Year | Propionaldehyde | Toluene | Xylenes | Arsenic | Chromium VI | Manganese | Mercury | Nickel | Total HAPs |
| **2021** | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | **0.18** |
| **2022** | 0.05 | 0.08 | 0.05 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | **1.37** |
| **2023** | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | **0.18** |
| **Total** | **0.07** | **0.10** | **0.07** | **0.03** | **0.03** | **0.03** | **0.03** | **0.03** | **1.73** |

| On-Road Tailpipe Emissions - Criteria Pollutants and GHG Emissions | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Annual Emissions (tons) | | | | | | | | | | |
| Year | CO | NOx | $SO_2$ | VOC | $PM_{10}$ | $PM_{2.5}$ | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| **2021** | 0.30 | 0.48 | <0.01 | 0.03 | 0.02 | 0.02 | 291 | 0.01 | <0.01 | 291 |
| **2022** | 13.81 | 45.49 | 0.25 | 2.26 | 1.56 | 1.43 | 29,593 | 0.70 | 0.03 | 29,621 |
| **2023** | 1.35 | 2.91 | 0.02 | 0.15 | 0.10 | 0.09 | 2,156 | 0.05 | <0.01 | 2,158 |
| **Total** | **15.46** | **48.88** | **0.28** | **2.43** | **1.67** | **1.54** | **32,040** | **0.76** | **0.05** | **32,070** |

| On-Road Tailpipe Emissions - Hazardous Air Pollutant Emissions | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Annual Emissions (tons) | | | | | | | | | | |
| Year | 1,3-Butadiene | 2,2,4-Trimethylpentane | Acetaldehyde | Acrolein | Benzene | Ethyl Benzene | Formaldehyde | Hexane | Naphthalene | PAH |
| **2021** | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| **2022** | <0.01 | 0.01 | 0.09 | 0.02 | 0.02 | 0.01 | 0.24 | 0.01 | <0.01 | 0.01 |
| **2023** | <0.01 | <0.01 | 0.01 | <0.01 | <0.01 | <0.01 | 0.02 | <0.01 | <0.01 | <0.01 |
| **Total** | **0.03** | **0.03** | **0.11** | **0.04** | **0.04** | **0.03** | **0.27** | **0.03** | **0.03** | **0.03** |

| On-Road Tailpipe Emissions - Hazardous Air Pollutant Emissions | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Annual Emissions (tons) | | | | | | | | | | |
| Year | Propionaldehyde | Styrene | Toluene | Xylenes | Arsenic | Chromium VI | Manganese | Mercury | Nickel | Total HAPs |
| **2021** | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | - | <0.01 | <0.01 | **0.18** |
| **2022** | 0.01 | <0.01 | 0.03 | 0.04 | <0.01 | <0.01 | - | <0.01 | <0.01 | **0.56** |
| **2023** | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 | - | <0.01 | <0.01 | **0.18** |
| **Total** | **0.03** | **0.03** | **0.05** | **0.06** | **0.03** | **0.03** | - | **0.03** | **0.03** | **0.92** |

| Fugitive Dust | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Annual Emissions (tons) | | | | | | | | | | |
| Year | CO | NOx | $SO_2$ | VOC | $PM_{10}$ | $PM_{2.5}$ | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| **2021** | - | - | - | - | 2.01 | 0.20 | - | - | - | - |
| **2022** | - | - | - | - | 24.16 | 2.45 | - | - | - | - |
| **2023** | - | - | - | - | 8.05 | 0.82 | - | - | - | - |
| **Total** | **-** | **-** | **-** | **-** | **34.22** | **3.47** | **-** | **-** | **-** | **-** |

**Table 18 - BMOP - Onshore Pipeline Construction Emissions**
**Construction Emissions Totals**
**(Continued)**

| Totals - Criteria and GHG Emissions | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Annual Emissions (tons) | | | | | | | | | | |
| Year | CO | NOx | $SO_2$ | VOC | $PM_{10}$ | $PM_{2.5}$ | $CO_2$ | $CH_4$ | $N_2O$ | $CO_2e$ |
| **2021** | 0.69 | 2.21 | 0.02 | 0.09 | 2.10 | 0.29 | 792 | 0.02 | 0.03 | 799 |
| **2022** | 36.38 | 141.73 | 0.38 | 6.44 | 29.51 | 7.62 | 47,123 | 1.41 | 0.77 | 47,386 |
| **2023** | 3.04 | 13.22 | 0.03 | 0.45 | 8.46 | 1.22 | 3,016 | 0.14 | 0.04 | 3,028 |
| **Total** | **40.10** | **157.15** | **0.43** | **6.98** | **40.08** | **9.13** | **50,930** | **1.56** | **0.84** | **51,213** |

| Totals - Hazardous Air Pollutant Emissions | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Annual Emissions (tons) | | | | | | | | | | |
| Year | 1,3-Butadiene | 2,2,4-Trimethylpentane | Acetaldehyde | Acrolein | Benzene | Ethyl Benzene | Formaldehyde | Hexane | Naphthalene | PAH |
| **2021** | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| **2022** | 0.02 | 0.03 | 0.33 | 0.07 | 0.14 | 0.02 | 0.89 | 0.02 | 0.02 | 0.02 |
| **2023** | 0.02 | 0.02 | 0.01 | 0.02 | 0.02 | 0.02 | 0.03 | 0.02 | 0.02 | 0.02 |
| **Total** | **0.06** | **0.07** | **0.37** | **0.11** | **0.18** | **0.06** | **0.94** | **0.06** | **0.06** | **0.06** |

| Totals - Hazardous Air Pollutant Emissions | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Annual Emissions (tons) | | | | | | | | | | |
| Year | Propionaldehyde | Styrene | Toluene | Xylenes | Arsenic | Chromium VI | Manganese | Mercury | Nickel | Total HAPs |
| **2021** | 0.02 | 0.01 | 0.02 | 0.02 | 0.02 | 0.02 | 0.01 | 0.02 | 0.02 | 0.36 |
| **2022** | 0.06 | 0.01 | 0.11 | 0.09 | 0.02 | 0.02 | 0.01 | 0.02 | 0.02 | 1.93 |
| **2023** | 0.02 | 0.01 | 0.02 | 0.02 | 0.02 | 0.02 | 0.01 | 0.02 | 0.02 | 0.36 |
| **Total** | **0.10** | **0.03** | **0.15** | **0.13** | **0.06** | **0.06** | **0.03** | **0.06** | **0.06** | **2.65** |

# APPENDIX B. DETAILED ONSHORE STATIONARY SOURCE EMISSIONS CALCULATIONS

# Blue Marlin Offshore Port (BMOP) Project

## Onshore Pump Stations in Texas

## Air Emissions Summary

| | VOC Emissions (tpy) | HAP Emissions (tpy) |
|---|---|---|
| Sump Tank | | |
| Sump Tank Emissions | 0.11 | 0.01 |
| Pigging Activities | | |
| Pigging Emissions | 0.81 | 0.05 |
| Fugitive Sources | | |
| Total Fugitive Emissions | 0.28 | 0.02 |
| **Total Emissions** | **1.19** | **0.07** |

**Hazardous Air Pollutant Speciated Emissions**

| | Hexane (tpy) | Benzene (tpy) | Toluene (tpy) | Ethylbenzene (tpy) | 1,2,4-Trimethylbenzene (tpy) | 1,3-Dimethylbenzene (tpy) | 1,4-Dimethylbenzene (tpy) | 1,2-Dimethylbenzene (Xylene) (tpy) | i-Propylbenzene (Cumene) (tpy) | Biphenyl (tpy) | Cresols (tpy) | Naphthalene (tpy) | Phenol (tpy) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sump Tank | | | | | | | | | | | | | |
| Sump Tank Emissions | 4.35E-03 | 8.51E-04 | 3.78E-04 | 5.28E-05 | 1.14E-05 | 5.07E-05 | 3.53E-05 | 2.21E-04 | 6.24E-06 | 2.13E-08 | 7.65E-07 | 6.70E-07 | 1.58E-06 |
| Pigging Activities | | | | | | | | | | | | | |
| Pigging Emissions | 3.30E-02 | 6.46E-03 | 2.87E-03 | 4.01E-04 | 8.63E-05 | 3.85E-04 | 2.68E-04 | 1.68E-03 | 4.74E-05 | 1.61E-07 | 5.81E-06 | 5.08E-06 | 1.20E-05 |
| Fugitive Sources | | | | | | | | | | | | | |
| Total Fugitive Emissions | 1.14E-02 | 2.22E-03 | 9.87E-04 | 1.38E-04 | 2.97E-05 | 1.32E-04 | 9.22E-05 | 5.77E-04 | 1.63E-05 | 5.56E-08 | 2.00E-06 | 1.75E-06 | 4.14E-06 |
| **Total Emissions** | **4.87E-02** | **9.53E-03** | **4.23E-03** | **5.92E-04** | **1.27E-04** | **5.68E-04** | **3.95E-04** | **2.47E-03** | **6.99E-05** | **2.38E-07** | **8.58E-06** | **7.50E-06** | **1.77E-05** |

# Blue Marlin Offshore Port (BMOP) Project
## Air Emissions Summary
## Sump Tank

***Source Parameters:***

| | | |
|---|---|---|
| Operating Time | 8,760 | hrs/yr |
| Contents | Crude Oil | |
| Vapor Pressure | 10 | RVP |
| Tank Type | Horizontal, underground | |
| Diameter | 6 | ft |
| Length | 21 | ft |
| Working Volume | 4,442 | gal |
| Throughput | 26,650 | gal/yr |
| Turnovers | 6 | |

***Calculation Methodology:***

Calculation performed using BREEZE Tank Emission Software Program (TankESP) PRO Version 5.1.0.

| | | |
|---|---|---|
| Working Losses | 212.61 | lb/yr |
| Breathing Losses[1] | 0.00 | lb/yr |
| **Total Losses** | **212.61** | **lb/yr** |
| | **0.11** | **ton/yr** |

[1] Underground tank so no breathing losses in the atmosphere.

***Emissions Summary:***

| Pollutant | Annual Emission Rate (tpy) |
|---|---|
| **Total VOC** | **0.11** |

**Hazardous Air Pollutant Speciation:**

| Pollutant | Crude Oil Vapor Composition[1] (Weight %) | Annual Emission Rate[2] (tpy) |
|---|---|---|
| Hexane | 4.09% | 4.35E-03 |
| Benzene | 0.80% | 8.51E-04 |
| Toluene | 0.36% | 3.78E-04 |
| Ethylbenzene | 0.05% | 5.28E-05 |
| 1,2,4-Trimethylbenzene | 0.01% | 1.14E-05 |
| 1,3-dimethylbenzene | 0.05% | 5.07E-05 |
| 1,4-dimethylbenzene | 0.03% | 3.53E-05 |
| 1,2-dimethylbenzene (Xylene) | 0.21% | 2.21E-04 |
| i-propylbenzene (Cumene) | 0.01% | 6.24E-06 |
| Biphenyl | 0.00002% | 2.13E-08 |
| Cresols | 0.001% | 7.65E-07 |
| Naphthalene | 0.001% | 6.70E-07 |
| Phenol | 0.001% | 1.58E-06 |
| **Total HAP Emissions** | **5.60%** | **5.96E-03** |

[1] Crude oil vapor composition is same used for WC509 emission calculations (the maximum of the calculated sample mass %, vapor, the Nederland permit basis, or the 99% UPL of the mass %, vapor, by individual HAP).

[2] Annual HAP Emission Rate = Total VOC Annual Emission Rate * Gas Composition Weight %.

# Blue Marlin Offshore Port (BMOP) Project
## Air Emissions Summary
## Pigging (Pig Launches and Receipts)

***Source Parameters:***

| | | |
|---|---|---|
| Operating Time | 8,760 | hrs/yr |
| Contents | Crude Oil | |
| Vapor Pressure | 10 | RVP |
| Tank Type | Horizontal Fixed Roof | |
| Diameter | 3 | ft |
| Length | 63 | ft |
| Working Volume | 3,329 | gal |
| Throughput | 79,888 | gal/yr |
| Turnovers | 24 | Number of Launches and Receipts per year |

***Calculation Methodology:***

Calculation performed using BREEZE Tank Emission Software Program (TankESP) PRO Version 5.1.0.

| | | |
|---|---|---|
| Working Losses | 638.50 | lb/yr |
| Breathing Losses | 975.59 | lb/yr |
| **Total Losses** | **1,614.10** | **lb/yr** |
| | **0.81** | **ton/yr** |

***Emissions Summary:***

| Pollutant | Annual Emission Rate (tpy) |
|---|---|
| Total VOC | 0.81 |

**Hazardous Air Pollutant Speciation:**

| Pollutant | Crude Oil Vapor Composition[1] (Weight %) | Annual Emission Rate[2] (tpy) |
|---|---|---|
| Hexane | 4.09% | 3.30E-02 |
| Benzene | 0.80% | 6.46E-03 |
| Toluene | 0.36% | 2.87E-03 |
| Ethylbenzene | 0.05% | 4.01E-04 |
| 1,2,4-Trimethylbenzene | 0.01% | 8.63E-05 |
| 1,3-dimethylbenzene | 0.05% | 3.85E-04 |
| 1,4-dimethylbenzene | 0.03% | 2.68E-04 |
| 1,2-dimethylbenzene (Xylene) | 0.21% | 1.68E-03 |
| i-propylbenzene (Cumene) | 0.01% | 4.74E-05 |
| Biphenyl | 0.00002% | 1.61E-07 |
| Cresols | 0.001% | 5.81E-06 |
| Naphthalene | 0.001% | 5.08E-06 |
| Phenol | 0.001% | 1.20E-05 |
| **Total HAP Emissions** | | 4.52E-02 |

[1] Crude oil vapor composition is same used for WC509 emission calculations (the maximum of the calculated sample mass %, vapor, the Nederland permit basis, or the 99% UPL of the mass %, vapor, by individual HAP).

[2] Annual HAP Emission Rate = Total VOC Annual Emission Rate * Gas Composition Weight %.

# Blue Marlin Offshore Port (BMOP) Project
## Air Emissions Summary
## Fug (Fugitive Components)

**PROPOSED EQUIPMENT**

| P&ID No. | Valves | Pumps | Connectors[1] | Flanged Connections |
|---|---|---|---|---|
| Pump 1 | 31 | 1 | 84 | 42 |
| Pump 2 | 31 | 1 | 84 | 42 |
| Pump 3 | 31 | 1 | 84 | 42 |
| Pump 4 | 31 | 1 | 84 | 42 |
| Pump 5 | 31 | 1 | 84 | 42 |
| Pump 6 | 31 | 1 | 84 | 42 |
| Pig Receiver | 27 | 0 | 92 | 46 |
| Pig Launcher | 35 | 0 | 100 | 50 |
| Sump Tank | 3 | 1 | 16 | 8 |
| Outbound Meter Skid | 14 | 0 | 34 | 17 |
| 4-pot Jiskoot Cojetix Sampler Skid | 14 | 0 | 34 | 17 |
| Small Volume Prover | 14 | 0 | 34 | 17 |
| PROPOSED EQUIPMENT TOTALS | 293 | 7 | 814 | 407 |
| Contingency Factor (%) | 10 | 10 | 10 | 10 |
| **PROPOSED EQUIPMENT W/CONTINGENCY** | **322** | **8** | **895** | **448** |

[1] The number of connectors is equal to two times the flanged connections.

**FUGITIVE COMPONENT COUNTS AND CALCULATION OF VOC EMISSIONS**
**Air Emissions Summary**

| Component Type | Service | Emission Factor [1] (lb/hr/comp) | Components | Emissions Factor[2] (lb/yr/comp) | VOC Emissions[3] (lb/yr) |
|---|---|---|---|---|---|
| Valves | Light Liquid | 9.48E-05 | 322 | 0.83 | 268 |
| Pumps | Light Liquid | 1.19E-03 | 8 | 10.43 | 80 |
| Connectors | Light Liquid | 1.76E-05 | 895 | 0.15 | 138 |
| Flanged Connections | Light Liquid | 1.76E-05 | 448 | 0.15 | 69 |
| | | | | **Total (lb/yr):** | **556** |
| | | | | **Total (tpy):** | **0.28** |

[1] Emission factors (lb/hr/comp) are based on EPA Protocol For Equipment Leaks, Table 2-3, Marketing Terminal Average Emission Factors (11/95).
[2] Emissions Factor (lb/yr/comp) = Emission Factor (lb/hr/comp) * Number of Hours per Year (8,760)
[3] VOC Emissions = Emission Factor (lb/yr/comp) * Number of Components (This is conservative as the factor includes methane and ethane)

**Hazardous Air Pollutant Speciation:**

| Pollutant | Crude Oil Vapor Composition[1] (Weight %) | Annual Emission Rate[2] (tpy) |
|---|---|---|
| Hexane | 4.09% | 1.14E-02 |
| Benzene | 0.80% | 2.22E-03 |
| Toluene | 0.36% | 9.87E-04 |
| Ethylbenzene | 0.05% | 1.38E-04 |
| 1,2,4-Trimethylbenzene | 0.01% | 2.97E-05 |
| 1,3-dimethylbenzene | 0.05% | 1.32E-04 |
| 1,4-dimethylbenzene | 0.03% | 9.22E-05 |
| 1,2-dimethylbenzene (Xylene) | 0.21% | 5.77E-04 |
| i-propylbenzene (Cumene) | 0.01% | 1.63E-05 |
| Biphenyl | 0.00002% | 5.56E-08 |
| Cresols | 0.001% | 2.00E-06 |
| Naphthalene | 0.001% | 1.75E-06 |
| Phenol | 0.001% | 4.14E-06 |
| **Total HAP Emissions** | | 1.56E-02 |

[1] Crude oil vapor composition is same used for WC509 emission calculations (the maximum of the calculated sample mass %, vapor, the Nederland permit basis, or the 99% UPL of the mass %, vapor, by individual HAP).
[2] Annual HAP Emission Rate = Total VOC Annual Emission Rate * Gas Composition Weight %.

**Blue Marlin Offshore Port (BMOP) Project**

**TankSummaries for 2021 Annual**

Site: BMOP Texas, Onshore Pump Stations

Equations for this site: After 2019 AP-42 revisions H/D ratio: calculated

| Tank ID | Tank Type | Tank Diameter (ft) | Product | Throughput (gal) | RVP | Max. TVP (psia) | Avg. TVP (psia) | Bulk Liquid Temperature (degF) | Avg. Liquid Surface Temp. (degF) | Report Start Date | Report End Date | Number of Days | Estimated standing losses (lbs) | Estimated working losses (lbs) | Routine Emissions (lbs) | Non Routine Emissions (lbs) | Total estimated emissions (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pigging | Horizontal Tank | 15.51 | Crude_Oil_ET | 6657 | 10 | 8.85 | 8.37 | 72.66 | 67.14 | 1/1/2021 | 2/1/2021 | 31 | 56.55 | 49.70 | 106.26 | 0.00 | 106.26 |
| Pigging | Horizontal Tank | 15.51 | Crude_Oil_ET | 6657 | 10 | 9.06 | 8.54 | 72.66 | 68.35 | 2/1/2021 | 3/1/2021 | 28 | 56.84 | 50.44 | 107.28 | 0.00 | 107.28 |
| Pigging | Horizontal Tank | 15.51 | Crude_Oil_ET | 6657 | 10 | 9.42 | 8.83 | 72.66 | 70.49 | 3/1/2021 | 4/1/2021 | 31 | 74.83 | 51.75 | 126.58 | 0.00 | 126.58 |
| Pigging | Horizontal Tank | 15.51 | Crude_Oil_ET | 6657 | 10 | 9.79 | 9.16 | 72.66 | 72.83 | 4/1/2021 | 5/1/2021 | 30 | 82.20 | 53.21 | 135.41 | 0.00 | 135.41 |
| Pigging | Horizontal Tank | 15.51 | Crude_Oil_ET | 6657 | 10 | 10.19 | 9.54 | 72.66 | 75.42 | 5/1/2021 | 6/1/2021 | 31 | 95.36 | 54.86 | 150.22 | 0.00 | 150.22 |
| Pigging | Horizontal Tank | 15.51 | Crude_Oil_ET | 6657 | 10 | 10.45 | 9.80 | 72.66 | 77.13 | 6/1/2021 | 7/1/2021 | 30 | 97.94 | 55.96 | 153.91 | 0.00 | 153.91 |
| Pigging | Horizontal Tank | 15.51 | Crude_Oil_ET | 6657 | 10 | 10.55 | 9.88 | 72.66 | 77.66 | 7/1/2021 | 8/1/2021 | 31 | 105.05 | 56.31 | 161.36 | 0.00 | 161.36 |
| Pigging | Horizontal Tank | 15.51 | Crude_Oil_ET | 6657 | 10 | 10.54 | 9.87 | 72.66 | 77.59 | 8/1/2021 | 9/1/2021 | 31 | 105.57 | 56.26 | 161.83 | 0.00 | 161.83 |
| Pigging | Horizontal Tank | 15.51 | Crude_Oil_ET | 6657 | 10 | 10.28 | 9.65 | 72.66 | 76.11 | 9/1/2021 | 10/1/2021 | 30 | 91.94 | 55.30 | 147.24 | 0.00 | 147.24 |
| Pigging | Horizontal Tank | 15.51 | Crude_Oil_ET | 6657 | 10 | 9.84 | 9.22 | 72.66 | 73.21 | 10/1/2021 | 11/1/2021 | 31 | 84.88 | 53.45 | 138.33 | 0.00 | 138.33 |
| Pigging | Horizontal Tank | 15.51 | Crude_Oil_ET | 6657 | 10 | 9.28 | 8.74 | 72.66 | 69.80 | 11/1/2021 | 12/1/2021 | 30 | 66.66 | 51.32 | 117.98 | 0.00 | 117.98 |
| Pigging | Horizontal Tank | 15.51 | Crude_Oil_ET | 6657 | 10 | 8.91 | 8.42 | 72.66 | 67.53 | 12/1/2021 | 1/1/2022 | 31 | 57.78 | 49.94 | 107.71 | 0.00 | 107.71 |
| Sump | Horizontal Tank | 12.67 | Crude_Oil_ET | 2221 | 10 | 9.14 | 9.14 | 72.66 | 72.66 | 1/1/2021 | 2/1/2021 | 31 | 0.00 | 17.72 | 17.72 | 0.00 | 17.72 |
| Sump | Horizontal Tank | 12.67 | Crude_Oil_ET | 2221 | 10 | 9.14 | 9.14 | 72.66 | 72.66 | 2/1/2021 | 3/1/2021 | 28 | 0.00 | 17.72 | 17.72 | 0.00 | 17.72 |
| Sump | Horizontal Tank | 12.67 | Crude_Oil_ET | 2221 | 10 | 9.14 | 9.14 | 72.66 | 72.66 | 3/1/2021 | 4/1/2021 | 31 | 0.00 | 17.72 | 17.72 | 0.00 | 17.72 |
| Sump | Horizontal Tank | 12.67 | Crude_Oil_ET | 2221 | 10 | 9.14 | 9.14 | 72.66 | 72.66 | 4/1/2021 | 5/1/2021 | 30 | 0.00 | 17.72 | 17.72 | 0.00 | 17.72 |
| Sump | Horizontal Tank | 12.67 | Crude_Oil_ET | 2221 | 10 | 9.14 | 9.14 | 72.66 | 72.66 | 5/1/2021 | 6/1/2021 | 31 | 0.00 | 17.72 | 17.72 | 0.00 | 17.72 |
| Sump | Horizontal Tank | 12.67 | Crude_Oil_ET | 2221 | 10 | 9.14 | 9.14 | 72.66 | 72.66 | 6/1/2021 | 7/1/2021 | 30 | 0.00 | 17.72 | 17.72 | 0.00 | 17.72 |
| Sump | Horizontal Tank | 12.67 | Crude_Oil_ET | 2221 | 10 | 9.14 | 9.14 | 72.66 | 72.66 | 7/1/2021 | 8/1/2021 | 31 | 0.00 | 17.72 | 17.72 | 0.00 | 17.72 |
| Sump | Horizontal Tank | 12.67 | Crude_Oil_ET | 2221 | 10 | 9.14 | 9.14 | 72.66 | 72.66 | 8/1/2021 | 9/1/2021 | 31 | 0.00 | 17.72 | 17.72 | 0.00 | 17.72 |
| Sump | Horizontal Tank | 12.67 | Crude_Oil_ET | 2221 | 10 | 9.14 | 9.14 | 72.66 | 72.66 | 9/1/2021 | 10/1/2021 | 30 | 0.00 | 17.72 | 17.72 | 0.00 | 17.72 |
| Sump | Horizontal Tank | 12.67 | Crude_Oil_ET | 2221 | 10 | 9.14 | 9.14 | 72.66 | 72.66 | 10/1/2021 | 11/1/2021 | 31 | 0.00 | 17.72 | 17.72 | 0.00 | 17.72 |
| Sump | Horizontal Tank | 12.67 | Crude_Oil_ET | 2221 | 10 | 9.14 | 9.14 | 72.66 | 72.66 | 11/1/2021 | 12/1/2021 | 30 | 0.00 | 17.72 | 17.72 | 0.00 | 17.72 |
| Sump | Horizontal Tank | 12.67 | Crude_Oil_ET | 2221 | 10 | 9.14 | 9.14 | 72.66 | 72.66 | 12/1/2021 | 1/1/2022 | 31 | 0.00 | 17.72 | 17.72 | 0.00 | 17.72 |

# Blue Marlin Offshore Port (BMOP) Project

## Station 501, Cameron Parish, LA

## Air Emissions Summary

| | VOC (tpy) | $H_2S$ (tpy) | HAPs (tpy) |
|---|---|---|---|
| **Pigging Activities** | | | |
| Pig Receiver Barrel | 1.01 | 0.01 | 0.06 |
| Pig Launcher Barrel | 0.72 | 0.01 | 0.04 |
| **Fugitive Sources** | | | |
| Total Fugitive Components | 0.10 | 0.001 | 0.01 |
| **Total Emissions** | **1.83** | **0.02** | **0.10** |

### Hazardous Air Pollutants (HAPs) Speciated Emissions

| | 1,2,4-Trimethylbenzene (tpy) | Benzene (tpy) | Biphenyl (tpy) | Cresols (tpy) | Cumene (tpy) | Ethylbenzene (tpy) | Hexane (tpy) | Naphthalene (tpy) | Phenol (tpy) | Toluene (tpy) | Xylene (tpy) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Pigging Activities** | | | | | | | | | | | |
| Pig Receiver Barrel | 1.08E-04 | 8.09E-03 | 2.02E-07 | 7.28E-06 | 5.93E-05 | 5.02E-04 | 4.13E-02 | 6.37E-06 | 1.51E-05 | 3.59E-03 | 2.92E-03 |
| Pig Launcher Barrel | 7.71E-05 | 5.77E-03 | 1.44E-07 | 5.19E-06 | 4.24E-05 | 3.58E-04 | 2.95E-02 | 4.55E-06 | 1.08E-05 | 2.56E-03 | 2.08E-03 |
| **Fugitive Sources** | | | | | | | | | | | |
| Total Fugitive Components | 1.02E-05 | 7.66E-04 | 1.91E-08 | 6.89E-07 | 5.62E-06 | 4.76E-05 | 3.91E-03 | 6.03E-07 | 1.43E-06 | 3.40E-04 | 2.76E-04 |
| **Total Emissions** | **1.95E-04** | **1.46E-02** | **3.66E-07** | **1.32E-05** | **1.07E-04** | **9.08E-04** | **7.48E-02** | **1.15E-05** | **2.72E-05** | **6.50E-03** | **5.27E-03** |

# Blue Marlin Offshore Port (BMOP) Project
## Station 501, Cameron Parish, LA
## Air Emission Equipment

***Source Parameters:***

| | | | |
|---|---|---|---|
| Operating Time | | 8,760 | hours/year |
| Contents | | Crude Oil | |
| Vapor Pressure | | 10 | RVP |
| Tank Type | | Horizontal Fixed Roof | |
| | Receiver Barrel | Launcher Barrel | |
| Diameter | 42 | 36 | inches |
| Length | 63 | 63 | feet |
| Working Volume | 4,534 | 3,331 | gallons |
| Throughput | 54,410 | 39,975 | gallons/year |
| Turnovers | 12 | 12 | Number of Launches and Receipts per year |

***Calculation Methodology:***

Calculation performed using BREEZE Tank Emission Software Program (TankESP) PRO Version 5.1.0.

| | Receiver Barrel | Launcher Barrel | |
|---|---|---|---|
| Working Losses | 434.13 | 319.00 | lb/yr |
| Breathing Losses | 1,587.00 | 1,124.02 | lb/yr |
| **Total Losses** | **2,021.13** | **1,443.02** | **lb/yr** |
| | **1.01** | **0.72** | **ton/yr** |

***Emissions Summary:***

| Source | VOC (lb/hr) | VOC (tpy) | HAPs (lb/hr) | HAPs (tpy) | $H_2S$[1] (lb/hr) | $H_2S$[1] (tpy) |
|---|---|---|---|---|---|---|
| **Pigging Emissions:** | | | | | | |
| Pig Receiver Barrel | 0.23 | 1.01 | 0.01 | 0.06 | 0.003 | 0.01 |
| Pig Launcher Barrel | 0.16 | 0.72 | 0.01 | 0.04 | 0.002 | 0.01 |
| **Fugitive Emissions:** | | | | | | |
| Total Fugitive Components | 0.02 | 0.10 | 0.00 | 0.01 | 0.0003 | 0.001 |
| **Total** | | **1.83** | | **0.10** | | **0.02** |

[1] Based on $H_2S$ concentration in crude oil vapor as used for WC509 emission calculations (for conservatism the short-term $H_2S$ concentration from Nederland permit basis was used for both 'lb/hr' and 'tpy' emission rates).

***LA Permitting Assessment:***

| Pollutants | Potential Emissions |
|---|---|
| **Total VOC (tpy)** | 1.83 |
| **Total Benzene (tpy)** | 0.01 |
| | |
| **Exemption Criteria 1 Threshold[1]** | **5** |
| **Meets Exemption Criteria 1 Requirements?** | **Yes** |
| **Exemption Criteria 2 Threshold[2]** | **15** |
| **Meets Exemption Criteria 2 Requirements?** | **Yes** |
| **Benzene MER(lb/yr)** | **260** |
| **Criteria 3 Requirements[3]** | **Yes** |

[1] Exemption Criteria 1: Facility-wide potential emissions must be less than five tons per year of any criteria or toxic air pollutant (LAC 33:III.501.B.2.d.i.(a)).

[2] Exemption Criteria 2: Facility-wide potential emissions are less than fifteen tons per year emitted of all criteria pollutants combined (LAC 33:III.501.B.2.d.i.(b)).

[3] Exemption Criteria 3: Facility-wide potential emissions are less than the minimum emission rate (MER) for each toxic air pollutant established pursuant to LAC 33:III.Chapter 51. No TAPs are emitted from the site.

| Pollutant | Crude Oil Vapor Composition[1] (Weight %) | Annual Emission Rate[2] (tpy) | lb/yr | MER (lb/yr) | Exceed? |
|---|---|---|---|---|---|
| Hexane | 4.09% | 7.48E-02 | 150 | 13,000 | No |
| Benzene | 0.80% | 1.46E-02 | 29 | 260 | No |
| Toluene | 0.36% | 6.50E-03 | 13 | 20,000 | No |
| Ethylbenzene | 0.05% | 9.08E-04 | 1.8 | 20,000 | No |
| 1,2,4-Trimethylbenzene | 0.01% | 1.95E-04 | 0.4 | - | No |
| Xylene | 0.05% | 8.71E-04 | 11 | 20,000 | No |
| | 0.03% | 6.07E-04 | | | |
| | 0.21% | 3.80E-03 | | | |
| Cumene | 0.01% | 1.07E-04 | 0.21 | 18,000 | No |
| Biphenyl | 0.00002% | 3.66E-07 | 0.001 | 97.5 | No |
| Cresols | 0.001% | 1.32E-05 | 0.03 | 1,600 | No |
| Naphthalene | 0.001% | 1.15E-05 | 0.02 | 1,990 | No |
| Phenol | 0.001% | 2.72E-05 | 0.05 | 1,400 | No |
| **Total** | **5.60%** | **0.10** | | | |

[1] Crude oil vapor composition is same used for WC509 emission calculations (the maximum of the calculated sample mass %, vapor, the Nederland permit basis, or the 99% UPL of the mass %, vapor, by individual HAP).

[2] Annual HAP Emission Rate = Total VOC Annual Emission Rate * Gas Composition Weight %.

# Blue Marlin Offshore Port (BMOP) Project
## Station 501, Cameron Parish, LA
## Fug (Fugitive Components)

**PROPOSED EQUIPMENT**

| P&ID No. | Valves | Pumps | Connectors[1] | Flanged Connections |
|---|---|---|---|---|
| Pig Receiver | 27 | 0 | 92 | 46 |
| Pig Launcher | 35 | 0 | 100 | 50 |
| Additional Piping Components[2] | 56 | 0 | 136 | 68 |
| PROPOSED EQUIPMENT TOTALS | 118 | 0 | 328 | 164 |
| Contingency Factor (%) | 10 | 10 | 10 | 10 |
| **Total Fugitive Components w/Contingency** | **130** | **0** | **361** | **180** |

[1] The number of connectors is equal to two times the flanged connections.
[2] Assumption.

**FUGITIVE COMPONENT COUNTS AND CALCULATION OF VOC EMISSIONS**
**Air Emissions Summary**

| Component Type | Service | Emission Factor [1] (lb/hr/comp) | Components | Emissions Factor[2] (lb/yr/comp) | VOC Emissions[3] (lb/yr) |
|---|---|---|---|---|---|
| Valves | Light Liquid | 9.48E-05 | 130 | 0.83 | 108 |
| Pumps | Light Liquid | 1.19E-03 | 0 | 10.43 | 0 |
| Connectors | Light Liquid | 1.76E-05 | 361 | 0.15 | 56 |
| Flanged Connections | Light Liquid | 1.76E-05 | 180 | 0.15 | 28 |
| | | | | **Total (lb/yr):** | **191** |
| | | | | **Total (tpy):** | **0.10** |

[1] Emission factors (lb/hr/comp) are based on EPA Protocol For Equipment Leaks, Table 2-3, Marketing Terminal Average Emission Factors (11/95).
[2] Emissions Factor (lb/yr/comp) = Emission Factor (lb/hr/comp) * Number of Hours per Year (8,760)
[3] VOC Emissions = Emission Factor (lb/yr/comp) * Number of Components (This is conservative as the factor includes methane and ethane)

**Hazardous Air Pollutant Speciation:**

| Pollutant | Crude Oil Vapor Composition[1] (Weight %) | Annual Emission Rate[2] (tpy) |
|---|---|---|
| Hexane | 4.09% | 3.91E-03 |
| Benzene | 0.80% | 7.66E-04 |
| Toluene | 0.36% | 3.40E-04 |
| Ethylbenzene | 0.05% | 4.76E-05 |
| 1,2,4-Trimethylbenzene | 0.01% | 1.02E-05 |
| 1,3-dimethylbenzene (m-Xylene) | 0.05% | 4.56E-05 |
| 1,4-dimethylbenzene (p-Xylene) | 0.03% | 3.18E-05 |
| 1,2-dimethylbenzene (o-Xylene) | 0.21% | 1.99E-04 |
| i-propylbenzene (Cumene) | 0.01% | 5.62E-06 |
| Biphenyl | 0.00002% | 1.91E-08 |
| Cresols | 0.001% | 6.89E-07 |
| Naphthalene | 0.001% | 6.03E-07 |
| Phenol | 0.001% | 1.43E-06 |
| **Total HAP Emissions** | **5.60%** | **5.36E-03** |

[1] Crude oil vapor composition is same used for WC509 emission calculations (the maximum of the calculated sample mass %, vapor, the Nederland permit basis, or the 99% UPL of the mass %, vapor, by individual HAP).
[2] Annual HAP Emission Rate = Total VOC Annual Emission Rate * Gas Composition Weight %.

# Blue Marlin Offshore Port (BMOP) Project

## Station 701, Cameron Parish, LA

## Air Emissions Summary

| | VOC (tpy) | $H_2S$ (tpy) | HAPs (tpy) |
|---|---|---|---|
| **Fugitive Sources** | | | |
| Total Fugitive Components | 0.13 | 0.002 | 0.01 |
| **Tanks** | | | |
| Surge Tank 1 | 19.69 | 0.25 | 1.10 |
| Surge Tank 2 | 19.69 | 0.25 | 1.10 |
| **Total Emissions** | **39.51** | **0.51** | **2.21** |

**Hazardous Air Pollutant Speciated Emissions**

| | 1,2,4-Trimethylbenzene (tpy) | Benzene (tpy) | Biphenyl (tpy) | Cresols (tpy) | Cumene (tpy) | Ethylbenzene (tpy) | Hexane (tpy) | Naphthalene (tpy) | Phenol (tpy) | Toluene (tpy) | Xylene (tpy) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Fugitive Sources** | | | | | | | | | | | |
| Total Fugitive Components | 1.40E-05 | 1.05E-03 | 2.62E-08 | 9.43E-07 | 7.69E-06 | 6.51E-05 | 5.36E-03 | 8.25E-07 | 1.95E-06 | 4.65E-04 | 3.78E-04 |
| **Tanks** | | | | | | | | | | | |
| Surge Tank 1 | 2.10E-03 | 1.58E-01 | 3.94E-06 | 1.42E-04 | 1.16E-03 | 9.78E-03 | 8.05E-01 | 1.24E-04 | 2.93E-04 | 7.00E-02 | 5.68E-02 |
| Surge Tank 2 | 2.10E-03 | 1.58E-01 | 3.94E-06 | 1.42E-04 | 1.16E-03 | 9.78E-03 | 8.05E-01 | 1.24E-04 | 2.93E-04 | 7.00E-02 | 5.68E-02 |
| **Total Emissions** | **4.22E-03** | **3.16E-01** | **7.90E-06** | **2.84E-04** | **2.32E-03** | **1.96E-02** | **1.62E+00** | **2.49E-04** | **5.89E-04** | **1.40E-01** | **1.14E-01** |

# Blue Marlin Offshore Port (BMOP) Project
## Station 701, Cameron Parish, LA
## Air Emission Equipment

***Tanks Parameters:***

| | | | |
|---|---|---|---|
| Operating Time | 8,760 | | hours/year |
| Contents | Crude Oil | | |
| Vapor Pressure | 10 | | RVP |
| Tank Type | Vertical Fixed Roof Tank (no floating roof) | | |
| | Surge Tank 1 | Surge Tank 2 | |
| Diameter | 54.6 | 54.6 | feet |
| Height | 24 | 24 | feet |
| Working Volume | 420,000 | 420,000 | gallons |
| Throughput[1] | 1,050,000 | 1,050,000 | gallons/year |

[1] Annual throughput is based on assumption of monthly throughput of crude oil volume equivalent to 5 ft of liquid height in the tank [based on email communication between Weston Threeton (Energy Transfer) and Michael Ballenger (Trinity Consultants) dated August 14, 2020].

***Calculation Methodology:***

Calculation performed using BREEZE Tank Emission Software Program (TankESP) PRO Version 5.1.0.

| | Surge Tank 1 | Surge Tank 2 | |
|---|---|---|---|
| Working Losses | 8,360.49 | 8,360.49 | lb/yr |
| Breathing Losses | 31,014.92 | 31,014.92 | lb/yr |
| **Total Losses** | **39,375.41** | **39,375.41** | **lb/yr** |
| | **19.69** | **19.69** | **ton/yr** |

***Emissions Summary:***

| Source | VOC (lb/hr) | VOC (tpy) | HAPs (lb/hr) | HAPs (tpy) | $H_2S$[1] (lb/hr) | $H_2S$[1] (tpy) |
|---|---|---|---|---|---|---|
| **Pigging Emissions:** | | | | | | |
| Surge Tank 1 | 4.49 | 19.69 | 0.25 | 1.10 | 0.058 | 0.25 |
| Surge Tank 2 | 4.49 | 19.69 | 0.25 | 1.10 | 0.058 | 0.25 |
| **Fugitive Emissions:** | | | | | | |
| Total Fugitive Components | 0.03 | 0.13 | 0.00 | 0.01 | 0.0004 | 0.002 |
| **Total** | | **39.51** | | **2.21** | | **0.51** |

[1] Based on $H_2S$ concentration in crude oil vapor as used for WC509 emission calculations (for conservatism the short-term $H_2S$ concentration from Nederland permit basis is used for both 'lb/hr' and 'tpy' emission rates).

***LA Permitting Assessment:***

| Pollutants | Current MSOG Permit Emission Limits | Exceed? |
|---|---|---|
| **Total VOC (tpy)** | 90.00 | No |
| **Total TAPs (tpy)** | 20.00 | No |
| **Any Individual TAP** | 8.00 | No |

| Pollutant | Crude Oil Vapor Composition[1] (Weight %) | Annual Emission Rate[2] (tpy) |
|---|---|---|
| Hexane | 4.09% | 1.6 |
| Benzene | 0.80% | 0.3 |
| Toluene | 0.36% | 0.1 |
| Ethylbenzene | 0.05% | 0.02 |
| 1,2,4-Trimethylbenzene | 0.01% | 0.00 |
| Xylene | 0.05% | 0.02 |
| | 0.03% | 0.01 |
| | 0.21% | 0.1 |
| Cumene | 0.01% | 0.002 |
| Biphenyl | 0.00002% | 0.0000 |
| Cresols | 0.001% | 0.0003 |
| Naphthalene | 0.001% | 0.0002 |
| Phenol | 0.001% | 0.001 |
| **Total** | **5.60%** | **2.21** |

[1] Crude oil vapor composition is same used for WC509 emission calculations (the maximum of the calculated sample mass %, vapor, the Nederland permit basis, or the 99% UPL of the mass %, vapor, by individual HAP).

[2] Annual HAP Emission Rate = Total VOC Annual Emission Rate * Gas Composition Weight %.

# Blue Marlin Offshore Port (BMOP) Project

## Station 701, Cameron Parish, LA

## Fug (Fugitive Components)

**PROPOSED EQUIPMENT**

| P&ID No. | Valves | Pumps | Connectors[1] | Flanged Connections |
|---|---|---|---|---|
| Surge Tank 1 | 12 | 2 | 44 | 22 |
| Surge Tank 2 | 12 | 2 | 44 | 22 |
| Surge Tank 1 Pump No. 1 | 4 | 0 | 16 | 8 |
| Surge Tank 1 Pump No. 2 | 4 | 0 | 16 | 8 |
| Surge Tank 2 Pump No. 1 | 4 | 0 | 16 | 8 |
| Surge Tank 2 Pump No. 2 | 4 | 0 | 16 | 8 |
| Surge Relief Valve Skid 1 | 20 | 0 | 36 | 18 |
| Surge Relief Valve Skid 2 | 20 | 0 | 36 | 18 |
| Additional Piping Components[2] | 56 | 0 | 136 | 68 |
| PROPOSED EQUIPMENT TOTALS | 136 | 4 | 360 | 180 |
| Contingency Factor (%) | 10 | 10 | 10 | 10 |
| **Total Fugitive Components w/Contingency** | **150** | **4** | **396** | **198** |

[1] The number of connectors is equal to two times the flanged connections.
[2] Assumption.

**FUGITIVE COMPONENT COUNTS AND CALCULATION OF VOC EMISSIONS**
**Air Emissions Summary**

| Component Type | Service | Emission Factor [1] (lb/hr/comp) | Components | Emissions Factor[2] (lb/yr/comp) | VOC Emissions[3] (lb/yr) |
|---|---|---|---|---|---|
| Valves | Light Liquid | 9.48E-05 | 150 | 0.83 | 124 |
| Pumps | Light Liquid | 1.19E-03 | 4 | 10.43 | 46 |
| Connectors | Light Liquid | 1.76E-05 | 396 | 0.15 | 61 |
| Flanged Connections | Light Liquid | 1.76E-05 | 198 | 0.15 | 31 |
| | | | | **Total (lb/yr):** | **262** |
| | | | | **Total (tpy):** | **0.13** |

[1] Emission factors (lb/hr/comp) are based on EPA Protocol For Equipment Leaks, Table 2-3, Marketing Terminal Average Emission Factors (11/95).
[2] Emissions Factor (lb/yr/comp) = Emission Factor (lb/hr/comp) * Number of Hours per Year (8,760)
[3] VOC Emissions = Emission Factor (lb/yr/comp) * Number of Components (This is conservative as the factor includes methane and ethane)

**Hazardous Air Pollutant Speciation:**

| Pollutant | Crude Oil Vapor Composition[1] (Weight %) | Annual Emission Rate[2] (tpy) |
|---|---|---|
| Hexane | 4.09% | 5.36E-03 |
| Benzene | 0.80% | 1.05E-03 |
| Toluene | 0.36% | 4.65E-04 |
| Ethylbenzene | 0.05% | 6.51E-05 |
| 1,2,4-Trimethylbenzene | 0.01% | 1.40E-05 |
| 1,3-dimethylbenzene (m-Xylene) | 0.05% | 6.24E-05 |
| 1,4-dimethylbenzene (p-Xylene) | 0.03% | 4.35E-05 |
| 1,2-dimethylbenzene (o-Xylene) | 0.21% | 2.72E-04 |
| i-propylbenzene (Cumene) | 0.01% | 7.69E-06 |
| Biphenyl | 0.00002% | 2.62E-08 |
| Cresols | 0.001% | 9.43E-07 |
| Naphthalene | 0.001% | 8.25E-07 |
| Phenol | 0.001% | 1.95E-06 |
| **Total HAP Emissions** | **5.60%** | **7.34E-03** |

[1] Crude oil vapor composition is same used for WC509 emission calculations (the maximum of the calculated sample mass %, vapor, the Nederland permit basis, or the 99% UPL of the mass %, vapor, by individual HAP).
[2] Annual HAP Emission Rate = Total VOC Annual Emission Rate * Gas Composition Weight %.

**Blue Marlin Offshore Port (BMOP) Project**
**TankSummaries for 2021 Annual**
Site: BMOP Louisiana, Onshore Stations 501 and 701
Equations for this site: After 2019 AP-42 revisions  H/D ratio: calculated

| Tank ID | Tank Type | Tank Diameter (ft) | Product | Throughput (gal) | RVP | Max. TVP (psia) | Avg. TVP (psia) | Bulk Liquid Temperature (degF) | Avg. Liquid Surface Temp. (degF) | Report Start Date | Report End Date | Number of Days | Estimated standing losses (lbs) | Estimated working losses (lbs) | Routine Emissions (lbs) | Non Routine Emissions (lbs) | Total estimated emissions (lbs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Station 501 Pig Barrel - 36" | Horizontal Tank | 15.51 | Crude_Oil_ET | 3331 | 10 | 8.83 | 8.34 | 72.66 | 66.89 | 1/1/2021 | 2/1/2021 | 31 | 65.51 | 24.80 | 90.31 | 0.00 | 90.31 |
| Station 501 Pig Barrel - 36" | Horizontal Tank | 15.51 | Crude_Oil_ET | 3331 | 10 | 9.04 | 8.49 | 72.66 | 68.04 | 2/1/2021 | 3/1/2021 | 28 | 66.68 | 25.14 | 91.83 | 0.00 | 91.83 |
| Station 501 Pig Barrel - 36" | Horizontal Tank | 15.51 | Crude_Oil_ET | 3331 | 10 | 9.41 | 8.80 | 72.66 | 70.29 | 3/1/2021 | 4/1/2021 | 31 | 87.22 | 25.83 | 113.05 | 0.00 | 113.05 |
| Station 501 Pig Barrel - 36" | Horizontal Tank | 15.51 | Crude_Oil_ET | 3331 | 10 | 9.80 | 9.15 | 72.66 | 72.70 | 4/1/2021 | 5/1/2021 | 30 | 97.22 | 26.59 | 123.80 | 0.00 | 123.80 |
| Station 501 Pig Barrel - 36" | Horizontal Tank | 15.51 | Crude_Oil_ET | 3331 | 10 | 10.20 | 9.54 | 72.66 | 75.36 | 5/1/2021 | 6/1/2021 | 31 | 109.76 | 27.43 | 137.19 | 0.00 | 137.19 |
| Station 501 Pig Barrel - 36" | Horizontal Tank | 15.51 | Crude_Oil_ET | 3331 | 10 | 10.46 | 9.80 | 72.66 | 77.12 | 6/1/2021 | 7/1/2021 | 30 | 111.08 | 28.00 | 139.08 | 0.00 | 139.08 |
| Station 501 Pig Barrel - 36" | Horizontal Tank | 15.51 | Crude_Oil_ET | 3331 | 10 | 10.53 | 9.88 | 72.66 | 77.66 | 7/1/2021 | 8/1/2021 | 31 | 114.76 | 28.17 | 142.93 | 0.00 | 142.93 |
| Station 501 Pig Barrel - 36" | Horizontal Tank | 15.51 | Crude_Oil_ET | 3331 | 10 | 10.53 | 9.86 | 72.66 | 77.55 | 8/1/2021 | 9/1/2021 | 31 | 117.83 | 28.14 | 145.97 | 0.00 | 145.97 |
| Station 501 Pig Barrel - 36" | Horizontal Tank | 15.51 | Crude_Oil_ET | 3331 | 10 | 10.29 | 9.64 | 72.66 | 76.03 | 9/1/2021 | 10/1/2021 | 30 | 106.56 | 27.65 | 134.21 | 0.00 | 134.21 |
| Station 501 Pig Barrel - 36" | Horizontal Tank | 15.51 | Crude_Oil_ET | 3331 | 10 | 9.85 | 9.20 | 72.66 | 73.06 | 10/1/2021 | 11/1/2021 | 31 | 100.30 | 26.70 | 127.00 | 0.00 | 127.00 |
| Station 501 Pig Barrel - 36" | Horizontal Tank | 15.51 | Crude_Oil_ET | 3331 | 10 | 9.29 | 8.71 | 72.66 | 69.62 | 11/1/2021 | 12/1/2021 | 30 | 79.12 | 25.63 | 104.74 | 0.00 | 104.74 |
| Station 501 Pig Barrel - 36" | Horizontal Tank | 15.51 | Crude_Oil_ET | 3331 | 10 | 8.91 | 8.40 | 72.66 | 67.34 | 12/1/2021 | 1/1/2022 | 31 | 67.98 | 24.93 | 92.91 | 0.00 | 92.91 |
| Station 501 Pig Barrel - 42" | Horizontal Tank | 16.76 | Crude_Oil_ET | 4534 | 10 | 8.83 | 8.33 | 72.66 | 66.85 | 1/1/2021 | 2/1/2021 | 31 | 93.34 | 33.73 | 127.07 | 0.00 | 127.07 |
| Station 501 Pig Barrel - 42" | Horizontal Tank | 16.76 | Crude_Oil_ET | 4534 | 10 | 9.03 | 8.49 | 72.66 | 68.00 | 2/1/2021 | 3/1/2021 | 28 | 94.83 | 34.21 | 129.03 | 0.00 | 129.03 |
| Station 501 Pig Barrel - 42" | Horizontal Tank | 16.76 | Crude_Oil_ET | 4534 | 10 | 9.41 | 8.80 | 72.66 | 70.26 | 3/1/2021 | 4/1/2021 | 31 | 123.61 | 35.15 | 158.76 | 0.00 | 158.76 |
| Station 501 Pig Barrel - 42" | Horizontal Tank | 16.76 | Crude_Oil_ET | 4534 | 10 | 9.80 | 9.14 | 72.66 | 72.69 | 4/1/2021 | 5/1/2021 | 30 | 137.30 | 36.18 | 173.48 | 0.00 | 173.48 |
| Station 501 Pig Barrel - 42" | Horizontal Tank | 16.76 | Crude_Oil_ET | 4534 | 10 | 10.20 | 9.54 | 72.66 | 75.36 | 5/1/2021 | 6/1/2021 | 31 | 154.47 | 37.34 | 191.81 | 0.00 | 191.81 |
| Station 501 Pig Barrel - 42" | Horizontal Tank | 16.76 | Crude_Oil_ET | 4534 | 10 | 10.46 | 9.80 | 72.66 | 77.13 | 6/1/2021 | 7/1/2021 | 30 | 155.99 | 38.12 | 194.11 | 0.00 | 194.11 |
| Station 501 Pig Barrel - 42" | Horizontal Tank | 16.76 | Crude_Oil_ET | 4534 | 10 | 10.53 | 9.88 | 72.66 | 77.68 | 7/1/2021 | 8/1/2021 | 31 | 161.07 | 38.36 | 199.43 | 0.00 | 199.43 |
| Station 501 Pig Barrel - 42" | Horizontal Tank | 16.76 | Crude_Oil_ET | 4534 | 10 | 10.54 | 9.87 | 72.66 | 77.56 | 8/1/2021 | 9/1/2021 | 31 | 165.48 | 38.31 | 203.78 | 0.00 | 203.78 |
| Station 501 Pig Barrel - 42" | Horizontal Tank | 16.76 | Crude_Oil_ET | 4534 | 10 | 10.29 | 9.64 | 72.66 | 76.04 | 9/1/2021 | 10/1/2021 | 30 | 150.00 | 37.63 | 187.63 | 0.00 | 187.63 |
| Station 501 Pig Barrel - 42" | Horizontal Tank | 16.76 | Crude_Oil_ET | 4534 | 10 | 9.85 | 9.20 | 72.66 | 73.04 | 10/1/2021 | 11/1/2021 | 31 | 141.76 | 36.33 | 178.09 | 0.00 | 178.09 |
| Station 501 Pig Barrel - 42" | Horizontal Tank | 16.76 | Crude_Oil_ET | 4534 | 10 | 9.29 | 8.71 | 72.66 | 69.59 | 11/1/2021 | 12/1/2021 | 30 | 112.34 | 34.87 | 147.20 | 0.00 | 147.20 |
| Station 501 Pig Barrel - 42" | Horizontal Tank | 16.76 | Crude_Oil_ET | 4534 | 10 | 8.90 | 8.39 | 72.66 | 67.30 | 12/1/2021 | 1/1/2022 | 31 | 96.81 | 33.92 | 130.73 | 0.00 | 130.73 |
| Station 701 Surge Tank 1 | FRT (no floating roof) | 54.60 | Crude_Oil_ET | 87574 | 10 | 8.75 | 8.22 | 72.66 | 66.03 | 1/1/2021 | 2/1/2021 | 31 | 1909.09 | 645.05 | 2554.14 | 0.00 | 2554.14 |
| Station 701 Surge Tank 1 | FRT (no floating roof) | 54.60 | Crude_Oil_ET | 87574 | 10 | 8.97 | 8.39 | 72.66 | 67.28 | 2/1/2021 | 3/1/2021 | 28 | 1916.09 | 654.93 | 2571.02 | 0.00 | 2571.02 |
| Station 701 Surge Tank 1 | FRT (no floating roof) | 54.60 | Crude_Oil_ET | 87574 | 10 | 9.37 | 8.73 | 72.66 | 69.73 | 3/1/2021 | 4/1/2021 | 31 | 2447.24 | 674.63 | 3121.86 | 0.00 | 3121.86 |
| Station 701 Surge Tank 1 | FRT (no floating roof) | 54.60 | Crude_Oil_ET | 87574 | 10 | 9.79 | 9.10 | 72.66 | 72.38 | 4/1/2021 | 5/1/2021 | 30 | 2666.10 | 696.28 | 3362.37 | 0.00 | 3362.37 |
| Station 701 Surge Tank 1 | FRT (no floating roof) | 54.60 | Crude_Oil_ET | 87574 | 10 | 10.22 | 9.53 | 72.66 | 75.33 | 5/1/2021 | 6/1/2021 | 31 | 2951.03 | 720.92 | 3671.95 | 0.00 | 3671.95 |
| Station 701 Surge Tank 1 | FRT (no floating roof) | 54.60 | Crude_Oil_ET | 87574 | 10 | 10.51 | 9.83 | 72.66 | 77.30 | 6/1/2021 | 7/1/2021 | 30 | 2956.97 | 737.61 | 3694.58 | 0.00 | 3694.58 |
| Station 701 Surge Tank 1 | FRT (no floating roof) | 54.60 | Crude_Oil_ET | 87574 | 10 | 10.59 | 9.92 | 72.66 | 77.91 | 7/1/2021 | 8/1/2021 | 31 | 3052.79 | 742.88 | 3795.67 | 0.00 | 3795.67 |
| Station 701 Surge Tank 1 | FRT (no floating roof) | 54.60 | Crude_Oil_ET | 87574 | 10 | 10.60 | 9.90 | 72.66 | 77.81 | 8/1/2021 | 9/1/2021 | 31 | 3160.47 | 741.95 | 3902.42 | 0.00 | 3902.42 |
| Station 701 Surge Tank 1 | FRT (no floating roof) | 54.60 | Crude_Oil_ET | 87574 | 10 | 10.34 | 9.65 | 72.66 | 76.15 | 9/1/2021 | 10/1/2021 | 30 | 2904.69 | 727.82 | 3632.51 | 0.00 | 3632.51 |
| Station 701 Surge Tank 1 | FRT (no floating roof) | 54.60 | Crude_Oil_ET | 87574 | 10 | 9.86 | 9.17 | 72.66 | 72.85 | 10/1/2021 | 11/1/2021 | 31 | 2799.16 | 700.19 | 3499.35 | 0.00 | 3499.35 |
| Station 701 Surge Tank 1 | FRT (no floating roof) | 54.60 | Crude_Oil_ET | 87574 | 10 | 9.25 | 8.63 | 72.66 | 69.06 | 11/1/2021 | 12/1/2021 | 30 | 2268.11 | 669.18 | 2937.29 | 0.00 | 2937.29 |
| Station 701 Surge Tank 1 | FRT (no floating roof) | 54.60 | Crude_Oil_ET | 87574 | 10 | 8.84 | 8.29 | 72.66 | 66.53 | 12/1/2021 | 1/1/2022 | 31 | 1983.19 | 649.05 | 2632.24 | 0.00 | 2632.24 |
| Station 701 Surge Tank 2 | FRT (no floating roof) | 54.60 | Crude_Oil_ET | 87574 | 10 | 8.75 | 8.22 | 72.66 | 66.03 | 1/1/2021 | 2/1/2021 | 31 | 1909.09 | 645.05 | 2554.14 | 0.00 | 2554.14 |
| Station 701 Surge Tank 2 | FRT (no floating roof) | 54.60 | Crude_Oil_ET | 87574 | 10 | 8.97 | 8.39 | 72.66 | 67.28 | 2/1/2021 | 3/1/2021 | 28 | 1916.09 | 654.93 | 2571.02 | 0.00 | 2571.02 |
| Station 701 Surge Tank 2 | FRT (no floating roof) | 54.60 | Crude_Oil_ET | 87574 | 10 | 9.37 | 8.73 | 72.66 | 69.73 | 3/1/2021 | 4/1/2021 | 31 | 2447.24 | 674.63 | 3121.86 | 0.00 | 3121.86 |
| Station 701 Surge Tank 2 | FRT (no floating roof) | 54.60 | Crude_Oil_ET | 87574 | 10 | 9.79 | 9.10 | 72.66 | 72.38 | 4/1/2021 | 5/1/2021 | 30 | 2666.10 | 696.28 | 3362.37 | 0.00 | 3362.37 |
| Station 701 Surge Tank 2 | FRT (no floating roof) | 54.60 | Crude_Oil_ET | 87574 | 10 | 10.22 | 9.53 | 72.66 | 75.33 | 5/1/2021 | 6/1/2021 | 31 | 2951.03 | 720.92 | 3671.95 | 0.00 | 3671.95 |
| Station 701 Surge Tank 2 | FRT (no floating roof) | 54.60 | Crude_Oil_ET | 87574 | 10 | 10.51 | 9.83 | 72.66 | 77.30 | 6/1/2021 | 7/1/2021 | 30 | 2956.97 | 737.61 | 3694.58 | 0.00 | 3694.58 |
| Station 701 Surge Tank 2 | FRT (no floating roof) | 54.60 | Crude_Oil_ET | 87574 | 10 | 10.59 | 9.92 | 72.66 | 77.91 | 7/1/2021 | 8/1/2021 | 31 | 3052.79 | 742.88 | 3795.67 | 0.00 | 3795.67 |
| Station 701 Surge Tank 2 | FRT (no floating roof) | 54.60 | Crude_Oil_ET | 87574 | 10 | 10.60 | 9.90 | 72.66 | 77.81 | 8/1/2021 | 9/1/2021 | 31 | 3160.47 | 741.95 | 3902.42 | 0.00 | 3902.42 |
| Station 701 Surge Tank 2 | FRT (no floating roof) | 54.60 | Crude_Oil_ET | 87574 | 10 | 10.34 | 9.65 | 72.66 | 76.15 | 9/1/2021 | 10/1/2021 | 30 | 2904.69 | 727.82 | 3632.51 | 0.00 | 3632.51 |
| Station 701 Surge Tank 2 | FRT (no floating roof) | 54.60 | Crude_Oil_ET | 87574 | 10 | 9.86 | 9.17 | 72.66 | 72.85 | 10/1/2021 | 11/1/2021 | 31 | 2799.16 | 700.19 | 3499.35 | 0.00 | 3499.35 |
| Station 701 Surge Tank 2 | FRT (no floating roof) | 54.60 | Crude_Oil_ET | 87574 | 10 | 9.25 | 8.63 | 72.66 | 69.06 | 11/1/2021 | 12/1/2021 | 30 | 2268.11 | 669.18 | 2937.29 | 0.00 | 2937.29 |
| Station 701 Surge Tank 2 | FRT (no floating roof) | 54.60 | Crude_Oil_ET | 87574 | 10 | 8.84 | 8.29 | 72.66 | 66.53 | 12/1/2021 | 1/1/2022 | 31 | 1983.19 | 649.05 | 2632.24 | 0.00 | 2632.24 |