

EP - AIR QUALITY

**OMB Control No. 1010-0151
OMB Approval Expires: xx/xx/202x**

| | |
|------------------------|--|
| COMPANY | |
| AREA | |
| BLOCK | |
| LEASE | |
| FACILITY | |
| WELL | |
| COMPANY CONTACT | |
| TELEPHONE NO. | |
| REMARKS | |

AIR EMISSIONS COMPUTATION FACTORS

| Fuel Usage Conversion Factors | Natural Gas Turbines | | Natural Gas Engines | | | | Diesel Recip. Engine | | Diesel Turbines | | REF. | DATE | Reference Links |
|--|----------------------|--------|---------------------|--------|-----------|--------|----------------------|----------|-----------------|--------|--|-------------|--|
| | SCF/hp-hr | 9.524 | SCF/hp-hr | 7.343 | SCF/hp-hr | 6.454 | SCF/hp-hr | 0.0514 | SCF/hp-hr | 0.0514 | | | |
| Equipment/Emission Factors | units | TSP | PM10 | PM2.5 | SOx | NOx | VOC | Pb | CO | NH3 | | | |
| Natural Gas Turbine | g/hp-hr | 0.0088 | 0.0088 | 0.0026 | 1.4515 | 0.0095 | N/A | 0.9719 | N/A | N/A | AP42 3.1-14.1.1-2a | 400 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0301.pdf |
| RECP- 2 Cycle Lean Natural Gas | g/hp-hr | 0.1293 | 0.1293 | 0.0020 | 6.5998 | 0.4262 | N/A | 1.2069 | N/A | N/A | AP42 3.1-1 | 760 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0302.pdf |
| RECP- 4 Cycle Lean Natural Gas | g/hp-hr | 0.0002 | 0.0002 | 0.0020 | 2.8814 | 0.4014 | N/A | 1.8849 | N/A | N/A | AP42 3.1-2 | 760 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0303.pdf |
| RECP- 4 Cycle Rich Natural Gas | g/hp-hr | 0.0323 | 0.0323 | 0.0020 | 7.7224 | 0.3221 | N/A | 11.9408 | N/A | N/A | AP42 3.1-3 | 760 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0304.pdf |
| Diesel Recip. < 600 hp | g/hp-hr | 1 | 1 | 1 | 0.0279 | 14.1 | 1.04 | N/A | 3.03 | N/A | AP42 3.1-1 | 1096 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0305.pdf |
| Diesel Recip. > 600 hp | g/hp-hr | 0.32 | 0.182 | 0.178 | 0.0095 | 10.9 | 0.29 | N/A | 2.5 | N/A | AP42 3.1-1.3.4.2 | 1096 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0306.pdf |
| Diesel Boiler | lb/MMscf | 0.0940 | 0.0420 | 0.0105 | 0.0089 | 1.0080 | 0.0084 | 5.14E-05 | 0.2100 | 0.0036 | AP42 3.1-9, Pb and NH3: WAFIR#8 (080216) | 898 and 910 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0307.pdf |
| Diesel Turbine | g/hp-hr | 0.0981 | 0.0137 | 0.0137 | 0.0048 | 2.7941 | 0.0013 | 4.45E-05 | 0.0105 | N/A | AP42 3.1-1.4.1.1-2a | 400 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0308.pdf |
| Dual Fuel Turbine | g/hp-hr | 0.0981 | 0.0137 | 0.0137 | 0.0048 | 2.7941 | 0.0095 | 4.45E-05 | 0.0105 | 0.0000 | AP42 3.1-14.1.3.2a, AP42 3.1-1.4.1.1-2a | 400 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0309.pdf |
| Vessels - Propulsion | g/hp-hr | 0.320 | 0.1931 | 0.1873 | 0.0047 | 7.6669 | 0.2204 | 2.24E-05 | 1.2025 | 0.0022 | USEPA 2017 NET TSP refer to Diesel Recip. > 600 hp reference | 319 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0310.pdf |
| Vessels - Drilling Prime Engine, Auxiliary | g/hp-hr | 0.320 | 0.1931 | 0.1873 | 0.0047 | 7.6669 | 0.2204 | 2.24E-05 | 1.2025 | 0.0022 | USEPA 2017 NET TSP refer to Diesel Recip. > 600 hp reference | 319 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0311.pdf |
| Vessels - Diesel Boiler | g/hp-hr | 0.0465 | 0.1491 | 0.1417 | 0.4430 | 1.4914 | 0.0020 | 3.73E-05 | 0.1491 | 0.0003 | USEPA 2017 NET TSP refer to Diesel Recip. > 600 hp reference | 319 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0312.pdf |
| Vessels - Well Stimulation | g/hp-hr | 0.320 | 0.1931 | 0.1873 | 0.0047 | 7.6669 | 0.2204 | 2.24E-05 | 1.2025 | 0.0022 | USEPA 2017 NET TSP refer to Diesel Recip. > 600 hp reference | 319 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0313.pdf |
| Natural Gas Heater/Boiler/Burner | lb/MMscf | 7.60 | 1.90 | 1.90 | 0.60 | 190.00 | 5.50 | 5.00E-04 | 84.00 | 3.2 | AP42 1.4-1.4.1.4.2, Pb and NH3: WAFIR#8 (080216) | 798 and 818 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0314.pdf |
| Combustion Flare (no smoke) | lb/MMscf | 0.00 | 0.00 | 0.00 | 0.57 | 71.40 | 35.93 | N/A | 325.5 | N/A | AP42 13.5-1, 13.5-2 | 218 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0315.pdf |
| Combustion Flare (light smoke) | lb/MMscf | 2.10 | 2.10 | 2.10 | 0.57 | 71.40 | 35.93 | N/A | 325.5 | N/A | AP42 13.5-1, 13.5-2 | 218 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0316.pdf |
| Combustion Flare (medium smoke) | lb/MMscf | 10.50 | 10.50 | 10.50 | 0.57 | 71.40 | 35.93 | N/A | 325.5 | N/A | AP42 13.5-1, 13.5-2 | 218 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0317.pdf |
| Combustion Flare (heavy smoke) | lb/MMscf | 21.00 | 21.00 | 21.00 | 0.57 | 71.40 | 35.93 | N/A | 325.5 | N/A | AP42 13.5-1, 13.5-2 | 218 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0318.pdf |
| Liquid Flaring | lb/MMscf | 0.42 | 0.0668 | 0.0651 | 5.964 | 0.84 | 0.01428 | 5.14E-05 | 0.21 | 0.0036 | AP42 1.3-1 through 1.3.3 and 1.3.5 | 530 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0319.pdf |
| Storage Tank | tons/year | | | | | | 4.300 | | | | 2014 Gulfwide Inventory, Avg. emss (upper bound of 95% CI) | 2017 | https://www.boem.gov/environment/environmental-studies/2014-gulfwide-e |
| Fugitives | lb/hr/component | | | | | | 0.0005 | | | | AP42 Table | 1293 | https://www.boem.gov/environment/environmental-studies/2014-gulfwide-e |
| Glycol Dehydrator | tons/year | | | | | | 19.240 | | | | 2011 Gulfwide Inventory, Avg. emss (upper bound of 95% CI) | 2014 | https://www.boem.gov/environment/environmental-studies/2011-gulfwide-e |
| Cold Vent | tons/year | | | | | | 44.747 | | | | 2014 Gulfwide Inventory, Avg. emss (upper bound of 95% CI) | 2017 | https://www.boem.gov/environment/environmental-studies/2014-gulfwide-e |
| Waste Incinerator | lb/ton | | 15.0 | 15.0 | 2.5 | 2.0 | N/A | N/A | 20.0 | N/A | AP 42 2.1-12 | 1096 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0320.pdf |
| Dn-ice - Loader | lb/sgal | 0.043 | 0.043 | 0.043 | 0.040 | 0.604 | 0.049 | N/A | 0.130 | 0.003 | USEPA NONROAD2008 model, TSP (units converted) refer to Diesel Recip. <600 reference | 2009 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0321.pdf |
| Dn-ice - Other Construction Equipment | lb/sgal | 0.043 | 0.043 | 0.043 | 0.040 | 0.604 | 0.049 | N/A | 0.130 | 0.003 | USEPA NONROAD2008 model, TSP (units converted) refer to Diesel Recip. <600 reference | 2009 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0322.pdf |
| Dn-ice - Other Survey Equipment | lb/sgal | 0.043 | 0.043 | 0.043 | 0.040 | 0.604 | 0.049 | N/A | 0.130 | 0.003 | USEPA NONROAD2008 model, TSP (units converted) refer to Diesel Recip. <600 reference | 2009 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0323.pdf |
| Dn-ice - Tractor | lb/sgal | 0.043 | 0.043 | 0.043 | 0.040 | 0.604 | 0.049 | N/A | 0.130 | 0.003 | USEPA NONROAD2008 model, TSP (units converted) refer to Diesel Recip. <600 reference | 2009 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0324.pdf |
| Dn-ice - Truck (for gravel island) | lb/sgal | 0.043 | 0.043 | 0.043 | 0.040 | 0.604 | 0.049 | N/A | 0.130 | 0.003 | USEPA NONROAD2008 model, TSP (units converted) refer to Diesel Recip. <600 reference | 2009 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0325.pdf |
| Dn-ice - Truck (for surveys) | lb/sgal | 0.043 | 0.043 | 0.043 | 0.040 | 0.604 | 0.049 | N/A | 0.130 | 0.003 | USEPA NONROAD2008 model, TSP (units converted) refer to Diesel Recip. <600 reference | 2009 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0326.pdf |
| Man Camp - Operation (max people/day) | tons/person/day | | 0.0004 | 0.0004 | 0.0004 | 0.006 | 0.001 | N/A | 0.001 | N/A | BDEM 2014 1001 | 2014 | https://www.boem.gov/sites/default/files/uploadedFiles/BOEM/BOEM_News |
| Vessels - Ice Management Diesel | g/hp-hr | 0.320 | 0.1931 | 0.1873 | 0.0047 | 7.6669 | 0.2204 | 2.24E-05 | 1.2025 | 0.0022 | USEPA 2017 NET TSP refer to Diesel Recip. > 600 hp reference | 319 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0327.pdf |
| Vessels - Hovercraft Diesel | g/hp-hr | 0.320 | 0.1931 | 0.1873 | 0.0047 | 7.6669 | 0.2204 | 2.24E-05 | 1.2025 | 0.0022 | USEPA 2017 NET TSP refer to Diesel Recip. > 600 hp reference | 319 | https://www3.epa.gov/ttr/hq1/ap42/ch03/final/c0328.pdf |

| Sulfur Content Source | Value | Units |
|-------------------------------|--------|----------|
| Fuel Gas | 3.38 | ppm |
| Diesel Fuel | 0.0015 | % weight |
| Produced Gas (Flare) | 3.38 | ppm |
| Produced Oil (Liquid Flaring) | 3 | % weight |

| Density and Heat Value of Diesel Fuel | |
|---------------------------------------|---------------|
| Density | 7.05 lb/sgal |
| Heat Value | 19,300 Btu/lb |

| Heat Value of Natural Gas | |
|---------------------------|-------------------|
| Heat Value | 1,050 MMBSU/MMscf |

| Natural Gas Flare Parameters | Value | Units |
|------------------------------|--------|-------------------|
| VOC Content of Flare Gas | 0.6816 | lb VOC/lb mol gas |
| Natural Gas Flare Efficiency | 98 | % |

AIR EMISSIONS CALCULATIONS

| COMPANY | AREA | BLOCK | LEASE | FACILITY | WELL | | | | |
|------------------|----------------------------|-------|-------|----------|------|------|------|------|------|
| 0 | | | | | | | | | |
| Year | Facility Emitted Substance | | | | | | | | |
| | TSP | PM10 | PM2.5 | SOx | NOx | VOC | Pb | CO | NH3 |
| 2020 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2021 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2022 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2023 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2024 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2025 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2026 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2027 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2028 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2029 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Allowable | 0.00 | | | 0.00 | 0.00 | 0.00 | | 0.00 | |