

COMPANY	
AREA	
BLOCK	
LEASE	
FACILITY	
WELL	
COMPANY CONTACT	
TELEPHONE NO.	
REMARKS*	

DRAFT

Pending Approval

LEASE TERM PIPELINE CONSTRUCTION INFORMATION:		
YEAR	NUMBER OF PIPELINES	TOTAL NUMBER OF CONSTRUCTION DAYS
2020		
2021		
2022		
2023		
2024		
2025		
2026		
2027		
2028		
2029		
2030		

\* Indicate if the calculated projected emission estimates are for a facility, a temporary facility, or construction activities of a facility (including installation activities for lease-term pipelines).

**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	7.143	GAL/HP-hr	0.0514	GAL/HP-hr	0.0514			
Equipment/Emission Factors	units	PM	SOx	NOx	VOC	Pb	CO	NH3			
Natural Gas Turbine	g/HP-hr		0.0026	1.4515	0.0095	N/A	0.3719	N/A	AP42 3.1-14.3.1-2a	400	<a href="https://www3.epa.gov/ttn/chie1/ap42/ch03/final/c03s01.pdf">https://www3.epa.gov/ttn/chie1/ap42/ch03/final/c03s01.pdf</a>
RECIP. 2 Cycle Lean Natural Gas	g/HP-hr		0.0020	6.5998	0.4082	N/A	1.2009	N/A	AP42 3.2-1	700	<a href="https://www3.epa.gov/ttn/chie1/ap42/ch03/final/c03s02.pdf">https://www3.epa.gov/ttn/chie1/ap42/ch03/final/c03s02.pdf</a>
RECIP. 4 Cycle Lean Natural Gas	g/HP-hr		0.0020	2.8614	0.4014	N/A	1.8949	N/A	AP42 3.2-2	700	<a href="https://www3.epa.gov/ttn/chie1/ap42/ch03/final/c03s03.pdf">https://www3.epa.gov/ttn/chie1/ap42/ch03/final/c03s03.pdf</a>
RECIP. 4 Cycle Rich Natural Gas	g/HP-hr		0.0020	7.7224	0.1021	N/A	11.9408	N/A	AP42 3.2-3	700	<a href="https://www3.epa.gov/ttn/chie1/ap42/ch03/final/c03s04.pdf">https://www3.epa.gov/ttn/chie1/ap42/ch03/final/c03s04.pdf</a>
Diesel Recip. < 600 hp	g/HP-hr	1	0.93	14.1	1.04	N/A	3.03	N/A	AP42 3.3-1	1096	<a href="https://www3.epa.gov/ttn/chie1/ap42/ch03/final/c03s05.pdf">https://www3.epa.gov/ttn/chie1/ap42/ch03/final/c03s05.pdf</a>
Diesel Recip. > 600 hp	g/HP-hr	0.32	0.0056	10.9	0.29	N/A	2.5	N/A	AP42 3.4-1 & 3.4-2	1096	<a href="https://www3.epa.gov/ttn/chie1/ap42/ch03/final/c03s06.pdf">https://www3.epa.gov/ttn/chie1/ap42/ch03/final/c03s06.pdf</a>
Diesel Boiler	lbs/bbl	0.0840	0.0089	1.0080	0.0084	0.0001	0.2100	0.0336	AP42 1.3-6, Pb and NH3 WebFIRE (08/2018)	998 and 5/10	<a href="https://www3.epa.gov/ttn/chie1/ap42/ch03/final/c03s07.pdf">https://www3.epa.gov/ttn/chie1/ap42/ch03/final/c03s07.pdf</a>
Diesel Turbine	g/HP-hr		0.0048	2.7941	0.0013	0.0000	0.0105	N/A	AP42 3.1-1 & 3.1-2a	400	<a href="https://www3.epa.gov/ttn/chie1/ap42/ch03/final/c03s08.pdf">https://www3.epa.gov/ttn/chie1/ap42/ch03/final/c03s08.pdf</a>
Dual Fuel Turbine	g/HP-hr		0.0048	2.7941	0.0095	0.0000	0.3719	0.0000	AP42 3.1-14.3.1-2a, AP42 3.1-1 & 3.1-2a	400	<a href="https://www3.epa.gov/ttn/chie1/ap42/ch03/final/c03s09.pdf">https://www3.epa.gov/ttn/chie1/ap42/ch03/final/c03s09.pdf</a>
Vessels – Propulsion	g/HP-hr	0.32	0.268452	12.6769	0.469791	2.2371E-05	1.0440	0.0022	EPA CMV model (2019). PM: refer to Diesel Recip. > 600 hp reference	3/19	<a href="https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inve">https://www.epa.gov/air-emissions-inventories/2017-national-emissions-inve</a>
Vessels – Drilling Prime Engine, Auxiliary	g/HP-hr	0.32	0.313194	10.29056	0.313194	2.2371E-05	0.5711	0.0037	EPA CMV model (2019). PM: refer to Diesel Recip. > 600 hp reference	3/19	
Vessels – Diesel Boiler	g/HP-hr	0.32	0.438963	1.4214	0.02027	3.7285E-06	0.1491	0.0003	EPA CMV model (2019)	3/19	
Vessels – Well Stimulation	g/HP-hr	0.32	0.268452	12.6769	0.469791	2.2371E-05	1.0440	0.0022	EPA CMV model (2019). PM: refer to Diesel Recip. > 600 hp reference	3/19	
Natural Gas Heater/Boiler/Burner	lbs/MMscf	7.60	0.60	190.00	5.50	0.001	84.00	3.2	AP42 1.4-1 & 1.4-2, Pb and NH3 WebFIRE (08/2018)	7/98 and 9/18	<a href="https://www3.epa.gov/ttn/chie1/ap42/ch03/final/c03s10.pdf">https://www3.epa.gov/ttn/chie1/ap42/ch03/final/c03s10.pdf</a>
Combustion Flare (no smoke)	lbs/MMscf		0.57	71.40	35.93	N/A	325.5	N/A	AP42 13.5-1, 13.5-2	2/18	
Combustion Flare (light smoke)	lbs/MMscf		0.57	71.40	35.93	N/A	325.5	N/A	AP42 13.5-1, 13.5-2	2/18	
Combustion Flare (medium smoke)	lbs/MMscf		0.57	71.40	35.93	N/A	325.5	N/A	AP42 13.5-1, 13.5-2	2/18	<a href="https://www3.epa.gov/ttn/chie1/ap42/ch03/final/c03s11.pdf">https://www3.epa.gov/ttn/chie1/ap42/ch03/final/c03s11.pdf</a>
Combustion Flare (heavy smoke)	lbs/MMscf		0.57	71.40	35.93	N/A	325.5	N/A	AP42 13.5-1, 13.5-2	2/18	
Liquid Flaring	lbs/bbl	0.42	5.964	0.84	0.01428	5.14E-05	0.21	0.0336	AP42 1.3-1 through 1.3-3 and 1.3-5	9/10	<a href="https://www3.epa.gov/ttn/chie1/ap42/ch03/final/c03s12.pdf">https://www3.epa.gov/ttn/chie1/ap42/ch03/final/c03s12.pdf</a>
Storage Tank	tons/yr/tank				3.921				2014 Gulfwide Inventory, Avg. emiss (upper bound of 95% CI)	2017	<a href="https://www.boem.gov/environmental-studies/2014-gulfwide-e">https://www.boem.gov/environmental-studies/2014-gulfwide-e</a>
Fugitives	lbs/hr/component				0.0005				API Study	12/93	<a href="https://www.aip.org/">https://www.aip.org/</a>
Glycol Dehydrator	tons/yr/dehydrator				16.706				2011 Gulfwide Inventory, Avg. emiss (upper bound of 95% CI)	2014	<a href="https://www.boem.gov/environmental-studies/2011-gulfwide-e">https://www.boem.gov/environmental-studies/2011-gulfwide-e</a>
Cold Vent	tons/yr/vent				44.646				2014 Gulfwide Inventory, Avg. emiss (upper bound of 95% CI)	2017	<a href="https://www.boem.gov/environmental-studies/2014-gulfwide-e">https://www.boem.gov/environmental-studies/2014-gulfwide-e</a>
Noise Incinerator	lb/hr		2.500	2.000	N/A	N/A	20.000	N/A	AP-42 2.1-12	10/96	<a href="https://www3.epa.gov/ttn/chie1/ap42/ch02/final/c02s01.pdf">https://www3.epa.gov/ttn/chie1/ap42/ch02/final/c02s01.pdf</a>
On-Ice – Loader	lbs/gal		0.040	0.604	0.049	N/A	0.130	0.003	USEPA NONROAD2008 model	2009	
On-Ice – Other Construction Equipment	lbs/gal		0.040	0.604	0.049	N/A	0.130	0.003	USEPA NONROAD2008 model	2009	
On-Ice – Other Survey Equipment	lbs/gal		0.040	0.604	0.049	N/A	0.130	0.003	USEPA NONROAD2008 model	2009	
On-Ice – Tractor	lbs/gal		0.040	0.604	0.049	N/A	0.130	0.003	USEPA NONROAD2008 model	2009	<a href="https://www.epa.gov/moves/nonroad2008a-installation-and-updates">https://www.epa.gov/moves/nonroad2008a-installation-and-updates</a>
On-Ice – Truck (for gravel island)	lbs/gal		0.040	0.604	0.049	N/A	0.130	0.003	USEPA NONROAD2008 model	2009	
On-Ice – Truck (for surveys)	lbs/gal		0.040	0.604	0.049	N/A	0.130	0.003	USEPA NONROAD2008 model	2009	
Man Camp - Operation (max people/day)	tons/person/day		0.0004	0.006	0.001	N/A	0.001	N/A	BOEM 2014_1001	2014	<a href="https://www.boem.gov/sites/default/files/uploadedFiles/BOEM/BOEM_Newsro">https://www.boem.gov/sites/default/files/uploadedFiles/BOEM/BOEM_Newsro</a>
Vessels - Ice Management Diesel	g/kW-hr		0.006	13.360	0.141	N/A	2.480	0.001	USEPA NEI 2014	2018	<a href="https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inve">https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inve</a>
Vessels - Hovercraft Diesel	g/kW-hr		0.006	13.360	0.141	N/A	2.480	0.001	USEPA NEI 2014	2018	<a href="https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inve">https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inve</a>

Sulphur Content Source	Value	Units
Fuel Gas	3.38	ppm
Diesel Fuel	0.0015	% weight
Produced Gas (Flare)	3.38	ppm
Produced Oil (Liquid Flaring)	1	% weight

Density and Heat Value of Diesel Fuel	
Density	7.65 lbs/gal
Heat Value	19,300 Btu/lb
Heat Value of Natural Gas	
Heat Value	1,050 MMBtu/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					
	PM	SOx	NOx	VOC	Pb	CO
2020	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
2022	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
2024	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
2026	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
2028	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
Allowable	0.00	0.00	0.00	0.00		0.00