

**AT&T - CHINA-US CABLE NETWORK DECOMMISSIONING PROJECT
 CRITERIA POLLUTANTS & GREENHOUSE GAS EMISSIONS
 TABLE 1: EMISSIONS SUMMARY**

Source	Peak Day Emissions, lbs/day										Project Emissions, tons/yr										
	Criteria Pollutants						Green House Gases				Criteria Pollutants						Green House Gases			MTCO ₂ e	
	NO _x	ROG	PM ₁₀	PM _{2.5}	DPM	CO	SO ₂	N ₂ O	CH ₄	CO ₂	NO _x	ROG	PM ₁₀	PM _{2.5}	DPM	CO	SO ₂	N ₂ O	CH ₄		CO ₂
Cable Removal	282.15	19.28	7.82	7.82	2.74	273.74	22.27	0.47	2.23	24,645.6	1.591	0.070	0.042	0.042	0.016	0.645	0.134	0.003	0.012	138.142	126.295
Peak Day within San Luis Obispo County	282.15	19.28	7.82	7.82	2.74	273.74	22.27	0.47	2.23	24,645.6	-	-	-	-	-	-	-	-	-	-	-
Total Annual Emissions within San Luis Obispo County											1.591	0.070	0.042	0.042	0.016	0.645	0.134	0.003	0.012	138.142	126.295
GHG - MTCO₂e conversions																		298	25	1	-
Total MTCO₂e, tons/yr																		126.3			

Notes:

- EPA Emission Factors for Greenhouse Gas Inventories (298 for N₂O, 25 for CH₄, and 1 for CO₂, April 2014, Table 9- Global Warming Potentials (GWPs) - http://www.epa.gov/sites/production/files/2015-07/documents/emission-factors_2014.pdf

NO_x - Oxides of Nitrogen

ROG - Reactive Organic Gases

PM_{2.5} - Particulate Matter 2.5 Microns or Less

PM₁₀ - Particulate Matter 10 Microns or Less

DPM - Diesel Particulate Matter

CO - carbon monoxide

SO₂ - Sulfur Dioxide

N₂O - Nitrous Oxide

CH₄ - Methane

CO₂ - Carbon Dioxide

MTCO₂e - million metric tons of carbon dioxide equivalent

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 TABLE 2: CABLE REMOVAL**

ON AND OFFSHORE SOURCES

Source	BHP	Load Factor	Number	Hours/Day	Duration (days)	Emission Factors (g/bhp-hr) ¹									Emissions (lb/day)									Total Emissions (tons)											
						Criteria Pollutants					Green House Gases				Criteria Pollutants					Green House Gases				Criteria Pollutants					Green House Gases						
						NO _x	ROG	PM ₁₀	PM _{2.5}	DPM	CO	SO ₂	N ₂ O	CH ₄	CO ₂	NO _x	ROG	PM ₁₀	PM _{2.5}	DPM	CO	SO ₂	N ₂ O	CH ₄	CO ₂	NO _x	ROG	PM ₁₀	PM _{2.5}	DPM	CO	SO ₂	N ₂ O	CH ₄	CO ₂
Backhoe	105	55	1	12	3	3.874	0.576	0.278	0.278	0.010	3.800	0.006	0.004	0.051	568.3	5.92	0.880	0.425	0.425	0.015	5.806	0.009	0.006	0.078	868.2	0.009	0.001	0.001	0.001	0.000	0.009	0.000	0.00001	0.00012	1.302
Cat Generator	482	74	1	24	12	4.900	0.239	0.084	0.084	0.010	1.400	0.005	0.004	0.021	568.3	92.47	4.510	1.585	1.585	0.189	26.42	0.094	0.079	0.396	10,725	0.555	0.027	0.010	0.010	0.001	0.159	0.001	0.00048	0.00238	64.350
Compressor (LP)	47	48	1	12	3	5.023	0.809	0.289	0.289	0.010	3.622	0.008	0.004	0.073	568.3	3.00	0.483	0.172	0.172	0.006	2.162	0.005	0.0025	0.044	339.2	0.004	0.001	0.000	0.000	0.003	0.000	0.00000	0.00007	0.509	
Outboard Motor	60	43	2	12	3	5.440	5.820	0.060	0.060	0.000	152.25	0.000	0.661	1.923	437.5	7.43	7.945	0.082	0.082	0.000	207.83	0.000	0.035	0.102	23.1	0.011	0.012	0.000	0.000	0.000	0.312	0.000	0.00005	0.00015	0.035
Vessel Engine (M/V Layla)	1004	43	1	24	12	7.311	0.201	0.224	0.224	0.110	1.119	0.970	0.015	0.067	514.7	167.00	4.601	5.112	5.112	2.512	25.56	22.153	0.341	1.534	11,758	1.002	0.028	0.031	0.031	0.015	0.153	0.133	0.00204	0.00920	70.548
Winch	100	62	1	12	3	3.862	0.524	0.269	0.269	0.010	3.634	0.006	0.004	0.047	568.3	6.33	0.859	0.441	0.441	0.016	5.961	0.010	0.007	0.077	932.1	0.010	0.001	0.001	0.001	0.000	0.009	0.000	0.00001	0.00012	1.398
Total																282.15	19.278	7.818	7.818	2.739	273.74	22.271	0.471	2.230	24,646	1.591	0.070	0.042	0.042	0.016	0.645	0.134	0.003	0.01203	138.14

Notes:
¹ - ROG, N₂O, CH₄ and CO₂ emissions factors for outboard motors are in g/hr.
 - g/bhp-hr was converted to lb/bhp-hr by the following conversion 1 gram = 0.0022046 lb.
 - Hours per day and durations provided by Project Applicant.

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 TABLE 3: EMISSION FACTORS AND ASSUMPTIONS**

ON AND OFFSHORE SOURCES

Source ²	Operational Horsepower	Load Factor	Emission Factors, g/bhp-hr ¹									
			Criteria Pollutants ^{3,4}							Green House Gases		
			NO _x	ROG	PM ₁₀	PM _{2.5}	DPM	CO	SO ₂	N ₂ O	CH ₄	CO ₂
Backhoe	105	55	3.874	0.576	0.278	0.278	0.010	3.800	0.006	0.0042	0.051	568.3
Cat Generator	482	74	4.900	0.239	0.084	0.084	0.010	1.400	0.005	0.0042	0.021	568.3
Compressor (LP)	47	48	5.023	0.809	0.289	0.289	0.010	3.622	0.008	0.0042	0.073	568.3
Outboard Motor	60	43	5.440	5.820	0.060	0.060	0.000	152.250	0.000	0.6609	1.9227	437.5
Vessel Engine (M/V Layla)	1004	43	7.311	0.201	0.224	0.224	0.110	1.119	0.970	0.0149	0.067	514.7
Winch	100	62	3.862	0.524	0.269	0.269	0.010	3.634	0.006	0.0042	0.047	568.3

Notes:

- 1 - N₂O, CH₄ and CO₂ emissions factors for outboard motors are in g/hr.
- 2 - Outboard motor is gasoline fired.
- 3 - No DPM emission factor for the gasoline fired outboard motor.
- 4 - No SO₂ emissions factor was available for the outboard motor.
- Equipment list and engine size provided by Project Applicant. HP were adjusted whenever data was available for the size of the equipment provided by the applicant.
- CH₄ and CO₂ emission factors for construction equipment were obtained from *CalEEMod Appendix D- Default Data Tables, Table 3.4 using 2016 as the base year.*
- N₂O emission factors for construction equipment were obtained from *40 CFR Part 98 Table C-2.* Kg/mmmbtu was converted to kg/bhp-hr using a diesel energy density of 7000 btu/hp-hr.
- CH₄ and N₂O emission factors for outboard motors were obtained from *EPA Emission Factors for GHG Inventories, updated 4 April 2014, Table 5: Mobile Combustion CH₄ and N₂O Emission Factors for Non-Road Vehicles.*
- CO₂ emission factor for outboard motors was obtained from *40 CFR Appendix Table C-1 to Subpart C of Part 98.* Utilizing a gasoline energy density of 6,230 btu/hr, CO₂ emission factor is 437.5 g/hr.
- Emission factors for M/V Layla were obtained from *ICF International report to the US EPA "Current Methodologies in Preparing Mobile Source Port-Related Emissions Inventories", April 2009.* Emission factor for VOCs used for ROG.
- NO_x, ROG, CO, PM_{2.5} and PM₁₀ emission factors for outboard motors were obtained and/or estimated based on *EPA Exhaust Emission Factors for Nonroad Engine Modeling - Spark Ignition, July 2010*
- NO_x and CO emission factors for the CAT Generator were obtained from Technical Specification Sheet for C13 Acert Generator, 2016.
- Construction equipment load factors were obtained from *CalEEMod Appendix D- Default Data Tables, Table 3.3.*
- M/V Layla criteria pollutants and GHG emission factors were obtained from *ICF International report to the US EPA "Current Methodologies in Preparing Mobile Source Port-Related Emissions Inventories", April 2009.*
- Emission factors for M/V Layla were converted from g/kW-hr to g/bhp-hr by application of the following conversion 1 kw = 1.341 bhp.
- DPM emission factors were derived from the Port of Los Angeles 2013 Air Emissions Inventory

Assumptions:

Winch - classified as "other construction equipment" (CalEEMod)