

Appendix H

Climate Change/Greenhouse Gas Emissions
Supporting Information

Crude Oil Production Potential (Energy Produced for End Use)

Proposed Project @ 10,000 bopd

	10,000 bbl/day (peak)	Crude Oil Heating Value (LHV), from OPGEE v1.1e Fuel Specs Table 1.1
	365 day/yr	6,324 MJ/bbl (API 12)
Crude Production		
By volume (barrels)	3,650,000 bbl per year	By heat content (mega-Joules) 2.308E+10 MJ per year
By volume (million barrels)	3.650 MMbbl per year	By heat content (tera-Joules) 2.308E+04 TJ per year
By volume (gallons)	153,300,000 gal per year	
		Crude Oil (Default High Heat Value, HHV), from 40 CFR Part 98, Subpart C Table C-1
		0.138 MMBtu/gallon
		By heat content (million Btu) 21,155,400 MMBtu per year
		By heat content (tera-Joules) 2.232E+04 TJ per year

GHG Typical via Production & Transport (ARB CI basis)

GHG via Production & Transport

Source: ARB 2016c, Carbon Intensity (CI) data for typical Cat Canyon; not project-specific.)

Baseline 3-yr Regional CI Est'd (g/MJ) x Crude Production (MJ per year)

5.09 CI (gCO₂e/MJ)

Typical (Production & Transport)

259,028,069 CO₂e (lb/yr)

117,495 CO₂e (MT/yr)

GHG Emitted via End Use of Crude Oil

GHG Indirect Emissions due to End Use

CO₂ Emission Factor x Crude Production (by volume or by heat content)

CO₂ Emission Factor (EPA, 2017)

74.54 kg CO₂/MMBtu (EPA, 2017)

70.65 MTCO₂/TJ

3,476,485,583 CO₂ (lb/yr)

1,576,924 CO₂ (MT/yr)

Include CH₄ & N₂O (EPA, 2017)

25 GWP CH₄

3.00E-03 kg CH₄/MMBtu (EPA, 2017)

63.47 CH₄ (MT/yr)

1587 CO₂e (MT/yr)

298 GWP N₂O

6.00E-04 kg N₂O/MMBtu (EPA, 2017)

12.69 N₂O (MT/yr)

3783 CO₂e (MT/yr)

Result (End Use)

1,582,293 CO₂e (MT/yr)

Ref: U.S. EPA, 2017. Mandatory Greenhouse Gas Reporting Regulation. 40 CFR Part 98, Subpart C, Table C-1. (Default HHV, CO₂ factors)

40 CFR Part 98, Subpart C, Table C-2. (Default CH₄, N₂O); Subpart A, Table A-1 (GWPs)

http://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=fbd64b2188110b00aaa829eed7718d5d&mc=true&n=sp40.23.98.c&r=SUBPART&ty=HTML#ap40.23.98_138.1