

Appendix G

Greenhouse Gases

Big Eddy- Knight CO₂ Emissions for 6 months of Transmission Line Construction

Note: Only Vehicle round trips/day or 6 months and distance need to be changed to calculate emissions

CO₂				
Vehicle round trips/day	Distance (miles)	Miles/ 6 months	Gallons/year*	CO₂ Emissions in Metric tons CO₂/year**
16	80	233,600	40,276	409

*Gallons/year is calculated using a fuel economy factor of 5.8 mpg for heavy trucks (more than 26,000 lbs)

**CO₂ Emission Factor for Diesel Fuel No 1 and 2 = 10.15 kg CO₂/gallon

CH₄					
Vehicle round trips/day	Distance (miles)	Miles/year	Gallons/mile*	CH₄ Emissions in Metric tons	CO₂e Emissions in Metric tons/year**
16	80	233,600	1,191	0.001	0.03

*Gallons/mile is calculated using a CH₄ emission factor of 0.0051 g/mi for all model years of diesel heavy-duty vehicles

**CO₂ equivalent conversion factor for CH₄ is 21 GWP

NO₂					
Vehicle round trips/day	Distance (miles)	Miles/year	Gallons/mile*	CH₄ Emissions in Metric tons	CO₂e Emissions in Metric tons/year**
16	80	233,600	1,121	0.001	0.35
				Total CO₂ Emissions over one year of transmission line construction in metric tons/year	409.38

*Gallons/mile is calculated using a NO₂ emission factor of 0.0048 g/mi for all model years of diesel heavy-duty vehicles

**CO₂ equivalent conversion factor for NO₂ is 310 GWP

Big Eddy- Knight CO2 Emissions for 6 months for Operations and Maintenance

CO₂				
Vehicle round trips/year	Distance (miles)	Miles/year	Gallons/year*	CO₂ Emissions in Metric tons CO₂/year**
3	80	240	30	0.3
Helicopter round trips/year	Distance (miles)	Miles/year	Gallons/year***	CO₂ Emissions in Metric tons CO₂/year****
2	60	120	44	0.4
			Total CO₂	0.7

*Gallons/year is calculated using a fuel economy factor of 8.0 mpg for medium trucks (more than 26,000 lbs)

**CO₂ Emission Factor for Motor gasoline = 8.81 kg CO₂/gallon

***Gallons/year is calculated using a fuel economy factor of 2.7 mpg (2.35 Nautical Miles/g) for a helicopter

****CO₂ Emission Factor for Aviation gasoline = 8.32 kg CO₂/gallon

CH₄					
Vehicle round trips/year	Distance (miles)	Miles/year	Gallons/mile*	CH₄ Emissions in Metric tons	CO₂e Emissions in Metric tons/year**
3	80	240	0.24	0.000000	0.000005
Helicopter round trips/year	Distance (miles)	Gallons/year***	Grams/year****	CH₄ Emissions in Metric tons	CO₂e Emissions in Metric tons/year**
2	60	44	313	0.0000	0.001
				Total CH₄	0.001005

*Gallons/mile is calculated using a CH₄ emission factor of 0.0010 g/mi for model years 1996-2004 diesel light trucks

**CO₂ equivalent conversion factor for CH₄ is 21 GWP

***Gallons used per year = miles per year/2.7 mpg for helicopter

****Grams/year is calculated using an emission factor of 7.04 grams/gallon fuel for aviation gasoline.

N₂O					
Vehicle round trips/year	Distance (miles)	Miles/year	Gallons/mile*	N₂O Emissions in Metric tons	CO₂e Emissions in Metric tons/year**
3	160	480	0.72	0.000001	0.0002
Helicopter round trips/year	Distance (miles)	Gallons/year***	Grams/year****	N₂O Emissions in Metric tons	CO₂e Emissions in Metric tons/year**
2	130	96	11	0.00010	0.030
				Total N₂O	0.0302
				Total CO₂ Emissions over one year of transmission line operation and maintenance in metric tons/year	0.7312

*Gallons/mile is calculated using a N₂O emission factor of 0.0015 g/mi for model years 1996-2004 diesel light trucks

**CO₂ equivalent conversion factor for NO₂ is 310 GWP

***Gallons used per year = miles per year/2.7 mpg for helicopter

****Grams/year is calculated using an emission factor of 0.11 grams/gallon fuel for aviation gasoline.

The following table is a summary of unit conversions and assumptions required to calculate CO₂ emissions associated with tree harvesting.

Coefficient	Unit	Source
300	Horse power	Assumed
2,545	(British thermal unit/hour)/horse power	---
2	hours/tree	Assumed
138,000	BTU/gallon-diesel	EPA 2005
10.1	kg-CO ₂ -equiv/gallon-diesel	EPA 2005
35%	Efficiency	Assumed