

1.0 INTRODUCTION

Rover Pipeline LLC (Rover) is seeking authorization from the Federal Energy Regulatory Commission (FERC or Commission) pursuant to Section 7(c) of the Natural Gas Act to construct, own, and operate the proposed Rover Pipeline Project (Project). The Rover Pipeline Project is a new natural gas pipeline system that will consist of approximately 711.2 miles of Supply Laterals and Mainlines, 10 compressor stations (CS), and associated meter stations (MS), and other aboveground facilities that will be located in parts of West Virginia (WV), Pennsylvania (PA), Ohio (OH), and Michigan (MI). The Project will include approximately 509.1 miles of proposed right-of-way, extending from the vicinity of New Milton, Doddridge County, WV to the vicinity of Howell, Livingston County, MI, and will include approximately 202.1 miles of dual pipelines.

2.0 REGULATORY BACKGROUND AND REQUIREMENTS

The General Conformity Rule is codified in Title 40 of the Code of Federal Regulations (CFR) Part 51, Subpart W and Part 93, Subpart B, “Determining Conformity of General Federal Actions to State or Federal Implementation Plans” (General Conformity Rule). The General Conformity Rule applies to all federal actions, except programs and projects that require funds or approval from the United States (U.S.) Department of Transportation (USDOT), the Federal Highway Administration, the Federal Transit Administration, or the Metropolitan Planning Organization.

As defined in the Clean Air Act (CAA), Title I, section 176(c)(1), conformity means to uphold air quality goals through reduction or elimination of National Ambient Air Quality Standards (NAAQS) violations to achieve attainment with NAAQS. Accordingly, a proposed action or activity achieves conformity if the associated air pollutant emissions would not:

- cause or contribute to any new violation of any NAAQS in any area;
- increase the frequency or severity of any existing violation of any NAAQS in any area; or
- delay timely attainment of any NAAQS, required interim emission reductions, or other milestones in any area.

The process to determine conformity for a proposed action involves two steps; applicability and determination. Applicability is an assessment of whether a proposed action is subject to the General Conformity Rule. An applicability assessment must be conducted for projects that meet the criteria of a “federal action” per Title 40 CFR 93.152. FERC is the lead agency responsible for authorizing applications to construct and operate interstate natural gas transmission facilities. The Project is considered a “federal action” and the FERC is the lead agency responsible for making the conformity determination.

As required under the General Conformity Rule, an applicability evaluation is conducted for the Project to determine if the total direct and indirect emissions for criteria pollutants in a non-attainment or maintenance area exceed the rates specified in Title 40 CFR 58.853(b)(1) and (2). If emissions exceed these rates, or if the emissions are determined to be regionally significant, then a general conformity determination is required.

Title 40 CFR 93.152(c) and (d) list actions which are exempt from General Conformity. The list is extensive, and includes actions where the emissions are not readily foreseeable, the portion of an action that includes major or minor new or modified stationary sources that require a permit under the New Source Review (NSR) or the Prevention of Significant Deterioration program, and actions in response to

emergencies which commence within hours or days after the emergency. A proposed action is considered regionally significant if the total nonexempt direct and indirect emissions for a criteria pollutant under consideration (i.e., a pollutant for which the area is classified as nonattainment or maintenance) or its precursor pollutants represent 10 percent or more of a nonattainment or maintenance area emissions inventory for that pollutant. As such, estimated emissions for the Project subject to review under the General Conformity thresholds are those associated with construction emissions or operational emissions not subject to major or minor NSR permitting.

If the General Conformity Rule is applicable for a proposed action, then a General Conformity Determination may be required. The determination process is an assessment of whether the proposed action conforms to the applicable state implementation plan (SIP). Positive conformity can be shown through State emission budgets, emission offsets, air quality models, or a combination of these.

3.0 APPLICABILITY

The conformity applicability thresholds apply to each air quality control region (AQCR) or designated portion thereof within the non-attainment or maintenance area. Pollutants of particular concern in these areas are ozone, particulate matter with an aerodynamic diameter no greater than 2.5 microns (PM_{2.5}), particulate matter with an aerodynamic diameter no greater than 10 microns (PM₁₀), sulfur dioxide (SO₂), and their precursors [nitrogen oxides (NO_x) and volatile organic compounds (VOC)]¹. General Conformity assessments must be completed when the total direct and indirect emissions of a project would equal or exceed specified pollutant thresholds on a calendar year basis for each nonattainment or maintenance area.

With respect to the Project, the relevant general conformity pollutant thresholds are listed in Table 3-1. The thresholds in Table 3-1 are based on the current air quality designations (e.g., serious nonattainment, moderate nonattainment, maintenance) for each county within each AQCR in tpy (tons per year).

Air Quality Control Region	Pollutant/ Status	Applicability Threshold	County, State	Project Components
Steubenville-Weirton-Wheeling Interstate AQCR	O ₃ / Maintenance	100 tpy of NO _x or VOC	Belmont Co, OH	Clarington Lateral Majorsville Lateral
			Marshall Co, WV	Majorsville Lateral Majorsville CS Majorsville Receipt MS
			Jefferson Co, OH	Burgettstown Lateral
	PM _{2.5} / Maintenance	100 tpy of PM _{2.5} , SO ₂ , or NO _x	Belmont Co, OH	Clarington Lateral Majorsville Lateral
			Marshall Co, WV	Majorsville Lateral Majorsville CS Majorsville Receipt MS
			Jefferson Co, OH	Burgettstown Lateral

¹ Depending on the context, SO₂ is evaluated either directly as a criteria pollutant or a PM_{2.5} precursor.

TABLE 3-1 Nonattainment and Maintenance Areas Crossed by the Project				
Air Quality Control Region	Pollutant/ Status	Applicability Threshold	County, State	Project Components
Steubenville-Weirton-Wheeling Interstate AQCR (cont'd)	PM ₁₀ / Maintenance	100 tpy of PM ₁₀	Jefferson Co, OH	Burgettstown Lateral
	SO ₂ / Nonattainment	100 tpy of SO ₂	Jefferson Co, OH	Burgettstown Lateral
			Marshall Co, WV	Majorsville Lateral Majorsville CS Majorsville Receipt MS
Greater Metropolitan Cleveland Intrastate AQCR	O ₃ / Maintenance	100 tpy of NO _x or VOC	Stark Co, OH	Mainlines A & B
	PM _{2.5} / Maintenance	100 tpy of PM _{2.5} , SO ₂ , or NO _x		
Metropolitan Toledo Interstate AQCR	O ₃ / Maintenance	100 tpy of NO _x or VOC	Wood Co, OH	Mainlines A & B,
Southwest Pennsylvania Intrastate AQCR	O ₃ / Marginal Nonattainment (2008)	100 tpy of NO _x or 50 tpy of VOC	Washington Co, PA	Burgettstown Lateral Burgettstown CS Burgettstown Receipt MS
	PM _{2.5} / Nonattainment	100 tpy of PM _{2.5} , SO ₂ , or NO _x		
South Central Michigan Intrastate AQCR	O ₃ / Maintenance	100 tpy of NO _x or VOC	Lenawee Co, MI	Market Mainline
			Washtenaw Co, MI	Market Segment Consumer Energy Deliver MS
			Livingston Co, MI	Market Segment Vector Deliver MS
	PM _{2.5} / Maintenance	100 tpy of PM _{2.5} , SO ₂ , or NO _x	Washtenaw Co, MI	Market Segment Consumer Energy Deliver MS
			Livingston Co, MI	Market Segment Vector Deliver MS

4.0 ASSESSMENT OF THE PROJECT EMISSIONS

In February 2015, Rover provided estimated construction emissions for the Project based on preliminary, conservative assumptions on equipment and construction personnel for each project component (e.g., lateral, mainline, compressor station). The resulting emissions were ratioed to provide an estimate of each pollutant by county. Assumptions used in developing these estimates included the following:

- Emission estimates were based on “general pipeline construction project” assumptions (a generic template with worst-case default assumptions on work force, quantities of equipment in different categories and their utilization, and default equipment fleet average emission factors. These assumptions were made because Rover had not identified or hired its construction contractors, nor had Rover determined its construction plan at the time of the filing. Rover has since hired its contractors, all of which are all top-tier contractors, utilizing the most modern and efficient equipment fleet as well as the most highly trained professionals in the pipeline construction business, which greatly reduces the potential air emissions resulting from the Project.

- The equipment used for construction of dual pipelines (i.e., Mainlines A and B) were double-counted, because it was assumed that an entire fleet of equipment would be used for each mainline. However, the revised construction plan will entail the same equipment being used first to install Mainline A, and then Mainline B, therefore reducing the total number of pieces of equipment and the duration of use for each piece.
- The construction emissions associated with the construction of a pipeline would be proportional to the length of pipeline in that county, unless there are specific reasons to do otherwise. Therefore, the revised emissions are reflective of the estimated duration each piece of equipment will actually be working to accomplish the construction based upon the site-specific conditions, actual type of equipment, and the rate of progress. For example, in agricultural areas, the rate of progress is estimated to be 6,352 feet installed per day, as compared to rough or steep topography which is estimated to be 3,750 feet per day. Therefore, the equipment operating in rough topographic conditions will be utilized for longer durations as compared to the agricultural areas, where construction will progress at a more rapid pace. These emissions are then summed within the county affected or region to determine the effect on General Conformity.
- Since the first emissions estimates were provided, Rover has retained construction contractors for the Project. These contractors have provided Project-specific estimates of equipment counts and utilization, construction personnel, materials, and construction schedules. In general, based upon the selected contractors' projections, the majority of the equipment will be U.S. Environmental Protection Agency (USEPA) Tier 3, interim Tier 4, or final Tier 4 compliant equipment, and as a standard practice, all equipment will be operated and maintained in accordance with manufacturers' requirements and industry best practices.

Fugitive dust would result from land clearing, grading, excavation, and vehicle traffic on unpaved roads. The amount of dust generated would be a function of construction activity, soil type, soil moisture content, wind speed, precipitation, vehicle traffic, vehicle types, and roadway characteristics. Emissions would be greater during dry periods and in areas of fine-textured soils subject to surface activity. Since the Project is located in one of the wettest regions of the U.S. and the Project will be constructed in the seasons when precipitation is anticipated, dust emissions are not anticipated to be a major contributor to the regional or site-specific air quality degradation. Additionally, when looking at the soil types across the Project region (See Figure 1. Soil Texture Class), the majority of the soils crossed are loams, with most having some level of sandy loam texture. These soils would generate less dust compared to silts and clays. Therefore, Rover does not anticipate an issue with dust emissions. If an abnormally dry period occurs where excess dust would be generated during construction, Rover would implement the following measures to control fugitive dust during Project construction, especially in sensitive areas such as road crossings, residences, and nonattainment areas:

- minimizing the generation of fugitive dust by:
 - watering or applying other dust suppressants to the construction workspace and access roads,
 - providing measures to limit track-out onto the roads (e.g. gravel entrances road cleanup),
 - maintaining a speed limit of 5 miles per hour (mph) on unsurfaced roads, and
- providing authority to construction inspectors to direct dust mitigation measures and stop work until dust control measures are installed; and
- establishing monitoring for PM₁₀ and recordkeeping of dust control as implemented.

Estimated emissions for the Project subject to review for General Conformity, along with a comparison to the applicable General Conformity threshold are presented in Table 4-1.

TABLE 4-1				
Comparison of Emissions Subject to General Conformity Review to Applicability Thresholds				
Nonattainment or Maintenance Areas	County, State	Pollutant/	Applicability Threshold (tpy)	Nonexempt Emissions (tpy)
<i>Steubenville-Weirton-Wheeling Interstate AQCR</i>				
Wheeling, WV-OH	Belmont Co, OH Marshall Co, WV	NO _x	100	46.51
		VOC	100	42.02
		PM _{2.5}	100	13.84
		SO ₂	100	1.95
Steubenville-Weirton, OH-WV	Jefferson Co, OH	NO _x	100	30.34
		VOC	100	10.54
		PM _{2.5}	100	5.11
		PM ₁₀	100	0.27
		SO ₂	100	46.51
<i>Greater Metropolitan Cleveland Intrastate AQCR</i>				
Canton-Massillon, OH	Stark Co, OH	NO _x	100	13.52
		VOC	100	13.28
		PM _{2.5}	100	3.66
		SO ₂	100	0.11
<i>Metropolitan Toledo Interstate Air Quality Control Region</i>				
Toledo, OH	Wood Co, OH	NO _x	100	3.60
		VOC	100	3.84
<i>Southwest Pennsylvania Intrastate AQCR</i>				
Pittsburgh-Beaver Valley, PA	Washington Co, PA	NO _x	100	24.47
		VOC	50	8.63
		PM _{2.5}	100	4.62
		SO ₂	100	1.57
<i>South Central Michigan Intrastate AQCR</i>				
Detroit-Ann Arbor, MI	Lenawee Co, MI Washtenaw Co, MI Livingston Co, MI	NO _x	100	16.53
		VOC	100	14.93
		PM _{2.5}	100	14.59
		SO ₂	100	0.55

As shown in Table 4-1, during all years of construction, emission estimates would not exceed General Conformity applicability thresholds. Based upon this evaluation, a General Conformity assessment is not required. If the schedule for construction should change, or modifications to the Project would result in emissions that would exceed the general conformity applicability thresholds in one calendar year, Rover will provide updated emissions estimates to determine if a General Conformity Determination is required at that time.

Backup calculations are provided in Appendix A.



Appendix A

Detailed Emissions Calculations

**Table 9A-21
Rover Construction Emissions - Summary**

Pipelines	Criteria Pollutant (tpy)						
	NOx (tons)	VOC (tons)	CO (tons)	SO2 (tons)	PM10 (tons)	PM2.5 (tons)	CO _{2e} (tons)
Spread 1 & 2 - Mainline A & B Pipeline - Shehan							
Construction Activities Fugitive Dust Emissions	--	--	--	--	130.4	13.0	--
Travel on Unpaved Roads Fugitive Dust Emissions	--	--	--	--	29.2	2.9	--
Construction Equipment Tailpipe Emissions	59.5	45.6	517.2	0.6	7.6	7.6	47,008.9
On-Road Tailpipe Emissions - Commuter and Truck	5.6	5.4	51.3	0.0	0.5	0.4	2,499.6
Spread 1 & 2 Mainline A & B - Emission Totals	65.1	51.0	568.5	0.6	167.6	24.0	49,508.4
Spread 3 - Mainline A & B Pipeline - US Pipeline							
Construction Activities Fugitive Dust Emissions	--	--	--	--	122.6	12.3	--
Travel on Unpaved Roads Fugitive Dust Emissions	--	--	--	--	23.2	2.3	--
Construction Equipment Tailpipe Emissions	71.5	73.7	460.2	0.6	3.9	3.9	39,208.8
On-Road Tailpipe Emissions - Commuter and Truck	3.8	3.6	34.6	0.0	0.3	0.3	1,673.7
Spread 3 Mainline A & B - Emission Totals	75.3	77.3	494.8	0.6	150.0	18.7	40,882.4
Spread 4 - Mainline A & B Pipeline - Michels							
Construction Activities Fugitive Dust Emissions	--	--	--	--	166.5	16.6	--
Travel on Unpaved Roads Fugitive Dust Emissions	--	--	--	--	30.1	3.0	--
Construction Equipment Tailpipe Emissions	115.7	36.4	690.2	1.0	5.2	5.2	56,940.2
On-Road Tailpipe Emissions - Commuter and Truck	6.2	7.0	68.5	0.1	0.6	0.6	2,835.8
Spread 4 Mainline A & B - Emission Totals	121.9	43.3	758.7	1.1	202.4	25.4	59,776.0
Mainline A & B Pipeline - Spread 5 & 6 - Precision							
Construction Activities Fugitive Dust Emissions	--	--	--	--	255.1	25.5	--
Travel on Unpaved Roads Fugitive Dust Emissions	--	--	--	--	25.5	2.6	--
Construction Equipment Tailpipe Emissions	19.5	21.0	284.7	0.3	0.7	0.7	26,846.1
On-Road Tailpipe Emissions - Commuter and Truck	8.6	8.9	85.9	0.1	0.8	0.7	-
Spread 5 & 6 Mainline A & B - Emission Totals	28.0	29.9	370.7	0.4	282.2	29.5	26,846.1
Spread 7 & 8 - Market Segment Pipeline - Precision							
Construction Activities Fugitive Dust Emissions	--	--	--	--	163.9	16.4	--
Travel on Unpaved Roads Fugitive Dust Emissions	--	--	--	--	16.3	1.6	--
Construction Equipment Tailpipe Emissions	12.4	13.4	182.0	0.2	0.5	0.5	17,163.9
On-Road Tailpipe Emissions - Commuter and Truck	5.5	5.7	54.9	0.0	0.5	0.5	2,463.1
Spread 7 & 8 Market Segment - Emission Totals	17.9	19.1	236.9	0.2	181.2	19.0	19,626.9

Berne Lateral Pipeline - Precision							
Construction Activities Fugitive Dust Emissions	--	--	--	--	6.0	0.6	--
Travel on Unpaved Roads Fugitive Dust Emissions	--	--	--	--	1.0	0.1	--
Construction Equipment Tailpipe Emissions	0.8	0.8	11.6	0.0	0.0	0.0	1,068.4
On-Road Tailpipe Emissions - Commuter and Truck	0.3	0.3	3.3	0.0	0.0	0.0	148.4
Berne Lateral - Emission Totals	1.1	1.2	14.9	0.0	7.1	0.8	1,216.8
Majorsville Lateral - precision							
Construction Activities Fugitive Dust Emissions	--	--	--	--	38.6	3.9	--
Travel on Unpaved Roads Fugitive Dust Emissions	--	--	--	--	6.6	0.7	--
Construction Equipment Tailpipe Emissions	5.0	5.4	74.2	0.1	0.2	0.2	6,821.4
On-Road Tailpipe Emissions - Commuter and Truck	2.2	2.3	22.5	0.0	0.2	0.2	1,009.0
Majorsville Lateral - Emission Totals	7.2	7.7	96.6	0.1	45.6	4.9	7,830.3
Sherwood & CGT Lateral Pipeline - Precision							
Construction Activities Fugitive Dust Emissions	--	--	--	--	42.0	4.2	--
Travel on Unpaved Roads Fugitive Dust Emissions	--	--	--	--	15.9	1.6	--
Construction Equipment Tailpipe Emissions	12.3	13.3	183.2	0.2	0.5	0.5	16,847.9
On-Road Tailpipe Emissions - Commuter and Truck	5.4	5.6	54.2	0.0	0.5	0.5	2,433.4
Sherwood & CGT Lateral - Emission Totals	17.7	18.9	237.3	0.2	58.8	6.7	19,281.3
Burgettstown Lateral Pipeline - Michels							
Construction Activities Fugitive Dust Emissions	--	--	--	--	84.0	8.4	--
Travel on Unpaved Roads Fugitive Dust Emissions	--	--	--	--	21.4	2.1	--
Construction Equipment Tailpipe Emissions	82.5	25.9	492.1	0.7	3.7	3.7	40,599.4
On-Road Tailpipe Emissions - Commuter and Truck	4.0	4.1	39.8	0.0	0.4	0.3	1,786.5
Burgettstown Lateral - Emission Totals	86.5	30.0	531.9	0.8	109.5	14.6	42,385.8
Seneca Lateral Pipeline - Latex							
Construction Activities Fugitive Dust Emissions	--	--	--	--	42.0	4.2	--
Travel on Unpaved Roads Fugitive Dust Emissions	--	--	--	--	12.2	1.2	--
Construction Equipment Tailpipe Emissions	27.2	21.7	233.3	0.3	1.7	1.7	18,550.5
On-Road Tailpipe Emissions - Commuter and Truck	2.8	3.7	36.9	0.0	0.3	0.3	1,336.1
Seneca Lateral - Emission Totals	30.0	25.3	270.3	0.4	56.2	7.4	19,886.5
Clarington & Cadiz Laterals - US Pipeline							
Construction Activities Fugitive Dust Emissions	--	--	--	--	58.1	5.8	--
Travel on Unpaved Roads Fugitive Dust Emissions	--	--	--	--	15.6	1.6	--
Construction Equipment Tailpipe Emissions	42.2	43.3	261.2	0.3	2.3	2.3	22,486.4
On-Road Tailpipe Emissions - Commuter and Truck	2.7	2.2	19.9	0.0	0.2	0.2	1,141.2
Clarington & Cadiz Lateral - Emission Totals	44.9	45.5	281.0	0.4	76.2	9.8	23,627.5

Mainline Compressor Stations and Metering Stations

	Criteria Pollutant (tpy)						CO ₂ e (tons)
	NOx (tons)	VOC (tons)	CO (tons)	SO2 (tons)	PM10 (tons)	PM2.5 (tons)	
Mainline CS 1 Compressor Station							
Construction Activities Fugitive Dust Emissions	--	--	--	--	1.8	0.2	--
Travel on Unpaved Roads Fugitive Dust Emissions	--	--	--	--	15.5	1.5	--
Construction Equipment Tailpipe Emissions	5.7	0.8	26.9	1.6	0.7	0.7	2,791.3
On-Road Tailpipe Emissions - Commuter and Truck	4.2	3.6	33.3	0.0	0.3	0.3	1,863.7
Mainline CS 1 Compressor Station Emission Totals	9.9	4.4	60.2	1.6	18.3	2.7	4,654.9
Mainline CS 2 Compressor Station							
Construction Activities Fugitive Dust Emissions	--	--	--	--	1.5	0.1	--
Travel on Unpaved Roads Fugitive Dust Emissions	--	--	--	--	15.5	1.5	--
Construction Equipment Tailpipe Emissions	5.7	0.8	26.9	1.6	0.7	0.7	2,791.3
On-Road Tailpipe Emissions - Commuter and Truck	4.2	3.6	33.3	0.0	0.3	0.3	1,863.7
Mainline CS 2 Compressor Station Emission Totals	9.9	4.4	60.2	1.6	18.0	2.7	4,654.9
Mainline CS 3 Compressor Station							
Construction Activities Fugitive Dust Emissions	--	--	--	--	1.7	0.2	--
Travel on Unpaved Roads Fugitive Dust Emissions	--	--	--	--	15.5	1.5	--
Construction Equipment Tailpipe Emissions	5.7	0.8	26.9	1.6	0.7	0.7	2,791.3
On-Road Tailpipe Emissions - Commuter and Truck	4.2	3.6	33.3	0.0	0.3	0.3	1,863.7
Mainline CS 3 Compressor Station Emission Totals	9.9	4.4	60.2	1.6	18.3	2.7	4,654.9
Defiance Compressor Station							
Construction Activities Fugitive Dust Emissions	--	--	--	--	1.5	0.1	--
Travel on Unpaved Roads Fugitive Dust Emissions	--	--	--	--	15.5	1.5	--
Construction Equipment Tailpipe Emissions	5.7	0.8	26.9	1.6	0.7	0.7	2,791.3
On-Road Tailpipe Emissions - Commuter and Truck	4.2	3.6	33.3	0.0	0.3	0.3	1,863.7
Defiance Compressor Station Emission Totals	9.9	4.4	60.2	1.6	18.0	2.7	4,654.9
Stand-Alone Metering Stations							
Construction Activities Fugitive Dust Emissions	--	--	--	--	0.7	0.1	--
Travel on Unpaved Roads Fugitive Dust Emissions	--	--	--	--	13.9	1.4	--
Construction Equipment Tailpipe Emissions	5.1	0.7	24.2	1.4	0.7	0.6	2,512.1
On-Road Tailpipe Emissions - Commuter and Truck	2.0	1.8	16.5	0.0	0.2	0.1	876.1
Stand-Alone Metering Stations Emission Totals	7.1	2.5	40.7	1.4	15.4	2.3	3,388.3

Lateral Compressor Stations

	Criteria Pollutant (tpy)						
	NOx (tons)	VOC (tons)	CO (tons)	SO2 (tons)	PM10 (tons)	PM2.5 (tons)	CO _{2e} (tons)
Sherwood Compressor Station							
Construction Activities Fugitive Dust Emissions	--	--	--	--	3.1	0.3	--
Travel on Unpaved Roads Fugitive Dust Emissions	--	--	--	--	9.0	0.9	--
Construction Equipment Tailpipe Emissions	5.1	0.7	24.2	1.4	0.7	0.6	2,512.1
On-Road Tailpipe Emissions - Commuter and Truck	2.5	2.1	18.9	0.0	0.2	0.2	1,084.8
Sherwood Compressor Station Emission Totals	7.6	2.8	43.1	1.4	12.9	2.0	3,597.0
Seneca Compressor Station							
Construction Activities Fugitive Dust Emissions	--	--	--	--	1.3	0.1	--
Travel on Unpaved Roads Fugitive Dust Emissions	--	--	--	--	9.0	0.9	--
Construction Equipment Tailpipe Emissions	5.1	0.7	24.2	1.4	0.7	0.6	2,512.1
On-Road Tailpipe Emissions - Commuter and Truck	2.5	2.1	18.9	0.0	0.2	0.2	1,084.8
Seneca Compressor Station Emission Totals	7.6	2.8	43.1	1.4	11.2	1.8	3,597.0
Clarington Compressor Station							
Construction Activities Fugitive Dust Emissions	--	--	--	--	2.1	0.2	--
Travel on Unpaved Roads Fugitive Dust Emissions	--	--	--	--	9.0	0.9	--
Construction Equipment Tailpipe Emissions	5.1	0.7	24.2	1.4	0.7	0.6	2,512.1
On-Road Tailpipe Emissions - Commuter and Truck	2.5	2.1	18.9	0.0	0.2	0.2	1,084.8
Clarington Compressor Station Emission Totals	7.6	2.8	43.1	1.4	11.9	1.9	3,597.0
Majorsville Compressor Station							
Construction Activities Fugitive Dust Emissions	--	--	--	--	1.8	0.2	--
Travel on Unpaved Roads Fugitive Dust Emissions	--	--	--	--	9.0	0.9	--
Construction Equipment Tailpipe Emissions	5.1	0.7	24.2	1.4	0.7	0.6	2,512.1
On-Road Tailpipe Emissions - Commuter and Truck	2.5	2.1	18.9	0.0	0.2	0.2	1,084.8
Majorsville Compressor Station Emission Totals	7.6	2.8	43.1	1.4	11.7	1.9	3,597.0
Cadiz Compressor Station							
Construction Activities Fugitive Dust Emissions	--	--	--	--	1.1	0.1	--
Travel on Unpaved Roads Fugitive Dust Emissions	--	--	--	--	9.0	0.9	--
Construction Equipment Tailpipe Emissions	5.1	0.7	24.2	1.4	0.7	0.6	2,512.1
On-Road Tailpipe Emissions - Commuter and Truck	2.5	2.1	18.9	0.0	0.2	0.2	1,084.8
Cadiz Compressor Station Emission Totals	7.6	2.8	43.1	1.4	10.9	1.8	3,597.0
Burgettstown Compressor Station							
Construction Activities Fugitive Dust Emissions	--	--	--	--	0.7	0.1	--
Travel on Unpaved Roads Fugitive Dust Emissions	--	--	--	--	9.0	0.9	--
Construction Equipment Tailpipe Emissions	5.1	0.7	24.2	1.4	0.7	0.6	2,512.1
On-Road Tailpipe Emissions - Commuter and Truck	2.5	2.1	18.9	0.0	0.2	0.2	1,084.8
Burgettstown Compressor Station Emission Totals	7.6	2.8	43.1	1.4	10.5	1.8	3,597.0
Rover Project Total Construction Emissions							
	318.5	129.3	2,067.3	18.3	650.2	83.4	165,378.5

**Table 9A-22
Rover Construction Emissions - Summary by County**

County	Elements within county	Criteria Pollutant (tpy ¹)						
		NOx (tons)	VOC (tons)	CO (tons)	SO2 (tons)	PM10 (tons)	PM2.5 (tons)	CO _{2e} (tons)
Ohio								
Monroe	2.57mi Berne Lateral pipeline, 24.8mi Seneca Lateral pipeline, 18.4mi Sherwood Lateral pipeline, 0.9mi Clarington Lateral pipeline, Clarington CS ^{4,5} , Hall Receipt, Gulfport Receipt, Berne Receipt	46.8	36.2	412.7	2.4	97.6	12.8	31673.4
Noble	1.79mi Berne lateral pipeline, 1.6mi Seneca Lateral pipeline, Seneca CS, Seneca Receipt ⁴ , Rex Delivery ⁴	10.0	4.9	67.2	1.4	18.1	2.7	5428.7
Belmont	11.6mi Majorsville Lateral pipeline, 24.4 Clarington Lateral pipeline	34.3	35.0	240.4	0.3	74.8	9.2	20070.3
Harrison	10.6 mi Clarington & Cadiz lateral pipeline, 17mi Spread 1 mainline pipeline, Cadiz CS ^{4,6}	34.9	27.2	248.3	1.7	69.5	9.9	21217.4
Jefferson	18mi Burgettstownlateral pipeline	30.3	10.5	186.6	0.3	38.4	5.1	14872.2
Carroll	16mi Burgettstown lateral pipeline, 6mi Spread 1 & 2 mainline pipeline, Mainline CS1	41.8	17.6	268.9	1.9	65.1	9.1	21606.5
Tuscarawas	14mi Spread 2 Mainline Pipeline	11.5	9.0	100.0	0.1	29.5	4.2	8707.5
Stark	3mi Spread 2 Mainline Pipeline, 11mi Spread 3 Mainline Pipeline	13.5	13.3	94.1	0.1	28.4	3.7	7873.2
Wayne	25mi Spread 3 Mainline Pipeline, 1.84mi Spread 4 Mainline Pipeline, Mainline CS2	37.2	31.0	239.1	1.8	71.7	9.4	19389.8
Ashland	17mi Spread 4 Mainline Pipeline	20.4	7.2	126.9	0.2	33.8	4.2	9996.0
Richland	18mi Spread 4 Mainline Pipeline	21.6	7.7	134.3	0.2	35.8	4.5	10584.0
Crawford	14.3mi Spread 4 Mainline Pipeline, 2.9mi Spread 5 Mainline Pipeline , Mainline CS3	27.5	11.1	173.8	1.7	52.0	6.9	13563.0
Seneca	22mi Spread 5 Mainline Pipeline	4.0	4.2	52.3	0.1	39.9	4.2	3790.8
Hancock	6mi Spread 5 Mainline Pipeline	1.1	1.2	14.3	0.0	10.9	1.1	1033.9
Wood	20mi Spread 5 & 6 Mainline Pipeline	3.6	3.8	47.6	0.0	36.2	3.8	3446.2
Henry	18mi Spread 6 Mainline Pipeline, 5 mi Market Pipeline	4.1	4.4	54.7	0.1	41.7	4.4	4082.9
Defiance	9mi Spread 6 Mainline Pipeline, 5mi Market Pipeline, Defiance CS, PEPL Delivery ⁴ , ANR Delivery	13.3	7.4	98.5	1.8	45.3	5.6	7610.6
Fulton	18mi Market Pipeline	3.2	3.4	42.6	0.0	32.6	3.4	3532.8
West Virginia								
Doddridge	15mi Sherwood & CGT lateral pipeline, Sherwood CS, Sherwood Receipt ⁴ , CGT Delivery	13.1	8.0	109.5	1.7	30.0	4.0	9007.0
Tyler	23mi Sherwood & CGT lateral pipeline	7.0	7.5	94.1	0.1	23.3	2.7	7646.0
Wetzel	2mi Sherwood & CGT lateral pipeline	0.6	0.7	8.2	0.0	2.0	0.2	664.9
Marshall ²	12mi Majorsville Lateral pipeline, Majorsville CS, Majorsville receipt	12.2	7.0	97.3	1.6	36.8	4.7	8002.0
Hancock	6mi Burgettstown lateral pipeline	10.1	3.5	62.2	0.1	12.8	1.7	4957.4
Pennsylvania								
Washington ³	10mi Bugettstown lateral pipeline; Burgettstown CS, Burgettstown Receipt ⁴	24.5	8.6	146.8	1.6	31.9	4.6	11859.3
Michigan								
Lenawee	29mi Market Pipeline	5.2	5.5	68.7	0.1	52.6	5.5	5691.8
Washtenaw	28mi Market Pipeline, Consumer Energy Deliver	5.9	5.7	71.4	0.2	52.7	5.6	5919.1
Livingston	15mi Market Pipeline, Vector Delivery	3.6	3.2	40.6	0.2	29.1	3.1	3367.6

¹ All construction activity and associated emissions are projected to take place in a single year.

² Parts of Marshall County WV are designated nonattainment for SO2, however, the Majorsville Compressor Station will be located in the attainment portion of the county.

³ Washington County, Pennsylvania is non-attainment for 8-hr Ozone and 24-hr PM2.5.

⁴ Meter station will be located within the associated compressor station

⁵ The Clarington Compressor Station will contain twon receipt meters and two bidirectional meters

⁶ The Cadiz Compressor Station will contain two receipt meters

Sample Calculations: Estimates by county were made by pro-rating the total construction emission by pipeline mileage and number of sites within a given county

Monroe County PM10 emissions

PM10= 44mi Lateral Pipeline PM10 + Clarington CS PM10 + Hall Receipt PM10 + Gulfport Receipt PM10 + Berne Receipt PM10

PM10= (44mi/195 total lateral miles)*765.8 tons (Lateral Pipeline PM10 Emission Total) + 11.2 tons (Clarington CS PM10 Emission Total) + (3/8 stand-alone stations)*14.3 tons (Stand-alone Metering Station PM10 Emission Total)

PM10= 97.6 tons

Belmont County NOx emissions

NOx= 36mi Lateral Pipeline Nox

NOx= (36mi/195 total lateral miles)*531.8 tons (Lateral Pipeline NOx Emission total)

NOx= 34.3 tons

Mainline CS 3 Compressor Station	83,264.9	0.06	1.4	83,264.9	0.012	0.3	1,665,298.8	2.52E-05	66.0	0.004
Construction Activity PM10 Emissions ⁵ (tons)	1.7									
Construction Activity PM2.5 Emissions ⁶ (tons)	0.2									
Defiance Compressor Station	70,915.7	0.06	1.2	70,915.7	0.012	0.3	1,418,313.6	2.52E-05	66.0	0.004
Construction Activity PM10 Emissions ⁵ (tons)	1.5									
Construction Activity PM2.5 Emissions ⁶ (tons)	0.1									
Stand-Alone Metering Stations	32,931.4	0.06	0.6	32,931.4	0.012	0.1	-	2.52E-05	66.0	0.000
Construction Activity PM10 Emissions ⁵ (tons)	0.7									
Construction Activity PM2.5 Emissions ⁶ (tons)	0.1									
Sherwood Compressor Station	148,931.6	0.06	2.5	148,931.6	0.012	0.5	2,978,632.8	2.52E-05	66.0	0.008
Construction Activity PM10 Emissions ⁵ (tons)	3.1									
Construction Activity PM2.5 Emissions ⁶ (tons)	0.3									
Seneca Compressor Station	64,403.5	0.06	1.1	64,403.5	0.012	0.2	1,288,069.2	2.52E-05	66.0	0.003
Construction Activity PM10 Emissions ⁵ (tons)	1.3									
Construction Activity PM2.5 Emissions ⁶ (tons)	0.1									
Clarington Compressor Station	100,993.9	0.06	1.7	100,993.9	0.012	0.4	2,019,877.2	2.52E-05	66.0	0.005
Construction Activity PM10 Emissions ⁵ (tons)	2.1									
Construction Activity PM2.5 Emissions ⁶ (tons)	0.2									
Majorsville Compressor Station	89,145.5	0.06	1.5	89,145.5	0.012	0.3	1,782,910.8	2.52E-05	66.0	0.005
Construction Activity PM10 Emissions ⁵ (tons)	1.8									
Construction Activity PM2.5 Emissions ⁶ (tons)	0.2									
Cadiz Compressor Station	54,515.3	0.06	0.9	54,515.3	0.012	0.2	1,090,306.8	2.52E-05	66.0	0.003
Construction Activity PM10 Emissions ⁵ (tons)	1.1									
Construction Activity PM2.5 Emissions ⁶ (tons)	0.1									
Burgettstown Compressor Station	34,151.0	0.06	0.6	34,151.0	0.012	0.1	683,020.8	2.52E-05	66.0	0.002
Construction Activity PM10 Emissions ⁵ (tons)	0.7									
Construction Activity PM2.5 Emissions ⁶ (tons)	0.1									

¹ Excavation and backfilling for pipeline assumes will be 10ft x 30ft x approximate length (mi). Excavation and backfilling for compressor stations conservatively assumes 10% of project acreage is impacted, at 10 foot depth. Soil density is assumed to be 100 lb/cf.

² Excavation and backfilling factors from AP-42, Table 11.9-4 (dated 7/98), assuming 100% of TSP is PM10.

³ Windblown dust factor from "Improvement of Specific Emission Factors" prepared for South Coast AQMD by Midwest Research Institute, March 1996, assuming 100% of TSP is PM10.

⁴ Control efficiency based on "Control of Open Fugitive Dust Sources", USEPA, 9/88. Project measures to minimize dust will primarily include the utilization of water trucks to dampen the ROW under dry-dusty conditions.

⁵ PM10 emissions are conservatively assumed to be 100% of TSP.

⁶ PM2.5 emissions were calculated following the SCAQMD Particulate Matter (PM) 2.5 Significance Thresholds and Calculation Methodology, October 2006. For construction and demolition fugitive dust sources, 10% of the PM10 would be PM2.5.

* Pipe yards/ware yards are assumed to have negligible particulate emissions because of no construction activities.

Example Calculations:

Mainline A & B Excavation (tons) = 10 ft * 30 ft * 209.5 mi/yr * 5280 ft/mi * 100 lb/ft³ / 2000 lb/ton = 16,592,400 tons soil

Mainline A & B Excavation PM10 Emissions (tons) = 16,592,400 tons soil * 0.058 lb/ton / 2000 lb/ton * 0.59 = 283.9 tons PM10; PM2.5 emissions are 20.8% of PM10 emissions.

Mainline A & B Backfilling (tons) = excavation (tons) = 16,592,400 tons soil

Mainline A & B Backfilling PM10 Emissions (tons) = 16,592,400 tons soil * 0.012 lb/ton / 2000 lb/ton * 0.59 = 58.7 tons PM10; PM2.5 emissions are 20.8% of PM10 emissions.

Mainline A & B Windblown Dust (ft²/yr) = 4018.59 acres * 43,560 ft²/acre = 175,049,780 ft²

Mainline A & B Windblown Dust PM10 Emissions (tons) = 175,049,780 ft² * 2.52E-05 lb/ft² * (100-66)/100 / 2000 lb/ton * 0.59 = 0.442 tons PM10; PM2.5 emissions are 20.8% of PM10 emissions.

**Table 9A-26
Rover Emissions from Construction Equipment and Vehicle Travel on Unpaved Roads**

Unpaved Roads emission factor from AP-42, Section 13.2.2: Unpaved Roads (11/06)

$$E = [k(s/12)^2(W/3)^5]^{1/4}[(365-P)/365]$$

where:

- s = 8.5 surface material silt content (%) [Table 13.2.2-1, Construction sites mean silt content %]
- W = 10 tons [Average vehicle weight]
- k = 1.5 lb/VMT [Table 13.2.2-2, for PM₁₀]
- k = 0.15 lb/VMT [Table 13.2.2-2, for PM_{2.5}]
- a = 0.9 constant [Table 13.2.2-2, for PM₁₀ and PM_{2.5}]
- b = 0.45 constant [Table 13.2.2-2, for PM₁₀ and PM_{2.5}]
- P = 145 days [Average number of days with > 0.01 inches of precipitation for north OH, Figure 13.2.2-1]
- E_(PM10) = 1.13 lb/VMT
- E_(PM2.5) = 0.11 lb/VMT

93	Duration of Construction (days)-	Spread 1 & 2 Mainline A & B Pipeline
62	Duration of Construction (days)-	Spread 3 Mainline A & B Pipeline
85	Duration of Construction (days)-	Spread 4 Mainline A & B Pipeline
130	Duration of Construction (days)-	Spread 5 & 6 Mainline A & B Pipeline
83	Duration of Construction (days)-	Spread 7 & 8 Market Segment Pipeline
34	Duration of Construction (days)-	Majorsville Lateral
50	Duration of Construction (days)-	Clarington & Cadiz Lateral
5	Duration of Construction (days)-	Berne Lateral
82	Duration of Construction (days)-	Sherwood & CGT Lateral
60	Duration of Construction (days)-	Burgettstown Lateral
30	Duration of Construction (days)-	Seneca Lateral
264	Duration of Construction (days)-	Mainline CS 1 Compressor Station
264	Duration of Construction (days)-	Mainline CS 2 Compressor Station
264	Duration of Construction (days)-	Mainline CS 3 Compressor Station
264	Duration of Construction (days)-	Defiance Compressor Station
238	Duration of Construction (days)-	Stand-Alone Metering Stations
238	Duration of Construction (days)-	Sherwood Compressor Station
238	Duration of Construction (days)-	Seneca Compressor Station
238	Duration of Construction (days)-	Clarington Compressor Station
238	Duration of Construction (days)-	Majorsville Compressor Station
238	Duration of Construction (days)-	Cadiz Compressor Station
238	Duration of Construction (days)-	Burgettstown Compressor Station

Pipelines

Equipment Type	Average Vehicle Weight (tons) ^a	VMT per Day ^b	Spread 1 & 2 Mainline A & B pipeline		Spread 3 Mainline A & B Pipeline		Spread 4 Mainline A & B Pipeline		Spread 5 & 6 Mainline A & B Pipeline - precision		Spread 7 & 8 Market Segment Pipeline		Berne Lateral Pipeline	
			Quantity	VMT ^c	Quantity	VMT ^c	Quantity	VMT ^c	Quantity	VMT ^c	Quantity	VMT ^c	Quantity	VMT ^c
1/2 Ton Trucks	4	5	30	14010	48	14928	5	2113	46	29900	46	19090	45	1170
1 Ton Trucks	6.5	5	30	14010	55	17105	109	46053	4	2600	4	1660	4	104
2 1/2 Ton Trucks	7.75	3	64	17933	8	1493	1	254	24	9360	24	5976	24	374
Tractor Trailers	25	3	0	0	16	2986	11	2789	8	3120	8	1992	8	125
Dump Trucks	25	3	21	5884	25	4665	9	2282	1	390	1	249	1	16
Concrete Trucks	40	3	0	0	0	0	0	0	0	0	0	0	0	0
Total VMT				51837		41176		53489		45370		28967		1789
<i>a - Weighted average vehicle wt (tons)</i>														
<i>PM10 (tons)</i>				29.2		23.2		30.1		25.5		16.3		1.0
<i>PM2.5 (tons)</i>				2.9		2.3		3.0		2.6		1.6		0.1

Pipelines

Equipment Type	Average Vehicle Weight (tons) ^a	VMT per Day ^b	Majorsville Lateral		Clarington & Cadiz Lateral		Sherwood & CGT Lateral		Burgettstown Lateral		Seneca Lateral			
			Quantity	VMT ^c	Quantity	VMT ^c	Quantity	VMT ^c	Quantity	VMT ^c	Quantity	VMT ^c		
1/2 Ton Trucks	4	5	45	7650	37	9250	45	18450	5	1505	45	6773		
1 Ton Trucks	6.5	5	4	680	44	11000	4	1640	109	32809	47	7074		
2 1/2 Ton Trucks	7.75	3	24	2448	33	4950	24	5904	1	181	67	6050		
Tractor Trailers	25	3	8	816	9	1350	8	1968	11	1987	9	813		
Dump Trucks	25	3	1	102	8	1200	1	246	9	1625	11	993		
Concrete Trucks	40	3	0	0	0	0	0	0	0	0	0	0		
Total VMT				11696		27750		28208		38107		21702		
<i>a - Weighted average vehicle wt (tons)</i>														
<i>PM10 (tons)</i>				6.6		15.6		15.9		21.4		12.2		
<i>PM2.5 (tons)</i>				0.7		1.6		1.6		2.1		1.2		

Mainline Compressor Stations and Metering Stations

Equipment Type	Average Vehicle Weight (tons) ^a	VMT per Day ^b	Mainline CS 1 Compressor Station		Mainline CS 2 Compressor Station		Mainline CS 3 Compressor Station		Defiance Compressor Station		Stand-Alone Metering Stations	
			Quantity	VMT ^c	Quantity	VMT ^c	Quantity	VMT ^c	Quantity	VMT ^c	Quantity	VMT ^c
1/2 Ton Trucks	4	5	3	3960	3	3960	3	3960	3	3960	3	3570
1 Ton Trucks	6.5	5	10	13200	10	13200	10	13200	10	13200	10	11900
2 1/2 Ton Trucks	7.75	3	3	2376	3	2376	3	2376	3	2376	3	2142
Tractor Trailers	25	3	5	3960	5	3960	5	3960	5	3960	5	3570
Dump Trucks	25	3	3	2376	3	2376	3	2376	3	2376	3	2142
Concrete Trucks	40	3	2	1584	2	1584	2	1584	2	1584	2	1428
Total VMT				27456		27456		27456		27456		24752
<i>a - Weighted average vehicle wt (tons)</i>												
<i>PM10 (tons)</i>												
15.5												
<i>PM2.5 (tons)</i>												
1.5												

Lateral Compressor Stations

Equipment Type	Average Vehicle Weight (tons) ^a	VMT per Day ^b	Sherwood Compressor Station		Seneca Compressor Station		Clarrington Compressor Station		Majorsville Compressor Station		Cadiz Compressor Station		Burgettstown Compressor Station	
			Quantity	VMT ^c	Quantity	VMT ^c	Quantity	VMT ^c	Quantity	VMT ^c	Quantity	VMT ^c	Quantity	VMT ^c
1/2 Ton Trucks	4	5	2	2376	2	2376	2	2376	2	2376	2	2376	2	2376
1 Ton Trucks	6.5	5	6	7128	6	7128	6	7128	6	7128	6	7128	6	7128
2 1/2 Ton Trucks	7.75	3	2	1426	2	1426	2	1426	2	1426	2	1426	2	1426
Tractor Trailers	25	3	3	2138	3	2138	3	2138	3	2138	3	2138	3	2138
Dump Trucks	25	3	2	1426	2	1426	2	1426	2	1426	2	1426	2	1426
Concrete Trucks	40	3	2	1426	2	1426	2	1426	2	1426	2	1426	2	1426
Total VMT				15919		15919		15919		15919		15919		15919
<i>a - Weighted average vehicle wt (tons)</i>														
<i>PM10 (tons)</i>														
9.0														
<i>PM2.5 (tons)</i>														
0.9														

Project Totals

Equipment Type	Total VMT	VMT x ave vehicle wt:
1/2 Ton Trucks	158,504	634,016
1 Ton Trucks	242,202	1,574,313
2 1/2 Ton Trucks	75,122	582,194
Tractor Trailers	50,185	1,254,615
Dump Trucks	37,852	946,290
Concrete Trucks	16,318	652,704
Total VMT	580,182	5,644,132
Weighted Avg vehicle wt (tons)		9.7

<i>Total Unpaved Road Emissions</i>	
Pollutant	tons
PM10	326.5
PM2.5	32.6

^a Average vehicle weights are assumed.

^b VMT per day are assumed.

^c Vehicle Miles Traveled (VMT) are based on the vehicle quantity and project duration.

**Table 9A-27
Rover Construction Activity Tailpipe Emissions - Precision**

Crew	Equipment Type ¹	Make/Model	Fuel Type	Engine Rating (hp)	Load Factor ²	Exhaust Emission Factors ⁴					
						NOx (g/hp-hr)	VOC (g/hp-hr)	CO (g/hp-hr)	SO2 (g/hp-hr)	PM10 (g/hp-hr)	PM2.5 (g/hp-hr)
Bend/ Setup	Sideboom	583	Diesel	319	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Bend/ Setup	Bending Machine	CRC Bending Machine	Diesel	325	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Bend/ Setup	Trucks	F-250/ equivalent	Diesel	250	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Clean Up	Excavator	336	Diesel	303	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Clean Up	Grader	14 Motor Grader	Diesel	259	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Clean Up	Trucks	2 ton	Diesel	300	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Clean Up	Dozer	D6	Diesel	207	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Clean Up	Dozer	D7	Diesel	238	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Clean Up	Dozer	D8	Diesel	317	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Clean Up	Trucks	F-250/ equivalent	Diesel	250	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Clean Up	Clean Up	Farm Tractor	Diesel	300	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Coating	Misc Equipment	750 CFM Air comp.	Diesel	95	0.8	1.1950	0.8490	3.7660	0.0100	0.0350	0.0350
Coating	Trucks	Bus	Diesel	275	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Coating	Dozer	D6T	Diesel	207	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Coating	Trucks	F-250/ equivalent	Diesel	250	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Coating	Trucks	F-450	Diesel	300	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Coating	Coating	Heat Ring	Diesel	85	0.8	1.1950	0.8490	3.7660	0.0100	0.0350	0.0350
Coating	Misc Equipment	Marooka	Diesel	225	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Drill Support	Excavator	349	Diesel	396	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Drill Support	Sideboom	583	Diesel	319	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Drill Support	Sideboom	587	Diesel	319	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Drill Support	Trucks	F-250/ equivalent	Diesel	250	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Drilling	Excavator	349	Diesel	396	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Drilling	Drilling	Drill Rig	Diesel	600	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Drilling	Trucks	F-250/ equivalent	Diesel	250	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Drilling	Drilling	Mud Pump	Diesel	600	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Environmental	Trucks	2 ton	Diesel	300	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Environmental	Misc Equipment	ASV	Diesel	95	0.8	1.1950	0.8490	3.7660	0.0100	0.0350	0.0350
Environmental	Misc Equipment	Ditch Witch	Diesel	25	0.8	3.6860	3.6860	3.7920	0.0100	0.0520	0.0520
Environmental	Trucks	F-250/ equivalent	Diesel	250	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Environmental	Trucks	F-450	Diesel	300	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Grade/ ROW	Excavator	336	Diesel	303	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Grade/ ROW	Grader	16 Motor Grader	Diesel	290	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Grade/ ROW	Dozer	D7	Diesel	238	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Grade/ ROW	Dozer	D8	Diesel	317	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Grade/ ROW	Trucks	F-250/ equivalent	Diesel	250	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Grade/ ROW	Trucks	F-450	Diesel	300	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Grade/ ROW	Clean Up	Farm Tractor	Diesel	300	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Lay Pipe	Sideboom	583	Diesel	319	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Lay Pipe	Excavator	336- Facing	Diesel	303	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Lay Pipe	Welding	572 Shack Tractor	Diesel	207	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240

Lay Pipe	Trucks	Bottle Truck	Diesel	275	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Lay Pipe	Trucks	Bus	Diesel	300	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Lay Pipe	Dozer	D6	Diesel	207	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Lay Pipe	Trucks	F-250/ equivalent	Diesel	250	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Lay Pipe	Misc Equipment	Gator	Diesel	50	0.8	3.5050	3.5050	3.7660	0.0100	0.0420	0.0420
Lay Pipe	Misc Equipment	Generator	Diesel	10	0.8	3.6860	3.6860	4.9216	0.0100	0.0520	0.0520
Lay Pipe	Misc Equipment	Marooka- buffing	Diesel	75	0.8	1.1950	0.8490	3.7660	0.0100	0.0350	0.0350
Lay Pipe	Welding	Vanguard Generators	Diesel	175	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Locate/ Utility	Excavator	349	Diesel	396	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Locate/ Utility	Misc Equipment	3" Water Pump	Diesel	10	0.8	3.6860	3.6860	4.9216	0.0100	0.0520	0.0520
Locate/ Utility	Trucks	F-250/ equivalent	Diesel	250	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Locate/ Utility	Trucks	F-450	Diesel	300	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Locate/ Utility	Trucks	Vaccum Excavator Truck	Diesel	500	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Locate/ Utility	Trucks	Water Truck	Diesel	300	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Road Bores	Misc Equipment	3" Water Pump	Diesel	317	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Road Bores	Bore Machine	30"- 48" Bore Machine	Diesel	425	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Road Bores	Excavator	349	Diesel	396	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Road Bores	Sideboom	587	Diesel	319	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Road Bores	Misc Equipment	6" Water Pump	Diesel	10	0.8	3.6860	3.6860	4.9216	0.0100	0.0520	0.0520
Road Bores	Dozer	D8T	Diesel	75	0.8	1.1950	0.8490	3.7660	0.0100	0.0350	0.0350
Road Bores	Trucks	F-250/ equivalent	Diesel	250	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Road Bores	Trucks	F-450	Diesel	300	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Road Bores	Welding	Lincoln 300 welders	Diesel	47	0.8	3.6860	3.6860	3.7920	0.0100	0.0520	0.0520
Road Bores	Drilling	TT Tech Mud Pump	Diesel	28	0.8	3.6860	3.6860	3.7920	0.0100	0.0520	0.0520
String	Excavator	349	Diesel	396	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
String	Grader	140 Motor Grader	Diesel	229	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
String	Dozer	D7	Diesel	238	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
String	Trucks	F-250/ equivalent	Diesel	250	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
String	Misc Equipment	Gator	Diesel	50	0.8	3.5050	3.5050	3.7660	0.0100	0.0420	0.0420
String	Heavy Equipment	Rubber tire Hoe	Diesel	15	0.8	3.6860	3.6860	4.9216	0.0100	0.0520	0.0520
String	Trucks	Stringing Trucks	Diesel	500	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
String	Excavator Attach.	Vaccu-lift	Diesel	18	0.8	3.6860	3.6860	4.9216	0.0100	0.0520	0.0520
Supervision	Heavy Equipment	973 Loader	Diesel	300	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Supervision	Trucks	F-250/ equivalent	Diesel	290	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Supervision	Trucks	F-450	Diesel	300	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Supervision	Trucks	Fuel Truck	Diesel	550	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Supervision	Trucks	Low Boy	Diesel	600	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Supervision	Trucks	Lube Truck	Diesel	350	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Supervision	Trucks	Mechanics Truck	Diesel	300	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Supervision	Trucks	Semi	Diesel	500	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Supervision	Trucks	Skid Truck	Diesel	400	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Supervision	Trucks	Stewards Truck	Diesel	250	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100

Supervision	Trucks	Stinger Truck	Diesel	550	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Supervision	Trucks	Water Truck	Diesel	300	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Testing	Excavator	349	Diesel	396	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Testing	Sideboom	583	Diesel	319	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Testing	Misc Equipment	1600 CFM Air Comp.	Diesel	600	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Testing	Misc Equipment	185 CFM Air Comp.	Diesel	85	0.8	1.1950	0.8490	3.7660	0.0100	0.0350	0.0350
Testing	Trucks	F-250/ equivalent	Diesel	250	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Testing	Trucks	F-450	Diesel	300	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Testing	Testing	Fill Pump	Diesel	350	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Testing	Welding	Lincoln 300 welders	Diesel	47	0.8	3.6860	3.6860	3.7920	0.0100	0.0520	0.0520
Testing	Testing	Pressure Pump	Diesel	400	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Testing	Trucks	Semi/ Float	Diesel	500	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Testing	Trucks	Water Truck	Diesel	300	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Tie Ins	Excavator	349	Diesel	396	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Tie Ins	Sideboom	583	Diesel	319	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Tie Ins	Sideboom	587	Diesel	319	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Tie Ins	Misc Equipment	185 CFM Air Comp.	Diesel	85	0.8	1.1950	0.8490	3.7660	0.0100	0.0350	0.0350
Tie Ins	Misc Equipment	3" Water Pump	Diesel	10	0.8	3.6860	3.6860	4.9216	0.0100	0.0520	0.0520
Tie Ins	Misc Equipment	6" Water Pump	Diesel	75	0.8	1.1950	0.8490	3.7660	0.0100	0.0350	0.0350
Tie Ins	Dozer	D7	Diesel	238	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Tie Ins	Trucks	F-250/ equivalent	Diesel	250	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Tie Ins	Trucks	F-450	Diesel	300	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Tie Ins	Welding	Lincoln 300 welders	Diesel	47	0.8	3.6860	3.6860	3.7920	0.0100	0.0520	0.0520
Tile	Excavator	320	Diesel	153	0.8	0.7290	0.7400	3.7660	0.0100	0.0300	0.0300
Tile	Trucks	2 ton	Diesel	300	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Tile	Misc Equipment	3" Water Pump	Diesel	10	0.8	3.6860	3.6860	4.9216	0.0100	0.0520	0.0520
Tile	Misc Equipment	6" Water Pump	Diesel	75	0.8	1.1950	0.8490	3.7660	0.0100	0.0350	0.0350
Tile	Dozer	D5	Diesel	175	0.8	0.7290	0.7400	2.6360	0.0100	0.0240	0.0240
Tile	Trucks	F-250/ equivalent	Diesel	250	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100

Spread 5,6,7,8

Crew	Equipment Type ¹	Make/Model	Quantity	Total Operation (hr/project)	Project Emission Rate					
					NOx (tons/project)	VOC (tons/project)	CO (tons/project)	SO2 (tons/project)	PM10 (tons/project)	PM2.5 (tons/project)
Bend/ Setup	Sideboom	583	5	1,522.5	0.3122	0.3169	1.1290	0.0043	0.0103	0.0103
Bend/ Setup	Bending Machine	CRC Bending Machine	3	913.5	0.1909	0.1937	0.6901	0.0026	0.0063	0.0063
Bend/ Setup	Trucks	F-250/ equivalent	10	5,220.0	0.0230	0.1611	17.8373	0.0063	0.0115	0.0115
Clean Up	Excavator	336	5	3,000.0	0.5844	0.5932	2.1130	0.0080	0.0192	0.0192
Clean Up	Grader	14 Motor Grader	2	700.0	0.1166	0.1183	0.4214	0.0016	0.0038	0.0038
Clean Up	Trucks	2 ton	4	2,400.0	0.0127	0.0889	9.8413	0.0035	0.0063	0.0063
Clean Up	Dozer	D6	3	1,800.0	0.2395	0.2431	0.8661	0.0033	0.0079	0.0079
Clean Up	Dozer	D7	5	3,000.0	0.4590	0.4659	1.6597	0.0063	0.0151	0.0151
Clean Up	Dozer	D8	3	1,800.0	0.3668	0.3723	1.3264	0.0050	0.0121	0.0121
Clean Up	Trucks	F-250/ equivalent	4	2,400.0	0.3857	0.3915	1.3947	0.0053	0.0127	0.0127
Clean Up	Clean Up	Farm Tractor	5	3,000.0	0.5786	0.5873	2.0921	0.0079	0.0190	0.0190
Coating	Misc Equipment	750 CFM Air comp.	1	552.0	0.0553	0.0393	0.1742	0.0005	0.0016	0.0016
Coating	Trucks	Bus	2	1,104.0	0.1952	0.1981	0.7057	0.0027	0.0064	0.0064
Coating	Dozer	D6T	1	552.0	0.0735	0.0746	0.2656	0.0010	0.0024	0.0024
Coating	Trucks	F-250/ equivalent	3	1,656.0	0.0073	0.0511	5.6587	0.0020	0.0037	0.0037
Coating	Trucks	F-450	1	552.0	0.0029	0.0204	2.2635	0.0008	0.0015	0.0015
Coating	Coating	Heat Ring	1	736.0	0.0659	0.0468	0.2078	0.0006	0.0019	0.0019
Coating	Misc Equipment	Marooka	4	2,944.0	0.4258	0.4323	1.5398	0.0058	0.0140	0.0140
Drill Support	Excavator	349	5	4,800.0	1.2219	1.2404	4.4184	0.0168	0.0402	0.0402
Drill Support	Sideboom	583	15	10,800.0	2.2148	2.2482	8.0084	0.0304	0.0729	0.0729
Drill Support	Sideboom	587	5	3,600.0	0.7383	0.7494	2.6695	0.0101	0.0243	0.0243
Drill Support	Trucks	F-250/ equivalent	10	7,200.0	0.0317	0.2222	24.6032	0.0087	0.0159	0.0159
Drilling	Excavator	349	10	7,200.0	1.8329	1.8606	6.6277	0.0251	0.0603	0.0603
Drilling	Drilling	Drill Rig	5	3,600.0	1.3886	1.4095	5.0210	0.0190	0.0457	0.0457
Drilling	Trucks	F-250/ equivalent	10	7,200.0	0.0317	0.2222	24.6032	0.0087	0.0159	0.0159
Drilling	Drilling	Mud Pump	5	3,600.0	1.3886	1.4095	5.0210	0.0190	0.0457	0.0457
Environmental	Trucks	2 ton	3	3,196.8	0.0169	0.1184	13.1086	0.0047	0.0085	0.0085
Environmental	Misc Equipment	ASV	3	3,196.8	0.3200	0.2274	1.0086	0.0027	0.0094	0.0094
Environmental	Misc Equipment	Ditch Witch	3	3,196.8	0.2598	0.2598	0.2672	0.0007	0.0037	0.0037
Environmental	Trucks	F-250/ equivalent	6	6,393.6	0.0282	0.1973	21.8476	0.0078	0.0141	0.0141
Environmental	Trucks	F-450	3	3,196.8	0.0169	0.1184	13.1086	0.0047	0.0085	0.0085

Grade/ ROW	Excavator	336	6	2,160.0	0.4207	0.4271	1.5213	0.0058	0.0139	0.0139
Grade/ ROW	Grader	16 Motor Grader	2	720.0	0.1342	0.1363	0.4854	0.0018	0.0044	0.0044
Grade/ ROW	Dozer	D7	1	360.0	0.0551	0.0559	0.1992	0.0008	0.0018	0.0018
Grade/ ROW	Dozer	D8	10	900.0	0.1834	0.1862	0.6632	0.0025	0.0060	0.0060
Grade/ ROW	Trucks	F-250/ equivalent	3	1,080.0	0.0048	0.0333	3.6905	0.0013	0.0024	0.0024
Grade/ ROW	Trucks	F-450	2	720.0	0.0038	0.0267	2.9524	0.0010	0.0019	0.0019
Grade/ ROW	Clean Up	Farm Tractor	1	360.0	0.0694	0.0705	0.2510	0.0010	0.0023	0.0023
Lay Pipe	Sideboom	583	2	206.0	0.0422	0.0429	0.1528	0.0006	0.0014	0.0014
Lay Pipe	Excavator	336- Facing	4	412.0	0.0803	0.0815	0.2902	0.0011	0.0026	0.0026
Lay Pipe	Welding	572 Shack Tractor	8	5,768.0	0.7676	0.7791	2.7754	0.0105	0.0253	0.0253
Lay Pipe	Trucks	Bottle Truck	1	721.0	0.0035	0.0245	2.7101	0.0010	0.0017	0.0017
Lay Pipe	Trucks	Bus	2	103.0	0.0005	0.0038	0.4224	0.0001	0.0003	0.0003
Lay Pipe	Dozer	D6	1	309.0	0.0411	0.0417	0.1487	0.0006	0.0014	0.0014
Lay Pipe	Trucks	F-250/ equivalent	5	257.5	0.0011	0.0079	0.8799	0.0003	0.0006	0.0006
Lay Pipe	Misc Equipment	Gator	2	103.0	0.0159	0.0159	0.0171	0.0000	0.0002	0.0002
Lay Pipe	Misc Equipment	Generator	2	103.0	0.0033	0.0033	0.0045	0.0000	0.0000	0.0000
Lay Pipe	Misc Equipment	Marooka- buffing	1	51.5	0.0041	0.0029	0.0128	0.0000	0.0001	0.0001
Lay Pipe	Welding	Vanguard Generators	8	412.0	0.0464	0.0470	0.1676	0.0006	0.0015	0.0015
Locate/ Utility	Excavator	349	2	146.0	0.0372	0.0377	0.1344	0.0005	0.0012	0.0012
Locate/ Utility	Misc Equipment	3" Water Pump	6	438.0	0.0142	0.0142	0.0190	0.0000	0.0002	0.0002
Locate/ Utility	Trucks	F-250/ equivalent	6	438.0	0.0019	0.0135	1.4967	0.0005	0.0010	0.0010
Locate/ Utility	Trucks	F-450	3	219.0	0.0012	0.0081	0.8980	0.0003	0.0006	0.0006
Locate/ Utility	Trucks	Vaccum Excavator Truck	6	438.0	0.0039	0.0270	2.9934	0.0011	0.0019	0.0019
Locate/ Utility	Trucks	Water Truck	3	2,190.0	0.0116	0.0811	8.9802	0.0032	0.0058	0.0058
Road Bores	Misc Equipment	3" Water Pump	2	1,200.0	0.2445	0.2482	0.8842	0.0034	0.0081	0.0081
Road Bores	Bore Machine	30"- 48" Bore Machine	6	3,600.0	0.9836	0.9984	3.5565	0.0135	0.0324	0.0324
Road Bores	Excavator	349	12	7,200.0	1.8329	1.8606	6.6277	0.0251	0.0603	0.0603
Road Bores	Sideboom	587	12	7,200.0	1.4765	1.4988	5.3389	0.0203	0.0486	0.0486
Road Bores	Misc Equipment	6" Water Pump	24	14,400.0	0.4681	0.4681	0.6250	0.0013	0.0066	0.0066
Road Bores	Dozer	D8T	6	3,600.0	0.2845	0.2021	0.8967	0.0024	0.0083	0.0083
Road Bores	Trucks	F-250/ equivalent	16	9,600.0	0.0423	0.2963	32.8042	0.0116	0.0212	0.0212
Road Bores	Trucks	F-450	6	360.0	0.0019	0.0133	1.4762	0.0005	0.0010	0.0010
Road Bores	Welding	Lincoln 300 welders	12	720.0	0.1100	0.1100	0.1132	0.0003	0.0016	0.0016
Road Bores	Drilling	TT Tech Mud Pump	6	2,880.0	0.2621	0.2621	0.2697	0.0007	0.0037	0.0037
String	Excavator	349	2	728.0	0.1853	0.1881	0.6701	0.0025	0.0061	0.0061
String	Grader	140 Motor Grader	1	364.0	0.0536	0.0544	0.1938	0.0007	0.0018	0.0018
String	Dozer	D7	1	364.0	0.0557	0.0565	0.2014	0.0008	0.0018	0.0018

String	Trucks	F-250/ equivalent	4	728.0	0.0032	0.0225	2.4877	0.0009	0.0016	0.0016
String	Misc Equipment	Gator	1	182.0	0.0281	0.0281	0.0302	0.0001	0.0003	0.0003
String	Heavy Equipment	Rubber tire Hoe	2	182.0	0.0089	0.0089	0.0118	0.0000	0.0001	0.0001
String	Trucks	Stringing Trucks	30	1,365.0	0.0120	0.0843	9.3287	0.0033	0.0060	0.0060
String	Excavator Attach.	Vaccu-lift	2	364.0	0.0213	0.0213	0.0284	0.0001	0.0003	0.0003
Supervision	Heavy Equipment	973 Loader	2	1,776.0	0.3425	0.3477	1.2385	0.0047	0.0113	0.0113
Supervision	Trucks	F-250/ equivalent	24	2,131.2	0.0109	0.0763	8.4477	0.0030	0.0055	0.0055
Supervision	Trucks	F-450	1	74.0	0.0004	0.0027	0.3034	0.0001	0.0002	0.0002
Supervision	Trucks	Fuel Truck	2	355.2	0.0034	0.0241	2.6703	0.0009	0.0017	0.0017
Supervision	Trucks	Low Boy	8	4,736.0	0.0501	0.3508	38.8402	0.0138	0.0251	0.0251
Supervision	Trucks	Lube Truck	2	355.2	0.0022	0.0153	1.6993	0.0006	0.0011	0.0011
Supervision	Trucks	Mechanics Truck	15	1,332.0	0.0070	0.0493	5.4619	0.0019	0.0035	0.0035
Supervision	Trucks	Semi	8	4,736.0	0.0418	0.2923	32.3668	0.0115	0.0209	0.0209
Supervision	Trucks	Skid Truck	2	177.6	0.0013	0.0088	0.9710	0.0003	0.0006	0.0006
Supervision	Trucks	Stewards Truck	4	296.0	0.0013	0.0091	1.0115	0.0004	0.0007	0.0007
Supervision	Trucks	Stinger Truck	1	162.8	0.0016	0.0111	1.2239	0.0004	0.0008	0.0008
Supervision	Trucks	Water Truck	4	296.0	0.0016	0.0110	1.2138	0.0004	0.0008	0.0008
Testing	Excavator	349	1	78.0	0.0199	0.0202	0.0718	0.0003	0.0007	0.0007
Testing	Sideboom	583	1	78.0	0.0160	0.0162	0.0578	0.0002	0.0005	0.0005
Testing	Misc Equipment	1600 CFM Air Comp.	16	624.0	0.2407	0.2443	0.8703	0.0033	0.0079	0.0079
Testing	Misc Equipment	185 CFM Air Comp.	1	78.0	0.0070	0.0050	0.0220	0.0001	0.0002	0.0002
Testing	Trucks	F-250/ equivalent	4	312.0	0.0501	0.0509	0.1813	0.0007	0.0017	0.0017
Testing	Trucks	F-450	1	39.0	0.0075	0.0076	0.0272	0.0001	0.0002	0.0002
Testing	Testing	Fill Pump	4	1,248.0	0.2808	0.2850	1.0153	0.0039	0.0092	0.0092
Testing	Welding	Lincoln 300 welders	2	78.0	0.0119	0.0119	0.0123	0.0000	0.0002	0.0002
Testing	Testing	Pressure Pump	2	312.0	0.0802	0.0814	0.2901	0.0011	0.0026	0.0026
Testing	Trucks	Semi/ Float	1	78.0	0.0007	0.0048	0.5331	0.0002	0.0003	0.0003
Testing	Trucks	Water Truck	2	78.0	0.0004	0.0029	0.3198	0.0001	0.0002	0.0002
Tie Ins	Excavator	349	36	17,424.0	4.4357	4.5026	16.0389	0.0608	0.1460	0.1460
Tie Ins	Sideboom	583	9	4,356.0	0.8933	0.9068	3.2301	0.0123	0.0294	0.0294
Tie Ins	Sideboom	587	27	1,633.5	0.3350	0.3400	1.2113	0.0046	0.0110	0.0110
Tie Ins	Misc Equipment	185 CFM Air Comp.	9	1,089.0	0.0975	0.0693	0.3074	0.0008	0.0029	0.0029
Tie Ins	Misc Equipment	3" Water Pump	70	4,235.0	0.1377	0.1377	0.1838	0.0004	0.0019	0.0019
Tie Ins	Misc Equipment	6" Water Pump	18	8,712.0	0.6885	0.4892	2.1699	0.0058	0.0202	0.0202

Tie Ins	Dozer	D7	9	4,356.0	0.6665	0.6765	2.4099	0.0091	0.0219	0.0219
Tie Ins	Trucks	F-250/ equivalent	18	2,178.0	0.0096	0.0672	7.4425	0.0026	0.0048	0.0048
Tie Ins	Trucks	F-450	9	544.5	0.0029	0.0202	2.2327	0.0008	0.0014	0.0014
Tie Ins	Welding	Lincoln 300 welders	18	1,089.0	0.1664	0.1664	0.1712	0.0005	0.0023	0.0023
Tile	Excavator	320	12	552.0	0.0543	0.0551	0.2805	0.0007	0.0022	0.0022
Tile	Trucks	2 ton	9	5,796.0	0.0307	0.2147	23.7667	0.0084	0.0153	0.0153
Tile	Misc Equipment	3" Water Pump	24	15,456.0	0.5024	0.5024	0.6708	0.0014	0.0071	0.0071
Tile	Misc Equipment	6" Water Pump	12	7,728.0	0.6108	0.4339	1.9248	0.0051	0.0179	0.0179
Tile	Dozer	D5	6	3,864.0	0.4347	0.4413	1.5718	0.0060	0.0143	0.0143
Tile	Trucks	F-250/ equivalent	12	7,728.0	0.0341	0.2385	26.4074	0.0094	0.0170	0.0170

Total 31.9 34.5 466.8 0.5 1.2 1.2

Majorsville Lateral

Crew	Equipment Type ¹	Make/Model	Quantity	Total Operation (hr/project)	Project Emission Rate					
					NOx (tons/project)	VOC (tons/project)	CO (tons/project)	SO2 (tons/project)	PM10 (tons/project)	PM2.5 (tons/project)
Bend/ Setup	Sideboom	583	5	142.7	0.0293	0.0297	0.1058	0.0004	0.00096310	0.0010
Bend/ Setup	Bending Machine	CRC Bending Machine	3	393.5	0.0822	0.0835	0.2973	0.0011	0.0027	0.0027
Bend/ Setup	Trucks	F-250/ equivalent	10	468.5	0.0021	0.0145	1.6009	0.0006	0.0010	0.0010
Clean Up	Excavator	336	5	56.2	0.0110	0.0111	0.0396	0.0002	0.0004	0.0004
Clean Up	Grader	14 Motor Grader	2	50.3	0.0084	0.0085	0.0303	0.0001	0.0003	0.0003
Clean Up	Trucks	2 ton	4	281.1	0.0015	0.0104	1.1526	0.0004	0.0007	0.0007
Clean Up	Dozer	D6	3	468.5	0.0623	0.0633	0.2254	0.0009	0.0021	0.0021
Clean Up	Dozer	D7	5	281.1	0.0430	0.0437	0.1555	0.0006	0.0014	0.0014
Clean Up	Dozer	D8	3	86.2	0.0176	0.0178	0.0635	0.0002	0.0006	0.0006
Clean Up	Trucks	F-250/ equivalent	4	56.2	0.0090	0.0092	0.0327	0.0001	0.0003	0.0003
Clean Up	Clean Up	Farm Tractor	5	562.2	0.1084	0.1101	0.3920	0.0015	0.0036	0.0036
Coating	Misc Equipment	750 CFM Air comp.	1	96.5	0.0097	0.0069	0.0304	0.0001	0.0003	0.0003
Coating	Trucks	Bus	2	674.6	0.1193	0.1211	0.4312	0.0016	0.0039	0.0039
Coating	Dozer	D6T	1	85.3	0.0113	0.0115	0.0410	0.0002	0.0004	0.0004
Coating	Trucks	F-250/ equivalent	3	1,020.4	0.0045	0.0315	3.4867	0.0012	0.0022	0.0022
Coating	Trucks	F-450	1	517.2	0.0027	0.0192	2.1208	0.0008	0.0014	0.0014
Coating	Coating	Heat Ring	1	749.6	0.0671	0.0477	0.2116	0.0006	0.0020	0.0020
Coating	Misc Equipment	Marooka	4	749.6	0.1084	0.1101	0.3920	0.0015	0.0036	0.0036

Drill Support	Excavator	349	5	899.5	0.2290	0.2324	0.8280	0.0031	0.0075	0.0075
Drill Support	Sideboom	583	15	468.5	0.0961	0.0975	0.3474	0.0013	0.0032	0.0032
Drill Support	Sideboom	587	5	562.2	0.1153	0.1170	0.4169	0.0016	0.0038	0.0038
Drill Support	Trucks	F-250/ equivalent	10	1,124.4	0.0050	0.0347	3.8421	0.0014	0.0025	0.0025
Drilling	Excavator	349	10	337.3	0.0859	0.0872	0.3105	0.0012	0.0028	0.0028
Drilling	Drilling	Drill Rig	5	386.0	0.1489	0.1511	0.5384	0.0020	0.0049	0.0049
Drilling	Trucks	F-250/ equivalent	10	273.6	0.0012	0.0084	0.9349	0.0003	0.0006	0.0006
Drilling	Drilling	Mud Pump	5	1,349.2	0.5204	0.5283	1.8818	0.0071	0.0171	0.0171
Environmental	Trucks	2 ton	3	170.5	0.0009	0.0063	0.6993	0.0002	0.0005	0.0005
Environmental	Misc Equipment	ASV	3	73.1	0.0073	0.0052	0.0231	0.0001	0.0002	0.0002
Environmental	Misc Equipment	Ditch Witch	3	4,081.4	0.3317	0.3317	0.3412	0.0009	0.0047	0.0047
Environmental	Trucks	F-250/ equivalent	6	1,034.4	0.0046	0.0319	3.5347	0.0013	0.0023	0.0023
Environmental	Trucks	F-450	3	170.5	0.0009	0.0063	0.6993	0.0002	0.0005	0.0005
Grade/ ROW	Excavator	336	6	187.4	0.0365	0.0371	0.1320	0.0005	0.0012	0.0012
Grade/ ROW	Grader	16 Motor Grader	2	112.4	0.0210	0.0213	0.0758	0.0003	0.0007	0.0007
Grade/ ROW	Dozer	D7	1	85.3	0.0130	0.0132	0.0472	0.0002	0.0004	0.0004
Grade/ ROW	Dozer	D8	10	42.6	0.0087	0.0088	0.0314	0.0001	0.0003	0.0003
Grade/ ROW	Trucks	F-250/ equivalent	3	277.3	0.0012	0.0086	0.9477	0.0003	0.0006	0.0006
Grade/ ROW	Trucks	F-450	2	86.2	0.0005	0.0032	0.3535	0.0001	0.0002	0.0002
Grade/ ROW	Clean Up	Farm Tractor	1	344.8	0.0665	0.0675	0.2405	0.0009	0.0022	0.0022
Lay Pipe	Sideboom	583	2	83.2	0.0171	0.0173	0.0617	0.0002	0.0006	0.0006
Lay Pipe	Excavator	336- Facing	4	83.2	0.0162	0.0165	0.0586	0.0002	0.0005	0.0005
Lay Pipe	Welding	572 Shack Tractor	8	225.2	0.0300	0.0304	0.1084	0.0004	0.0010	0.0010
Lay Pipe	Trucks	Bottle Truck	1	225.2	0.0011	0.0076	0.8464	0.0003	0.0005	0.0005
Lay Pipe	Trucks	Bus	2	8.0	0.0000	0.0003	0.0330	0.0000	0.0000	0.0000
Lay Pipe	Dozer	D6	1	410.4	0.0546	0.0554	0.1975	0.0007	0.0018	0.0018
Lay Pipe	Trucks	F-250/ equivalent	5	18.7	0.0001	0.0006	0.0640	0.0000	0.0000	0.0000
Lay Pipe	Misc Equipment	Gator	2	224.9	0.0348	0.0348	0.0373	0.0001	0.0004	0.0004
Lay Pipe	Misc Equipment	Generator	2	7.1	0.0002	0.0002	0.0003	0.0000	0.0000	0.0000
Lay Pipe	Misc Equipment	Marooka- buffing	1	97.4	0.0077	0.0055	0.0243	0.0001	0.0002	0.0002
Lay Pipe	Welding	Vanguard Generators	8	6.1	0.0007	0.0007	0.0025	0.0000	0.0000	0.0000
Locate/ Utility	Excavator	349	2	85.0	0.0216	0.0220	0.0783	0.0003	0.0007	0.0007
Locate/ Utility	Misc Equipment	3" Water Pump	6	661.3	0.0215	0.0215	0.0287	0.0001	0.0003	0.0003
Locate/ Utility	Trucks	F-250/ equivalent	6	170.1	0.0007	0.0052	0.5811	0.0002	0.0004	0.0004

Locate/ Utility	Trucks	F-450	3	172.4	0.0009	0.0064	0.7069	0.0003	0.0005	0.0005
Locate/ Utility	Trucks	Vaccum Excavator Truck	6	86.2	0.0008	0.0053	0.5891	0.0002	0.0004	0.0004
Locate/ Utility	Trucks	Water Truck	3	339.7	0.0018	0.0126	1.3928	0.0005	0.0009	0.0009
Road Bores	Misc Equipment	3" Water Pump	2	1,405.5	0.2864	0.2907	1.0356	0.0039	0.0094	0.0094
Road Bores	Bore Machine	30"- 48" Bore Machine	6	468.5	0.1280	0.1299	0.4628	0.0018	0.0042	0.0042
Road Bores	Excavator	349	12	160.8	0.0409	0.0416	0.1481	0.0006	0.0013	0.0013
Road Bores	Sideboom	587	12	1,124.4	0.2306	0.2341	0.8337	0.0032	0.0076	0.0076
Road Bores	Misc Equipment	6" Water Pump	24	60.9	0.0020	0.0020	0.0026	0.0000	0.0000	0.0000
Road Bores	Dozer	D8T	6	850.3	0.0672	0.0477	0.2118	0.0006	0.0020	0.0020
Road Bores	Trucks	F-250/ equivalent	16	2,550.9	0.0112	0.0787	8.7167	0.0031	0.0056	0.0056
Road Bores	Trucks	F-450	6	24.4	0.0001	0.0009	0.0999	0.0000	0.0001	0.0001
Road Bores	Welding	Lincoln 300 welders	12	12.2	0.0019	0.0019	0.0019	0.0000	0.0000	0.0000
Road Bores	Drilling	TT Tech Mud Pump	6	249.9	0.0227	0.0227	0.0234	0.0001	0.0003	0.0003
String	Excavator	349	2	332.8	0.0847	0.0860	0.3064	0.0012	0.0028	0.0028
String	Grader	140 Motor Grader	1	517.2	0.0761	0.0773	0.2753	0.0010	0.0025	0.0025
String	Dozer	D7	1	64.3	0.0098	0.0100	0.0356	0.0001	0.0003	0.0003
String	Trucks	F-250/ equivalent	4	57.5	0.0003	0.0018	0.1964	0.0001	0.0001	0.0001
String	Misc Equipment	Gator	1	64.3	0.0099	0.0099	0.0107	0.0000	0.0001	0.0001
String	Heavy Equipment	Rubber tire Hoe	2	135.9	0.0066	0.0066	0.0088	0.0000	0.0001	0.0001
String	Trucks	Stringing Trucks	30	31.2	0.0003	0.0019	0.2134	0.0001	0.0001	0.0001
String	Excavator Attach.	Vaccu-lift	2	86.2	0.0050	0.0050	0.0067	0.0000	0.0001	0.0001
Supervision	Heavy Equipment	973 Loader	2	1,124.4	0.2168	0.2201	0.7841	0.0030	0.0071	0.0071
Supervision	Trucks	F-250/ equivalent	24	93.7	0.0005	0.0034	0.3714	0.0001	0.0002	0.0002
Supervision	Trucks	F-450	1	83.2	0.0004	0.0031	0.3412	0.0001	0.0002	0.0002
Supervision	Trucks	Fuel Truck	2	28.1	0.0003	0.0019	0.2113	0.0001	0.0001	0.0001
Supervision	Trucks	Low Boy	8	321.7	0.0034	0.0238	2.6382	0.0009	0.0017	0.0017
Supervision	Trucks	Lube Truck	2	136.8	0.0008	0.0059	0.6544	0.0002	0.0004	0.0004
Supervision	Trucks	Mechanics Truck	15	149.9	0.0008	0.0056	0.6147	0.0002	0.0004	0.0004
Supervision	Trucks	Semi	8	227.4	0.0020	0.0140	1.5539	0.0006	0.0010	0.0010
Supervision	Trucks	Skid Truck	2	332.8	0.0023	0.0164	1.8196	0.0006	0.0012	0.0012
Supervision	Trucks	Stewards Truck	4	24.4	0.0001	0.0008	0.0832	0.0000	0.0001	0.0001

Supervision	Trucks	Stinger Truck	1	340.1
Supervision	Trucks	Water Truck	4	86.2
Testing	Excavator	349	1	14.4
Testing	Sideboom	583	1	83.2
Testing	Misc Equipment	1600 CFM Air Comp.	16	9.4
Testing	Misc Equipment	185 CFM Air Comp.	1	68.4
Testing	Trucks	F-250/ equivalent	4	112.4
Testing	Trucks	F-450	1	11.6
Testing	Testing	Fill Pump	4	48.7
Testing	Welding	Lincoln 300 welders	2	85.0
Testing	Testing	Pressure Pump	2	110.9
Testing	Trucks	Semi/ Float	1	184.9
Testing	Trucks	Water Truck	2	27.7
Tie Ins	Excavator	349	36	1,664.1
Tie Ins	Sideboom	583	9	739.6
Tie Ins	Sideboom	587	27	6.1
Tie Ins	Misc Equipment	185 CFM Air Comp.	9	55.5
Tie Ins	Misc Equipment	3" Water Pump	70	46.2
Tie Ins	Misc Equipment	6" Water Pump	18	101.7
Tie Ins	Dozer	D7	9	1,705.3
Tie Ins	Trucks	F-250/ equivalent	18	136.8
Tie Ins	Trucks	F-450	9	34.2
Tie Ins	Welding	Lincoln 300 welders	18	46.2
Tile	Excavator	320	12	12.2
Tile	Trucks	2 ton	9	900.7
Tile	Misc Equipment	3" Water Pump	24	900.7
Tile	Misc Equipment	6" Water Pump	12	1,574.1
Tile	Dozer	D5	6	170.5
Tile	Trucks	F-250/ equivalent	12	2,380.8

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Berne Lateral

Crew	Equipment Type ¹	Make/Model	Quantity	Total Operation (hr/project)	Project Emission Rate					
					NOx (tons/project)	VOC (tons/project)	CO (tons/project)	SO2 (tons/project)	PM10 (tons/project)	PM2.5 (tons/project)
Bend/ Setup	Sideboom	583	5	22.3	0.0046	0.0047	0.0166	0.0001	0.0002	0.0002
Bend/ Setup	Bending Machine	CRC Bending Machine	3	61.6	0.0129	0.0131	0.0466	0.0002	0.0004	0.0004
Bend/ Setup	Trucks	F-250/ equivalent	10	73.4	0.0003	0.0023	0.2507	0.0001	0.0002	0.0002
Clean Up	Excavator	336	5	8.8	0.0017	0.0017	0.0062	0.0000	0.0001	0.0001
Clean Up	Grader	14 Motor Grader	2	7.9	0.0013	0.0013	0.0047	0.0000	0.0000	0.0000
Clean Up	Trucks	2 ton	4	44.0	0.0002	0.0016	0.1805	0.0001	0.0001	0.0001
Clean Up	Dozer	D6	3	73.4	0.0098	0.0099	0.0353	0.0001	0.0003	0.0003
Clean Up	Dozer	D7	5	44.0	0.0067	0.0068	0.0244	0.0001	0.0002	0.0002
Clean Up	Dozer	D8	3	13.5	0.0028	0.0028	0.0099	0.0000	0.0001	0.0001
Clean Up	Trucks	F-250/ equivalent	4	8.8	0.0014	0.0014	0.0051	0.0000	0.0000	0.0000
Clean Up	Clean Up	Farm Tractor	5	88.1	0.0170	0.0172	0.0614	0.0002	0.0006	0.0006
Coating	Misc Equipment	750 CFM Air comp.	1	15.1	0.0015	0.0011	0.0048	0.0000	0.0000	0.0000
Coating	Trucks	Bus	2	105.7	0.0187	0.0190	0.0675	0.0003	0.0006	0.0006
Coating	Dozer	D6T	1	13.4	0.0018	0.0018	0.0064	0.0000	0.0001	0.0001
Coating	Trucks	F-250/ equivalent	3	159.8	0.0007	0.0049	0.5461	0.0002	0.0004	0.0004
Coating	Trucks	F-450	1	81.0	0.0004	0.0030	0.3322	0.0001	0.0002	0.0002
Coating	Coating	Heat Ring	1	117.4	0.0105	0.0075	0.0331	0.0001	0.0003	0.0003
Coating	Misc Equipment	Marooka	4	117.4	0.0170	0.0172	0.0614	0.0002	0.0006	0.0006
Drill Support	Excavator	349	5	140.9	0.0359	0.0364	0.1297	0.0005	0.0012	0.0012
Drill Support	Sideboom	583	15	73.4	0.0150	0.0153	0.0544	0.0002	0.0005	0.0005
Drill Support	Sideboom	587	5	88.1	0.0181	0.0183	0.0653	0.0002	0.0006	0.0006
Drill Support	Trucks	F-250/ equivalent	10	176.1	0.0008	0.0054	0.6018	0.0002	0.0004	0.0004
Drilling	Excavator	349	10	52.8	0.0134	0.0137	0.0486	0.0002	0.0004	0.0004
Drilling	Drilling	Drill Rig	5	60.5	0.0233	0.0237	0.0843	0.0003	0.0008	0.0008
Drilling	Trucks	F-250/ equivalent	10	42.9	0.0002	0.0013	0.1464	0.0001	0.0001	0.0001
Drilling	Drilling	Mud Pump	5	211.3	0.0815	0.0827	0.2947	0.0011	0.0027	0.0027
Environmental	Trucks	2 ton	3	26.7	0.0001	0.0010	0.1095	0.0000	0.0001	0.0001
Environmental	Misc Equipment	ASV	3	11.4	0.0011	0.0008	0.0036	0.0000	0.0000	0.0000
Environmental	Misc Equipment	Ditch Witch	3	639.3	0.0519	0.0519	0.0534	0.0001	0.0007	0.0007
Environmental	Trucks	F-250/ equivalent	6	162.0	0.0007	0.0050	0.5536	0.0002	0.0004	0.0004
Environmental	Trucks	F-450	3	26.7	0.0001	0.0010	0.1095	0.0000	0.0001	0.0001
Grade/ ROW	Excavator	336	6	29.4	0.0057	0.0058	0.0207	0.0001	0.0002	0.0002

Grade/ ROW	Grader	16 Motor Grader	2	17.6	0.0033	0.0033	0.0119	0.0000	0.0001	0.0001
Grade/ ROW	Dozer	D7	1	13.4	0.0020	0.0021	0.0074	0.0000	0.0001	0.0001
Grade/ ROW	Dozer	D8	10	6.7	0.0014	0.0014	0.0049	0.0000	0.0000	0.0000
Grade/ ROW	Trucks	F-250/ equivalent	3	43.4	0.0002	0.0013	0.1484	0.0001	0.0001	0.0001
Grade/ ROW	Trucks	F-450	2	13.5	0.0001	0.0005	0.0554	0.0000	0.0000	0.0000
Grade/ ROW	Clean Up	Farm Tractor	1	54.0	0.0104	0.0106	0.0377	0.0001	0.0003	0.0003
Lay Pipe	Sideboom	583	2	13.0	0.0027	0.0027	0.0097	0.0000	0.0001	0.0001
Lay Pipe	Excavator	336- Facing	4	13.0	0.0025	0.0026	0.0092	0.0000	0.0001	0.0001
Lay Pipe	Welding	572 Shack Tractor	8	35.3	0.0047	0.0048	0.0170	0.0001	0.0002	0.0002
Lay Pipe	Trucks	Bottle Truck	1	35.3	0.0002	0.0012	0.1326	0.0000	0.0001	0.0001
Lay Pipe	Trucks	Bus	2	1.3	0.0000	0.0000	0.0052	0.0000	0.0000	0.0000
Lay Pipe	Dozer	D6	1	64.3	0.0086	0.0087	0.0309	0.0001	0.0003	0.0003
Lay Pipe	Trucks	F-250/ equivalent	5	2.9	0.0000	0.0001	0.0100	0.0000	0.0000	0.0000
Lay Pipe	Misc Equipment	Gator	2	35.2	0.0054	0.0054	0.0058	0.0000	0.0001	0.0001
Lay Pipe	Misc Equipment	Generator	2	1.1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Lay Pipe	Misc Equipment	Marooka- buffing	1	15.3	0.0012	0.0009	0.0038	0.0000	0.0000	0.0000
Lay Pipe	Welding	Vanguard Generators	8	1.0	0.0001	0.0001	0.0004	0.0000	0.0000	0.0000
Locate/ Utility	Excavator	349	2	13.3	0.0034	0.0034	0.0123	0.0000	0.0001	0.0001
Locate/ Utility	Misc Equipment	3" Water Pump	6	103.6	0.0034	0.0034	0.0045	0.0000	0.0000	0.0000
Locate/ Utility	Trucks	F-250/ equivalent	6	26.6	0.0001	0.0008	0.0910	0.0000	0.0001	0.0001
Locate/ Utility	Trucks	F-450	3	27.0	0.0001	0.0010	0.1107	0.0000	0.0001	0.0001

Locate/ Utility	Trucks	Vaccum Excavator Truc	6	13.5
Locate/ Utility	Trucks	Water Truck	3	53.2
Road Bores	Misc Equipment	3" Water Pump	2	220.1
Road Bores	Bore Machine	30"- 48" Bore Machine	6	73.4
Road Bores	Excavator	349	12	25.2
Road Bores	Sideboom	587	12	176.1
Road Bores	Misc Equipment	6" Water Pump	24	9.5
Road Bores	Dozer	D8T	6	133.2
Road Bores	Trucks	F-250/ equivalent	16	399.5
Road Bores	Trucks	F-450	6	3.8
Road Bores	Welding	Lincoln 300 welders	12	1.9
Road Bores	Drilling	TT Tech Mud Pump	6	39.1
String	Excavator	349	2	52.1
String	Grader	140 Motor Grader	1	81.0
String	Dozer	D7	1	10.1
String	Trucks	F-250/ equivalent	4	9.0
String	Misc Equipment	Gator	1	10.1
String	Heavy Equipment	Rubber tire Hoe	2	21.3
String	Trucks	Stringing Trucks	30	4.9
String	Excavator Attach.	Vaccu-lift	2	13.5
Supervision	Heavy Equipment	973 Loader	2	176.1
Supervision	Trucks	F-250/ equivalent	24	14.7
Supervision	Trucks	F-450	1	13.0
Supervision	Trucks	Fuel Truck	2	4.4
Supervision	Trucks	Low Boy	8	50.4
Supervision	Trucks	Lube Truck	2	21.4
Supervision	Trucks	Mechanics Truck	15	23.5
Supervision	Trucks	Semi	8	35.6
Supervision	Trucks	Skid Truck	2	52.1
Supervision	Trucks	Stewards Truck	4	3.8
Supervision	Trucks	Stinger Truck	1	53.3
Supervision	Trucks	Water Truck	4	13.5
Testing	Excavator	349	1	2.3
Testing	Sideboom	583	1	13.0
Testing	Misc Equipment	1600 CFM Air Comp.	16	1.5
Testing	Misc Equipment	185 CFM Air Comp.	1	10.7

0.0001	0.0008	0.0923	0.0000	0.0001	0.0001
0.0003	0.0020	0.2181	0.0001	0.0001	0.0001
0.0449	0.0455	0.1622	0.0006	0.0015	0.0015
0.0200	0.0204	0.0725	0.0003	0.0007	0.0007
0.0064	0.0065	0.0232	0.0001	0.0002	0.0002
0.0361	0.0367	0.1306	0.0005	0.0012	0.0012
0.0003	0.0003	0.0004	0.0000	0.0000	0.0000
0.0105	0.0075	0.0332	0.0001	0.0003	0.0003
0.0018	0.0123	1.3653	0.0005	0.0009	0.0009
0.0000	0.0001	0.0156	0.0000	0.0000	0.0000
0.0003	0.0003	0.0003	0.0000	0.0000	0.0000
0.0036	0.0036	0.0037	0.0000	0.0001	0.0001
0.0133	0.0135	0.0480	0.0002	0.0004	0.0004
0.0119	0.0121	0.0431	0.0002	0.0004	0.0004
0.0015	0.0016	0.0056	0.0000	0.0001	0.0001
0.0000	0.0003	0.0308	0.0000	0.0000	0.0000
0.0016	0.0016	0.0017	0.0000	0.0000	0.0000
0.0010	0.0010	0.0014	0.0000	0.0000	0.0000
0.0000	0.0003	0.0334	0.0000	0.0000	0.0000
0.0008	0.0008	0.0011	0.0000	0.0000	0.0000
0.0340	0.0345	0.1228	0.0005	0.0011	0.0011
0.0001	0.0005	0.0582	0.0000	0.0000	0.0000
0.0001	0.0005	0.0534	0.0000	0.0000	0.0000
0.0000	0.0003	0.0331	0.0000	0.0000	0.0000
0.0005	0.0037	0.4132	0.0001	0.0003	0.0003
0.0001	0.0009	0.1025	0.0000	0.0001	0.0001
0.0001	0.0009	0.0963	0.0000	0.0001	0.0001
0.0003	0.0022	0.2434	0.0001	0.0002	0.0002
0.0004	0.0026	0.2850	0.0001	0.0002	0.0002
0.0000	0.0001	0.0130	0.0000	0.0000	0.0000
0.0005	0.0036	0.4005	0.0001	0.0003	0.0003
0.0001	0.0005	0.0554	0.0000	0.0000	0.0000
0.0006	0.0006	0.0021	0.0000	0.0000	0.0000
0.0027	0.0027	0.0097	0.0000	0.0001	0.0001
0.0006	0.0006	0.0020	0.0000	0.0000	0.0000
0.0010	0.0007	0.0030	0.0000	0.0000	0.0000

Testing	Trucks	F-250/ equivalent	4	17.6	0.0028	0.0029	0.0102	0.0000	0.0001	0.0001
Testing	Trucks	F-450	1	1.8	0.0003	0.0004	0.0013	0.0000	0.0000	0.0000
Testing	Testing	Fill Pump	4	7.6	0.0017	0.0017	0.0062	0.0000	0.0001	0.0001
Testing	Welding	Lincoln 300 welders	2	13.3	0.0020	0.0020	0.0021	0.0000	0.0000	0.0000
Testing	Testing	Pressure Pump	2	17.4	0.0045	0.0045	0.0162	0.0001	0.0001	0.0001
Testing	Trucks	Semi/ Float	1	29.0	0.0003	0.0018	0.1979	0.0001	0.0001	0.0001
Testing	Trucks	Water Truck	2	4.3	0.0000	0.0002	0.0178	0.0000	0.0000	0.0000
Tie Ins	Excavator	349	36	260.6	0.0664	0.0674	0.2399	0.0009	0.0022	0.0022
Tie Ins	Sideboom	583	9	115.8	0.0238	0.0241	0.0859	0.0003	0.0008	0.0008
Tie Ins	Sideboom	587	27	1.0	0.0002	0.0002	0.0007	0.0000	0.0000	0.0000
Tie Ins	Misc Equipment	185 CFM Air Comp.	9	8.7	0.0008	0.0006	0.0025	0.0000	0.0000	0.0000
Tie Ins	Misc Equipment	3" Water Pump	70	7.2	0.0002	0.0002	0.0003	0.0000	0.0000	0.0000
Tie Ins	Misc Equipment	6" Water Pump	18	15.9	0.0013	0.0009	0.0040	0.0000	0.0000	0.0000
Tie Ins	Dozer	D7	9	267.1	0.0409	0.0415	0.1478	0.0006	0.0013	0.0013
Tie Ins	Trucks	F-250/ equivalent	18	21.4	0.0001	0.0007	0.0732	0.0000	0.0000	0.0000
Tie Ins	Trucks	F-450	9	5.4	0.0000	0.0002	0.0220	0.0000	0.0000	0.0000
Tie Ins	Welding	Lincoln 300 welders	18	7.2	0.0011	0.0011	0.0011	0.0000	0.0000	0.0000
Tile	Excavator	320	12	1.9	0.0002	0.0002	0.0010	0.0000	0.0000	0.0000
Tile	Trucks	2 ton	9	141.1	0.0007	0.0052	0.5785	0.0002	0.0004	0.0004
Tile	Misc Equipment	3" Water Pump	24	141.1	0.0046	0.0046	0.0061	0.0000	0.0001	0.0001
Tile	Misc Equipment	6" Water Pump	12	246.5	0.0195	0.0138	0.0614	0.0002	0.0006	0.0006
Tile	Dozer	D5	6	26.7	0.0030	0.0031	0.0109	0.0000	0.0001	0.0001
Tile	Trucks	F-250/ equivalent	12	372.9	0.0016	0.0115	1.2743	0.0005	0.0008	0.0008
Total					0.8	0.8	11.6	0.0	0.0	0.0

Sherwood & CGT Lateral

Crew	Equipment Type ¹	Make/Model	Quantity	Total Operation (hr/project)	Project Emission Rate					
					NOx (tons/project)	VOC (tons/project)	CO (tons/project)	SO2 (tons/project)	PM10 (tons/project)	PM2.5 (tons/project)
Bend/ Setup	Sideboom	583	5	352.3	0.0723	0.0733	0.2613	0.0010	0.0024	0.0024
Bend/ Setup	Bending Machine	CRC Bending Machine	3	972.0	0.2031	0.2061	0.7343	0.0028	0.0067	0.0067
Bend/ Setup	Trucks	F-250/ equivalent	10	1,157.1	0.0051	0.0357	3.9539	0.0014	0.0026	0.0026

Clean Up	Excavator	336	5	138.9	0.0270	0.0275	0.0978	0.0004	0.0009	0.0009
Clean Up	Grader	14 Motor Grader	2	124.2	0.0207	0.0210	0.0748	0.0003	0.0007	0.0007
Clean Up	Trucks	2 ton	4	694.3	0.0037	0.0257	2.8468	0.0010	0.0018	0.0018
Clean Up	Dozer	D6	3	1,157.1	0.1540	0.1563	0.5568	0.0021	0.0051	0.0051
Clean Up	Dozer	D7	5	694.3	0.1062	0.1078	0.3841	0.0015	0.0035	0.0035
Clean Up	Dozer	D8	3	212.9	0.0434	0.0440	0.1569	0.0006	0.0014	0.0014
Clean Up	Trucks	F-250/ equivalent	4	138.9	0.0223	0.0227	0.0807	0.0003	0.0007	0.0007
Clean Up	Clean Up	Farm Tractor	5	1,388.5	0.2678	0.2718	0.9683	0.0037	0.0088	0.0088
Coating	Misc Equipment	750 CFM Air comp.	1	238.4	0.0239	0.0170	0.0752	0.0002	0.0007	0.0007
Coating	Trucks	Bus	2	1,666.2	0.2946	0.2990	1.0651	0.0040	0.0097	0.0097
Coating	Dozer	D6T	1	210.6	0.0280	0.0284	0.1013	0.0004	0.0009	0.0009
Coating	Trucks	F-250/ equivalent	3	2,520.2	0.0111	0.0778	8.6117	0.0031	0.0056	0.0056
Coating	Trucks	F-450	1	1,277.4	0.0068	0.0473	5.2382	0.0019	0.0034	0.0034
Coating	Coating	Heat Ring	1	1,851.4	0.1658	0.1178	0.5226	0.0014	0.0049	0.0049
Coating	Misc Equipment	Marooka	4	1,851.4	0.2678	0.2718	0.9683	0.0037	0.0088	0.0088
Drill Support	Excavator	349	5	2,221.6	0.5656	0.5741	2.0450	0.0078	0.0186	0.0186
Drill Support	Sideboom	583	15	1,157.1	0.2373	0.2409	0.8580	0.0033	0.0078	0.0078
Drill Support	Sideboom	587	5	1,388.5	0.2847	0.2890	1.0296	0.0039	0.0094	0.0094
Drill Support	Trucks	F-250/ equivalent	10	2,777.0	0.0122	0.0857	9.4895	0.0034	0.0061	0.0061
Drilling	Excavator	349	10	833.1	0.2121	0.2153	0.7669	0.0029	0.0070	0.0070
Drilling	Drilling	Drill Rig	5	953.5	0.3678	0.3733	1.3298	0.0050	0.0121	0.0121
Drilling	Trucks	F-250/ equivalent	10	675.7	0.0030	0.0209	2.3091	0.0008	0.0015	0.0015
Drilling	Drilling	Mud Pump	5	3,332.5	1.2854	1.3048	4.6478	0.0176	0.0423	0.0423
Environmental	Trucks	2 ton	3	421.2	0.0022	0.0156	1.7271	0.0006	0.0011	0.0011
Environmental	Misc Equipment	ASV	3	180.5	0.0181	0.0128	0.0569	0.0002	0.0005	0.0005
Environmental	Misc Equipment	Ditch Witch	3	10,080.7	0.8192	0.8192	0.8427	0.0022	0.0116	0.0116
Environmental	Trucks	F-250/ equivalent	6	2,554.9	0.0113	0.0789	8.7303	0.0031	0.0056	0.0056
Environmental	Trucks	F-450	3	421.2	0.0022	0.0156	1.7271	0.0006	0.0011	0.0011
Grade/ ROW	Excavator	336	6	462.8	0.0902	0.0915	0.3260	0.0012	0.0030	0.0030
Grade/ ROW	Grader	16 Motor Grader	2	277.7	0.0518	0.0526	0.1872	0.0007	0.0017	0.0017
Grade/ ROW	Dozer	D7	1	210.6	0.0322	0.0327	0.1165	0.0004	0.0011	0.0011
Grade/ ROW	Dozer	D8	10	105.3	0.0215	0.0218	0.0776	0.0003	0.0007	0.0007
Grade/ ROW	Trucks	F-250/ equivalent	3	685.0	0.0030	0.0211	2.3407	0.0008	0.0015	0.0015
Grade/ ROW	Trucks	F-450	2	212.9	0.0011	0.0079	0.8730	0.0003	0.0006	0.0006
Grade/ ROW	Clean Up	Farm Tractor	1	851.6	0.1642	0.1667	0.5939	0.0023	0.0054	0.0054
Lay Pipe	Sideboom	583	2	205.5	0.0421	0.0428	0.1524	0.0006	0.0014	0.0014
Lay Pipe	Excavator	336- Facing	4	205.5	0.0400	0.0406	0.1447	0.0005	0.0013	0.0013
Lay Pipe	Welding	572 Shack Tractor	8	556.2	0.0740	0.0751	0.2676	0.0010	0.0024	0.0024

Lay Pipe	Trucks	Bottle Truck	1	556.2	0.0027	0.0189	2.0906	0.0007	0.0013	0.0013
Lay Pipe	Trucks	Bus	2	19.9	0.0001	0.0007	0.0815	0.0000	0.0001	0.0001
Lay Pipe	Dozer	D6	1	1,013.6	0.1349	0.1369	0.4877	0.0019	0.0044	0.0044
Lay Pipe	Trucks	F-250/ equivalent	5	46.3	0.0002	0.0014	0.1582	0.0001	0.0001	0.0001
Lay Pipe	Misc Equipment	Gator	2	555.4	0.0858	0.0858	0.0922	0.0002	0.0010	0.0010
Lay Pipe	Misc Equipment	Generator	2	17.5	0.0006	0.0006	0.0008	0.0000	0.0000	0.0000
Lay Pipe	Misc Equipment	Marooka- buffing	1	240.7	0.0190	0.0135	0.0599	0.0002	0.0006	0.0006
Lay Pipe	Welding	Vanguard Generators	8	15.0	0.0017	0.0017	0.0061	0.0000	0.0001	0.0001
Locate/ Utility	Excavator	349	2	210.0	0.0535	0.0543	0.1933	0.0007	0.0018	0.0018
Locate/ Utility	Misc Equipment	3" Water Pump	6	1,633.4	0.0531	0.0531	0.0709	0.0001	0.0007	0.0007
Locate/ Utility	Trucks	F-250/ equivalent	6	420.0	0.0019	0.0130	1.4353	0.0005	0.0009	0.0009
Locate/ Utility	Trucks	F-450	3	425.8	0.0023	0.0158	1.7461	0.0006	0.0011	0.0011
Locate/ Utility	Trucks	Vaccum Excavator Truck	6	212.9	0.0019	0.0131	1.4551	0.0005	0.0009	0.0009
Locate/ Utility	Trucks	Water Truck	3	838.9	0.0044	0.0311	3.4399	0.0012	0.0022	0.0022
Road Bores	Misc Equipment	3" Water Pump	2	3,471.3	0.7074	0.7181	2.5579	0.0097	0.0233	0.0233
Road Bores	Bore Machine	30"- 48" Bore Machine	6	1,157.1	0.3161	0.3209	1.1431	0.0043	0.0104	0.0104
Road Bores	Excavator	349	12	397.3	0.1011	0.1027	0.3657	0.0014	0.0033	0.0033
Road Bores	Sideboom	587	12	2,777.0	0.5695	0.5781	2.0592	0.0078	0.0187	0.0187
Road Bores	Misc Equipment	6" Water Pump	24	150.4	0.0049	0.0049	0.0065	0.0000	0.0001	0.0001
Road Bores	Dozer	D8T	6	2,100.1	0.1660	0.1179	0.5231	0.0014	0.0049	0.0049
Road Bores	Trucks	F-250/ equivalent	16	6,300.4	0.0278	0.1945	21.5292	0.0076	0.0139	0.0139
Road Bores	Trucks	F-450	6	60.2	0.0003	0.0022	0.2467	0.0001	0.0002	0.0002
Road Bores	Welding	Lincoln 300 welders	12	30.1	0.0046	0.0046	0.0047	0.0000	0.0001	0.0001
Road Bores	Drilling	TT Tech Mud Pump	6	617.1	0.0562	0.0562	0.0578	0.0002	0.0008	0.0008
String	Excavator	349	2	822.0	0.2093	0.2124	0.7567	0.0029	0.0069	0.0069
String	Grader	140 Motor Grader	1	1,277.4	0.1881	0.1909	0.6800	0.0026	0.0062	0.0062
String	Dozer	D7	1	158.9	0.0243	0.0247	0.0879	0.0003	0.0008	0.0008
String	Trucks	F-250/ equivalent	4	141.9	0.0006	0.0044	0.4850	0.0002	0.0003	0.0003
String	Misc Equipment	Gator	1	158.9	0.0246	0.0246	0.0264	0.0001	0.0003	0.0003
String	Heavy Equipment	Rubber tire Hoe	2	335.6	0.0164	0.0164	0.0218	0.0000	0.0002	0.0002
String	Trucks	Stringing Trucks	30	77.1	0.0007	0.0048	0.5272	0.0002	0.0003	0.0003
String	Excavator Attach.	Vaccu-lift	2	212.9	0.0125	0.0125	0.0166	0.0000	0.0002	0.0002
Supervision	Heavy Equipment	973 Loader	2	2,777.0	0.5356	0.5437	1.9366	0.0073	0.0176	0.0176
Supervision	Trucks	F-250/ equivalent	24	231.4	0.0012	0.0083	0.9173	0.0003	0.0006	0.0006

Supervision	Trucks	F-450	1	205.5	0.0011	0.0076	0.8427	0.0003	0.0005	0.0005
Supervision	Trucks	Fuel Truck	2	69.4	0.0007	0.0047	0.5219	0.0002	0.0003	0.0003
Supervision	Trucks	Low Boy	8	794.5	0.0084	0.0589	6.5161	0.0023	0.0042	0.0042
Supervision	Trucks	Lube Truck	2	337.9	0.0021	0.0146	1.6164	0.0006	0.0010	0.0010
Supervision	Trucks	Mechanics Truck	15	370.3	0.0020	0.0137	1.5183	0.0005	0.0010	0.0010
Supervision	Trucks	Semi	8	561.6	0.0050	0.0347	3.8380	0.0014	0.0025	0.0025
Supervision	Trucks	Skid Truck	2	822.0	0.0058	0.0406	4.4942	0.0016	0.0029	0.0029
Supervision	Trucks	Stewards Truck	4	60.2	0.0003	0.0019	0.2056	0.0001	0.0001	0.0001
Supervision	Trucks	Stinger Truck	1	840.1	0.0081	0.0570	6.3152	0.0022	0.0041	0.0041
Supervision	Trucks	Water Truck	4	212.9	0.0011	0.0079	0.8730	0.0003	0.0006	0.0006
Testing	Excavator	349	1	35.5	0.0090	0.0092	0.0327	0.0001	0.0003	0.0003
Testing	Sideboom	583	1	205.5	0.0421	0.0428	0.1524	0.0006	0.0014	0.0014
Testing	Misc Equipment	1600 CFM Air Comp.	16	23.1	0.0089	0.0091	0.0323	0.0001	0.0003	0.0003
Testing	Misc Equipment	185 CFM Air Comp.	1	168.9	0.0151	0.0108	0.0477	0.0001	0.0004	0.0004
Testing	Trucks	F-250/ equivalent	4	277.7	0.0446	0.0453	0.1614	0.0006	0.0015	0.0015
Testing	Trucks	F-450	1	28.5	0.0055	0.0056	0.0199	0.0001	0.0002	0.0002
Testing	Testing	Fill Pump	4	120.3	0.0271	0.0275	0.0979	0.0004	0.0009	0.0009
Testing	Welding	Lincoln 300 welders	2	210.0	0.0321	0.0321	0.0330	0.0001	0.0005	0.0005
Testing	Testing	Pressure Pump	2	274.0	0.0705	0.0715	0.2548	0.0010	0.0023	0.0023
Testing	Trucks	Semi/ Float	1	456.7	0.0040	0.0282	3.1210	0.0011	0.0020	0.0020
Testing	Trucks	Water Truck	2	68.5	0.0004	0.0025	0.2809	0.0001	0.0002	0.0002
Tie Ins	Excavator	349	36	4,110.0	1.0463	1.0621	3.7833	0.0144	0.0344	0.0344
Tie Ins	Sideboom	583	9	1,826.7	0.3746	0.3803	1.3545	0.0051	0.0123	0.0123
Tie Ins	Sideboom	587	27	15.0	0.0031	0.0031	0.0112	0.0000	0.0001	0.0001
Tie Ins	Misc Equipment	185 CFM Air Comp.	9	137.0	0.0123	0.0087	0.0387	0.0001	0.0004	0.0004
Tie Ins	Misc Equipment	3" Water Pump	70	114.2	0.0037	0.0037	0.0050	0.0000	0.0001	0.0001
Tie Ins	Misc Equipment	6" Water Pump	18	251.2	0.0199	0.0141	0.0626	0.0002	0.0006	0.0006
Tie Ins	Dozer	D7	9	4,211.9	0.6444	0.6541	2.3301	0.0088	0.0212	0.0212
Tie Ins	Trucks	F-250/ equivalent	18	337.9	0.0015	0.0104	1.1546	0.0004	0.0007	0.0007
Tie Ins	Trucks	F-450	9	84.5	0.0004	0.0031	0.3464	0.0001	0.0002	0.0002
Tie Ins	Welding	Lincoln 300 welders	18	114.2	0.0174	0.0174	0.0179	0.0000	0.0002	0.0002
Tile	Excavator	320	12	30.1	0.0030	0.0030	0.0153	0.0000	0.0001	0.0001
Tile	Trucks	2 ton	9	2,224.7	0.0118	0.0824	9.1225	0.0032	0.0059	0.0059
Tile	Misc Equipment	3" Water Pump	24	2,224.7	0.0723	0.0723	0.0966	0.0002	0.0010	0.0010
Tile	Misc Equipment	6" Water Pump	12	3,887.9	0.3073	0.2183	0.9684	0.0026	0.0090	0.0090
Tile	Dozer	D5	6	421.2	0.0474	0.0481	0.1713	0.0006	0.0016	0.0016
Tile	Trucks	F-250/ equivalent	12	5,880.4	0.0259	0.1815	20.0939	0.0071	0.0130	0.0130
Total					12.3	13.3	183.2	0.2	0.5	0.5

¹ List includes representative equipment for all activities (clearing & grading, ditching, bending, etc.) and crew types (welding crew, coating crew, lowering crew, etc.).

² Based on values presented in EPA guidance document "Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling" (EPA420-P-04-005 dated April 2004).

⁴ Factors developed using methodology presented in EPA guidance documents "Exhaust and Crankcase Emission Factors for Nonroad Engine Emissions Modeling--Compression-Ignition" and "Exhaust Emission Factors

⁵ Project Emissions Rate = Engine Rating (hp) x Load Factor x Total Operation (hr/project) x Exhaust Emission Factor (g/hp-hr) / 453.6 grams/lb / 2000 lb/ton

**Table 9A-28
Rover Construction Activity Green House Gas Emissions - Precision**

Crew	Equipment Type ¹	Make/Model	Fuel	Engine Rating (Horsepow	Fuel Use	Emission Factors (g/gal) ²		
					gal/hr	CO ₂	N ₂ O	CH ₄
Bend/ Setup	Sideboom	583	Diesel	319	17.33078	10210	0.26	0.57
Bend/ Setup	Bending Machine	CRC Bending Machine	Diesel	325	17.65675	10210	0.26	0.57
Bend/ Setup	Trucks	F-250/ equivalent	Diesel	250	13.58212	10210	0.26	0.57
Clean Up	Excavator	336	Diesel	303	16.46153	10210	0.26	0.57
Clean Up	Grader	14 Motor Grader	Diesel	259	14.07107	10210	0.26	0.57
Clean Up	Trucks	2 ton	Diesel	300	16.29854	10210	0.26	0.57
Clean Up	Dozer	D6	Diesel	207	11.24599	10210	0.26	0.57
Clean Up	Dozer	D7	Diesel	238	12.93018	10210	0.26	0.57
Clean Up	Dozer	D8	Diesel	317	17.22212	10210	0.26	0.57
Clean Up	Trucks	F-250/ equivalent	Diesel	250	13.58212	10210	0.26	0.57
Clean Up	Clean Up	Farm Tractor	Diesel	300	16.29854	10210	0.26	0.57
Coating	Misc Equipment	750 CFM Air comp.	Diesel	95	5.161204	10210	0.26	0.57
Coating	Trucks	Bus	Diesel	275	14.94033	10210	0.26	0.57
Coating	Dozer	D6T	Diesel	207	11.24599	10210	0.26	0.57
Coating	Trucks	F-250/ equivalent	Diesel	250	13.58212	10210	0.26	0.57
Coating	Trucks	F-450	Diesel	300	16.29854	10210	0.26	0.57
Coating	Coating	Heat Ring	Diesel	85	4.61792	10210	0.26	0.57
Coating	Misc Equipment	Marooka	Diesel	225	12.22391	10210	0.26	0.57
Drill Support	Excavator	349	Diesel	396	21.51407	10210	0.26	0.57
Drill Support	Sideboom	583	Diesel	319	17.33078	10210	0.26	0.57
Drill Support	Sideboom	587	Diesel	319	17.33078	10210	0.26	0.57
Drill Support	Trucks	F-250/ equivalent	Diesel	250	13.58212	10210	0.26	0.57
Drilling	Excavator	349	Diesel	396	21.51407	10210	0.26	0.57
Drilling	Drilling	Drill Rig	Diesel	600	32.59708	10210	0.26	0.57
Drilling	Trucks	F-250/ equivalent	Diesel	250	13.58212	10210	0.26	0.57
Drilling	Drilling	Mud Pump	Diesel	600	32.59708	10210	0.26	0.57
Environmental	Trucks	2 ton	Diesel	300	16.29854	10210	0.26	0.57
Environmental	Misc Equipment	ASV	Diesel	95	5.161204	10210	0.26	0.57
Environmental	Misc Equipment	Ditch Witch	Diesel	25	1.358212	10210	0.26	0.57
Environmental	Trucks	F-250/ equivalent	Diesel	250	13.58212	10210	0.26	0.57
Environmental	Trucks	F-450	Diesel	300	16.29854	10210	0.26	0.57
Grade/ ROW	Excavator	336	Diesel	303	16.46153	10210	0.26	0.57
Grade/ ROW	Grader	16 Motor Grader	Diesel	290	15.75526	10210	0.26	0.57
Grade/ ROW	Dozer	D7	Diesel	238	12.93018	10210	0.26	0.57
Grade/ ROW	Dozer	D8	Diesel	317	17.22212	10210	0.26	0.57
Grade/ ROW	Trucks	F-250/ equivalent	Diesel	250	13.58212	10210	0.26	0.57
Grade/ ROW	Trucks	F-450	Diesel	300	16.29854	10210	0.26	0.57
Grade/ ROW	Clean Up	Farm Tractor	Diesel	300	16.29854	10210	0.26	0.57
Lay Pipe	Sideboom	583	Diesel	319	17.33078	10210	0.26	0.57
Lay Pipe	Excavator	336- Facing	Diesel	303	16.46153	10210	0.26	0.57
Lay Pipe	Welding	572 Shack Tractor	Diesel	207	11.24599	10210	0.26	0.57
Lay Pipe	Trucks	Bottle Truck	Diesel	275	14.94033	10210	0.26	0.57
Lay Pipe	Trucks	Bus	Diesel	300	16.29854	10210	0.26	0.57
Lay Pipe	Dozer	D6	Diesel	207	11.24599	10210	0.26	0.57
Lay Pipe	Trucks	F-250/ equivalent	Diesel	250	13.58212	10210	0.26	0.57
Lay Pipe	Misc Equipment	Gator	Diesel	50	2.716423	10210	0.26	0.57
Lay Pipe	Misc Equipment	Generator	Diesel	10	0.543285	10210	0.26	0.57
Lay Pipe	Misc Equipment	Marooka- buffing	Diesel	75	4.074635	10210	0.26	0.57
Lay Pipe	Welding	Vanguard Generators	Diesel	175	9.507482	10210	0.26	0.57
Locate/ Utility	Excavator	349	Diesel	396	21.51407	10210	0.26	0.57
Locate/ Utility	Misc Equipment	3" Water Pump	Diesel	10	0.543285	10210	0.26	0.57
Locate/ Utility	Trucks	F-250/ equivalent	Diesel	250	13.58212	10210	0.26	0.57
Locate/ Utility	Trucks	F-450	Diesel	300	16.29854	10210	0.26	0.57
Locate/ Utility	Trucks	Vaccum Excavator Truc	Diesel	500	27.16423	10210	0.26	0.57
Locate/ Utility	Trucks	Water Truck	Diesel	300	16.29854	10210	0.26	0.57
Road Bores	Misc Equipment	3" Water Pump	Diesel	317	17.22212	10210	0.26	0.57
Road Bores	Bore Machine	30"- 48" Bore Machine	Diesel	425	23.0896	10210	0.26	0.57
Road Bores	Excavator	349	Diesel	396	21.51407	10210	0.26	0.57
Road Bores	Sideboom	587	Diesel	319	17.33078	10210	0.26	0.57

Road Bores	Misc Equipment	6" Water Pump	Diesel	10	0.543285	10210	0.26	0.57
Road Bores	Dozer	D8T	Diesel	75	4.074635	10210	0.26	0.57
Road Bores	Trucks	F-250/ equivalent	Diesel	250	13.58212	10210	0.26	0.57
Road Bores	Trucks	F-450	Diesel	300	16.29854	10210	0.26	0.57
Road Bores	Welding	Lincoln 300 welders	Diesel	47	2.553438	10210	0.26	0.57
Road Bores	Drilling	TT Tech Mud Pump	Diesel	28	1.521197	10210	0.26	0.57
String	Excavator	349	Diesel	396	21.51407	10210	0.26	0.57
String	Grader	140 Motor Grader	Diesel	229	12.44122	10210	0.26	0.57
String	Dozer	D7	Diesel	238	12.93018	10210	0.26	0.57
String	Trucks	F-250/ equivalent	Diesel	250	13.58212	10210	0.26	0.57
String	Misc Equipment	Gator	Diesel	50	2.716423	10210	0.26	0.57
String	Heavy Equipment	Rubber tire Hoe	Diesel	15	0.814927	10210	0.26	0.57
String	Trucks	Stringing Trucks	Diesel	500	27.16423	10210	0.26	0.57
String	Excavator Attach.	Vaccu-lift	Diesel	18	0.977912	10210	0.26	0.57
Supervision	Heavy Equipment	973 Loader	Diesel	300	16.29854	10210	0.26	0.57
Supervision	Trucks	F-250/ equivalent	Diesel	290	15.75526	10210	0.26	0.57
Supervision	Trucks	F-450	Diesel	300	16.29854	10210	0.26	0.57
Supervision	Trucks	Fuel Truck	Diesel	550	29.88066	10210	0.26	0.57
Supervision	Trucks	Low Boy	Diesel	600	32.59708	10210	0.26	0.57
Supervision	Trucks	Lube Truck	Diesel	350	19.01496	10210	0.26	0.57
Supervision	Trucks	Mechanics Truck	Diesel	300	16.29854	10210	0.26	0.57
Supervision	Trucks	Semi	Diesel	500	27.16423	10210	0.26	0.57
Supervision	Trucks	Skid Truck	Diesel	400	21.73139	10210	0.26	0.57
Supervision	Trucks	Stewards Truck	Diesel	250	13.58212	10210	0.26	0.57
Supervision	Trucks	Stinger Truck	Diesel	550	29.88066	10210	0.26	0.57
Supervision	Trucks	Water Truck	Diesel	300	16.29854	10210	0.26	0.57
Testing	Excavator	349	Diesel	396	21.51407	10210	0.26	0.57
Testing	Sideboom	583	Diesel	319	17.33078	10210	0.26	0.57
Testing	Misc Equipment	1600 CFM Air Comp.	Diesel	600	32.59708	10210	0.26	0.57
Testing	Misc Equipment	185 CFM Air Comp.	Diesel	85	4.61792	10210	0.26	0.57
Testing	Trucks	F-250/ equivalent	Diesel	250	13.58212	10210	0.26	0.57
Testing	Trucks	F-450	Diesel	300	16.29854	10210	0.26	0.57
Testing	Testing	Fill Pump	Diesel	350	19.01496	10210	0.26	0.57
Testing	Welding	Lincoln 300 welders	Diesel	47	2.553438	10210	0.26	0.57
Testing	Testing	Pressure Pump	Diesel	400	21.73139	10210	0.26	0.57
Testing	Trucks	Semi/ Float	Diesel	500	27.16423	10210	0.26	0.57
Testing	Trucks	Water Truck	Diesel	300	16.29854	10210	0.26	0.57
Tie Ins	Excavator	349	Diesel	396	21.51407	10210	0.26	0.57
Tie Ins	Sideboom	583	Diesel	319	17.33078	10210	0.26	0.57
Tie Ins	Sideboom	587	Diesel	319	17.33078	10210	0.26	0.57
Tie Ins	Misc Equipment	185 CFM Air Comp.	Diesel	85	4.61792	10210	0.26	0.57
Tie Ins	Misc Equipment	3" Water Pump	Diesel	10	0.543285	10210	0.26	0.57
Tie Ins	Misc Equipment	6" Water Pump	Diesel	75	4.074635	10210	0.26	0.57
Tie Ins	Dozer	D7	Diesel	238	12.93018	10210	0.26	0.57
Tie Ins	Trucks	F-250/ equivalent	Diesel	250	13.58212	10210	0.26	0.57
Tie Ins	Trucks	F-450	Diesel	300	16.29854	10210	0.26	0.57
Tie Ins	Welding	Lincoln 300 welders	Diesel	47	2.553438	10210	0.26	0.57
Tile	Excavator	320	Diesel	153	8.312255	10210	0.26	0.57
Tile	Trucks	2 ton	Diesel	300	16.29854	10210	0.26	0.57
Tile	Misc Equipment	3" Water Pump	Diesel	10	0.543285	10210	0.26	0.57
Tile	Misc Equipment	6" Water Pump	Diesel	75	4.074635	10210	0.26	0.57
Tile	Dozer	D5	Diesel	175	9.507482	10210	0.26	0.57
Tile	Trucks	F-250/ equivalent	Diesel	250	13.58212	10210	0.26	0.57

¹ Horsepowers supplied by contractor

² Source of emission factors - Emission Factors for Greenhouse Gas Inventories, 4 April 2014

³ Emissions Equation = EF g/gal * Gallons of fuel total / 453.6g/lb / 2000lb/ton

⁴ CO2e based on global warming potential of CO2=1, N2O=298, CH4=25

Spread 5,6,7,8

Crew	Equipment Type ¹	Make/Model	total operational hours	gallons of fuel total	Emissions (tons) ³			
					CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Bend/ Setup	Sideboom	583	1522.5	26386.11	296.9601	0.007562	0.016579	299.6281
Bend/ Setup	Bending Machine	CRC Bending Machine	913.5	16129.44	181.5273	0.004623	0.010134	183.1583
Bend/ Setup	Trucks	F-250/ equivalent	5220	70898.65	797.9224	0.020319	0.044546	805.0912
Clean Up	Excavator	336	3000	49384.58	555.7942	0.014153	0.031029	560.7877
Clean Up	Grader	14 Motor Grader	700	9849.751	110.8531	0.002823	0.006189	111.8491
Clean Up	Trucks	2 ton	2400	39116.5	440.2331	0.011211	0.024577	444.1883
Clean Up	Dozer	D6	1800	20242.79	227.8206	0.005802	0.012719	229.8674
Clean Up	Dozer	D7	3000	38790.53	436.5644	0.011117	0.024372	440.4867
Clean Up	Dozer	D8	1800	30999.82	348.8847	0.008884	0.019477	352.0192
Clean Up	Trucks	F-250/ equivalent	2400	32597.08	366.8609	0.009342	0.020481	370.1569
Clean Up	Clean Up	Farm Tractor	3000	48895.62	550.2913	0.014013	0.030721	555.2353
Coating	Misc Equipment	750 CFM Air comp.	552	2848.985	32.06364	0.000817	0.00179	32.35171
Coating	Trucks	Bus	1104	16494.12	185.6316	0.004727	0.010363	187.2994
Coating	Dozer	D6T	552	6207.788	69.86499	0.001779	0.0039	70.49268
Coating	Trucks	F-250/ equivalent	1656	22491.99	253.134	0.006446	0.014132	255.4082
Coating	Trucks	F-450	552	8996.794	101.2536	0.002578	0.005653	102.1633
Coating	Coating	Heat Ring	736	3398.789	38.25136	0.000974	0.002135	38.59502
Coating	Misc Equipment	Marooka	2944	35987.18	405.0144	0.010314	0.022611	408.6532
Drill Support	Excavator	349	4800	103267.6	1162.215	0.029596	0.064884	1172.657
Drill Support	Sideboom	583	10800	187172.4	2106.515	0.053643	0.117602	2125.441
Drill Support	Sideboom	587	3600	62390.81	702.1717	0.017881	0.039201	708.4803
Drill Support	Trucks	F-250/ equivalent	7200	97791.24	1100.583	0.028027	0.061443	1110.471
Drilling	Excavator	349	7200	154901.3	1743.323	0.044394	0.097326	1758.985
Drilling	Drilling	Drill Rig	3600	117349.5	1320.699	0.033632	0.073731	1332.565
Drilling	Trucks	F-250/ equivalent	7200	97791.24	1100.583	0.028027	0.061443	1110.471
Drilling	Drilling	Mud Pump	3600	117349.5	1320.699	0.033632	0.073731	1332.565
Environmental	Trucks	2 ton	3196.8	52103.17	586.3904	0.014933	0.032737	591.6588
Environmental	Misc Equipment	ASV	3196.8	16499.34	185.6903	0.004729	0.010367	187.3586
Environmental	Misc Equipment	Ditch Witch	3196.8	4341.931	48.86587	0.001244	0.002728	49.3049
Environmental	Trucks	F-250/ equivalent	6393.6	86838.62	977.3174	0.024888	0.054561	986.0979
Environmental	Trucks	F-450	3196.8	52103.17	586.3904	0.014933	0.032737	591.6588
Grade/ ROW	Excavator	336	2160	35556.9	400.1718	0.01019	0.022341	403.7671
Grade/ ROW	Grader	16 Motor Grader	720	11343.78	127.6676	0.003251	0.007127	128.8146
Grade/ ROW	Dozer	D7	360	4654.863	52.38773	0.001334	0.002925	52.8584
Grade/ ROW	Dozer	D8	900	15499.91	174.4423	0.004442	0.009739	176.0096
Grade/ ROW	Trucks	F-250/ equivalent	1080	14668.69	165.0874	0.004204	0.009216	166.5706
Grade/ ROW	Trucks	F-450	720	11734.95	132.0699	0.003363	0.007373	133.2565
Grade/ ROW	Clean Up	Farm Tractor	360	5867.474	66.03496	0.001682	0.003687	66.62824
Lay Pipe	Sideboom	583	206	3570.141	40.17983	0.001023	0.002243	40.54082
Lay Pipe	Excavator	336- Facing	412	6782.149	76.32907	0.001944	0.004261	77.01484
Lay Pipe	Welding	572 Shack Tractor	5768	64866.89	730.0385	0.018591	0.040756	736.5974
Lay Pipe	Trucks	Bottle Truck	721	10771.98	121.2322	0.003087	0.006768	122.3214
Lay Pipe	Trucks	Bus	103	1678.75	18.89334	0.000481	0.001055	19.06308
Lay Pipe	Dozer	D6	309	3475.012	39.1092	0.000996	0.002183	39.46057
Lay Pipe	Trucks	F-250/ equivalent	257.5	3497.395	39.36112	0.001002	0.002197	39.71475
Lay Pipe	Misc Equipment	Gator	103	279.7916	3.148889	8.02E-05	0.000176	3.17718
Lay Pipe	Misc Equipment	Generator	103	55.95832	0.629778	1.6E-05	3.52E-05	0.635436
Lay Pipe	Misc Equipment	Marooka- buffing	51.5	209.8437	2.361667	6.01E-05	0.000132	2.382885
Lay Pipe	Welding	Vanguard Generators	412	3917.082	44.08445	0.001123	0.002461	44.48052
Locate/ Utility	Excavator	349	146	3141.055	35.35071	0.0009	0.001974	35.66832
Locate/ Utility	Misc Equipment	3" Water Pump	438	237.9587	2.678084	6.82E-05	0.00015	2.702145
Locate/ Utility	Trucks	F-250/ equivalent	438	5948.967	66.95211	0.001705	0.003738	67.55363
Locate/ Utility	Trucks	F-450	219	3569.38	40.17127	0.001023	0.002243	40.53218
Locate/ Utility	Trucks	Vaccum Excavator Truck	438	11897.93	133.9042	0.00341	0.007476	135.1073
Locate/ Utility	Trucks	Water Truck	2190	35693.8	401.7127	0.01023	0.022427	405.3218
Road Bores	Misc Equipment	3" Water Pump	1200	20666.55	232.5898	0.005923	0.012985	234.6795
Road Bores	Bore Machine	30"- 48" Bore Machine	3600	83122.55	935.4952	0.023823	0.052226	943.9
Road Bores	Excavator	349	7200	154901.3	1743.323	0.044394	0.097326	1758.985
Road Bores	Sideboom	587	7200	124781.6	1404.343	0.035762	0.078401	1416.961
Road Bores	Misc Equipment	6" Water Pump	14400	7823.299	88.04661	0.002242	0.004915	88.83765

Road Bores	Dozer	D8T	3600	14668.69	165.0874	0.004204	0.009216	166.5706
Road Bores	Trucks	F-250/ equivalent	9600	130388.3	1467.444	0.037369	0.081924	1480.628
Road Bores	Trucks	F-450	360	5867.474	66.03496	0.001682	0.003687	66.62824
Road Bores	Welding	Lincoln 300 welders	720	1838.475	20.69095	0.000527	0.001155	20.87685
Road Bores	Drilling	TT Tech Mud Pump	2880	4381.048	49.3061	0.001256	0.002753	49.74908
String	Excavator	349	728	15662.25	176.2693	0.004489	0.009841	177.853
String	Grader	140 Motor Grader	364	4528.604	50.96676	0.001298	0.002845	51.42466
String	Dozer	D7	364	4706.584	52.96982	0.001349	0.002957	53.44572
String	Trucks	F-250/ equivalent	728	9887.781	111.2811	0.002834	0.006213	112.2809
String	Misc Equipment	Gator	182	494.3891	5.564057	0.000142	0.000311	5.614046
String	Heavy Equipment	Rubber tire Hoe	182	148.3167	1.669217	4.25E-05	9.32E-05	1.684214
String	Trucks	Stringing Trucks	1365	37079.18	417.3043	0.010627	0.023297	421.0534
String	Excavator Attach.	Vaccu-lift	364	355.9601	4.006121	0.000102	0.000224	4.042113
Supervision	Heavy Equipment	973 Loader	1776	28946.21	325.7725	0.008296	0.018187	328.6993
Supervision	Trucks	F-250/ equivalent	2131.2	33577.6	377.8961	0.009623	0.021097	381.2912
Supervision	Trucks	F-450	74	1206.092	13.57385	0.000346	0.000758	13.6958
Supervision	Trucks	Fuel Truck	355.2	10613.61	119.4499	0.003042	0.006669	120.5231
Supervision	Trucks	Low Boy	4736	154379.8	1737.453	0.044245	0.096998	1753.063
Supervision	Trucks	Lube Truck	355.2	6754.115	76.01357	0.001936	0.004244	76.69651
Supervision	Trucks	Mechanics Truck	1332	21709.66	244.3293	0.006222	0.01364	246.5245
Supervision	Trucks	Semi	4736	128649.8	1447.878	0.036871	0.080832	1460.886
Supervision	Trucks	Skid Truck	177.6	3859.494	43.43633	0.001106	0.002425	43.82657
Supervision	Trucks	Stewards Truck	296	4020.307	45.24618	0.001152	0.002526	45.65268
Supervision	Trucks	Stinger Truck	162.8	4864.571	54.74787	0.001394	0.003056	55.23974
Supervision	Trucks	Water Truck	296	4824.368	54.29541	0.001383	0.003031	54.78322
Testing	Excavator	349	78	1678.098	18.886	0.000481	0.001054	19.05568
Testing	Sideboom	583	78	1351.801	15.21372	0.000387	0.000849	15.35041
Testing	Misc Equipment	1600 CFM Air Comp.	624	20340.58	228.9212	0.00583	0.01278	230.9779
Testing	Misc Equipment	185 CFM Air Comp.	78	360.1977	4.053813	0.000103	0.000226	4.090234
Testing	Trucks	F-250/ equivalent	312	4237.62	47.69191	0.001214	0.002663	48.12039
Testing	Trucks	F-450	39	635.6431	7.153787	0.000182	0.000399	7.218059
Testing	Testing	Fill Pump	1248	23730.67	267.0747	0.006801	0.01491	269.4742
Testing	Welding	Lincoln 300 welders	78	199.1682	2.24152	5.71E-05	0.000125	2.261659
Testing	Testing	Pressure Pump	312	6780.193	76.30706	0.001943	0.00426	76.99263
Testing	Trucks	Semi/ Float	78	2118.81	23.84596	0.000607	0.001331	24.0602
Testing	Trucks	Water Truck	78	1271.286	14.30757	0.000364	0.000799	14.43612
Tie Ins	Excavator	349	17424	374861.2	4218.841	0.107434	0.235528	4256.745
Tie Ins	Sideboom	583	4356	75492.88	849.6278	0.021636	0.047433	857.2611
Tie Ins	Sideboom	587	1633.5	28309.83	318.6104	0.008113	0.017787	321.4729
Tie Ins	Misc Equipment	185 CFM Air Comp.	1089	5028.915	56.59746	0.001441	0.00316	57.10595
Tie Ins	Misc Equipment	3" Water Pump	4235	2300.811	25.89426	0.000659	0.001446	26.12691
Tie Ins	Misc Equipment	6" Water Pump	8712	35498.22	399.5115	0.010174	0.022304	403.1008
Tie Ins	Dozer	D7	4356	56323.84	633.8916	0.016142	0.035389	639.5867
Tie Ins	Trucks	F-250/ equivalent	2178	29581.85	332.9262	0.008478	0.018586	335.9174
Tie Ins	Trucks	F-450	544.5	8874.555	99.87787	0.002543	0.005576	100.7752
Tie Ins	Welding	Lincoln 300 welders	1089	2780.694	31.29507	0.000797	0.001747	31.57623
Tile	Excavator	320	552	4588.365	51.63934	0.001315	0.002883	52.10328
Tile	Trucks	2 ton	5796	94466.34	1063.163	0.027074	0.059354	1072.715
Tile	Misc Equipment	3" Water Pump	15456	8397.008	94.50336	0.002407	0.005276	95.35241
Tile	Misc Equipment	6" Water Pump	7728	31488.78	354.3876	0.009025	0.019785	357.5715
Tile	Dozer	D5	3864	36736.91	413.4522	0.010529	0.023082	417.1668
Tile	Trucks	F-250/ equivalent	7728	104962.6	1181.292	0.030082	0.065949	1191.905
				total	43618.06	1.110744	2.435092	44009.94

Majorsville Lateral

Crew	Equipment Type ¹	Make/Model	total operational hours	gallons of fuel total	Emissions (tons) ³			
					CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Bend/ Setup	Sideboom	583	142.65381	2472.302	27.8243	0.000709	0.001553	28.07428
Bend/ Setup	Bending Machine	CRC Bending Machine	393.5277516	6948.422	78.20038	0.001991	0.004366	78.90296
Bend/ Setup	Trucks	F-250/ equivalent	468.4854186	6363.024	71.61207	0.001824	0.003998	72.25546
Clean Up	Excavator	336	56.21825024	925.4382	10.41526	0.000265	0.000581	10.50883
Clean Up	Grader	14 Motor Grader	50.2841016	707.5513	7.963071	0.000203	0.000445	8.034614
Clean Up	Trucks	2 ton	281.0912512	4581.377	51.56069	0.001313	0.002879	52.02393
Clean Up	Dozer	D6	468.4854186	5268.584	59.2948	0.00151	0.00331	59.82752
Clean Up	Dozer	D7	281.0912512	3634.559	40.90482	0.001042	0.002284	41.27232
Clean Up	Dozer	D8	86.20131703	1484.57	16.70796	0.000425	0.000933	16.85807
Clean Up	Trucks	F-250/ equivalent	56.21825024	763.5628	8.593449	0.000219	0.00048	8.670655
Clean Up	Clean Up	Farm Tractor	562.1825024	9162.754	103.1214	0.002626	0.005757	104.0479
Coating	Misc Equipment	750 CFM Air comp.	96.50799624	498.0975	5.605793	0.000143	0.000313	5.656157
Coating	Trucks	Bus	674.6190028	10079.03	113.4335	0.002889	0.006333	114.4526
Coating	Dozer	D6T	85.26434619	958.8822	10.79165	0.000275	0.000602	10.88861
Coating	Trucks	F-250/ equivalent	1020.361242	13858.67	155.9711	0.003972	0.008707	157.3724
Coating	Trucks	F-450	517.2079022	8429.734	94.87167	0.002416	0.005296	95.72403
Coating	Coating	Heat Ring	749.5766698	3461.485	38.95697	0.000992	0.002175	39.30697
Coating	Misc Equipment	Marooka	749.5766698	9162.754	103.1214	0.002626	0.005757	104.0479
Drill Support	Excavator	349	899.4920038	19351.74	217.7924	0.005546	0.012159	219.7491
Drill Support	Sideboom	583	468.4854186	8119.218	91.377	0.002327	0.005101	92.19796
Drill Support	Sideboom	587	562.1825024	9743.062	109.6524	0.002792	0.006122	110.6376
Drill Support	Trucks	F-250/ equivalent	1124.365005	15271.26	171.869	0.004377	0.009595	173.4131
Drilling	Excavator	349	337.3095014	7256.901	81.67214	0.00208	0.00456	82.40591
Drilling	Drilling	Drill Rig	386.0319849	12583.52	141.62	0.003606	0.007906	142.8924
Drilling	Trucks	F-250/ equivalent	273.5954845	3716.006	41.82145	0.001065	0.002335	42.19719
Drilling	Drilling	Mud Pump	1349.238006	43981.22	494.9826	0.012605	0.027634	499.4297
Environmental	Trucks	2 ton	170.5286924	2779.369	31.28015	0.000797	0.001746	31.56118
Environmental	Misc Equipment	ASV	73.08372531	377.2	4.245164	0.000108	0.000237	4.283304
Environmental	Misc Equipment	Ditch Witch	4081.444967	5543.466	62.38844	0.001589	0.003483	62.94896
Environmental	Trucks	F-250/ equivalent	1034.415804	14049.56	158.1195	0.004027	0.008827	159.5401
Environmental	Trucks	F-450	170.5286924	2779.369	31.28015	0.000797	0.001746	31.56118
Grade/ ROW	Excavator	336	187.3941675	3084.794	34.71753	0.000884	0.001938	35.02945
Grade/ ROW	Grader	16 Motor Grader	112.4365005	1771.466	19.9368	0.000508	0.001113	20.11592
Grade/ ROW	Dozer	D7	85.26434619	1102.483	12.40779	0.000316	0.000693	12.51927
Grade/ ROW	Dozer	D8	42.6321731	734.2166	8.263174	0.00021	0.000461	8.337413
Grade/ ROW	Trucks	F-250/ equivalent	277.3433678	3766.91	42.39435	0.00108	0.002367	42.77523
Grade/ ROW	Trucks	F-450	86.20131703	1404.956	15.81195	0.000403	0.000883	15.95401
Grade/ ROW	Clean Up	Farm Tractor	344.8052681	5619.823	63.24778	0.001611	0.003531	63.81602
Lay Pipe	Sideboom	583	83.20301035	1441.973	16.22856	0.000413	0.000906	16.37436
Lay Pipe	Excavator	336- Facing	83.20301035	1369.648	15.41458	0.000393	0.000861	15.55307
Lay Pipe	Welding	572 Shack Tractor	225.1853246	2532.433	28.50103	0.000726	0.001591	28.75709
Lay Pipe	Trucks	Bottle Truck	225.1853246	3364.343	37.86369	0.000964	0.002114	38.20387
Lay Pipe	Trucks	Bus	8.04233302	131.0783	1.475209	3.76E-05	8.24E-05	1.488462
Lay Pipe	Dozer	D6	410.3932267	4615.279	51.94224	0.001323	0.0029	52.40891
Lay Pipe	Trucks	F-250/ equivalent	18.73941675	254.5209	2.864483	7.29E-05	0.00016	2.890218
Lay Pipe	Misc Equipment	Gator	224.8730009	610.8503	6.874759	0.000175	0.000384	6.936524
Lay Pipe	Misc Equipment	Generator	7.105362183	3.860234	0.043445	1.11E-06	2.43E-06	0.043835
Lay Pipe	Misc Equipment	Marooka- buffing	97.44496707	397.0527	4.468593	0.000114	0.000249	4.508741
Lay Pipe	Welding	Vanguard Generators	6.090310442	57.90352	0.65167	1.66E-05	3.64E-05	0.657525
Locate/ Utility	Excavator	349	85.03010348	1829.344	20.58818	0.000524	0.001149	20.77316
Locate/ Utility	Misc Equipment	3" Water Pump	661.3452493	359.2987	4.043695	0.000103	0.000226	4.080025
Locate/ Utility	Trucks	F-250/ equivalent	170.060207	2309.778	25.99518	0.000662	0.001451	26.22873
Locate/ Utility	Trucks	F-450	172.4026341	2809.911	31.62389	0.000805	0.001765	31.90801
Locate/ Utility	Trucks	Vaccum Excavator Truck	86.20131703	2341.593	26.35324	0.000671	0.001471	26.59001
Locate/ Utility	Trucks	Water Truck	339.6519285	5535.831	62.3025	0.001587	0.003478	62.86225
Road Bores	Misc Equipment	3" Water Pump	1405.456256	24204.94	272.4123	0.006937	0.015208	274.8598
Road Bores	Bore Machine	30"- 48" Bore Machine	468.4854186	10817.14	121.7405	0.0031	0.006796	122.8343
Road Bores	Excavator	349	160.8466604	3460.467	38.94551	0.000992	0.002174	39.29541
Road Bores	Sideboom	587	1124.365005	19486.12	219.3048	0.005585	0.012243	221.2751

Road Bores	Misc Equipment	6" Water Pump	60.90310442	33.08772	0.372383	9.48E-06	2.08E-05	0.375728
Road Bores	Dozer	D8T	850.3010348	3464.666	38.99277	0.000993	0.002177	39.3431
Road Bores	Trucks	F-250/ equivalent	2550.903104	34646.66	389.9277	0.00993	0.021769	393.431
Road Bores	Trucks	F-450	24.36124177	397.0527	4.468593	0.000114	0.000249	4.508741
Road Bores	Welding	Lincoln 300 welders	12.18062088	31.10246	0.35004	8.91E-06	1.95E-05	0.353185
Road Bores	Drilling	TT Tech Mud Pump	249.8588899	380.0846	4.277628	0.000109	0.000239	4.316059
String	Excavator	349	332.8120414	7160.143	80.58317	0.002052	0.004499	81.30716
String	Grader	140 Motor Grader	517.2079022	6434.697	72.41871	0.001844	0.004043	73.06934
String	Dozer	D7	64.33866416	831.9102	9.362658	0.000238	0.000523	9.446775
String	Trucks	F-250/ equivalent	57.46754468	780.5309	8.784414	0.000224	0.00049	8.863336
String	Misc Equipment	Gator	64.33866416	174.7711	1.966945	5.01E-05	0.00011	1.984617
String	Heavy Equipment	Rubber tire Hoe	135.8607714	110.7166	1.24605	3.17E-05	6.96E-05	1.257245
String	Trucks	Stringing Trucks	31.23236124	848.4032	9.548276	0.000243	0.000533	9.634061
String	Excavator Attach.	Vaccu-lift	86.20131703	84.29734	0.948717	2.42E-05	5.3E-05	0.95724
Supervision	Heavy Equipment	973 Loader	1124.365005	18325.51	206.2428	0.005252	0.011514	208.0957
Supervision	Trucks	F-250/ equivalent	93.69708373	1476.221	16.614	0.000423	0.000928	16.76327
Supervision	Trucks	F-450	83.20301035	1356.088	15.26196	0.000389	0.000852	15.39908
Supervision	Trucks	Fuel Truck	28.10912512	839.9191	9.452793	0.000241	0.000528	9.537721
Supervision	Trucks	Low Boy	321.6933208	10486.26	118.0167	0.003005	0.006589	119.077
Supervision	Trucks	Lube Truck	136.7977422	2601.204	29.27502	0.000745	0.001634	29.53803
Supervision	Trucks	Mechanics Truck	149.915334	2443.401	27.49904	0.0007	0.001535	27.7461
Supervision	Trucks	Semi	227.3715898	6176.375	69.51145	0.00177	0.003881	70.13596
Supervision	Trucks	Skid Truck	332.8120414	7232.467	81.39715	0.002073	0.004544	82.12844
Supervision	Trucks	Stewards Truck	24.36124177	330.8772	3.723828	9.48E-05	0.000208	3.757284
Supervision	Trucks	Stinger Truck	340.1204139	10163.02	114.3788	0.002913	0.006385	115.4064
Supervision	Trucks	Water Truck	86.20131703	1404.956	15.81195	0.000403	0.000883	15.95401
Testing	Excavator	349	14.36688617	309.0902	3.478628	8.86E-05	0.000194	3.509881
Testing	Sideboom	583	83.20301035	1441.973	16.22856	0.000413	0.000906	16.37436
Testing	Misc Equipment	1600 CFM Air Comp.	9.369708373	305.4251	3.437379	8.75E-05	0.000192	3.468262
Testing	Misc Equipment	185 CFM Air Comp.	68.39887112	315.8605	3.554823	9.05E-05	0.000198	3.586761
Testing	Trucks	F-250/ equivalent	112.4365005	1527.126	17.1869	0.000438	0.00096	17.34131
Testing	Trucks	F-450	11.55597366	188.3455	2.119717	5.4E-05	0.000118	2.138762
Testing	Testing	Fill Pump	48.72248354	926.4562	10.42672	0.000266	0.000582	10.52039
Testing	Welding	Lincoln 300 welders	85.03010348	217.1191	2.443547	6.22E-05	0.000136	2.465501
Testing	Testing	Pressure Pump	110.9373471	2410.822	27.13238	0.000691	0.001515	27.37615
Testing	Trucks	Semi/ Float	184.8955786	5022.547	56.5258	0.001439	0.003156	57.03364
Testing	Trucks	Water Truck	27.73433678	452.0292	5.087322	0.00013	0.000284	5.133028
Tie Ins	Excavator	349	1664.060207	35800.71	402.9159	0.01026	0.022494	406.5358
Tie Ins	Sideboom	583	739.5823142	12817.54	144.2538	0.003673	0.008053	145.5499
Tie Ins	Sideboom	587	6.090310442	105.5498	1.187901	3.03E-05	6.63E-05	1.198574
Tie Ins	Misc Equipment	185 CFM Air Comp.	55.46867357	256.1499	2.882816	7.34E-05	0.000161	2.908716
Tie Ins	Misc Equipment	3" Water Pump	46.22389464	25.11273	0.282629	7.2E-06	1.58E-05	0.285168
Tie Ins	Misc Equipment	6" Water Pump	101.6925682	414.3601	4.663378	0.000119	0.00026	4.705275
Tie Ins	Dozer	D7	1705.286924	22049.66	248.1559	0.006319	0.013854	250.3854
Tie Ins	Trucks	F-250/ equivalent	136.7977422	1858.003	20.91073	0.000532	0.001167	21.09859
Tie Ins	Trucks	F-450	34.19943556	557.4009	6.273218	0.00016	0.00035	6.329578
Tie Ins	Welding	Lincoln 300 welders	46.22389464	118.0298	1.328356	3.38E-05	7.42E-05	1.340291
Tile	Excavator	320	12.18062088	101.2484	1.139491	2.9E-05	6.36E-05	1.149729
Tile	Trucks	2 ton	900.7412982	14680.77	165.2234	0.004207	0.009224	166.7078
Tile	Misc Equipment	3" Water Pump	900.7412982	489.3589	5.507446	0.00014	0.000307	5.556926
Tile	Misc Equipment	6" Water Pump	1574.111007	6413.928	72.18497	0.001838	0.00403	72.8335
Tile	Dozer	D5	170.5286924	1621.298	18.24676	0.000465	0.001019	18.41069
Tile	Trucks	F-250/ equivalent	2380.842897	32336.89	363.9325	0.009268	0.020317	367.2022
				total	6760.613	0.172161	0.377429	6821.352

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Crew	Equipment Type ¹	Make/Model	total operational hours	gallons of fuel total	Emissions (tons) ³			
					CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Bend/ Setup	Sideboom	583	22.34336783	387.228	4.358023	0.000111	0.000243	4.397176
Bend/ Setup	Bending Machine	CRC Bending Machine	61.63687676	1088.307	12.24825	0.000312	0.000684	12.3583
Bend/ Setup	Trucks	F-250/ equivalent	73.37723424	996.6182	11.21635	0.000286	0.000626	11.31712
Clean Up	Excavator	336	8.805268109	144.9481	1.631306	4.15E-05	9.11E-05	1.645962
Clean Up	Grader	14 Motor Grader	7.875823142	110.8213	1.247228	3.18E-05	6.96E-05	1.258434

Clean Up	Trucks	2 ton	44.02634055	717.5651	8.075771	0.000206	0.000451	8.148326
Clean Up	Dozer	D6	73.37723424	825.1998	9.287137	0.000236	0.000518	9.370575
Clean Up	Dozer	D7	44.02634055	569.2683	6.406778	0.000163	0.000358	6.464339
Clean Up	Dozer	D8	13.5014111	232.523	2.616909	6.66E-05	0.000146	2.64042
Clean Up	Trucks	F-250/ equivalent	8.805268109	119.5942	1.345962	3.43E-05	7.51E-05	1.358054
Clean Up	Clean Up	Farm Tractor	88.05268109	1435.13	16.15154	0.000411	0.000902	16.29665
Coating	Misc Equipment	750 CFM Air comp.	15.11571025	78.01527	0.878016	2.24E-05	4.9E-05	0.885904
Coating	Trucks	Bus	105.6632173	1578.643	17.7667	0.000452	0.000992	17.92632
Coating	Dozer	D6T	13.35465663	150.1864	1.690259	4.3E-05	9.44E-05	1.705445
Coating	Trucks	F-250/ equivalent	159.8156162	2170.634	24.42921	0.000622	0.001364	24.64869
Coating	Trucks	F-450	81.0084666	1320.32	14.85942	0.000378	0.00083	14.99292
Coating	Coating	Heat Ring	117.4035748	542.1603	6.101694	0.000155	0.000341	6.156513
Coating	Misc Equipment	Marooka	117.4035748	1435.13	16.15154	0.000411	0.000902	16.29665
Drill Support	Excavator	349	140.8842897	3030.995	34.11206	0.000869	0.001904	34.41853
Drill Support	Sideboom	583	73.37723424	1271.685	14.31206	0.000364	0.000799	14.44065
Drill Support	Sideboom	587	88.05268109	1526.022	17.17447	0.000437	0.000959	17.32877
Drill Support	Trucks	F-250/ equivalent	176.1053622	2391.884	26.91924	0.000686	0.001503	27.16109
Drilling	Excavator	349	52.83160865	1136.623	12.79202	0.000326	0.000714	12.90695
Drilling	Drilling	Drill Rig	60.46284102	1970.912	22.18145	0.000565	0.001238	22.38074
Drilling	Trucks	F-250/ equivalent	42.8523048	582.025	6.550348	0.000167	0.000366	6.609198
Drilling	Drilling	Mud Pump	211.3264346	6888.625	77.5274	0.001974	0.004328	78.22393
Environmental	Trucks	2 ton	26.70931326	435.3228	4.899301	0.000125	0.000274	4.943318
Environmental	Misc Equipment	ASV	11.44684854	59.07952	0.664905	1.69E-05	3.71E-05	0.670879
Environmental	Misc Equipment	Ditch Witch	639.2624647	868.2537	9.771683	0.000249	0.000546	9.859475
Environmental	Trucks	F-250/ equivalent	162.0169332	2200.533	24.7657	0.000631	0.001383	24.9882
Environmental	Trucks	F-450	26.70931326	435.3228	4.899301	0.000125	0.000274	4.943318
Grade/ ROW	Excavator	336	29.3508937	483.1605	5.437686	0.000138	0.000304	5.48654
Grade/ ROW	Grader	16 Motor Grader	17.61053622	277.4585	3.122631	7.95E-05	0.000174	3.150686
Grade/ ROW	Dozer	D7	13.35465663	172.678	1.943389	4.95E-05	0.000108	1.960849
Grade/ ROW	Dozer	D8	6.677328316	114.9978	1.294232	3.3E-05	7.23E-05	1.30586
Grade/ ROW	Trucks	F-250/ equivalent	43.43932267	589.998	6.640078	0.000169	0.000371	6.699735
Grade/ ROW	Trucks	F-450	13.5014111	220.0533	2.47657	6.31E-05	0.000138	2.49882
Grade/ ROW	Clean Up	Farm Tractor	54.0056444	880.2132	9.906279	0.000252	0.000553	9.99528
Lay Pipe	Sideboom	583	13.0317968	225.8512	2.541822	6.47E-05	0.000142	2.564659
Lay Pipe	Excavator	336- Facing	13.0317968	214.5233	2.414332	6.15E-05	0.000135	2.436024
Lay Pipe	Welding	572 Shack Tractor	35.26999059	396.6461	4.464017	0.000114	0.000249	4.504123
Lay Pipe	Trucks	Bottle Truck	35.26999059	526.9452	5.930457	0.000151	0.000331	5.983739
Lay Pipe	Trucks	Bus	1.259642521	20.53033	0.231057	5.88E-06	1.29E-05	0.233133
Lay Pipe	Dozer	D6	64.2784572	722.8751	8.135532	0.000207	0.000454	8.208624
Lay Pipe	Trucks	F-250/ equivalent	2.93508937	39.86473	0.448654	1.14E-05	2.5E-05	0.452685
Lay Pipe	Misc Equipment	Gator	35.22107244	95.67534	1.076769	2.74E-05	6.01E-05	1.086444
Lay Pipe	Misc Equipment	Generator	1.112888053	0.604615	0.006805	1.73E-07	3.8E-07	0.006866
Lay Pipe	Misc Equipment	Marooka- buffing	15.26246472	62.18897	0.6999	1.78E-05	3.91E-05	0.706188
Lay Pipe	Welding	Vanguard Generators	0.953904045	9.069225	0.102069	2.6E-06	5.7E-06	0.102986
Locate/ Utility	Excavator	349	13.31796802	286.5237	3.224655	8.21E-05	0.00018	3.253627
Locate/ Utility	Misc Equipment	3" Water Pump	103.5841957	56.27571	0.63335	1.61E-05	3.54E-05	0.63904
Locate/ Utility	Trucks	F-250/ equivalent	26.63593603	361.7724	4.071535	0.000104	0.000227	4.108115
Locate/ Utility	Trucks	F-450	27.0028222	440.1066	4.95314	0.000126	0.000277	4.99764
Locate/ Utility	Trucks	Vaccum Excavator Truck	13.5014111	366.7555	4.127616	0.000105	0.00023	4.1647
Locate/ Utility	Trucks	Water Truck	53.19849483	867.0578	9.758223	0.000248	0.000545	9.845894
Road Bores	Misc Equipment	3" Water Pump	220.1317027	3791.135	42.66699	0.001087	0.002382	43.05032
Road Bores	Bore Machine	30"- 48" Bore Machine	73.37723424	1694.251	19.06779	0.000486	0.001065	19.2391
Road Bores	Excavator	349	25.19285042	542.0008	6.099899	0.000155	0.000341	6.154703
Road Bores	Sideboom	587	176.1053622	3052.043	34.34895	0.000875	0.001918	34.65755
Road Bores	Misc Equipment	6" Water Pump	9.539040452	5.182414	0.058325	1.49E-06	3.26E-06	0.058849
Road Bores	Dozer	D8T	133.1796802	542.6586	6.107302	0.000156	0.000341	6.162172
Road Bores	Trucks	F-250/ equivalent	399.5390405	5426.586	61.07302	0.001555	0.00341	61.62172
Road Bores	Trucks	F-450	3.815616181	62.18897	0.6999	1.78E-05	3.91E-05	0.706188
Road Bores	Welding	Lincoln 300 welders	1.90780809	4.87147	0.054826	1.4E-06	3.06E-06	0.055318
Road Bores	Drilling	TT Tech Mud Pump	39.13452493	59.53133	0.66999	1.71E-05	3.74E-05	0.676009
String	Excavator	349	52.12718721	1121.468	12.62146	0.000321	0.000705	12.73486
String	Grader	140 Motor Grader	81.0084666	1007.844	11.34269	0.000289	0.000633	11.4446
String	Dozer	D7	10.07714017	130.2992	1.46644	3.73E-05	8.19E-05	1.479615

String	Trucks	F-250/ equivalent	9.000940734	122.2518	1.375872	3.5E-05	7.68E-05	1.388233
String	Misc Equipment	Gator	10.07714017	27.37378	0.308076	7.85E-06	1.72E-05	0.310844
String	Heavy Equipment	Rubber tire Hoe	21.27939793	17.34116	0.195164	4.97E-06	1.09E-05	0.196918
String	Trucks	Stringing Trucks	4.891815616	132.8824	1.495513	3.81E-05	8.35E-05	1.508949
String	Excavator Attach.	Vaccu-lift	13.5014111	13.2032	0.148594	3.78E-06	8.3E-06	0.149929
Supervision	Heavy Equipment	973 Loader	176.1053622	2870.26	32.30308	0.000823	0.001803	32.59331
Supervision	Trucks	F-250/ equivalent	14.67544685	231.2154	2.602193	6.63E-05	0.000145	2.625572
Supervision	Trucks	F-450	13.0317968	212.3993	2.390428	6.09E-05	0.000133	2.411905
Supervision	Trucks	Fuel Truck	4.402634055	131.5536	1.480558	3.77E-05	8.27E-05	1.49386
Supervision	Trucks	Low Boy	50.38570085	1642.427	18.48454	0.000471	0.001032	18.65061
Supervision	Trucks	Lube Truck	21.4261524	407.4175	4.585243	0.000117	0.000256	4.626439
Supervision	Trucks	Mechanics Truck	23.48071496	382.7014	4.307078	0.00011	0.00024	4.345774
Supervision	Trucks	Semi	35.61241769	967.384	10.88734	0.000277	0.000608	10.98515
Supervision	Trucks	Skid Truck	52.12718721	1132.796	12.74895	0.000325	0.000712	12.86349
Supervision	Trucks	Stewards Truck	3.815616181	51.82414	0.58325	1.49E-05	3.26E-05	0.58849
Supervision	Trucks	Stinger Truck	53.27187206	1591.799	17.91475	0.000456	0.001	18.0757
Supervision	Trucks	Water Truck	13.5014111	220.0533	2.47657	6.31E-05	0.000138	2.49882
Testing	Excavator	349	2.250235183	48.41172	0.544845	1.39E-05	3.04E-05	0.54974
Testing	Sideboom	583	13.0317968	225.8512	2.541822	6.47E-05	0.000142	2.564659
Testing	Misc Equipment	1600 CFM Air Comp.	1.467544685	47.83767	0.538385	1.37E-05	3.01E-05	0.543222
Testing	Misc Equipment	185 CFM Air Comp.	10.7130762	49.47213	0.55678	1.42E-05	3.11E-05	0.561782
Testing	Trucks	F-250/ equivalent	17.61053622	239.1884	2.691924	6.86E-05	0.00015	2.716109
Testing	Trucks	F-450	1.809971778	29.4999	0.332004	8.45E-06	1.85E-05	0.334987
Testing	Testing	Fill Pump	7.631232361	145.1076	1.6331	4.16E-05	9.12E-05	1.647773
Testing	Welding	Lincoln 300 welders	13.31796802	34.00661	0.382724	9.75E-06	2.14E-05	0.386163
Testing	Testing	Pressure Pump	17.37572907	377.5987	4.24965	0.000108	0.000237	4.28783
Testing	Trucks	Semi/ Float	28.95954845	786.6639	8.853438	0.000225	0.000494	8.93298
Testing	Trucks	Water Truck	4.343932267	70.79975	0.796809	2.03E-05	4.45E-05	0.803968
Tie Ins	Excavator	349	260.635936	5607.341	63.1073	0.001607	0.003523	63.67428
Tie Ins	Sideboom	583	115.8381938	2007.566	22.59397	0.000575	0.001261	22.79697
Tie Ins	Sideboom	587	0.953904045	16.5319	0.186057	4.74E-06	1.04E-05	0.187728
Tie Ins	Misc Equipment	185 CFM Air Comp.	8.687864534	40.11986	0.451525	1.15E-05	2.52E-05	0.455582
Tie Ins	Misc Equipment	3" Water Pump	7.239887112	3.93332	0.044267	1.13E-06	2.47E-06	0.044665
Tie Ins	Misc Equipment	6" Water Pump	15.92775165	64.89977	0.730409	1.86E-05	4.08E-05	0.736971
Tie Ins	Dozer	D7	267.0931326	3453.561	38.86779	0.00099	0.00217	39.21699
Tie Ins	Trucks	F-250/ equivalent	21.4261524	291.0125	3.275174	8.34E-05	0.000183	3.304599
Tie Ins	Trucks	F-450	5.3565381	87.30375	0.982552	2.5E-05	5.49E-05	0.99138
Tie Ins	Welding	Lincoln 300 welders	7.239887112	18.4866	0.208056	5.3E-06	1.16E-05	0.209925
Tile	Excavator	320	1.90780809	15.85819	0.178475	4.54E-06	9.96E-06	0.180078
Tile	Trucks	2 ton	141.0799624	2299.397	25.87836	0.000659	0.001445	26.11086
Tile	Misc Equipment	3" Water Pump	141.0799624	76.64658	0.862612	2.2E-05	4.82E-05	0.870362
Tile	Misc Equipment	6" Water Pump	246.5475071	1004.591	11.30608	0.000288	0.000631	11.40766
Tile	Dozer	D5	26.70931326	253.9383	2.857926	7.28E-05	0.00016	2.883602
Tile	Trucks	F-250/ equivalent	372.9031044	5064.814	57.00148	0.001452	0.003182	57.5136
				total	1058.891	0.026965	0.059115	1068.405

Sherwood & CGT

Crew	Equipment Type ¹	Make/Model	total operational hours	gallons of fuel total	Emissions (tons) ³			
					CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Bend/ Setup	Sideboom	583	352.3377234	6106.288	68.72266	0.00175	0.003837	69.34009
Bend/ Setup	Bending Machine	CRC Bending Machine	971.9661336	17161.76	193.1455	0.004918	0.010783	194.8808
Bend/ Setup	Trucks	F-250/ equivalent	1157.10254	15715.9	176.8732	0.004504	0.009874	178.4623
Clean Up	Excavator	336	138.8523048	2285.721	25.72444	0.000655	0.001436	25.95555
Clean Up	Grader	14 Motor Grader	124.1956726	1747.566	19.66783	0.000501	0.001098	19.84453
Clean Up	Trucks	2 ton	694.261524	11315.45	127.3487	0.003243	0.00711	128.4928
Clean Up	Dozer	D6	1157.10254	13012.77	146.451	0.003729	0.008176	147.7668
Clean Up	Dozer	D7	694.261524	8976.923	101.03	0.002573	0.00564	101.9377
Clean Up	Dozer	D8	212.9068674	3666.708	41.26664	0.001051	0.002304	41.63739
Clean Up	Trucks	F-250/ equivalent	138.8523048	1885.908	21.22478	0.00054	0.001185	21.41547
Clean Up	Clean Up	Farm Tractor	1388.523048	22630.9	254.6974	0.006486	0.014219	256.9857
Coating	Misc Equipment	750 CFM Air comp.	238.3631232	1230.241	13.84563	0.000353	0.000773	13.97003
Coating	Trucks	Bus	1666.227658	24893.99	280.1671	0.007135	0.015641	282.6842
Coating	Dozer	D6T	210.5926623	2368.324	26.65408	0.000679	0.001488	26.89355
Coating	Trucks	F-250/ equivalent	2520.169332	34229.23	385.2298	0.00981	0.021506	388.6908

Coating	Trucks	F-450	1277.441204	20820.43	234.3216	0.005967	0.013082	236.4268
Coating	Coating	Heat Ring	1851.364064	8549.451	96.21902	0.00245	0.005372	97.08348
Coating	Misc Equipment	Marooka	1851.364064	22630.9	254.6974	0.006486	0.014219	256.9857
Drill Support	Excavator	349	2221.636877	47796.46	537.9209	0.013698	0.030031	542.7538
Drill Support	Sideboom	583	1157.10254	20053.49	225.6902	0.005747	0.0126	227.7179
Drill Support	Sideboom	587	1388.523048	24064.19	270.8282	0.006897	0.01512	273.2614
Drill Support	Trucks	F-250/ equivalent	2777.046096	37718.16	424.4957	0.01081	0.023699	428.3095
Drilling	Excavator	349	833.1138288	17923.67	201.7203	0.005137	0.011262	203.5327
Drilling	Drilling	Drill Rig	953.4524929	31079.77	349.7844	0.008907	0.019528	352.927
Drilling	Trucks	F-250/ equivalent	675.7478833	9178.087	103.2939	0.00263	0.005767	104.222
Drilling	Drilling	Mud Pump	3332.455315	108628.3	1222.547	0.031132	0.068252	1233.531
Environmental	Trucks	2 ton	421.1853246	6864.706	77.25821	0.001967	0.004313	77.95232
Environmental	Misc Equipment	ASV	180.5079962	931.6387	10.48504	0.000267	0.000585	10.57924
Environmental	Misc Equipment	Ditch Witch	10080.67733	13691.69	154.0919	0.003924	0.008603	155.4763
Environmental	Trucks	F-250/ equivalent	2554.882408	34700.71	390.536	0.009945	0.021803	394.0447
Environmental	Trucks	F-450	421.1853246	6864.706	77.25821	0.001967	0.004313	77.95232
Grade/ ROW	Excavator	336	462.841016	7619.069	85.74812	0.002184	0.004787	86.51851
Grade/ ROW	Grader	16 Motor Grader	277.7046096	4375.307	49.2415	0.001254	0.002749	49.6839
Grade/ ROW	Dozer	D7	210.5926623	2723	30.64576	0.00078	0.001711	30.92109
Grade/ ROW	Dozer	D8	105.2963311	1813.426	20.40904	0.00052	0.001139	20.59241
Grade/ ROW	Trucks	F-250/ equivalent	685.0047037	9303.814	104.7089	0.002666	0.005846	105.6497
Grade/ ROW	Trucks	F-450	212.9068674	3470.071	39.0536	0.000995	0.00218	39.40447
Grade/ ROW	Clean Up	Farm Tractor	851.6274694	13880.28	156.2144	0.003978	0.008721	157.6179
Lay Pipe	Sideboom	583	205.5014111	3561.5	40.08258	0.001021	0.002238	40.44269
Lay Pipe	Excavator	336- Facing	205.5014111	3382.867	38.07217	0.00097	0.002125	38.41422
Lay Pipe	Welding	572 Shack Tractor	556.1806209	6254.803	70.39411	0.001793	0.00393	71.02656
Lay Pipe	Trucks	Bottle Truck	556.1806209	8309.521	93.51875	0.002381	0.005221	94.35895
Lay Pipe	Trucks	Bus	19.8635936	323.7476	3.643588	9.28E-05	0.000203	3.676323
Lay Pipe	Dozer	D6	1013.621825	11399.18	128.2911	0.003267	0.007162	129.4437
Lay Pipe	Trucks	F-250/ equivalent	46.2841016	628.6361	7.074928	0.00018	0.000395	7.138491
Lay Pipe	Misc Equipment	Gator	555.4092192	1508.727	16.97983	0.000432	0.000948	17.13238
Lay Pipe	Misc Equipment	Generator	17.54938852	9.534314	0.107303	2.73E-06	5.99E-06	0.108267
Lay Pipe	Misc Equipment	Marooka- buffing	240.6773283	980.6723	11.03689	0.000281	0.000616	11.13605
Lay Pipe	Welding	Vanguard Generators	15.04233302	143.0147	1.609546	4.1E-05	8.99E-05	1.624007
Locate/ Utility	Excavator	349	210.014111	4518.259	50.85033	0.001295	0.002839	51.30719
Locate/ Utility	Misc Equipment	3" Water Pump	1633.443086	887.4246	9.987439	0.000254	0.000558	10.07717
Locate/ Utility	Trucks	F-250/ equivalent	420.028222	5704.872	64.20497	0.001635	0.003584	64.78181
Locate/ Utility	Trucks	F-450	425.8137347	6940.142	78.1072	0.001989	0.004361	78.80894
Locate/ Utility	Trucks	Vaccum Excavator Truck	212.9068674	5783.452	65.08933	0.001658	0.003634	65.67412
Locate/ Utility	Trucks	Water Truck	838.8993415	13672.83	153.8797	0.003919	0.008591	155.2622
Road Bores	Misc Equipment	3" Water Pump	3471.30762	59783.29	672.8256	0.017134	0.037562	678.8705
Road Bores	Bore Machine	30"- 48" Bore Machine	1157.10254	26717.03	300.6844	0.007657	0.016786	303.3859
Road Bores	Excavator	349	397.2718721	8546.936	96.19072	0.00245	0.00537	97.05492
Road Bores	Sideboom	587	2777.046096	48128.38	541.6565	0.013793	0.030239	546.5229
Road Bores	Misc Equipment	6" Water Pump	150.4233302	81.72269	0.919741	2.34E-05	5.13E-05	0.928004
Road Bores	Dozer	D8T	2100.14111	8557.309	96.30745	0.002452	0.005377	97.17271
Road Bores	Trucks	F-250/ equivalent	6300.42333	85573.09	963.0745	0.024525	0.053766	971.7271
Road Bores	Trucks	F-450	60.16933208	980.6723	11.03689	0.000281	0.000616	11.13605
Road Bores	Welding	Lincoln 300 welders	30.08466604	76.81933	0.864556	2.2E-05	4.83E-05	0.872324
Road Bores	Drilling	TT Tech Mud Pump	617.1213547	938.7632	10.56523	0.000269	0.00059	10.66015
String	Excavator	349	822.0056444	17684.69	199.0307	0.005068	0.011111	200.8189
String	Grader	140 Motor Grader	1277.441204	15892.93	178.8655	0.004555	0.009986	180.4725
String	Dozer	D7	158.9087488	2054.718	23.12464	0.000589	0.001291	23.3324
String	Trucks	F-250/ equivalent	141.9379116	1927.817	21.69644	0.000553	0.001211	21.89137
String	Misc Equipment	Gator	158.9087488	431.6634	4.858117	0.000124	0.000271	4.901764
String	Heavy Equipment	Rubber tire Hoe	335.5597366	273.4567	3.077594	7.84E-05	0.000172	3.105244
String	Trucks	Stringing Trucks	77.14016933	2095.454	23.58309	0.000601	0.001317	23.79497
String	Excavator Attach.	Vaccu-lift	212.9068674	208.2043	2.343216	5.97E-05	0.000131	2.364268
Supervision	Heavy Equipment	973 Loader	2777.046096	45261.8	509.3948	0.012972	0.028438	513.9714
Supervision	Trucks	F-250/ equivalent	231.420508	3646.089	41.03458	0.001045	0.002291	41.40325
Supervision	Trucks	F-450	205.5014111	3349.373	37.69521	0.00096	0.002104	38.03388
Supervision	Trucks	Fuel Truck	69.4261524	2074.499	23.34726	0.000595	0.001303	23.55702
Supervision	Trucks	Low Boy	794.5437441	25899.81	291.487	0.007423	0.016273	294.1058

Supervision	Trucks	Lube Truck	337.8739417	6424.661	72.30576	0.001841	0.004037	72.95538
Supervision	Trucks	Mechanics Truck	370.2728128	6034.906	67.9193	0.00173	0.003792	68.52951
Supervision	Trucks	Semi	561.5804327	15254.9	171.6849	0.004372	0.009585	173.2274
Supervision	Trucks	Skid Truck	822.0056444	17863.32	201.0411	0.00512	0.011224	202.8474
Supervision	Trucks	Stewards Truck	60.16933208	817.2269	9.197406	0.000234	0.000513	9.280038
Supervision	Trucks	Stinger Truck	840.056444	25101.44	282.5019	0.007194	0.015771	285.0399
Supervision	Trucks	Water Truck	212.9068674	3470.071	39.0536	0.000995	0.00218	39.40447
Testing	Excavator	349	35.48447789	763.4156	8.591792	0.000219	0.00048	8.668984
Testing	Sideboom	583	205.5014111	3561.5	40.08258	0.001021	0.002238	40.44269
Testing	Misc Equipment	1600 CFM Air Comp.	23.1420508	754.3633	8.489913	0.000216	0.000474	8.566189
Testing	Misc Equipment	185 CFM Air Comp.	168.9369708	780.1374	8.779985	0.000224	0.00049	8.858867
Testing	Trucks	F-250/ equivalent	277.7046096	3771.816	42.44957	0.001081	0.00237	42.83095
Testing	Trucks	F-450	28.54186265	465.1907	5.235446	0.000133	0.000292	5.282483
Testing	Testing	Fill Pump	120.3386642	2288.235	25.75274	0.000656	0.001438	25.98411
Testing	Welding	Lincoln 300 welders	210.014111	536.258	6.035267	0.000154	0.000337	6.08949
Testing	Testing	Pressure Pump	274.0018815	5954.441	67.01371	0.001707	0.003741	67.61579
Testing	Trucks	Semi/ Float	456.6698024	12405.09	139.6119	0.003555	0.007794	140.8662
Testing	Trucks	Water Truck	68.50047037	1116.458	12.56507	0.00032	0.000701	12.67796
Tie Ins	Excavator	349	4110.028222	88423.45	995.1537	0.025342	0.055557	1004.094
Tie Ins	Sideboom	583	1826.67921	31657.78	356.2896	0.009073	0.019891	359.4906
Tie Ins	Sideboom	587	15.04233302	260.6954	2.933972	7.47E-05	0.000164	2.960332
Tie Ins	Misc Equipment	185 CFM Air Comp.	137.0009407	632.6593	7.120207	0.000181	0.000398	7.184177
Tie Ins	Misc Equipment	3" Water Pump	114.1674506	62.02543	0.69806	1.78E-05	3.9E-05	0.704331
Tie Ins	Misc Equipment	6" Water Pump	251.1683913	1023.42	11.51798	0.000293	0.000643	11.62146
Tie Ins	Dozer	D7	4211.853246	54460	612.9151	0.015608	0.034218	618.4218
Tie Ins	Trucks	F-250/ equivalent	337.8739417	4589.043	51.64697	0.001315	0.002883	52.11098
Tie Ins	Trucks	F-450	84.46848542	1376.713	15.49409	0.000395	0.000865	15.6333
Tie Ins	Welding	Lincoln 300 welders	114.1674506	291.5195	3.28088	8.35E-05	0.000183	3.310356
Tile	Excavator	320	30.08466604	250.0714	2.814406	7.17E-05	0.000157	2.839692
Tile	Trucks	2 ton	2224.722484	36259.73	408.0818	0.010392	0.022782	411.7482
Tile	Misc Equipment	3" Water Pump	2224.722484	1208.658	13.60273	0.000346	0.000759	13.72494
Tile	Misc Equipment	6" Water Pump	3887.864534	15841.63	178.2882	0.00454	0.009953	179.89
Tile	Dozer	D5	421.1853246	4004.412	45.06729	0.001148	0.002516	45.47219
Tile	Trucks	F-250/ equivalent	5880.395108	79868.21	898.8696	0.02289	0.050182	906.9453
				total	16697.9	0.425216	0.932204	16847.92

**Table 9A-27
Rover Construction Activity Tailpipe Emissions - USP**

Make/Model	Fuel Type	Engine Rating (hp)	Load Factor ²	Exhaust Emission Factors ⁴					
				NOx (g/hp-hr)	VOC (g/hp-hr)	CO (g/hp-hr)	SO2 (g/hp-hr)	PM10 (g/hp-hr)	PM2.5 (g/hp-hr)
Cat 426 Rubber Tire backHoe	Diesel	225	0.8	0.2983	0.1417	2.6100	0.0055	0.1417	0.1417
Flatbed truck 1 ton	Diesel	250	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Hydrovac truck	Diesel	325	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Marooka	Diesel	250	0.8	2.9828	2.9828	2.6100	0.0183	0.1491	0.1491
Foreman's pickup	Diesel	250	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Operator's pickup	Diesel	250	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Vermeer trencher	Diesel	130	0.8	1.6410	1.5620	3.7290	0.0120	0.1190	0.1190
Timber Pro 830B	Diesel	300	0.8	2.9828	2.9828	2.6100	0.0183	0.1491	0.1491
JD748H Skidder	Diesel	325	0.8	2.9828	2.9828	2.6100	0.0183	0.1491	0.1491
Terex 430TL Chipper	Diesel	400	0.8	2.9828	2.9828	2.6100	0.0183	0.1491	0.1491
Tiger Cat 822C	Diesel	350	0.8	2.9828	2.9828	2.6100	0.0183	0.1491	0.1491
Tiger Cat M726	Diesel	350	0.8	2.9828	2.9828	2.6100	0.0183	0.1491	0.1491
Morbark 4600 SL Grinder	Diesel	400	0.8	2.9828	2.9828	2.6100	0.0183	0.1491	0.1491
Excavator 336 with thumbs	Diesel	300	0.8	2.9828	2.9828	2.6100	0.0183	0.1491	0.1491
KW T800 truck with log loader	Diesel	350	0.8	2.9828	2.9828	2.6100	0.0183	0.1491	0.1491
Cat 320 EL with grappler & saw	Diesel	300	0.8	2.9828	2.9828	2.6100	0.0183	0.1491	0.1491
Truck tractor with chip trailer	Diesel	350	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Cat 730 Dump Truck	Diesel	350	0.8	2.9828	2.9828	2.6100	0.0183	0.1491	0.1491
Cat excavator with hot saw	Diesel	350	0.8	2.9828	2.9828	2.6100	0.0183	0.1491	0.1491
D8 Dozers	Diesel	300	0.8	1.6410	1.5620	2.6100	0.0120	0.0820	0.0820
Cat 349 Excavator	Diesel	315	0.8	2.9828	2.9828	2.6100	0.0183	0.1491	0.1491
D8 Dozer Ripper	Diesel	300	0.8	1.6410	1.5620	2.6100	0.0120	0.0820	0.0820
Stringing Trucks & Trailer	Diesel	400	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Vaculifter	Diesel	5	0.8	4.5490	4.5490	4.9216	0.0120	0.2350	0.2350
D7 Tow Tractor	Diesel	250	0.8	2.9828	2.9828	2.6100	0.0183	0.1491	0.1491
42" bending machine	Diesel	150	0.8	1.6410	1.5620	3.7290	0.0120	0.1190	0.1190
Piplayer 572	Diesel	240	0.8	1.6410	1.5620	2.6100	0.0120	0.0820	0.0820
Pipelayer 583	Diesel	300	0.8	1.6410	1.5620	2.6100	0.0120	0.0820	0.0820
Pipelayer 594 / 587	Diesel	350	0.8	1.6410	1.5620	2.6100	0.0120	0.0820	0.0820
Skid Truck Tandem	Diesel	300	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100

ATV	Diesel	15	0.8	4.5490	4.5490	4.9216	0.0120	0.2350	0.2350
Farm Tractor	Diesel	75	0.8	1.9020	3.5050	3.7290	0.0120	0.1570	0.1570
Crew Bus	Diesel	250	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Flatbed truck 2 ton	Diesel	250	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Water Truck	Diesel	325	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Tack Rig	Diesel	240	0.8	1.6410	1.5620	2.6100	0.0120	0.0820	0.0820
NDE Mainline Rig	Diesel	250	0.8	1.6410	1.5620	2.6100	0.0120	0.0820	0.0820
NDE Tie In Rig	Diesel	250	0.8	1.6410	1.5620	2.6100	0.0120	0.0820	0.0820
Air compressor 450 CFM	Diesel	125	0.8	1.6410	1.5620	3.7290	0.0120	0.1190	0.1190
Generator	Diesel	30	0.8	4.5490	4.5490	3.9150	0.0120	0.2350	0.2350
D6 Dozer	Diesel	240	0.8	2.9828	2.9828	2.6100	0.0183	0.1491	0.1491
6" Water pump	Diesel	125	0.8	1.6410	1.5620	3.7290	0.0120	0.1190	0.1190
3" Water Pump	Diesel	20	0.8	4.5490	4.5490	4.9216	0.0120	0.2350	0.2350
Cat 336 Excavator	Diesel	300	0.8	2.9828	2.9828	2.6100	0.0183	0.1491	0.1491
Cat 349 with hammer	Diesel	305	0.8	2.9828	2.9828	2.6100	0.0183	0.1491	0.1491
D7 Dozer	Diesel	265	0.8	2.9828	2.9828	2.6100	0.0183	0.1491	0.1491
Ozzie Padder 300	Diesel	285	0.8	2.9828	2.9828	2.6100	0.0183	0.1491	0.1491
Truck Foam Rig	Diesel	300	0.8	1.6410	1.5620	2.6100	0.0120	0.0820	0.0820
Road Bore Machine 60"	Diesel	250	0.8	1.6410	1.5620	2.6100	0.0120	0.0820	0.0820
Mud Pump	Diesel	50	0.8	3.5050	3.5050	3.7290	0.0120	0.1600	0.1600
Light Tower	Diesel	85	0.8	1.9020	3.5050	3.7290	0.0120	0.1570	0.1570
Low Head Fill Pump	Diesel	265	0.8	1.6410	1.5620	2.6100	0.0120	0.0820	0.0820
High Head Fill Pump	Diesel	300	0.8	1.6410	1.5620	2.6100	0.0120	0.0820	0.0820
Squeeze Pump	Diesel	150	0.8	1.6410	1.5620	3.7290	0.0120	0.1190	0.1190
1700 Air Compressors	Diesel	275	0.8	2.9828	2.9828	2.6100	0.0183	0.1491	0.1491
Boom Truck 20 Ton	Diesel	300	0.8	1.6410	1.5620	2.6100	0.0120	0.0820	0.0820
Motorgrader 14M	Diesel	265	0.8	2.9828	2.9828	2.6100	0.0183	0.1491	0.1491
Forklift 4 ton	Diesel	225	0.8	2.9828	2.9828	2.6100	0.0183	0.1491	0.1491
IT 28 with bucket and forks	Diesel	270	0.8	2.9828	2.9828	2.6100	0.0183	0.1491	0.1491
Float truck and Trailer	Diesel	325	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Fuel Truck	Diesel	325	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Grease Truck	Diesel	325	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Lowboy Truck and Trailer	Diesel	500	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Street Broom	Diesel	225	0.8	1.6410	1.5620	2.6100	0.0120	0.0820	0.0820
Supervision Pickups	Diesel	250	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Steward's Pickup	Diesel	250	0.8	0.0200	0.1400	15.5000	0.0055	0.0100	0.0100
Mechanic's Rigs	Diesel	300	0.8	1.6410	1.5620	2.6100	0.0120	0.0820	0.0820
Welder Rigs	Diesel	250	0.8	1.6410	1.5620	2.6100	0.0120	0.0820	0.0820
Tandem Dump Truck	Diesel	300	0.8	1.6410	1.5620	2.6100	0.0120	0.0820	0.0820
D6 Dozer LGP	Diesel	250	0.8	2.9828	2.9828	2.6100	0.0183	0.1491	0.1491

Clarington & Cadiz Lateral

Make/Model	Quantity	Total Operation (hr/project)	Project Emission Rate					
			NOx (tons/project)	VOC (tons/project)	CO (tons/project)	SO2 (tons/project)	PM10 (tons/project)	PM2.5 (tons/project)
Cat 426 Rubber Tire backHoe	1	367	0.0217	0.0103	0.1900	0.0004	0.0103	0.0103
Flatbed truck 1 ton	13	4,771	0.0210	0.1473	16.3030	0.0058	0.0105	0.0105
Hydrovac truck	1	367	0.0021	0.0147	1.6303	0.0006	0.0011	0.0011
Marooka	2	734	0.4827	0.4827	0.4223	0.0030	0.0241	0.0241
Foreman's pickup	25	9,175	0.0405	0.2832	31.3520	0.0111	0.0202	0.0202
Operator's pickup	105	19,856	0.0875	0.6128	67.8501	0.0241	0.0438	0.0438
Vermeer trencher	3	1,101	0.2071	0.1972	0.4707	0.0015	0.0150	0.0150
Timber Pro 830B	2	734	0.5792	0.5792	0.5068	0.0036	0.0290	0.0290
JD748H Skidder	2	734	0.6275	0.6275	0.5490	0.0038	0.0314	0.0314
Terex 430TL Chipper	2	734	0.7723	0.7723	0.6757	0.0047	0.0386	0.0386
Tiger Cat 822C	2	734	0.6757	0.6757	0.5913	0.0041	0.0338	0.0338
Tiger Cat M726	2	734	0.6757	0.6757	0.5913	0.0041	0.0338	0.0338
Morbark 4600 SL Grinder	2	734	0.7723	0.7723	0.6757	0.0047	0.0386	0.0386
Excavator 336 with thumbs	8	2,936	2.3168	2.3168	2.0272	0.0142	0.1158	0.1158
KW T800 truck with log loader	4	1,468	1.3515	1.3515	1.1825	0.0083	0.0676	0.0676
Cat 320 EL with grapppler & saw	2	734	0.5792	0.5792	0.5068	0.0036	0.0290	0.0290
Truck tractor with chip trailer	4	1,468	0.0091	0.0634	7.0228	0.0025	0.0045	0.0045
Cat 730 Dump Truck	2	734	0.6757	0.6757	0.5913	0.0041	0.0338	0.0338
Cat excavator with hot saw	2	734	0.6757	0.6757	0.5913	0.0041	0.0338	0.0338
D8 Dozers	6	2,202	0.9559	0.9099	1.5204	0.0070	0.0478	0.0478
Cat 349 Excavator	15	5,505	4.5612	4.5612	3.9910	0.0280	0.2281	0.2281
D8 Dozer Ripper	4	1,468	0.6373	0.6066	1.0136	0.0047	0.0318	0.0318
Stringing Trucks & Trailer	12	4,404	0.0311	0.2175	24.0783	0.0085	0.0155	0.0155
Vaculifter	2	734	0.0147	0.0147	0.0159	0.0000	0.0008	0.0008
D7 Tow Tractor	1	367	0.2413	0.2413	0.2112	0.0015	0.0121	0.0121
42" bending machine	1	367	0.0797	0.0758	0.1810	0.0006	0.0058	0.0058
Piplayer 572	5	1,835	0.6373	0.6066	1.0136	0.0047	0.0318	0.0318
Pipelayer 583	19	6,973	3.0272	2.8814	4.8147	0.0221	0.1513	0.1513
Pipelayer 594 / 587	8	2,936	1.4870	1.4154	2.3651	0.0109	0.0743	0.0743
Skid Truck Tandem	1	367	0.0019	0.0136	1.5049	0.0005	0.0010	0.0010
ATV	2	734	0.0442	0.0442	0.0478	0.0001	0.0023	0.0023
Farm Tractor	4	1,468	0.1847	0.3403	0.3620	0.0012	0.0152	0.0152
Crew Bus	4	1,468	0.0065	0.0453	5.0163	0.0018	0.0032	0.0032

Flatbed truck 2 ton	3	1,101	0.0049	0.0340	3.7622	0.0013	0.0024	0.0024
Water Truck	3	1,101	0.0063	0.0442	4.8909	0.0017	0.0032	0.0032
Tack Rig	1	367	0.1275	0.1213	0.2027	0.0009	0.0064	0.0064
NDE Mainline Rig	1	367	0.1328	0.1264	0.2112	0.0010	0.0066	0.0066
NDE Tie In Rig	2	734	0.2655	0.2528	0.4223	0.0019	0.0133	0.0133
Air compressor 450 CFM	6	2,202	0.3983	0.3791	0.9051	0.0029	0.0289	0.0289
Generator	1	367	0.0442	0.0442	0.0380	0.0001	0.0023	0.0023
D6 Dozer	6	2,202	1.3901	1.3901	1.2163	0.0085	0.0695	0.0695
6" Water pump	7	2,569	0.4647	0.4423	1.0560	0.0034	0.0337	0.0337
3" Water Pump	10	3,670	0.2944	0.2944	0.3186	0.0008	0.0152	0.0152
Cat 336 Excavator	9	3,303	2.6064	2.6064	2.2806	0.0160	0.1303	0.1303
Cat 349 with hammer	3	1,101	0.8833	0.8833	0.7729	0.0054	0.0442	0.0442
D7 Dozer	6	2,202	1.5349	1.5349	1.3430	0.0094	0.0767	0.0767
Ozzie Padder 300	1	367	0.2751	0.2751	0.2407	0.0017	0.0138	0.0138
Truck Foam Rig	2	734	0.3186	0.3033	0.5068	0.0023	0.0159	0.0159
Road Bore Machine 60"	2	734	0.2655	0.2528	0.4223	0.0019	0.0133	0.0133
Mud Pump	2	734	0.1134	0.1134	0.1207	0.0004	0.0052	0.0052
Light Tower	2	734	0.1046	0.1928	0.2052	0.0007	0.0086	0.0086
Low Head Fill Pump	2	734	0.2815	0.2679	0.4477	0.0021	0.0141	0.0141
High Head Fill Pump	2	734	0.3186	0.3033	0.5068	0.0023	0.0159	0.0159
Squeeze Pump	1	367	0.0797	0.0758	0.1810	0.0006	0.0058	0.0058
1700 Air Compressors	6	2,202	1.5928	1.5928	1.3937	0.0098	0.0796	0.0796
Boom Truck 20 Ton	2	734	0.3186	0.3033	0.5068	0.0023	0.0159	0.0159
Motorgrader 14M	1	367	0.2558	0.2558	0.2238	0.0016	0.0128	0.0128
Forklift 4 ton	1	367	0.2172	0.2172	0.1900	0.0013	0.0109	0.0109
IT 28 with bucket and forks	1	367	0.2606	0.2606	0.2281	0.0016	0.0130	0.0130
Float truck and Trailer	3	1,101	0.0063	0.0442	4.8909	0.0017	0.0032	0.0032
Fuel Truck	1	367	0.0021	0.0147	1.6303	0.0006	0.0011	0.0011
Grease Truck	1	367	0.0021	0.0147	1.6303	0.0006	0.0011	0.0011
Lowboy Truck and Trailer	4	1,468	0.0129	0.0906	10.0326	0.0036	0.0065	0.0065
Street Broom	2	734	0.2390	0.2275	0.3801	0.0017	0.0119	0.0119
Supervision Pickups	20	7,340	0.0324	0.2265	25.0816	0.0089	0.0162	0.0162
Steward's Pickup	4	1,468	0.0065	0.0453	5.0163	0.0018	0.0032	0.0032
Mechanic's Rigs	7	2,569	1.1153	1.0616	1.7738	0.0082	0.0557	0.0557
Welder Rigs	33	12,111	4.3814	4.1705	6.9686	0.0320	0.2189	0.2189
Tandem Dump Truck	1	367	0.1593	0.1517	0.2534	0.0012	0.0080	0.0080
D6 Dozer LGP	5	1,835	1.2067	1.2067	1.0558	0.0074	0.0603	0.0603
			42.2	43.3	261.2	0.3	2.3	2.3

Spread 3

Make/Model	Quantity	Total Operation (hr/project)	Project Emission Rate					
			NOx (tons/project)	VOC (tons/project)	CO (tons/project)	SO2 (tons/project)	PM10 (tons/project)	PM2.5 (tons/project)
Cat 426 Rubber Tire backHoe	1	498	0.0295	0.0140	0.2579	0.0005	0.0140	0.0140
Flatbed truck 1 ton	14	6,972	0.0307	0.2152	23.8241	0.0085	0.0154	0.0154
Hydrovac truck	1	498	0.0029	0.0200	2.2122	0.0008	0.0014	0.0014
Marooka	4	1,992	1.3099	1.3099	1.1462	0.0080	0.0655	0.0655
Foreman's pickup	36	17,928	0.0790	0.5533	61.2619	0.0217	0.0395	0.0395
Operator's pickup	145	32,928	0.1452	1.0163	112.5185	0.0399	0.0726	0.0726
Vermeer trencher	3	1,494	0.2811	0.2675	0.6387	0.0021	0.0204	0.0204
Timber Pro 830B	2	996	0.7859	0.7859	0.6877	0.0048	0.0393	0.0393
JD748H Skidder	2	996	0.8514	0.8514	0.7450	0.0052	0.0426	0.0426
Terex 430TL Chipper	2	996	1.0479	1.0479	0.9169	0.0064	0.0524	0.0524
Tiger Cat 822C	2	996	0.9169	0.9169	0.8023	0.0056	0.0458	0.0458
Tiger Cat M726	2	996	0.9169	0.9169	0.8023	0.0056	0.0458	0.0458
Morbark 4600 SL Grinder	2	996	1.0479	1.0479	0.9169	0.0064	0.0524	0.0524
Excavator 336 with thumbs	10	4,980	3.9297	3.9297	3.4385	0.0241	0.1965	0.1965
KW T800 truck with log loader	2	996	0.9169	0.9169	0.8023	0.0056	0.0458	0.0458
Cat 320 EL with grapppler & saw	2	996	0.7859	0.7859	0.6877	0.0048	0.0393	0.0393
Truck tractor with chip trailer	4	1,992	0.0123	0.0861	9.5296	0.0034	0.0061	0.0061
Cat 730 Dump Truck	2	996	0.9169	0.9169	0.8023	0.0056	0.0458	0.0458
Cat excavator with hot saw	2	996	0.9169	0.9169	0.8023	0.0056	0.0458	0.0458
D8 Dozers	6	2,988	1.2972	1.2347	2.0631	0.0095	0.0648	0.0648
Cat 349 Excavator	22	10,956	9.0777	9.0777	7.9429	0.0557	0.4539	0.4539
D8 Dozer Ripper	3	1,494	0.6486	0.6174	1.0316	0.0047	0.0324	0.0324
Stringing Trucks & Trailer	24	11,952	0.0843	0.5902	65.3460	0.0232	0.0422	0.0422
Vaculifter	2	996	0.0200	0.0200	0.0216	0.0001	0.0010	0.0010
D7 Tow Tractor	2	996	0.6550	0.6550	0.5731	0.0040	0.0327	0.0327
42" bending machine	1	498	0.1081	0.1029	0.2456	0.0008	0.0078	0.0078
Piplayer 572	10	4,980	1.7296	1.6463	2.7509	0.0126	0.0864	0.0864
Pipelayer 583	35	17,430	7.5668	7.2026	12.0350	0.0553	0.3781	0.3781

Pipelayer 594 / 587	18	8,964	4.5401	4.3215	7.2210	0.0332	0.2269	0.2269
Skid Truck Tandem	1	498	0.0026	0.0184	2.0421	0.0007	0.0013	0.0013
ATV	2	996	0.0599	0.0599	0.0648	0.0002	0.0031	0.0031
Farm Tractor	10	4,980	0.6265	1.1544	1.2282	0.0040	0.0517	0.0517
Crew Bus	24	11,952	0.0527	0.3689	40.8413	0.0145	0.0263	0.0263
Flatbed truck 2 ton	3	1,494	0.0066	0.0461	5.1052	0.0018	0.0033	0.0033
Water Truck	3	1,494	0.0086	0.0599	6.6367	0.0024	0.0043	0.0043
Tack Rig	5	2,490	0.8648	0.8231	1.3754	0.0063	0.0432	0.0432
NDE Mainline Rig	8	3,984	1.4413	1.3719	2.2924	0.0105	0.0720	0.0720
NDE Tie In Rig	4	1,992	0.7207	0.6860	1.1462	0.0053	0.0360	0.0360
Air compressor 450 CFM	8	3,984	0.7207	0.6860	1.6376	0.0053	0.0523	0.0523
Generator	2	996	0.1199	0.1199	0.1032	0.0003	0.0062	0.0062
D6 Dozer	1	498	0.3144	0.3144	0.2751	0.0019	0.0157	0.0157
6" Water pump	2	996	0.1802	0.1715	0.4094	0.0013	0.0131	0.0131
3" Water Pump	6	2,988	0.2397	0.2397	0.2594	0.0006	0.0124	0.0124
Cat 336 Excavator	2	996	0.7859	0.7859	0.6877	0.0048	0.0393	0.0393
Cat 349 with hammer	6	2,988	2.3971	2.3971	2.0975	0.0147	0.1199	0.1199
D7 Dozer	12	5,976	4.1655	4.1655	3.6448	0.0256	0.2083	0.2083
Ozzie Padder 300	10	4,980	3.7332	3.7332	3.2666	0.0229	0.1867	0.1867
Truck Foam Rig	15	7,470	3.2429	3.0868	5.1579	0.0237	0.1620	0.1620
Road Bore Machine 60"	8	3,984	1.4413	1.3719	2.2924	0.0105	0.0720	0.0720
Mud Pump	6	2,988	0.4618	0.4618	0.4913	0.0016	0.0211	0.0211
Light Tower	2	996	0.1420	0.2617	0.2784	0.0009	0.0117	0.0117
Low Head Fill Pump	2	996	0.3819	0.3636	0.6075	0.0028	0.0191	0.0191
High Head Fill Pump	2	996	0.4324	0.4116	0.6877	0.0032	0.0216	0.0216
Squeeze Pump	2	996	0.2162	0.2058	0.4913	0.0016	0.0157	0.0157
1700 Air Compressors	4	1,992	1.4409	1.4409	1.2608	0.0088	0.0720	0.0720
Boom Truck 20 Ton	2	996	0.4324	0.4116	0.6877	0.0032	0.0216	0.0216
Motorgrader 14M	2	996	0.6943	0.6943	0.6075	0.0043	0.0347	0.0347
Forklift 4 ton	1	498	0.2947	0.2947	0.2579	0.0018	0.0147	0.0147
IT 28 with bucket and forks	6	2,988	2.1220	2.1220	1.8568	0.0130	0.1061	0.1061
Float truck and Trailer	6	2,988	0.0171	0.1199	13.2734	0.0047	0.0086	0.0086
Fuel Truck	2	996	0.0057	0.0400	4.4245	0.0016	0.0029	0.0029
Grease Truck	2	996	0.0057	0.0400	4.4245	0.0016	0.0029	0.0029
Lowboy Truck and Trailer	2	996	0.0088	0.0615	6.8069	0.0024	0.0044	0.0044
Street Broom	2	996	0.3243	0.3087	0.5158	0.0024	0.0162	0.0162
Supervision Pickups	2	996	0.0044	0.0307	3.4034	0.0012	0.0022	0.0022
Steward's Pickup	8	3,984	0.0176	0.1230	13.6138	0.0048	0.0088	0.0088
Mechanic's Rigs	2	996	0.4324	0.4116	0.6877	0.0032	0.0216	0.0216
Welder Rigs	2	996	0.3603	0.3430	0.5731	0.0026	0.0180	0.0180
Tandem Dump Truck	6	2,988	1.2972	1.2347	2.0631	0.0095	0.0648	0.0648
D6 Dozer LGP	2	996	0.6550	0.6550	0.5731	0.0040	0.0327	0.0327

71.5

73.7

460.2

0.6

3.9

3.9

¹ List includes representative equipment for all activities (clearing & grading, ditching, bending, etc.) and crew types (welding crew, coating crew, lowering crew, etc.).

² Based on values presented in EPA guidance document "Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling" (EPA420-P-04-005 dated April 2004).

⁴ Factors developed using methodology presented in EPA guidance documents "Exhaust and Crankcase Emission Factors for Nonroad Engine Emissions Modeling--Compression-Ignition" and "Exhaust Emission Factors for Nonroad Engine Modeling: Spark Ignition"

⁵ Project Emissions Rate = Engine Rating (hp) x Load Factor x Total Operation (hr/project) x Exhaust Emission Factor (g/hp-hr) / 453.6 grams/lb / 2000 lb/ton

**Table 9A-28
Rover Construction Activity Green House Gas Emissions - USP**

Make/Model	Fuel	Engine Rating (Horsepow	Fuel Use	Emission Factors (g/gal) ²		
			gal/hr	CO ₂	N ₂ O	CH ₄
Cat 426 Rubber Tire backHoe	Diesel	225	12.22391	10210	0.26	0.57
Flatbed truck 1 ton	Diesel	250	13.58212	10210	0.26	0.57
Hydrovac truck	Diesel	325	17.65675	10210	0.26	0.57
Marooka	Diesel	250	13.58212	10210	0.26	0.57
Foreman's pickup	Diesel	250	13.58212	10210	0.26	0.57
Operator's pickup	Diesel	250	13.58212	10210	0.26	0.57
Vermeer trencher	Diesel	130	7.062701	10210	0.26	0.57
Timber Pro 830B	Diesel	300	16.29854	10210	0.26	0.57
JD748H Skidder	Diesel	325	17.65675	10210	0.26	0.57
Terex 430TL Chipper	Diesel	400	21.73139	10210	0.26	0.57
Tiger Cat 822C	Diesel	350	19.01496	10210	0.26	0.57
Tiger Cat M726	Diesel	350	19.01496	10210	0.26	0.57
Morbark 4600 SL Grinder	Diesel	400	21.73139	10210	0.26	0.57
Excavator 336 with thumbs	Diesel	300	16.29854	10210	0.26	0.57
KW T800 truck with log loader	Diesel	350	19.01496	10210	0.26	0.57
Cat 320 EL with grappler & saw	Diesel	300	16.29854	10210	0.26	0.57
Truck tractor with chip trailer	Diesel	350	19.01496	10210	0.26	0.57
Cat 730 Dump Truck	Diesel	350	19.01496	10210	0.26	0.57
Cat excavator with hot saw	Diesel	350	19.01496	10210	0.26	0.57
D8 Dozers	Diesel	300	16.29854	10210	0.26	0.57
Cat 349 Excavator	Diesel	315	17.11347	10210	0.26	0.57
D8 Dozer Ripper	Diesel	300	16.29854	10210	0.26	0.57
Stringing Trucks & Trailer	Diesel	400	21.73139	10210	0.26	0.57
Vaculifter	Diesel	5	0.271642	10210	0.26	0.57
D7 Tow Tractor	Diesel	250	13.58212	10210	0.26	0.57
42" bending machine	Diesel	150	8.14927	10210	0.26	0.57
Piplayer 572	Diesel	240	13.03883	10210	0.26	0.57
Pipelayer 583	Diesel	300	16.29854	10210	0.26	0.57
Pipelayer 594 / 587	Diesel	350	19.01496	10210	0.26	0.57

Skid Truck Tandem	Diesel	300	16.29854	10210	0.26	0.57
ATV	Diesel	15	0.814927	10210	0.26	0.57
Farm Tractor	Diesel	75	4.074635	10210	0.26	0.57
Crew Bus	Diesel	250	13.58212	10210	0.26	0.57
Flatbed truck 2 ton	Diesel	250	13.58212	10210	0.26	0.57
Water Truck	Diesel	325	17.65675	10210	0.26	0.57
Tack Rig	Diesel	240	13.03883	10210	0.26	0.57
NDE Mainline Rig	Diesel	250	13.58212	10210	0.26	0.57
NDE Tie In Rig	Diesel	250	13.58212	10210	0.26	0.57
Air compressor 450 CFM	Diesel	125	6.791058	10210	0.26	0.57
Generator	Diesel	30	1.629854	10210	0.26	0.57
D6 Dozer	Diesel	240	13.03883	10210	0.26	0.57
6" Water pump	Diesel	125	6.791058	10210	0.26	0.57
3" Water Pump	Diesel	20	1.086569	10210	0.26	0.57
Cat 336 Excavator	Diesel	300	16.29854	10210	0.26	0.57
Cat 349 with hammer	Diesel	305	16.57018	10210	0.26	0.57
D7 Dozer	Diesel	265	14.39704	10210	0.26	0.57
Ozzie Padder 300	Diesel	285	15.48361	10210	0.26	0.57
Truck Foam Rig	Diesel	300	16.29854	10210	0.26	0.57
Road Bore Machine 60"	Diesel	250	13.58212	10210	0.26	0.57
Mud Pump	Diesel	50	2.716423	10210	0.26	0.57
Light Tower	Diesel	85	4.61792	10210	0.26	0.57
Low Head Fill Pump	Diesel	265	14.39704	10210	0.26	0.57
High Head Fill Pump	Diesel	300	16.29854	10210	0.26	0.57
Squeeze Pump	Diesel	150	8.14927	10210	0.26	0.57
1700 Air Compressors	Diesel	275	14.94033	10210	0.26	0.57
Boom Truck 20 Ton	Diesel	300	16.29854	10210	0.26	0.57
Motorgrader 14M	Diesel	265	14.39704	10210	0.26	0.57
Forklift 4 ton	Diesel	225	12.22391	10210	0.26	0.57
IT 28 with bucket and forks	Diesel	270	14.66869	10210	0.26	0.57
Float truck and Trailer	Diesel	325	17.65675	10210	0.26	0.57
Fuel Truck	Diesel	325	17.65675	10210	0.26	0.57
Grease Truck	Diesel	325	17.65675	10210	0.26	0.57
Lowboy Truck and Trailer	Diesel	500	27.16423	10210	0.26	0.57
Street Broom	Diesel	225	12.22391	10210	0.26	0.57
Supervision Pickups	Diesel	250	13.58212	10210	0.26	0.57
Steward's Pickup	Diesel	250	13.58212	10210	0.26	0.57
Mechanic's Rigs	Diesel	300	16.29854	10210	0.26	0.57
Welder Rigs	Diesel	250	13.58212	10210	0.26	0.57
Tandem Dump Truck	Diesel	300	16.29854	10210	0.26	0.57
D6 Dozer LGP	Diesel	250	13.58212	10210	0.26	0.57

¹ Horsepowers supplied by contractor

² Source of emission factors - Emission Factors for Greenhouse Gas Inventories, 4 April 2014

³ Emissions Equation = EF g/gal * Gallons of fuel total / 453.6g/lb / 2000lb/ton

⁴ CO2e based on global warming potential of CO2=1, N2O=298, CH4=25

Clarington & Cadiz Lateral

Make/Model	total operational hours	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Cat 426 Rubber Tire backHoe	367	4486.173	50.48923	0.001286	0.002819	50.94284
Flatbed truck 1 ton	4771	64800.28	729.2889	0.018572	0.040714	735.841
Hydrovac truck	367	6480.028	72.92889	0.001857	0.004071	73.5841
Marooka	734	9969.274	112.1983	0.002857	0.006264	113.2063
Foreman's pickup	9175	124615.9	1402.479	0.035714	0.078297	1415.079
Operator's pickup	19856	269686.5	3035.162	0.077291	0.169446	3062.431
Vermeer trencher	1101	7776.034	87.51466	0.002229	0.004886	88.30092
Timber Pro 830B	734	11963.13	134.6379	0.003429	0.007517	135.8476
JD748H Skidder	734	12960.06	145.8578	0.003714	0.008143	147.1682
Terex 430TL Chipper	734	15950.84	179.5173	0.004571	0.010022	181.1301
Tiger Cat 822C	734	13956.98	157.0776	0.004	0.008769	158.4888
Tiger Cat M726	734	13956.98	157.0776	0.004	0.008769	158.4888
Morbark 4600 SL Grinder	734	15950.84	179.5173	0.004571	0.010022	181.1301
Excavator 336 with thumbs	2936	47852.51	538.5518	0.013714	0.030066	543.3903
KW T800 truck with log loader	1468	27913.97	314.1552	0.008	0.017539	316.9777
Cat 320 EL with grappler & saw	734	11963.13	134.6379	0.003429	0.007517	135.8476
Truck tractor with chip trailer	1468	27913.97	314.1552	0.008	0.017539	316.9777
Cat 730 Dump Truck	734	13956.98	157.0776	0.004	0.008769	158.4888
Cat excavator with hot saw	734	13956.98	157.0776	0.004	0.008769	158.4888
D8 Dozers	2202	35889.39	403.9138	0.010286	0.02255	407.5427
Cat 349 Excavator	5505	94209.64	1060.274	0.027	0.059193	1069.8
D8 Dozer Ripper	1468	23926.26	269.2759	0.006857	0.015033	271.6951
Stringing Trucks & Trailer	4404	95705.03	1077.104	0.027429	0.060132	1086.781
Vaculifter	734	199.3855	2.243966	5.71E-05	0.000125	2.264126
D7 Tow Tractor	367	4984.637	56.09914	0.001429	0.003132	56.60316
42" bending machine	367	2990.782	33.65949	0.000857	0.001879	33.96189
Piplayer 572	1835	23926.26	269.2759	0.006857	0.015033	271.6951
Pipelayer 583	6973	113649.7	1279.06	0.032572	0.071407	1290.552

Pipelayer 594 / 587	2936	55827.93	628.3104	0.016	0.035077	633.9553
Skid Truck Tandem	367	5981.564	67.31897	0.001714	0.003758	67.92379
ATV	734	598.1564	6.731897	0.000171	0.000376	6.792379
Farm Tractor	1468	5981.564	67.31897	0.001714	0.003758	67.92379
Crew Bus	1468	19938.55	224.3966	0.005714	0.012528	226.4126
Flatbed truck 2 ton	1101	14953.91	168.2974	0.004286	0.009396	169.8095
Water Truck	1101	19440.08	218.7867	0.005571	0.012214	220.7523
Tack Rig	367	4785.251	53.85518	0.001371	0.003007	54.33903
NDE Mainline Rig	367	4984.637	56.09914	0.001429	0.003132	56.60316
NDE Tie In Rig	734	9969.274	112.1983	0.002857	0.006264	113.2063
Air compressor 450 CFM	2202	14953.91	168.2974	0.004286	0.009396	169.8095
Generator	367	598.1564	6.731897	0.000171	0.000376	6.792379
D6 Dozer	2202	28711.51	323.1311	0.008229	0.01804	326.0342
6" Water pump	2569	17446.23	196.347	0.005	0.010962	198.111
3" Water Pump	3670	3987.709	44.87931	0.001143	0.002506	45.28252
Cat 336 Excavator	3303	53834.08	605.8707	0.015429	0.033824	611.3141
Cat 349 with hammer	1101	18243.77	205.3229	0.005229	0.011463	207.1676
D7 Dozer	2202	31702.29	356.7905	0.009086	0.019919	359.9961
Ozzie Padder 300	367	5682.486	63.95302	0.001629	0.00357	64.5276
Truck Foam Rig	734	11963.13	134.6379	0.003429	0.007517	135.8476
Road Bore Machine 60"	734	9969.274	112.1983	0.002857	0.006264	113.2063
Mud Pump	734	1993.855	22.43966	0.000571	0.001253	22.64126
Light Tower	734	3389.553	38.14742	0.000971	0.00213	38.49015
Low Head Fill Pump	734	10567.43	118.9302	0.003029	0.00664	119.9987
High Head Fill Pump	734	11963.13	134.6379	0.003429	0.007517	135.8476
Squeeze Pump	367	2990.782	33.65949	0.000857	0.001879	33.96189
1700 Air Compressors	2202	32898.6	370.2543	0.009429	0.02067	373.5808
Boom Truck 20 Ton	734	11963.13	134.6379	0.003429	0.007517	135.8476
Motorgrader 14M	367	5283.715	59.46509	0.001514	0.00332	59.99935
Forklift 4 ton	367	4486.173	50.48923	0.001286	0.002819	50.94284
IT 28 with bucket and forks	367	5383.408	60.58707	0.001543	0.003382	61.13141
Float truck and Trailer	1101	19440.08	218.7867	0.005571	0.012214	220.7523
Fuel Truck	367	6480.028	72.92889	0.001857	0.004071	73.5841
Grease Truck	367	6480.028	72.92889	0.001857	0.004071	73.5841
Lowboy Truck and Trailer	1468	39877.09	448.7931	0.011429	0.025055	452.8252
Street Broom	734	8972.346	100.9785	0.002571	0.005637	101.8857
Supervision Pickups	7340	99692.74	1121.983	0.028572	0.062638	1132.063
Steward's Pickup	1468	19938.55	224.3966	0.005714	0.012528	226.4126
Mechanic's Rigs	2569	41870.95	471.2328	0.012	0.026308	475.4665
Welder Rigs	12111	164493	1851.272	0.047143	0.103352	1867.904
Tandem Dump Truck	367	5981.564	67.31897	0.001714	0.003758	67.92379
D6 Dozer LGP	1835	24923.18	280.4957	0.007143	0.015659	283.0158
		total	22286.14	0.567522	1.244182	22486.37

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Make/Model	total operational hours	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Cat 426 Rubber Tire backHoe	498	6087.505	68.51127	0.001745	0.003825	69.1268
Flatbed truck 1 ton	6972	94694.52	1065.731	0.027139	0.059497	1075.306
Hydrovac truck	498	8793.062	98.96072	0.00252	0.005525	99.84982
Marooka	1992	27055.58	304.4945	0.007754	0.016999	307.2302
Foreman's pickup	17928	243500.2	2740.451	0.069786	0.152993	2765.072
Operator's pickup	32928	447231.9	5033.331	0.128175	0.280999	5078.552
Vermeer trencher	1494	10551.67	118.7529	0.003024	0.00663	119.8198
Timber Pro 830B	996	16233.35	182.6967	0.004652	0.0102	184.3381
JD748H Skidder	996	17586.12	197.9214	0.00504	0.011049	199.6996
Terex 430TL Chipper	996	21644.46	243.5956	0.006203	0.013599	245.7842
Tiger Cat 822C	996	18938.9	213.1462	0.005428	0.011899	215.0611
Tiger Cat M726	996	18938.9	213.1462	0.005428	0.011899	215.0611
Morbark 4600 SL Grinder	996	21644.46	243.5956	0.006203	0.013599	245.7842
Excavator 336 with thumbs	4980	81166.73	913.4836	0.023262	0.050998	921.6906
KW T800 truck with log loader	996	18938.9	213.1462	0.005428	0.011899	215.0611
Cat 320 EL with grappler & saw	996	16233.35	182.6967	0.004652	0.0102	184.3381
Truck tractor with chip trailer	1992	37877.81	426.2923	0.010856	0.023799	430.1223
Cat 730 Dump Truck	996	18938.9	213.1462	0.005428	0.011899	215.0611
Cat excavator with hot saw	996	18938.9	213.1462	0.005428	0.011899	215.0611
D8 Dozers	2988	48700.04	548.0902	0.013957	0.030599	553.0144
Cat 349 Excavator	10956	187495.1	2110.147	0.053735	0.117804	2129.105
D8 Dozer Ripper	1494	24350.02	274.0451	0.006979	0.015299	276.5072
Stringing Trucks & Trailer	11952	259733.5	2923.147	0.074439	0.163192	2949.41
Vaculifter	996	270.5558	3.044945	7.75E-05	0.00017	3.072302
D7 Tow Tractor	996	13527.79	152.2473	0.003877	0.0085	153.6151
42" bending machine	498	4058.336	45.67418	0.001163	0.00255	46.08453
Piplayer 572	4980	64933.38	730.7869	0.01861	0.040798	737.3525
Pipelayer 583	17430	284083.6	3197.193	0.081417	0.178492	3225.917

Pipelayer 594 / 587	8964	170450.1	1918.316	0.04885	0.107095	1935.55
Skid Truck Tandem	498	8116.673	91.34836	0.002326	0.0051	92.16906
ATV	996	811.6673	9.134836	0.000233	0.00051	9.216906
Farm Tractor	4980	20291.68	228.3709	0.005816	0.012749	230.4227
Crew Bus	11952	162333.5	1826.967	0.046524	0.101995	1843.381
Flatbed truck 2 ton	1494	20291.68	228.3709	0.005816	0.012749	230.4227
Water Truck	1494	26379.19	296.8822	0.00756	0.016574	299.5495
Tack Rig	2490	32466.69	365.3934	0.009305	0.020399	368.6763
NDE Mainline Rig	3984	54111.15	608.9891	0.015508	0.033998	614.4604
NDE Tie In Rig	1992	27055.58	304.4945	0.007754	0.016999	307.2302
Air compressor 450 CFM	3984	27055.58	304.4945	0.007754	0.016999	307.2302
Generator	996	1623.335	18.26967	0.000465	0.00102	18.43381
D6 Dozer	498	6493.338	73.07869	0.001861	0.00408	73.73525
6" Water pump	996	6763.894	76.12363	0.001939	0.00425	76.80755
3" Water Pump	2988	3246.669	36.53934	0.00093	0.00204	36.86763
Cat 336 Excavator	996	16233.35	182.6967	0.004652	0.0102	184.3381
Cat 349 with hammer	2988	49511.71	557.225	0.01419	0.031109	562.2313
D7 Dozer	5976	86036.73	968.2926	0.024658	0.054057	976.9921
Ozzie Padder 300	4980	77108.39	867.8094	0.022099	0.048448	875.6061
Truck Foam Rig	7470	121750.1	1370.225	0.034893	0.076496	1382.536
Road Bore Machine 60"	3984	54111.15	608.9891	0.015508	0.033998	614.4604
Mud Pump	2988	8116.673	91.34836	0.002326	0.0051	92.16906
Light Tower	996	4599.448	51.76407	0.001318	0.00289	52.22914
Low Head Fill Pump	996	14339.46	161.3821	0.00411	0.00901	162.832
High Head Fill Pump	996	16233.35	182.6967	0.004652	0.0102	184.3381
Squeeze Pump	996	8116.673	91.34836	0.002326	0.0051	92.16906
1700 Air Compressors	1992	29761.13	334.944	0.008529	0.018699	337.9532
Boom Truck 20 Ton	996	16233.35	182.6967	0.004652	0.0102	184.3381
Motorgrader 14M	996	14339.46	161.3821	0.00411	0.00901	162.832
Forklift 4 ton	498	6087.505	68.51127	0.001745	0.003825	69.1268
IT 28 with bucket and forks	2988	43830.03	493.2811	0.012562	0.027539	497.7129
Float truck and Trailer	2988	52758.37	593.7643	0.01512	0.033148	599.0989
Fuel Truck	996	17586.12	197.9214	0.00504	0.011049	199.6996
Grease Truck	996	17586.12	197.9214	0.00504	0.011049	199.6996
Lowboy Truck and Trailer	996	27055.58	304.4945	0.007754	0.016999	307.2302
Street Broom	996	12175.01	137.0225	0.003489	0.00765	138.2536
Supervision Pickups	996	13527.79	152.2473	0.003877	0.0085	153.6151
Steward's Pickup	3984	54111.15	608.9891	0.015508	0.033998	614.4604
Mechanic's Rigs	996	16233.35	182.6967	0.004652	0.0102	184.3381
Welder Rigs	996	13527.79	152.2473	0.003877	0.0085	153.6151
Tandem Dump Truck	2988	48700.04	548.0902	0.013957	0.030599	553.0144
D6 Dozer LGP	996	13527.79	152.2473	0.003877	0.0085	153.6151
		total	38859.63	0.989569	2.169441	39208.76

**Table 9A-27
Rover Construction Activity Tailpipe Emissions - Sheehan**

Equipment Type ¹	Make/Model	Fuel Type	Engine Rating (hp)	Load Factor ²	Exhaust Emission Factors ⁴					
					NOx (g/hp-hr)	VOC (g/hp-hr)	CO (g/hp-hr)	SO2 (g/hp-hr)	PM10 (g/hp-hr)	PM2.5 (g/hp-hr)
Dozer	D8T	Diesel	310	0.8	1.64	1.56	2.61	0.01	0.08	0.08
Dozer	D6T	Diesel	200	0.8	0.30	0.15	2.61	0.01	0.15	0.15
Dozer	D6T LGP	Diesel	200	0.8	0.30	0.15	2.61	0.01	0.15	0.15
Dozer	D7R XT	Diesel	240	0.8	2.98	2.98	2.61	0.02	0.15	0.15
Dozer	D6R LGP	Diesel	200	0.8	3.94	0.98	2.61	0.02	0.15	0.15
excavator	349	Diesel	404	0.8	0.30	0.15	2.61	0.01	0.15	0.15
excavator	336	Diesel	300	0.8	0.30	0.15	2.61	0.01	0.15	0.15
excavator	329	Diesel	232	0.8	0.30	0.15	2.61	0.01	0.15	0.15
excavator	320	Diesel	138	0.8	0.30	0.15	3.73	0.01	0.15	0.15
excavator	305.5 Mini	Diesel	44	0.8	3.50	3.50	3.73	0.01	0.22	0.22
Flatbed	Mack CL733	Diesel	550	0.8	0.02	0.14	15.50	0.01	0.01	0.01
Flatbed	Volvo VHD64B	Diesel	500	0.8	0.02	0.14	15.50	0.01	0.01	0.01
Flatbed	Fuel Truck	Diesel	450	0.8	0.02	0.14	15.50	0.01	0.01	0.01
Flatbed	Mack CL613	Diesel	425	0.8	0.02	0.14	15.50	0.01	0.01	0.01
Flatbed	Mack CL700	Diesel	375	0.8	0.02	0.14	15.50	0.01	0.01	0.01
Flatbed	Dump Truck	Diesel	350	0.8	0.02	0.14	15.50	0.01	0.01	0.01
Flatbed	Ford 550	Diesel	300	0.8	0.02	0.14	15.50	0.01	0.01	0.01
Flatbed	Tandem Flatbed	Diesel	300	0.8	0.02	0.14	15.50	0.01	0.01	0.01
Flatbed	Ford 750	Diesel	250	0.8	0.02	0.14	15.50	0.01	0.01	0.01
Flatbed	Lube Truck	Diesel	250	0.8	0.02	0.14	15.50	0.01	0.01	0.01
Flatbed	Winch Truck	Diesel	250	0.8	0.02	0.14	15.50	0.01	0.01	0.01
misc	Marooka	Diesel	250	0.8	1.64	1.56	2.61	0.01	0.08	0.08
misc	140K Grader	Diesel	175	0.8	1.64	1.56	2.61	0.01	0.08	0.08
misc	John Henry	Diesel	138	0.8	1.64	1.56	3.73	0.01	1.56	1.56
misc	Air Compressor	Diesel	49	0.8	4.55	4.55	0.24	0.01	3.51	3.51
misc	8" fill pump	Diesel	325	0.8	5.34	0.96	5.56	0.02	0.28	0.28
misc	1055 Telehandler	Diesel	120	0.8	0.30	0.15	3.73	0.01	0.15	0.15
misc	Backhoe	Diesel	101	0.8	0.30	0.15	3.73	0.01	0.15	0.15
misc	6" Trash Pump	Diesel	26	0.8	3.50	3.50	3.73	0.01	0.22	0.22
misc	Ozzie Padder	Diesel	300	0.8	2.98	2.98	2.61	0.02	0.15	0.15
misc	42' Bender	Diesel	180	0.8	6.86	0.97	8.50	0.02	0.40	0.40
misc	60" Boring Machine	Diesel	160	0.8	6.86	0.97	3.73	0.02	0.40	0.40
Pickup	F-250 Diesel	Diesel	420	0.8	0.02	0.14	15.50	0.01	0.01	0.01
Pickup	Dodge 2500	Diesel	370	0.8	0.02	0.14	15.50	0.01	0.01	0.01
Pickup	Chevy 2500	Diesel	300	0.8	0.02	0.14	15.50	0.01	0.01	0.01
Pickup	F-250	Diesel	220	0.8	0.02	0.14	15.50	0.01	0.01	0.01
Pipe Layer	PL-87	Diesel	366	0.8	0.30	0.15	2.61	0.01	0.15	0.15
Pipe Layer	587T	Diesel	366	0.8	2.98	2.98	2.61	0.02	0.15	0.15
Pipe Layer	583T	Diesel	310	0.8	2.98	2.98	2.61	0.02	0.15	0.15
Pipe Layer	240R	Diesel	240	0.8	2.98	2.98	2.61	0.02	0.15	0.15
Pipe Layer	594	Diesel	410	0.8	6.86	0.97	8.50	0.02	0.40	0.40
Welding Tractor	D6N	Diesel	150	0.8	2.98	2.98	3.73	0.02	0.22	0.22
Welding Tractor	D6D	Diesel	140	0.8	6.86	0.97	3.73	0.02	0.40	0.40

Equipment Type ¹	Make/Model	Quantity	Total Operation (hr/project)	Project Emission Rate ⁵					
				NOx (tons/project)	VOC (tons/project)	CO (tons/project)	SO2 (tons/project)	PM10 (tons/project)	PM2.5 (tons/project)
Dozer	D8T	38	14,174.0	6.3584	6.0523	10.1130	0.0465	0.3177	0.3177
Dozer	D6T	17	6,341.0	0.3336	0.1642	2.9188	0.0062	0.1668	0.1668
Dozer	D6T LGP	4	4,849.0	0.2551	0.1256	2.2320	0.0047	0.1275	0.1275
Dozer	D7R XT	13	1,492.0	0.9419	0.9419	0.8241	0.0058	0.0471	0.0471
Dozer	D6R LGP	2	746.0	0.5180	0.1295	0.3434	0.0024	0.0196	0.0196
excavator	349	53	23,499.0	2.4971	1.2292	21.8499	0.0460	1.2486	1.2486
excavator	336	63	19,769.0	1.5600	0.7679	13.6498	0.0288	0.7800	0.7800
excavator	329	4	4,476.0	0.2731	0.1345	2.3900	0.0050	0.1366	0.1366
excavator	320	2	1,492.0	0.0542	0.0267	0.6770	0.0010	0.0271	0.0271
excavator	305.5 Mini	12	746.0	0.1014	0.1014	0.1079	0.0002	0.0065	0.0065
Flatbed	Mack CL733	7	9,325.0	0.0905	0.6332	70.1020	0.0249	0.0452	0.0452
Flatbed	Volvo VHD64B	3	4,103.0	0.0362	0.2533	28.0408	0.0099	0.0181	0.0181
Flatbed	Fuel Truck	6	3,730.0	0.0296	0.2072	22.9425	0.0081	0.0148	0.0148
Flatbed	Mack CL613	8	2,611.0	0.0196	0.1370	15.1675	0.0054	0.0098	0.0098
Flatbed	Mack CL700	7	2,984.0	0.0197	0.1381	15.2950	0.0054	0.0099	0.0099
Flatbed	Dump Truck	10	5,968.0	0.0368	0.2579	28.5506	0.0101	0.0184	0.0184
Flatbed	Ford 550	16	2,611.0	0.0138	0.0967	10.7065	0.0038	0.0069	0.0069
Flatbed	Tandem Flatbed	11	2,238.0	0.0118	0.0829	9.1770	0.0033	0.0059	0.0059
Flatbed	Ford 750	25	2,238.0	0.0099	0.0691	7.6475	0.0027	0.0049	0.0049
Flatbed	Lube Truck	4	1,492.0	0.0066	0.0460	5.0983	0.0018	0.0033	0.0033
Flatbed	Winch Truck	6	1,119.0	0.0049	0.0345	3.8237	0.0014	0.0025	0.0025
misc	Marooka	7	2,238.0	0.8096	0.7707	1.2877	0.0059	0.0405	0.0405
misc	140K Grader	4	24,245.0	6.1398	5.8442	9.7653	0.0449	0.3068	0.3068
misc	John Henry	8	2,984.0	0.5959	0.5672	1.3541	0.0044	0.5672	0.5672
misc	Air Compressor	12	4,476.0	0.8798	0.8798	0.0455	0.0023	0.6779	0.6779
misc	8" fill pump	8	2,611.0	3.9953	0.7198	4.1572	0.0137	0.2065	0.2065
misc	1055 Telehandler	6	1,492.0	0.0471	0.0232	0.5887	0.0009	0.0235	0.0235
misc	Backhoe	4	2,238.0	0.0595	0.0293	0.7432	0.0011	0.0297	0.0297
misc	6" Trash Pump	65	1,865.0	0.1499	0.1499	0.1594	0.0002	0.0096	0.0096
misc	Ozzie Padder	4	1,492.0	1.1773	1.1773	1.0302	0.0072	0.0589	0.0589
misc	42' Bender	6	1,492.0	1.6247	0.2296	2.0132	0.0043	0.0954	0.0954
misc	60" Boring Machine	5	2,984.0	2.8884	0.4081	1.5698	0.0077	0.1695	0.1695
Pickup	F-250 Diesel	8	18,650.0	0.1381	0.9670	107.0648	0.0380	0.0691	0.0691
Pickup	Dodge 2500	50	11,190.0	0.0730	0.5111	56.5914	0.0201	0.0365	0.0365
Pickup	Chevy 2500	6	2,984.0	0.0158	0.1105	12.2360	0.0043	0.0079	0.0079
Pickup	F-250	30	2,238.0	0.0087	0.0608	6.7298	0.0024	0.0043	0.0043
Pipe Layer	PL-87	27	18,277.0	1.7595	0.8661	15.3959	0.0324	0.8798	0.8798
Pipe Layer	587T	8	10,071.0	9.6954	9.6954	8.4835	0.0595	0.4848	0.4848
Pipe Layer	583T	49	8,952.0	7.2995	7.2995	6.3871	0.0448	0.3650	0.3650
Pipe Layer	240R	6	2,984.0	1.8837	1.8837	1.6483	0.0116	0.0942	0.0942
Pipe Layer	594	24	2,238.0	5.5511	0.7844	6.8786	0.0148	0.3258	0.3258
Welding Tractor	D6N	2	2,238.0	0.8830	0.8830	1.1038	0.0054	0.0662	0.0662
Welding Tractor	D6D	6	746.0	0.6318	0.0893	0.3434	0.0017	0.0371	0.0371
Total				59.5	45.6	517.2	0.6	7.6	7.6

¹ List includes representative equipment for all activities (clearing & grading, ditching, bending, etc.) and crew types (welding crew, coating crew, lowering crew, etc.).

² Based on values presented in EPA guidance document "Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling" (EPA420-P-04-005 dated April 2004).

⁴ Factors developed using methodology presented in EPA guidance documents "Exhaust and Crankcase Emission Factors for Nonroad Engine Emissions Modeling--Compression-Ignition" and "Exhaust Emission Factors for Nonroad Engine Modeling: Spark Ignition"

⁵ Project Emissions Rate = Engine Rating (hp) x Load Factor x Total Operation (hr/project) x Exhaust Emission Factor (g/hp-hr) / 453.6 grams/lb / 2000 lb/ton

**Table 9A-28
Rover Construction Activity Green House Gas Emissions - Sheehan**

Equipment Type ¹	Make/Model	Fuel	Engine Rating (Horsepow	Fuel Use	Emission Factors (g/gal) ²		
				gal/hr	CO ₂	N ₂ O	CH ₄
Dozer	D8T	Diesel	310	16.84182	10210	0.26	0.57
Dozer	D6T	Diesel	200	10.86569	10210	0.26	0.57
Dozer	D6T LGP	Diesel	200	10.86569	10210	0.26	0.57
Dozer	D7R XT	Diesel	240	13.03883	10210	0.26	0.57
Dozer	D6R LGP	Diesel	200	10.86569	10210	0.26	0.57
excavator	349	Diesel	404	21.9487	10210	0.26	0.57
excavator	336	Diesel	300	16.29854	10210	0.26	0.57
excavator	329	Diesel	232	12.6042	10210	0.26	0.57
excavator	320	Diesel	138	7.497328	10210	0.26	0.57
excavator	305.5 Mini	Diesel	44	2.390453	10210	0.26	0.57
Flatbed	Mack CL733	Diesel	550	29.88066	10210	0.26	0.57
Flatbed	Volvo VHD64B	Diesel	500	27.16423	10210	0.26	0.57
Flatbed	Fuel Truck	Diesel	450	24.44781	10210	0.26	0.57
Flatbed	Mack CL613	Diesel	425	23.0896	10210	0.26	0.57
Flatbed	Mack CL700	Diesel	375	20.37318	10210	0.26	0.57
Flatbed	Dump Truck	Diesel	350	19.01496	10210	0.26	0.57
Flatbed	Ford 550	Diesel	300	16.29854	10210	0.26	0.57
Flatbed	Tandem Flatbed	Diesel	300	16.29854	10210	0.26	0.57
Flatbed	Ford 750	Diesel	250	13.58212	10210	0.26	0.57
Flatbed	Lube Truck	Diesel	250	13.58212	10210	0.26	0.57
Flatbed	Winch Truck	Diesel	250	13.58212	10210	0.26	0.57
misc	Marooka	Diesel	250	13.58212	10210	0.26	0.57
misc	140K Grader	Diesel	175	9.507482	10210	0.26	0.57
misc	John Henry	Diesel	138	7.497328	10210	0.26	0.57
misc	Air Compressor	Diesel	49	2.662095	10210	0.26	0.57
misc	8" fill pump	Diesel	325	17.65675	10210	0.26	0.57
misc	1055 Telehandler	Diesel	120	6.519416	10210	0.26	0.57
misc	Backhoe	Diesel	101	5.487175	10210	0.26	0.57
misc	6" Trash Pump	Diesel	26	1.41254	10210	0.26	0.57
misc	Ozzie Padder	Diesel	300	16.29854	10210	0.26	0.57
misc	42' Bender	Diesel	180	9.779124	10210	0.26	0.57
misc	60" Boring Machine	Diesel	160	8.692555	10210	0.26	0.57
Pickup	F-250 Diesel	Diesel	420	22.81796	10210	0.26	0.57
Pickup	Dodge 2500	Diesel	370	20.10153	10210	0.26	0.57
Pickup	Chevy 2500	Diesel	300	16.29854	10210	0.26	0.57
Pickup	F-250	Diesel	220	11.95226	10210	0.26	0.57
Pipe Layer	PL-87	Diesel	366	19.88422	10210	0.26	0.57
Pipe Layer	587T	Diesel	366	19.88422	10210	0.26	0.57
Pipe Layer	583T	Diesel	310	16.84182	10210	0.26	0.57
Pipe Layer	240R	Diesel	240	13.03883	10210	0.26	0.57
Pipe Layer	594	Diesel	410	22.27467	10210	0.26	0.57
Welding Tractor	D6N	Diesel	150	8.14927	10210	0.26	0.57
Welding Tractor	D6D	Diesel	140	7.605985	10210	0.26	0.57

¹ Horsepowers are estimated

² Source of emission factors - Emission Factors for Greenhouse Gas Inventories, 4 April 2014

³ Emissions Equation = EF g/gal * Gallons of fuel total / 453.6g/lb / 2000lb/ton

⁴ CO₂e based on global warming potential of CO₂=1, N₂O=298, CH₄=25

Spread 1 & 2 - Mainline A & B Pipeline - Shehan

Equipment Type ¹	Make/Model	total operational hours	gallons of fuel total	Emissions (tons) ³			
				CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Dozer	D8T	14174	238716	2686.608	0.068415	0.149987	2710.745
Dozer	D6T	6341	68899.36	775.4216	0.019746	0.04329	782.3883
Dozer	D6T LGP	4849	52687.75	592.9695	0.0151	0.033104	598.2969
Dozer	D7R XT	1492	19453.94	218.9426	0.005575	0.012223	220.9096
Dozer	D6R LGP	746	8105.807	91.22607	0.002323	0.005093	92.04568
excavator	349	23499	515772.5	5804.715	0.147818	0.324063	5856.866
excavator	336	19769	322205.8	3626.236	0.092343	0.202444	3658.816
excavator	329	4476	56416.42	634.9335	0.016169	0.035447	640.6379
excavator	320	1492	11186.01	125.892	0.003206	0.007028	127.023
excavator	305.5 Mini	746	1783.278	20.06974	0.000511	0.00112	20.25005
Flatbed	Mack CL733	9325	278637.1	3135.896	0.079856	0.17507	3164.07
Flatbed	Volvo VHD64B	4103	111454.9	1254.358	0.031943	0.070028	1265.628
Flatbed	Fuel Truck	3730	91190.33	1026.293	0.026135	0.057296	1035.514
Flatbed	Mack CL613	2611	60286.94	678.4939	0.017278	0.037879	684.5897
Flatbed	Mack CL700	2984	60793.55	684.1955	0.017423	0.038197	690.3426
Flatbed	Dump Truck	5968	113481.3	1277.165	0.032523	0.071301	1288.639
Flatbed	Ford 550	2611	42555.49	478.9369	0.012196	0.026738	483.2398
Flatbed	Tandem Flatbed	2238	36476.13	410.5173	0.010454	0.022918	414.2055
Flatbed	Ford 750	2238	30396.78	342.0978	0.008712	0.019099	345.1713
Flatbed	Lube Truck	1492	20264.52	228.0652	0.005808	0.012732	230.1142
Flatbed	Winch Truck	1119	15198.39	171.0489	0.004356	0.009549	172.5856
misc	Marooka	2238	30396.78	342.0978	0.008712	0.019099	345.1713
misc	140K Grader	24245	230508.9	2594.241	0.066063	0.14483	2617.549
misc	John Henry	2984	22372.03	251.784	0.006412	0.014056	254.0461
misc	Air Compressor	4476	11915.54	134.1023	0.003415	0.007487	135.3071
misc	8" fill pump	2611	46101.78	518.8483	0.013213	0.028966	523.5098
misc	1055 Telehandler	1492	9726.969	109.4713	0.002788	0.006112	110.4548
misc	Backhoe	2238	12280.3	138.2075	0.003519	0.007716	139.4492
misc	6" Trash Pump	1865	2634.387	29.64847	0.000755	0.001655	29.91485
misc	Ozzie Padder	1492	24317.42	273.6782	0.006969	0.015279	276.137
misc	42' Bender	1492	14590.45	164.2069	0.004182	0.009167	165.6822
misc	60" Boring Machine	2984	25938.58	291.9234	0.007434	0.016297	294.5462
Pickup	F-250 Diesel	18650	425554.9	4789.369	0.121962	0.267379	4832.398
Pickup	Dodge 2500	11190	224936.2	2531.523	0.064466	0.141329	2554.268
Pickup	Chevy 2500	2984	48634.84	547.3564	0.013939	0.030558	552.2741
Pickup	F-250	2238	26749.16	301.046	0.007666	0.016807	303.7507
Pipe Layer	PL-87	18277	363423.9	4090.121	0.104156	0.228342	4126.868
Pipe Layer	587T	10071	200254	2253.74	0.057392	0.125821	2273.988
Pipe Layer	583T	8952	150768	1696.805	0.04321	0.094729	1712.05
Pipe Layer	240R	2984	38907.88	437.8851	0.011151	0.024446	441.8192
Pipe Layer	594	2238	49850.71	561.0403	0.014287	0.031322	566.0809
Welding Tractor	D6N	2238	18238.07	205.2587	0.005227	0.011459	207.1028
Welding Tractor	D6D	746	5674.065	63.85825	0.001626	0.003565	64.43197
			total	46590.3	1.186433	2.601025	47008.88

**Table 9A-27
Rover Construction Activity Tailpipe Emissions - Michels**

Make/Model	Fuel Type	Engine Rating (hp)	Load Factor ²	Exhaust Emission Factors ⁴					
				NOx (g/hp-hr)	VOC (g/hp-hr)	CO (g/hp-hr)	SO2 (g/hp-hr)	PM10 (g/hp-hr)	PM2.5 (g/hp-hr)
BENDING MACHINE- 22"-36	Diesel	50	0.8	4.4700	1.1200	3.7300	0.0183	0.4000	0.4000
BUS	Diesel	245	0.8	0.2000	0.1400	15.5000	0.0055	0.0100	0.0100
COMPRESSOR- 1600	Gas	350	0.8	2.3860	0.6000	2.6360	0.0183	0.1500	0.1500
CRADLE BORE	Diesel	85	0.8	2.8010	0.6000	3.7300	0.0183	0.3000	0.3000
DOZER- D5	Diesel	100	0.8	1.1600	1.5600	2.6360	0.0183	0.0150	0.0150
DOZER- D6	Diesel	200	0.8	1.1600	1.5600	2.6360	0.0183	0.0150	0.0150
DOZER- D7	Diesel	240	0.8	2.3860	0.6000	2.6360	0.0183	0.1500	0.1500
DOZER- D8	Diesel	310	0.8	2.3860	0.6000	2.6360	0.0183	0.1500	0.1500
EXCAVATOR- 115 BACKHO	Diesel	75	0.8	2.8010	0.7000	3.7300	0.0183	0.0150	0.0150
EXCAVATOR- 350	Gas	270	0.8	2.3860	0.6000	2.6360	0.0183	0.0150	0.0150
EXCAVATOR- 450	Diesel	375	0.8	2.3860	0.6000	2.6360	0.0183	0.0150	0.0150
EXCAVATOR- JOHN HENRY	Diesel	300	0.8	2.3860	0.6000	2.6360	0.0183	0.1500	0.1500
FORK LIFT	Diesel	125	0.8	1.1600	1.5600	2.6360	0.0183	0.0150	0.0150
GRADER- CAT 14	Diesel	200	0.8	1.1600	1.5600	2.6360	0.0183	0.0150	0.0150
GRADER- CAT 16	Gas	240	0.8	1.1600	1.5600	2.6360	0.0183	0.0150	0.0150
HAMMER- 345 EXCAVATOR	Diesel	210	0.8	1.1600	1.5600	2.6360	0.0183	0.0150	0.0150
LOADER- CAT 936	Diesel	200	0.8	2.3860	0.6000	2.6360	0.0183	0.1500	0.1500
MOROOKA- 2200	Diesel	125	0.8	2.3860	0.6000	3.7300	0.0183	0.2240	0.2240
MOROOKA- COATING	Diesel	125	0.8	2.3860	0.6000	3.7300	0.0183	0.2240	0.2240
MOROOKA- FOAM	Diesel	125	0.8	2.3860	0.6000	3.7300	0.0183	0.2240	0.2240
MOROOKA- POTHOLE	Diesel	125	0.8	2.3860	0.6000	3.7300	0.0183	0.2240	0.2240
MOROOKA- SANDBLAST	Gas	125	0.8	2.3860	0.6000	3.7300	0.0183	0.2240	0.2240
POSI-TRACK	Diesel	100	0.8	1.1600	1.5600	2.6360	0.0183	0.0150	0.0150
PUMP- 3"	Gas	100	0.8	2.3860	0.6000	3.7300	0.0183	0.2240	0.2240
PUMP- 6"	Diesel	300	0.8	2.3860	0.6000	2.6360	0.0183	0.2000	0.2000
PUMP- DEWATERING	Diesel	200	0.8	1.1600	1.5600	2.6360	0.0183	0.0150	0.0150
PUMP- FILL/ TEST	Diesel	200	0.8	3.9400	0.9843	3.5000	0.0183	0.2000	0.2000
SANDBLASTER	Diesel	75	0.8	2.8010	0.7000	3.7300	0.0183	0.3000	0.3000
SIDEBOOM- 572	Gas	175	0.8	2.3860	0.6000	2.6360	0.0183	0.1500	0.1500
SIDEBOOM- 583	Diesel	310	0.8	3.8180	0.9545	3.5000	0.0183	0.1500	0.1500
SIDEBOOM- 594	Diesel	300	0.8	2.3860	0.6000	2.6360	0.0183	0.1500	0.1500
TIMBER PRO	Diesel	300	0.8	2.3860	0.6000	2.6360	0.0183	0.1500	0.1500
TRACTOR- 40-60 HP	Diesel	60	0.8	2.8010	0.7000	3.7300	0.0183	0.4000	0.4000
TRACTOR- 80-120 HP	Gas	120	0.8	2.3860	0.6000	3.7300	0.0183	0.2240	0.2240
TRACTOR- CHISEL PLOW A	Diesel	300	0.8	2.3860	0.6000	2.6360	0.0183	0.1500	0.1500
TRACTOR- DISC ATTACHM	Diesel	400	0.8	2.3860	0.6000	2.6360	0.0183	0.1500	0.1500
TRENCHER- WALK BEHIND	Diesel	20	0.8	4.4720	1.1200	4.9200	0.0183	0.6000	0.6000
TRUCK- 1/2 TON PICKUP	Diesel	300	0.8	0.2000	0.1400	15.5000	0.0183	0.0100	0.0100
TRUCK- 3/4 TON PICKUP	Diesel	380	0.8	0.2000	0.1400	15.5000	0.0055	0.0100	0.0100
TRUCK- 1 TON	Diesel	362	0.8	0.2000	0.1400	15.5000	0.0055	0.0100	0.0100
TRUCK- 2 TON	Diesel	275	0.8	0.2000	0.1400	15.5000	0.0055	0.0100	0.0100
TRUCK- BOX W/ FOAM SYS	Diesel	300	0.8	0.2000	0.1400	15.5000	0.0055	0.0100	0.0100
TRUCK- DUMP	Gas	300	0.8	0.2000	0.1400	15.5000	0.0120	0.0100	0.0100
TRUCK- FUEL- 4,000 GAL	Gas	425	0.8	0.2000	0.1400	15.5000	0.0055	0.0100	0.0100
TRUCK- GRAPPLE	Gas	425	0.8	0.2000	0.1400	15.5000	0.0055	0.0100	0.0100
TRUCK- GREASE	Diesel	425	0.8	0.2000	0.1400	15.5000	0.0055	0.0100	0.0100
TRUCK- KNUCKLE BOOM	Diesel	300	0.8	0.2000	0.1400	15.5000	0.0055	0.0100	0.0100
TRUCK- SEMI	Diesel	450	0.8	0.2000	0.1400	15.5000	0.0055	0.0100	0.0100
TRUCK- SKID	Gas	425	0.8	0.2000	0.1400	15.5000	0.0055	0.0100	0.0100
TRUCK- STINGER	Gas	300	0.8	0.2000	0.1400	15.5000	0.0055	0.0100	0.0100
TRUCK- VAC [Tractor - Broo	Diesel	300	0.8	0.2000	0.1400	15.5000	0.0055	0.0100	0.0100
TRUCK- WATER	Diesel	300	0.8	0.2000	0.1400	15.5000	0.0055	0.0100	0.0100
VAC UNIT- EXCAVATOR	Diesel	450	0.8	0.4000	0.1900	3.5000	0.0055	0.0150	0.0150

Spread 4

Make/Model	Quantity	Total Operation (hr/project)	Project Emission Rate ⁽⁵⁾					
			NOx (tons/project)	VOC (tons/project)	CO (tons/project)	SO2 (tons/project)	PM10 (tons/project)	PM2.5 (tons/project)
BENDING MACHINE- 22"-36	3	2,028.0	0.3997	0.1001	0.3335	0.0016	0.0358	0.0358
BUS	6	4,056.0	0.1753	0.1227	13.5826	0.0048	0.0088	0.0088
COMPRESSOR- 1600	8	5,408.0	3.9826	1.0015	4.3998	0.0305	0.2504	0.2504
CRADLE BORE	3	2,028.0	0.4258	0.0912	0.5670	0.0028	0.0456	0.0456
DOZER- D5	2	1,352.0	0.1383	0.1860	0.3143	0.0022	0.0018	0.0018
DOZER- D6	9	6,084.0	1.2447	1.6739	2.8285	0.0196	0.0161	0.0161
DOZER- D7	2	1,352.0	0.6827	0.1717	0.7543	0.0052	0.0429	0.0429
DOZER- D8	18	12,168.0	7.9367	1.9958	8.7683	0.0609	0.4990	0.4990
EXCAVATOR- 115 BACKHO	3	2,028.0	0.3757	0.0939	0.5003	0.0025	0.0020	0.0020
EXCAVATOR- 350	23	15,548.0	8.8327	2.2211	9.7582	0.0677	0.0555	0.0555
EXCAVATOR- 450	50	33,800.0	26.6689	6.7063	29.4632	0.2045	0.1677	0.1677
EXCAVATOR- JOHN HENRY	1	676.0	0.4267	0.1073	0.4714	0.0033	0.0268	0.0268
FORK LIFT	2	1,352.0	0.1729	0.2325	0.3928	0.0027	0.0022	0.0022
GRADER- CAT 14	1	676.0	0.1383	0.1860	0.3143	0.0022	0.0018	0.0018
GRADER- CAT 16	2	1,352.0	0.3319	0.4464	0.7543	0.0052	0.0043	0.0043
HAMMER- 345 EXCAVATOR	8	5,408.0	1.1617	1.5623	2.6399	0.0183	0.0150	0.0150
LOADER- CAT 936	1	676.0	0.2845	0.0715	0.3143	0.0022	0.0179	0.0179
MOROOKA- 2200	3	2,028.0	0.5334	0.1341	0.8338	0.0041	0.0501	0.0501
MOROOKA- COATING	2	1,352.0	0.3556	0.0894	0.5559	0.0027	0.0334	0.0334
MOROOKA- FOAM	2	1,352.0	0.3556	0.0894	0.5559	0.0027	0.0334	0.0334
MOROOKA- POTHOLE	1	676.0	0.1778	0.0447	0.2779	0.0014	0.0167	0.0167
MOROOKA- SANDBLAST	2	1,352.0	0.3556	0.0894	0.5559	0.0027	0.0334	0.0334
POSI-TRACK	3	2,028.0	0.2074	0.2790	0.4714	0.0033	0.0027	0.0027
PUMP- 3"	43	29,068.0	6.1161	1.5380	9.5612	0.0469	0.5742	0.5742
PUMP- 6"	21	14,196.0	8.9608	2.2533	9.8996	0.0687	0.7511	0.7511
PUMP- DEWATERING	2	1,352.0	0.2766	0.3720	0.6285	0.0044	0.0036	0.0036
PUMP- FILL/ TEST	2	1,352.0	0.9395	0.2347	0.8346	0.0044	0.0477	0.0477
SANDBLASTER	2	1,352.0	0.2505	0.0626	0.3335	0.0016	0.0268	0.0268
SIDEBOOM- 572	8	5,408.0	1.9913	0.5007	2.1999	0.0153	0.1252	0.1252
SIDEBOOM- 583	19	12,844.0	13.4056	3.3514	12.2890	0.0643	0.5267	0.5267
SIDEBOOM- 594	30	20,280.0	12.8011	3.2190	14.1423	0.0982	0.8048	0.8048
TIMBER PRO	9	6,084.0	3.8403	0.9657	4.2427	0.0295	0.2414	0.2414
TRACTOR- 40-60 HP	1	676.0	0.1002	0.0250	0.1334	0.0007	0.0143	0.0143
TRACTOR- 80-120 HP	7	4,732.0	1.1948	0.3004	1.8678	0.0092	0.1122	0.1122
TRACTOR- CHISEL PLOW A	3	2,028.0	1.2801	0.3219	1.4142	0.0098	0.0805	0.0805
TRACTOR- DISC ATTACHM	3	2,028.0	1.7068	0.4292	1.8856	0.0131	0.1073	0.1073
TRENCHER- WALK BEHIND	3	2,028.0	0.1600	0.0401	0.1760	0.0007	0.0215	0.0215
TRUCK- 1/2 TON PICKUP	5	3,380.0	0.1788	0.1252	13.8598	0.0164	0.0089	0.0089
TRUCK- 3/4 TON PICKUP	90	60,840.0	4.0775	2.8542	316.0032	0.1121	0.2039	0.2039
TRUCK- 1 TON	19	12,844.0	0.8200	0.5740	63.5517	0.0226	0.0410	0.0410
TRUCK- 2 TON	1	676.0	0.0328	0.0230	2.5410	0.0009	0.0016	0.0016
TRUCK- BOX W/ FOAM SYS	2	1,352.0	0.0715	0.0501	5.5439	0.0020	0.0036	0.0036
TRUCK- DUMP	1	676.0	0.0358	0.0250	2.7720	0.0021	0.0018	0.0018
TRUCK- FUEL- 4,000 GAL	2	1,352.0	0.1013	0.0709	7.8539	0.0028	0.0051	0.0051
TRUCK- GRAPPLE	2	1,352.0	0.1013	0.0709	7.8539	0.0028	0.0051	0.0051
TRUCK- GREASE	2	1,352.0	0.1013	0.0709	7.8539	0.0028	0.0051	0.0051
TRUCK- KNUCKLE BOOM	2	1,352.0	0.0715	0.0501	5.5439	0.0020	0.0036	0.0036
TRUCK- SEMI	22	14,872.0	1.1803	0.8262	91.4746	0.0325	0.0590	0.0590
TRUCK- SKID	2	1,352.0	0.1013	0.0709	7.8539	0.0028	0.0051	0.0051
TRUCK- STINGER	1	676.0	0.0358	0.0250	2.7720	0.0021	0.0018	0.0018
TRUCK- VAC [Tractor - Broo	1	676.0	0.0358	0.0250	2.7720	0.0021	0.0018	0.0018
TRUCK- WATER	4	2,704.0	0.1431	0.1001	11.0878	0.0039	0.0072	0.0072
VAC UNIT- EXCAVATOR	2	1,352.0	0.2146	0.1019	1.8778	0.0030	0.0080	0.0080
			115.7	36.4	690.2	1.0	5.2	5.2

Burgettstown Lateral								
Make/Model	Quantity	Total Operation (hr/project)	Project Emission Rate ^[5]					
			NOx (tons/project)	VOC (tons/project)	CO (tons/project)	SO2 (tons/project)	PM10 (tons/project)	PM2.5 (tons/project)
BENDING MACHINE- 22"-36	3	1,446.0	0.2850	0.0714	0.2378	0.0012	0.0255	0.0255
BUS	6	2,892.0	0.1250	0.0875	9.6846	0.0034	0.0062	0.0062
COMPRESSOR- 1600	8	3,856.0	2.8396	0.7141	3.1372	0.0218	0.1785	0.1785
CRADLE BORE	3	1,446.0	0.3036	0.0650	0.4043	0.0020	0.0325	0.0325
DOZER- D5	2	964.0	0.0986	0.1326	0.2241	0.0016	0.0013	0.0013
DOZER- D6	9	4,338.0	0.8875	1.1935	2.0167	0.0140	0.0115	0.0115
DOZER- D7	2	964.0	0.4868	0.1224	0.5378	0.0037	0.0306	0.0306
DOZER- D8	18	8,676.0	5.6590	1.4230	6.2519	0.0434	0.3558	0.3558
EXCAVATOR- 115 BACKHO	3	1,446.0	0.2679	0.0669	0.3567	0.0018	0.0014	0.0014
EXCAVATOR- 350	23	11,086.0	6.2979	1.5837	6.9578	0.0483	0.0396	0.0396
EXCAVATOR- 450	50	24,100.0	19.0154	4.7817	21.0078	0.1458	0.1195	0.1195
EXCAVATOR- JOHN HENRY	1	482.0	0.3042	0.0765	0.3361	0.0023	0.0191	0.0191
FORK LIFT	2	964.0	0.1233	0.1658	0.2801	0.0019	0.0016	0.0016
GRADER- CAT 14	1	482.0	0.0986	0.1326	0.2241	0.0016	0.0013	0.0013
GRADER- CAT 16	2	964.0	0.2367	0.3183	0.5378	0.0037	0.0031	0.0031
HAMMER- 345 EXCAVATOR	8	3,856.0	0.8283	1.1140	1.8823	0.0131	0.0107	0.0107
LOADER- CAT 936	1	482.0	0.2028	0.0510	0.2241	0.0016	0.0128	0.0128
MOROOKA- 2200	3	1,446.0	0.3803	0.0956	0.5945	0.0029	0.0357	0.0357
MOROOKA- COATING	2	964.0	0.2535	0.0638	0.3964	0.0019	0.0238	0.0238
MOROOKA- FOAM	2	964.0	0.2535	0.0638	0.3964	0.0019	0.0238	0.0238
MOROOKA- POTHOLE	1	482.0	0.1268	0.0319	0.1982	0.0010	0.0119	0.0119
MOROOKA- SANDBLAST	2	964.0	0.2535	0.0638	0.3964	0.0019	0.0238	0.0238
POSI-TRACK	3	1,446.0	0.1479	0.1989	0.3361	0.0023	0.0019	0.0019
PUMP- 3"	43	20,726.0	4.3609	1.0966	6.8173	0.0334	0.4094	0.4094
PUMP- 6"	21	10,122.0	6.3892	1.6067	7.0586	0.0490	0.5356	0.5356
PUMP- DEWATERING	2	964.0	0.1972	0.2652	0.4482	0.0031	0.0026	0.0026
PUMP- FILL/ TEST	2	964.0	0.6699	0.1673	0.5951	0.0031	0.0340	0.0340
SANDBLASTER	2	964.0	0.1786	0.0446	0.2378	0.0012	0.0191	0.0191
SIDEBOOM- 572	8	3,856.0	1.4198	0.3570	1.5686	0.0109	0.0893	0.0893
SIDEBOOM- 583	19	9,158.0	9.5584	2.3896	8.7623	0.0458	0.3755	0.3755
SIDEBOOM- 594	30	14,460.0	9.1274	2.2952	10.0837	0.0700	0.5738	0.5738
TIMBER PRO	9	4,338.0	2.7382	0.6886	3.0251	0.0210	0.1721	0.1721
TRACTOR- 40-60 HP	1	482.0	0.0714	0.0179	0.0951	0.0005	0.0102	0.0102
TRACTOR- 80-120 HP	7	3,374.0	0.8519	0.2142	1.3317	0.0065	0.0800	0.0800
TRACTOR- CHISEL PLOW A	3	1,446.0	0.9127	0.2295	1.0084	0.0070	0.0574	0.0574
TRACTOR- DISC ATTACHM	3	1,446.0	1.2170	0.3060	1.3445	0.0093	0.0765	0.0765
TRENCHER- WALK BEHIND	3	1,446.0	0.1140	0.0286	0.1255	0.0005	0.0153	0.0153
TRUCK- 1/2 TON PICKUP	5	2,410.0	0.1275	0.0893	9.8823	0.0117	0.0064	0.0064
TRUCK- 3/4 TON PICKUP	90	43,380.0	2.9073	2.0351	225.3159	0.0800	0.1454	0.1454
TRUCK- 1 TON	19	9,158.0	0.5847	0.4093	45.3135	0.0161	0.0292	0.0292
TRUCK- 2 TON	1	482.0	0.0234	0.0164	1.8118	0.0006	0.0012	0.0012
TRUCK- BOX W/ FOAM SYS	2	964.0	0.0510	0.0357	3.9529	0.0014	0.0026	0.0026
TRUCK- DUMP	1	482.0	0.0255	0.0179	1.9765	0.0015	0.0013	0.0013
TRUCK- FUEL- 4,000 GAL	2	964.0	0.0723	0.0506	5.6000	0.0020	0.0036	0.0036
TRUCK- GRAPPLE	2	964.0	0.0723	0.0506	5.6000	0.0020	0.0036	0.0036
TRUCK- GREASE	2	964.0	0.0723	0.0506	5.6000	0.0020	0.0036	0.0036
TRUCK- KNUCKLE BOOM	2	964.0	0.0510	0.0357	3.9529	0.0014	0.0026	0.0026
TRUCK- SEMI	22	10,604.0	0.8416	0.5891	65.2230	0.0231	0.0421	0.0421
TRUCK- SKID	2	964.0	0.0723	0.0506	5.6000	0.0020	0.0036	0.0036
TRUCK- STINGER	1	482.0	0.0255	0.0179	1.9765	0.0007	0.0013	0.0013
TRUCK- VAC [Tractor - Broo	1	482.0	0.0255	0.0179	1.9765	0.0007	0.0013	0.0013
TRUCK- WATER	4	1,928.0	0.1020	0.0714	7.9058	0.0028	0.0051	0.0051
VAC UNIT- EXCAVATOR	2	964.0	0.1530	0.0727	1.3389	0.0021	0.0057	0.0057
			82.5	25.9	492.1	0.7	3.7	3.7

¹ List includes representative equipment for all activities (clearing & grading, ditching, bending, etc.) and crew types (welding crew, coating crew, lowering crew, etc.).

² Based on values presented in EPA guidance document "Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling" (EPA420-P-04-005 dated April 2004).

⁴ Factors developed using methodology presented in EPA guidance documents "Exhaust and Crankcase Emission Factors for Nonroad Engine Emissions Modeling--Compression-Ignition" and "Exhaust Emission Factors for Nonroad Engine Modeling: Spark Ignition"

⁵ Project Emissions Rate = Engine Rating (hp) x Load Factor x Total Operation (hr/project) x Exhaust Emission Factor (g/hp-hr) / 453.6 grams/lb / 2000 lb/ton

**Table 9A-28
Rover Construction Activity Green House Gas Emissions - Michels**

Make/Model	Fuel	Engine Rating (Horsepow	Fuel Use	Emission Factors (g/gal) ²		
			gal/hr	CO ₂	N ₂ O	CH ₄
BENDING MACHINE- 22"-36"	Diesel	50	2.716423	10210	0.26	0.57
BUS	Diesel	245	13.31047	10210	0.26	0.57
COMPRESSOR- 1600	Diesel	350	19.01496	10210	0.26	0.57
CRADLE BORE	Diesel	85	4.61792	10210	0.26	0.57
DOZER- D5	Diesel	100	5.432847	10210	0.26	0.57
DOZER- D6	Diesel	200	10.86569	10210	0.26	0.57
DOZER- D7	Diesel	240	13.03883	10210	0.26	0.57
DOZER- D8	Diesel	310	16.84182	10210	0.26	0.57
EXCAVATOR- 115 BACKHO	Diesel	75	4.074635	10210	0.26	0.57
EXCAVATOR- 350	Diesel	270	14.66869	10210	0.26	0.57
EXCAVATOR- 450	Diesel	375	20.37318	10210	0.26	0.57
EXCAVATOR- JOHN HENRY	Diesel	300	16.29854	10210	0.26	0.57
FORK LIFT	Diesel	125	6.791058	10210	0.26	0.57
GRADER- CAT 14	Diesel	200	10.86569	10210	0.26	0.57
GRADER- CAT 16	Diesel	240	13.03883	10210	0.26	0.57
HAMMER- 345 EXCAVATOR	Diesel	210	11.40898	10210	0.26	0.57
LOADER- CAT 936	Diesel	200	10.86569	10210	0.26	0.57
MOROOKA- 2200	Diesel	125	6.791058	10210	0.26	0.57
MOROOKA- COATING	Diesel	125	6.791058	10210	0.26	0.57
MOROOKA- FOAM	Diesel	125	6.791058	10210	0.26	0.57
MOROOKA- POTHOLE	Diesel	125	6.791058	10210	0.26	0.57
MOROOKA- SANDBLAST	Diesel	125	6.791058	10210	0.26	0.57
POSI-TRACK	Diesel	100	5.432847	10210	0.26	0.57
PUMP- 3"	Diesel	100	5.432847	10210	0.26	0.57
PUMP- 6"	Diesel	300	16.29854	10210	0.26	0.57
PUMP- DEWATERING	Diesel	200	10.86569	10210	0.26	0.57
PUMP- FILL/ TEST	Diesel	200	10.86569	10210	0.26	0.57
SANDBLASTER	Diesel	75	4.074635	10210	0.26	0.57
SIDEBOOM- 572	Diesel	175	9.507482	10210	0.26	0.57
SIDEBOOM- 583	Diesel	310	16.84182	10210	0.26	0.57
SIDEBOOM- 594	Diesel	300	16.29854	10210	0.26	0.57
TIMBER PRO	Diesel	300	16.29854	10210	0.26	0.57
TRACTOR- 40-60 HP	Diesel	60	3.259708	10210	0.26	0.57
TRACTOR- 80-120 HP	Diesel	120	6.519416	10210	0.26	0.57
TRACTOR- CHISEL PLOW A	Diesel	300	16.29854	10210	0.26	0.57
TRACTOR- DISC ATTACHM	Diesel	400	21.73139	10210	0.26	0.57
TRENCHER- WALK BEHIND	Diesel	20	1.086569	10210	0.26	0.57
TRUCK- 1/2 TON PICKUP	Diesel	300	16.29854	10210	0.26	0.57
TRUCK- 3/4 TON PICKUP	Diesel	380	20.64482	10210	0.26	0.57
TRUCK- 1 TON	Diesel	362	19.66691	10210	0.26	0.57
TRUCK- 2 TON	Diesel	275	14.94033	10210	0.26	0.57
TRUCK- BOX W/ FOAM SYS	Diesel	300	16.29854	10210	0.26	0.57
TRUCK- DUMP	Diesel	300	16.29854	10210	0.26	0.57
TRUCK- FUEL- 4,000 GAL	Diesel	425	23.0896	10210	0.26	0.57
TRUCK- GRAPPLE	Diesel	425	23.0896	10210	0.26	0.57
TRUCK- GREASE	Diesel	425	23.0896	10210	0.26	0.57
TRUCK- KNUCKLE BOOM	Diesel	300	16.29854	10210	0.26	0.57
TRUCK- SEMI	Diesel	450	24.44781	10210	0.26	0.57
TRUCK- SKID	Diesel	425	23.0896	10210	0.26	0.57
TRUCK- STINGER	Diesel	300	16.29854	10210	0.26	0.57
TRUCK- VAC [Tractor - Broo	Diesel	300	16.29854	10210	0.26	0.57
TRUCK- WATER	Diesel	300	16.29854	10210	0.26	0.57
VAC UNIT- EXCAVATOR	Diesel	450	24.44781	10210	0.26	0.57

¹ Horsepowers are estimated

² Source of emission factors - Emission Factors for Greenhouse Gas Inventories, 4 April 2014

³ Emissions Equation = EF g/gal * Gallons of fuel total / 453.6g/lb / 2000lb/ton

⁴ CO₂e based on global warming potential of CO₂=1, N₂O=298, CH₄=25

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Make/Model	total operational hours	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
BENDING MACHINE- 22"-36"	2028	5508.907	61.99949	0.001579	0.003461	62.55651
BUS	4056	53987.28	607.595	0.015473	0.033921	613.0538
COMPRESSOR- 1600	5408	102832.9	1157.324	0.029472	0.064611	1167.722
CRADLE BORE	2028	9365.141	105.3991	0.002684	0.005884	106.3461
DOZER- D5	1352	7345.209	82.66598	0.002105	0.004615	83.40868
DOZER- D6	6084	66106.88	743.9939	0.018946	0.041535	750.6781
DOZER- D7	1352	17628.5	198.3984	0.005052	0.011076	200.1808
DOZER- D8	12168	204931.3	2306.381	0.058733	0.12876	2327.102
EXCAVATOR- 115 BACKHO	2028	8263.36	92.99923	0.002368	0.005192	93.83477
EXCAVATOR- 350	15548	228068.7	2566.779	0.065364	0.143297	2589.84
EXCAVATOR- 450	33800	688613.3	7749.936	0.197354	0.43266	7819.564
EXCAVATOR- JOHN HENRY	676	11017.81	123.999	0.003158	0.006923	125.113
FORK LIFT	1352	9181.511	103.3325	0.002631	0.005769	104.2609
GRADER- CAT 14	676	7345.209	82.66598	0.002105	0.004615	83.40868
GRADER- CAT 16	1352	17628.5	198.3984	0.005052	0.011076	200.1808
HAMMER- 345 EXCAVATOR	5408	61699.75	694.3943	0.017683	0.038766	700.6329
LOADER- CAT 936	676	7345.209	82.66598	0.002105	0.004615	83.40868
MOROOKA- 2200	2028	13772.27	154.9987	0.003947	0.008653	156.3913
MOROOKA- COATING	1352	9181.511	103.3325	0.002631	0.005769	104.2609
MOROOKA- FOAM	1352	9181.511	103.3325	0.002631	0.005769	104.2609
MOROOKA- POTHOLE	676	4590.755	51.66624	0.001316	0.002884	52.13043
MOROOKA- SANDBLAST	1352	9181.511	103.3325	0.002631	0.005769	104.2609
POSI-TRACK	2028	11017.81	123.999	0.003158	0.006923	125.113
PUMP- 3"	29068	157922	1777.319	0.04526	0.099223	1793.287
PUMP- 6"	14196	231374.1	2603.979	0.066311	0.145374	2627.374
PUMP- DEWATERING	1352	14690.42	165.332	0.00421	0.00923	166.8174
PUMP- FILL/ TEST	1352	14690.42	165.332	0.00421	0.00923	166.8174
SANDBLASTER	1352	5508.907	61.99949	0.001579	0.003461	62.55651
SIDEBOOM- 572	5408	51416.46	578.6619	0.014736	0.032305	583.8608
SIDEBOOM- 583	12844	216316.4	2434.513	0.061995	0.135913	2456.386
SIDEBOOM- 594	20280	330534.4	3719.969	0.09473	0.207677	3753.391
TIMBER PRO	6084	99160.32	1115.991	0.028419	0.062303	1126.017
TRACTOR- 40-60 HP	676	2203.563	24.7998	0.000632	0.001385	25.0226
TRACTOR- 80-120 HP	4732	30849.88	347.1971	0.008841	0.019383	350.3165
TRACTOR- CHISEL PLOW A	2028	33053.44	371.9969	0.009473	0.020768	375.3391
TRACTOR- DISC ATTACHM	2028	44071.25	495.9959	0.012631	0.02769	500.4521
TRENCHER- WALK BEHIND	2028	2203.563	24.7998	0.000632	0.001385	25.0226
TRUCK- 1/2 TON PICKUP	3380	55089.07	619.9949	0.015788	0.034613	625.5651
TRUCK- 3/4 TON PICKUP	60840	1256031	14135.88	0.359974	0.789173	14262.88
TRUCK- 1 TON	12844	252601.7	2842.883	0.072395	0.158711	2868.425
TRUCK- 2 TON	676	10099.66	113.6657	0.002895	0.006346	114.6869
TRUCK- BOX W/ FOAM SYS	1352	22035.63	247.998	0.006315	0.013845	250.226
TRUCK- DUMP	676	11017.81	123.999	0.003158	0.006923	125.113
TRUCK- FUEL- 4,000 GAL	1352	31217.14	351.3304	0.008947	0.019614	354.4869
TRUCK- GRAPPLE	1352	31217.14	351.3304	0.008947	0.019614	354.4869
TRUCK- GREASE	1352	31217.14	351.3304	0.008947	0.019614	354.4869
TRUCK- KNUCKLE BOOM	1352	22035.63	247.998	0.006315	0.013845	250.226
TRUCK- SEMI	14872	363587.8	4091.966	0.104203	0.228445	4128.73
TRUCK- SKID	1352	31217.14	351.3304	0.008947	0.019614	354.4869
TRUCK- STINGER	676	11017.81	123.999	0.003158	0.006923	125.113
TRUCK- VAC [Tractor - Broo	676	11017.81	123.999	0.003158	0.006923	125.113
TRUCK- WATER	2704	44071.25	495.9959	0.012631	0.02769	500.4521
VAC UNIT- EXCAVATOR	1352	33053.44	371.9969	0.009473	0.020768	375.3391
		total	56433.17	1.437084	3.15053	56940.19

Burgettstown						
Make/Model	total operational hours	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
BENDING MACHINE- 22"-36"	1446	3927.948	44.20674	0.001126	0.002468	44.6039
BUS	2892	38493.89	433.226	0.011032	0.024186	437.1183
COMPRESSOR- 1600	3856	73321.7	825.1924	0.021014	0.046069	832.6062
CRADLE BORE	1446	6677.512	75.15145	0.001914	0.004196	75.82664
DOZER- D5	964	5237.264	58.94231	0.001501	0.003291	59.47187
DOZER- D6	4338	47135.38	530.4808	0.013509	0.029615	535.2468
DOZER- D7	964	12569.43	141.4616	0.003602	0.007897	142.7325
DOZER- D8	8676	146119.7	1644.491	0.041877	0.091808	1659.265
EXCAVATOR- 115 BACKHO	1446	5891.922	66.3101	0.001689	0.003702	66.90586
EXCAVATOR- 350	11086	162617.1	1830.159	0.046605	0.102173	1846.602
EXCAVATOR- 450	24100	490993.5	5525.842	0.140717	0.308495	5575.488
EXCAVATOR- JOHN HENRY	482	7855.896	88.41347	0.002251	0.004936	89.20781
FORK LIFT	964	6546.58	73.67789	0.001876	0.004113	74.33984
GRADER- CAT 14	482	5237.264	58.94231	0.001501	0.003291	59.47187
GRADER- CAT 16	964	12569.43	141.4616	0.003602	0.007897	142.7325
HAMMER- 345 EXCAVATOR	3856	43993.02	495.1154	0.012608	0.027641	499.5637
LOADER- CAT 936	482	5237.264	58.94231	0.001501	0.003291	59.47187
MOROOKA- 2200	1446	9819.87	110.5168	0.002814	0.00617	111.5098
MOROOKA- COATING	964	6546.58	73.67789	0.001876	0.004113	74.33984
MOROOKA- FOAM	964	6546.58	73.67789	0.001876	0.004113	74.33984
MOROOKA- POTHOLE	482	3273.29	36.83895	0.000938	0.002057	37.16992
MOROOKA- SANDBLAST	964	6546.58	73.67789	0.001876	0.004113	74.33984
POSI-TRACK	1446	7855.896	88.41347	0.002251	0.004936	89.20781
PUMP- 3"	20726	112601.2	1267.26	0.032271	0.070748	1278.645
PUMP- 6"	10122	164973.8	1856.683	0.047281	0.103654	1873.364
PUMP- DEWATERING	964	10474.53	117.8846	0.003002	0.006581	118.9437
PUMP- FILL/ TEST	964	10474.53	117.8846	0.003002	0.006581	118.9437
SANDBLASTER	964	3927.948	44.20674	0.001126	0.002468	44.6039
SIDEBOOM- 572	3856	36660.85	412.5962	0.010507	0.023034	416.3031
SIDEBOOM- 583	9158	154237.4	1735.851	0.044204	0.096908	1751.447
SIDEBOOM- 594	14460	235676.9	2652.404	0.067544	0.148077	2676.234
TIMBER PRO	4338	70703.07	795.7212	0.020263	0.044423	802.8703
TRACTOR- 40-60 HP	482	1571.179	17.68269	0.00045	0.000987	17.84156
TRACTOR- 80-120 HP	3374	21996.51	247.5577	0.006304	0.013821	249.7819
TRACTOR- CHISEL PLOW A	1446	23567.69	265.2404	0.006754	0.014808	267.6234
TRACTOR- DISC ATTACHM	1446	31423.59	353.6539	0.009006	0.019744	356.8312
TRENCHER- WALK BEHIND	1446	1571.179	17.68269	0.00045	0.000987	17.84156
TRUCK- 1/2 TON PICKUP	2410	39279.48	442.0674	0.011257	0.02468	446.039
TRUCK- 3/4 TON PICKUP	43380	895572.2	10079.14	0.256668	0.562694	10169.69
TRUCK- 1 TON	9158	180109.5	2027.026	0.051619	0.113164	2045.238
TRUCK- 2 TON	482	7201.238	81.04568	0.002064	0.004525	81.77382
TRUCK- BOX W/ FOAM SYS	964	15711.79	176.8269	0.004503	0.009872	178.4156
TRUCK- DUMP	482	7855.896	88.41347	0.002251	0.004936	89.20781
TRUCK- FUEL- 4,000 GAL	964	22258.37	250.5048	0.006379	0.013985	252.7555
TRUCK- GRAPPLE	964	22258.37	250.5048	0.006379	0.013985	252.7555
TRUCK- GREASE	964	22258.37	250.5048	0.006379	0.013985	252.7555
TRUCK- KNUCKLE BOOM	964	15711.79	176.8269	0.004503	0.009872	178.4156
TRUCK- SEMI	10604	259244.6	2917.645	0.074298	0.162885	2943.858
TRUCK- SKID	964	22258.37	250.5048	0.006379	0.013985	252.7555
TRUCK- STINGER	482	7855.896	88.41347	0.002251	0.004936	89.20781
TRUCK- VAC [Tractor - Broo	482	7855.896	88.41347	0.002251	0.004936	89.20781
TRUCK- WATER	1928	31423.59	353.6539	0.009006	0.019744	356.8312
VAC UNIT- EXCAVATOR	964	23567.69	265.2404	0.006754	0.014808	267.6234
		total	40237.86	1.024666	2.246384	40599.37

**Table 9A-27
Rover Construction Activity Tailpipe Emissions - Latex**

Make/Model	Fuel Type	Engine Rating (hp)	Load Factor ²	Exhaust Emission Factors ⁴					
				NOx (g/hp-hr)	VOC (g/hp-hr)	CO (g/hp-hr)	SO2 (g/hp-hr)	PM10 (g/hp-hr)	PM2.5 (g/hp-hr)
BENDING MACHINE- 22"-36"	Diesel	300	0.8	1.6410	1.8230	2.6360	0.0183	0.0820	0.0820
BUS	Diesel	245	0.8	0.2000	0.1400	15.5000	0.0055	0.0100	0.0100
COMPRESSOR- 1200	Diesel	600	0.8	1.6410	1.8230	2.6360	0.0183	0.0820	0.0820
CRADLE BORE	Diesel	85	0.8	2.8010	0.6000	3.7300	0.0183	0.3000	0.3000
DOZER- D5	Diesel	100	0.8	1.1600	1.5600	2.6360	0.0183	0.0150	0.0150
DOZER- D6	Diesel	200	0.8	1.6410	1.8230	2.6360	0.0183	0.0820	0.0820
DOZER- D7	Diesel	240	0.8	1.6410	1.8230	2.6360	0.0183	0.0820	0.0820
DOZER- D8 - Tier 3/4	Diesel	310	0.8	1.6410	1.8230	2.6360	0.0183	0.0820	0.0820
DOZER- D8 - Tier 4	Diesel	310	0.8	0.4000	0.1900	2.6360	0.0055	0.4000	0.4000
EXCAVATOR- 330 BACKHOE	Diesel	268	0.8	1.6410	1.8230	2.6360	0.0183	0.0820	0.0820
EXCAVATOR- 345	Diesel	321	0.8	1.6410	1.8230	2.6360	0.0183	0.0820	0.0820
EXCAVATOR- Mini	Diesel	90	0.8	0.3000	0.1420	3.7280	0.0055	0.1500	0.1500
EXCAVATOR- JOHN HENRY	Diesel	268	0.8	1.6410	1.8230	2.6360	0.0183	0.0820	0.0820
FORK LIFT	Diesel	200	0.8	0.3000	0.1420	2.6360	0.0055	0.0150	0.0150
GRADER- CAT 14	Diesel	200	0.8	1.1600	1.5600	2.6360	0.0183	0.0150	0.0150
GRADER- CAT 16	Diesel	240	0.8	0.3000	0.1420	2.6360	0.0055	0.0150	0.0150
HAMMER- 345 EXCAVATOR	Diesel	210	0.8	1.1600	1.5600	2.6360	0.0183	0.0150	0.0150
LOADER- BOBCAT	Diesel	65	0.8	2.3860	0.6000	2.6360	0.0183	0.1500	0.1500
MOROOKA-	Diesel	65	0.8	2.3860	0.6000	3.7300	0.0183	0.2240	0.2240
MOROOKA- COATING	Diesel	125	0.8	2.3860	0.6000	3.7300	0.0183	0.2240	0.2240
MOROOKA- FOAM	Diesel	125	0.8	2.3860	0.6000	3.7300	0.0183	0.2240	0.2240
MOROOKA- POTHOLE	Diesel	125	0.8	2.3860	0.6000	3.7300	0.0183	0.2240	0.2240
MOROOKA- SANDBLAST	Diesel	125	0.8	2.3860	0.6000	3.7300	0.0183	0.2240	0.2240
POSI-TRACK	Diesel	400	0.8	1.1600	1.5600	2.6360	0.0183	0.0150	0.0150
PUMP- 3"	Diesel	100	0.8	2.3860	0.6000	3.7300	0.0183	0.2240	0.2240
PUMP- 6"	Diesel	210	0.8	2.3860	0.6000	2.6360	0.0183	0.2000	0.2000
PUMP- FILL/	Diesel	600	0.8	1.1600	1.5600	2.6360	0.0183	0.0150	0.0150
PUMP- FILL/ TEST	Diesel	210	0.8	3.9400	0.9843	3.5000	0.0183	0.2000	0.2000
SANDBLASTER	Diesel	75	0.8	2.8010	0.7000	3.7300	0.0183	0.3000	0.3000
SIDEBOOM- 572	Diesel	175	0.8	2.3860	0.6000	2.6360	0.0183	0.1500	0.1500
SIDEBOOM- 583	Diesel	310	0.8	3.8180	0.9545	3.5000	0.0183	0.1500	0.1500
SIDEBOOM- 587	Diesel	300	0.8	2.3860	0.6000	2.6360	0.0183	0.1500	0.1500
TIMBER PRO	Diesel	300	0.8	2.3860	0.6000	2.6360	0.0183	0.1500	0.1500
TRACTOR- 40-60 HP	Diesel	60	0.8	2.8010	0.7000	3.7300	0.0183	0.4000	0.4000
TRACTOR- 80-120 HP	Diesel	100	0.8	2.3860	0.6000	3.7300	0.0183	0.2240	0.2240
TRACTOR- CHISEL PLOW ATTACH	Diesel	300	0.8	2.3860	0.6000	2.6360	0.0183	0.1500	0.1500
TRACTOR- DISC ATTACHMENT	Diesel	400	0.8	2.3860	0.6000	2.6360	0.0183	0.1500	0.1500
TRENCHER- WALK BEHIND	Diesel	20	0.8	4.4720	1.1200	4.9200	0.0183	0.6000	0.6000
TRUCK- 1/2 TON PICKUP	Diesel	300	0.8	0.2000	0.1400	15.5000	0.0183	0.0100	0.0100
TRUCK- 3/4 TON PICKUP	Diesel	380	0.8	0.2000	0.1400	15.5000	0.0055	0.0100	0.0100
TRUCK- 1 TON	Diesel	362	0.8	0.2000	0.1400	15.5000	0.0055	0.0100	0.0100
TRUCK- 2 TON	Diesel	275	0.8	0.2000	0.1400	15.5000	0.0055	0.0100	0.0100
TRUCK- BOX W/ FOAM SYSTEM	Diesel	300	0.8	0.2000	0.1400	15.5000	0.0055	0.0100	0.0100
TRUCK- DUMP	Diesel	300	0.8	0.2000	0.1400	15.5000	0.0120	0.0100	0.0100
TRUCK- FUEL- 4,000 GAL	Diesel	425	0.8	0.2000	0.1400	15.5000	0.0055	0.0100	0.0100
TRUCK- GREASE	Diesel	425	0.8	0.2000	0.1400	15.5000	0.0055	0.0100	0.0100
TRUCK- KNUCKLE BOOM	Diesel	300	0.8	0.2000	0.1400	15.5000	0.0055	0.0100	0.0100
TRUCK- SEMI	Diesel	450	0.8	0.2000	0.1400	15.5000	0.0055	0.0100	0.0100
TRUCK- VAC [Tractor - Broom]	Diesel	300	0.8	0.2000	0.1400	15.5000	0.0055	0.0100	0.0100
TRUCK- WATER	Diesel	300	0.8	0.2000	0.1400	15.5000	0.0055	0.0100	0.0100
WELD RIGS	Diesel	350	0.8	1.6410	1.8230	2.6360	0.0183	0.0820	0.0820
VAC UNIT- EXCAVATOR	Diesel	268	0.8	0.3000	0.1420	2.6360	0.0055	0.0150	0.0150

Make/Model	Quantity	Total Operation (hr/project)	Project Emission Rate ^[5]					
			NOx (tons/project)	VOC (tons/project)	CO (tons/project)	SO2 (tons/project)	PM10 (tons/project)	PM2.5 (tons/project)
BENDING MACHINE- 22"-36"	1	241.0	0.1046	0.1162	0.1681	0.0012	0.0052	0.0052
BUS	6	1,446.0	0.0625	0.0437	4.8423	0.0017	0.0031	0.0031
COMPRESSOR- 1200	8	1,928.0	1.6740	1.8597	2.6890	0.0187	0.0836	0.0836
CRADLE BORE	0	0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DOZER- D5	0	0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
DOZER- D6	11	2,651.0	0.7672	0.8523	1.2325	0.0086	0.0383	0.0383
DOZER- D7	4	964.0	0.3348	0.3719	0.5378	0.0037	0.0167	0.0167
DOZER- D8	7	1,687.0	0.5859	0.6509	0.9411	0.0065	0.0293	0.0293
DOZER- D8	11	2,651.0	0.2899	0.1377	1.9103	0.0040	0.2899	0.2899
EXCAVATOR- 330 BACKHOE	24	5,784.0	2.2432	2.4919	3.6033	0.0250	0.1121	0.1121
EXCAVATOR- 345	18	4,338.0	2.0151	2.2386	3.2369	0.0225	0.1007	0.1007
EXCAVATOR- Mini	2	482.0	0.0115	0.0054	0.1426	0.0002	0.0057	0.0057
EXCAVATOR- JOHN HENRY	5	1,205.0	0.4673	0.5192	0.7507	0.0052	0.0234	0.0234
FORK LIFT	4	964.0	0.0510	0.0241	0.4482	0.0009	0.0026	0.0026
GRADER- CAT 14	0	0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GRADER- CAT 16	1	241.0	0.0153	0.0072	0.1344	0.0003	0.0008	0.0008
HAMMER- 345 EXCAVATOR	0	0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
LOADER- BOBCAT	3	723.0	0.0989	0.0249	0.1092	0.0008	0.0062	0.0062
MOROOKA-	3	723.0	0.0989	0.0249	0.1546	0.0008	0.0093	0.0093
MOROOKA- COATING	0	0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MOROOKA- FOAM	0	0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MOROOKA- POTHOLE	0	0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
MOROOKA- SANDBLAST	0	0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
POSI-TRACK	5	1,205.0	0.4931	0.6631	1.1204	0.0078	0.0064	0.0064
PUMP- 3"	0	0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
PUMP- 6"	11	2,651.0	1.1713	0.2946	1.2941	0.0090	0.0982	0.0982
PUMP- FILL/	1	241.0	0.1479	0.1989	0.3361	0.0023	0.0019	0.0019
PUMP- FILL/ TEST	1	241.0	0.1758	0.0439	0.1562	0.0008	0.0089	0.0089
SANDBLASTER	6	1,446.0	0.2679	0.0669	0.3567	0.0018	0.0287	0.0287
SIDEBOOM- 572	1	241.0	0.0887	0.0223	0.0980	0.0007	0.0056	0.0056
SIDEBOOM- 583	16	3,856.0	4.0246	1.0061	3.6894	0.0193	0.1581	0.1581
SIDEBOOM- 587	17	4,097.0	2.5861	0.6503	2.8571	0.0198	0.1626	0.1626
TIMBER PRO	0	0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TRACTOR- 40-60 HP	0	0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TRACTOR- 80-120 HP	1	241.0	0.0507	0.0128	0.0793	0.0004	0.0048	0.0048
TRACTOR- CHISEL PLOW ATTACH	0	0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TRACTOR- DISC ATTACHMENT	0	0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TRENCHER- WALK BEHIND	0	0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TRUCK- 1/2 TON PICKUP	45	10,845.0	0.5738	0.4017	44.4702	0.0525	0.0287	0.0287
TRUCK- 3/4 TON PICKUP	0	0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TRUCK- 1 TON	47	11,327.0	0.7232	0.5062	56.0457	0.0199	0.0362	0.0362
TRUCK- 2 TON	67	16,147.0	0.7831	0.5482	60.6936	0.0215	0.0392	0.0392
TRUCK- BOX W/ FOAM SYSTEM	0	0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TRUCK- DUMP	4	964.0	0.0510	0.0357	3.9529	0.0031	0.0026	0.0026
TRUCK- FUEL- 4,000 GAL	2	482.0	0.0361	0.0253	2.8000	0.0010	0.0018	0.0018
TRUCK- GREASE	2	482.0	0.0361	0.0253	2.8000	0.0010	0.0018	0.0018
TRUCK- KNUCKLE BOOM	0	0.0	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
TRUCK- SEMI	9	2,169.0	0.1721	0.1205	13.3411	0.0047	0.0086	0.0086
TRUCK- VAC [Tractor - Broom]	2	482.0	0.0255	0.0179	1.9765	0.0007	0.0013	0.0013
TRUCK- WATER	5	1,205.0	0.0638	0.0446	4.9411	0.0018	0.0032	0.0032
WELD RIGS	56	13,496.0	6.8355	7.5936	10.9801	0.0762	0.3416	0.3416
VAC UNIT- EXCAVATOR	3	723.0	0.0513	0.0243	0.4504	0.0009	0.0026	0.0026
			27.2	21.7	233.3	0.3	1.7	1.7

¹ List includes representative equipment for all activities (clearing & grading, ditching, bending, etc.) and crew types (welding crew, coating crew, lowering crew, etc.).

² Based on values presented in EPA guidance document "Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling" (EPA420-P-04-005 dated April 2004).

⁴ Factors developed using methodology presented in EPA guidance documents "Exhaust and Crankcase Emission Factors for Nonroad Engine Emissions Modeling--Compression-Ignition" and "Exhaust Emission Factors for Nonroad Engine Modeling: Spark Ignition"

⁵ Project Emissions Rate = Engine Rating (hp) x Load Factor x Total Operation (hr/project) x Exhaust Emission Factor (g/hp-hr) / 453.6 grams/lb / 2000 lb/ton

**Table 9A-28
Rover Construction Activity Green House Gas Emissions - Latex**

Make/Model	Fuel	Engine Rating (Horsepow	Fuel Use	Emission Factors (g/gal) ²		
			gal/hr	CO ₂	N ₂ O	CH ₄
BENDING MACHINE- 22"-36"	Diesel	300	16.29854	10210	0.26	0.57
BUS	Diesel	245	13.31047	10210	0.26	0.57
COMPRESSOR- 1200	Diesel	600	32.59708	10210	0.26	0.57
CRADLE BORE	Diesel	85	4.61792	10210	0.26	0.57
DOZER- D5	Diesel	100	5.432847	10210	0.26	0.57
DOZER- D6	Diesel	200	10.86569	10210	0.26	0.57
DOZER- D7	Diesel	240	13.03883	10210	0.26	0.57
DOZER- D8 - Tier 3/4	Diesel	310	16.84182	10210	0.26	0.57
DOZER- D8 - Tier 4	Diesel	310	16.84182	10210	0.26	0.57
EXCAVATOR- 330 BACKHO	Diesel	268	14.56003	10210	0.26	0.57
EXCAVATOR- 345	Diesel	321	17.43944	10210	0.26	0.57
EXCAVATOR- Mini	Diesel	90	4.889562	10210	0.26	0.57
EXCAVATOR- JOHN HENRY	Diesel	268	14.56003	10210	0.26	0.57
FORK LIFT	Diesel	200	10.86569	10210	0.26	0.57
GRADER- CAT 14	Diesel	200	10.86569	10210	0.26	0.57
GRADER- CAT 16	Diesel	240	13.03883	10210	0.26	0.57
HAMMER- 345 EXCAVATOR	Diesel	210	11.40898	10210	0.26	0.57
LOADER- BOBCAT	Diesel	65	3.53135	10210	0.26	0.57
MOROOKA-	Diesel	65	3.53135	10210	0.26	0.57
MOROOKA- COATING	Diesel	125	6.791058	10210	0.26	0.57
MOROOKA- FOAM	Diesel	125	6.791058	10210	0.26	0.57
MOROOKA- POTHOLE	Diesel	125	6.791058	10210	0.26	0.57
MOROOKA- SANDBLAST	Diesel	125	6.791058	10210	0.26	0.57
POSI-TRACK	Diesel	400	21.73139	10210	0.26	0.57
PUMP- 3"	Diesel	100	5.432847	10210	0.26	0.57
PUMP- 6"	Diesel	210	11.40898	10210	0.26	0.57
PUMP- FILL/	Diesel	600	32.59708	10210	0.26	0.57
PUMP- FILL/ TEST	Diesel	210	11.40898	10210	0.26	0.57
SANDBLASTER	Diesel	75	4.074635	10210	0.26	0.57
SIDEBOOM- 572	Diesel	175	9.507482	10210	0.26	0.57
SIDEBOOM- 583	Diesel	310	16.84182	10210	0.26	0.57
SIDEBOOM- 587	Diesel	300	16.29854	10210	0.26	0.57
TIMBER PRO	Diesel	300	16.29854	10210	0.26	0.57
TRACTOR- 40-60 HP	Diesel	60	3.259708	10210	0.26	0.57
TRACTOR- 80-120 HP	Diesel	100	5.432847	10210	0.26	0.57
TRACTOR- CHISEL PLOW A	Diesel	300	16.29854	10210	0.26	0.57
TRACTOR- DISC ATTACHM	Diesel	400	21.73139	10210	0.26	0.57
TRENCHER- WALK BEHIND	Diesel	20	1.086569	10210	0.26	0.57
TRUCK- 1/2 TON PICKUP	Diesel	300	16.29854	10210	0.26	0.57
TRUCK- 3/4 TON PICKUP	Diesel	380	20.64482	10210	0.26	0.57
TRUCK- 1 TON	Diesel	362	19.66691	10210	0.26	0.57
TRUCK- 2 TON	Diesel	275	14.94033	10210	0.26	0.57
TRUCK- BOX W/ FOAM SYS	Diesel	300	16.29854	10210	0.26	0.57
TRUCK- DUMP	Diesel	300	16.29854	10210	0.26	0.57
TRUCK- FUEL- 4,000 GAL	Diesel	425	23.0896	10210	0.26	0.57
TRUCK- GREASE	Diesel	425	23.0896	10210	0.26	0.57
TRUCK- KNUCKLE BOOM	Diesel	300	16.29854	10210	0.26	0.57
TRUCK- SEMI	Diesel	450	24.44781	10210	0.26	0.57
TRUCK- VAC [Tractor - Broo	Diesel	300	16.29854	10210	0.26	0.57
TRUCK- WATER	Diesel	300	16.29854	10210	0.26	0.57
WELD RIGS	Diesel	350	19.01496	10210	0.26	0.57
VAC UNIT- EXCAVATOR	Diesel	268	14.56003	10210	0.26	0.57
¹ Horsepowers are estimated						
² Source of emission factors - Emission Factors for Greenhouse Gas Inventories, 4 April 2014						
³ Emissions Equation = EF g/gal * Gallons of fuel total / 453.6g/lb / 2000lb/ton						
⁴ CO2e based on global warming potential of CO2=1, N2O=298, CH4=25						

**Table 9A-28
Rover Construction Activity Green House Gas Emissions - Latex**

Seneca Lateral						
Make/Model	total operational hours	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
BENDING MACHINE- 22"-36"	241	3927.948	44.20674	0.001126	0.002468	44.6039
BUS	1446	19246.95	216.613	0.005516	0.012093	218.5591
COMPRESSOR- 1200	1928	62847.17	707.3078	0.018012	0.039487	713.6625
CRADLE BORE	0	0	0	0	0	0
DOZER- D5	0	0	0	0	0	0
DOZER- D6	2651	28804.95	324.1827	0.008255	0.018098	327.0953
DOZER- D7	964	12569.43	141.4616	0.003602	0.007897	142.7325
DOZER- D8 - Tier 3/4	1687	28412.16	319.7621	0.008143	0.017852	322.6349
DOZER- D8 - Tier 4	2651	44647.68	502.4832	0.012796	0.028052	506.9977
EXCAVATOR- 330 BACKHO	5784	84215.21	947.7924	0.024136	0.052913	956.3077
EXCAVATOR- 345	4338	75652.28	851.4217	0.021682	0.047533	859.0712
EXCAVATOR- Mini	482	2356.769	26.52404	0.000675	0.001481	26.76234
EXCAVATOR- JOHN HENRY	1205	17544.84	197.4568	0.005028	0.011024	199.2308
FORK LIFT	964	10474.53	117.8846	0.003002	0.006581	118.9437
GRADER- CAT 14	0	0	0	0	0	0
GRADER- CAT 16	241	3142.359	35.36539	0.000901	0.001974	35.68312
HAMMER- 345 EXCAVATOR	0	0	0	0	0	0
LOADER- BOBCAT	723	2553.166	28.73438	0.000732	0.001604	28.99254
MOROOKA-	723	2553.166	28.73438	0.000732	0.001604	28.99254
MOROOKA- COATING	0	0	0	0	0	0
MOROOKA- FOAM	0	0	0	0	0	0
MOROOKA- POTHOLE	0	0	0	0	0	0
MOROOKA- SANDBLAST	0	0	0	0	0	0
POSI-TRACK	1205	26186.32	294.7116	0.007505	0.016453	297.3594
PUMP- 3"	0	0	0	0	0	0
PUMP- 6"	2651	30245.2	340.3919	0.008668	0.019003	343.4501
PUMP- FILL/	241	7855.896	88.41347	0.002251	0.004936	89.20781
PUMP- FILL/ TEST	241	2749.564	30.94472	0.000788	0.001728	31.22273
SANDBLASTER	1446	5891.922	66.3101	0.001689	0.003702	66.90586
SIDEBOOM- 572	241	2291.303	25.78726	0.000657	0.00144	26.01894
SIDEBOOM- 583	3856	64942.08	730.8847	0.018612	0.040804	737.4512
SIDEBOOM- 587	4097	66775.12	751.5145	0.019137	0.041955	758.2664
TIMBER PRO	0	0	0	0	0	0
TRACTOR- 40-60 HP	0	0	0	0	0	0
TRACTOR- 80-120 HP	241	1309.316	14.73558	0.000375	0.000823	14.86797
TRACTOR- CHISEL PLOW A	0	0	0	0	0	0
TRACTOR- DISC ATTACHM	0	0	0	0	0	0
TRENCHER- WALK BEHIND	0	0	0	0	0	0
TRUCK- 1/2 TON PICKUP	10845	176757.7	1989.303	0.050658	0.111058	2007.176
TRUCK- 3/4 TON PICKUP	0	0	0	0	0	0
TRUCK- 1 TON	11327	222767	2507.111	0.063844	0.139966	2529.636
TRUCK- 2 TON	16147	241241.5	2715.03	0.069139	0.151574	2739.423
TRUCK- BOX W/ FOAM SYS	0	0	0	0	0	0
TRUCK- DUMP	964	15711.79	176.8269	0.004503	0.009872	178.4156
TRUCK- FUEL- 4,000 GAL	482	11129.19	125.2524	0.00319	0.006993	126.3777
TRUCK- GREASE	482	11129.19	125.2524	0.00319	0.006993	126.3777
TRUCK- KNUCKLE BOOM	0	0	0	0	0	0
TRUCK- SEMI	2169	53027.3	596.7909	0.015197	0.033317	602.1527
TRUCK- VAC [Tractor - Broo	482	7855.896	88.41347	0.002251	0.004936	89.20781
TRUCK- WATER	1205	19639.74	221.0337	0.005629	0.01234	223.0195
WELD RIGS	13496	256625.9	2888.173	0.073548	0.16124	2914.122
VAC UNIT- EXCAVATOR	723	10526.9	118.4741	0.003017	0.006614	119.5385
		total	18385.29	0.468186	1.026407	18550.47

**Table 9A-27
Rover Construction Activity Tailpipe Emissions - Compressor Stations**

Equipment Type ¹	Fuel Type	Engine Rating (hp)	Load Factor ²	Exhaust Emission Factors ⁴						Compressor Station ³		
				NOx (g/hp-hr)	VOC (g/hp-hr)	CO (g/hp-hr)	SO2 (g/hp-hr)	PM10 (g/hp-hr)	PM2.5 (g/hp-hr)	Quantity	single unit hrs/wk	relative use %
1/2 Ton Trucks	Gasoline	150	0.8	0.6900	0.2700	11.9400	0.1442	0.0600	0.0552	NA ⁶	--	0
1 Ton Trucks	Gasoline	175	0.8	0.6900	0.2700	11.9400	0.1442	0.0600	0.0552	NA ⁶	--	0
2 1/2 Ton Trucks	Diesel	250	0.59	2.9013	0.2117	1.3107	0.8208	0.3168	0.3073	NA ⁶	--	0
Tractor Trailers	Diesel	250	0.59	2.9013	0.2117	1.3107	0.8208	0.3168	0.3073	NA ⁶	--	0
Dump Trucks	Diesel	400	0.21	3.0492	0.3925	2.4922	0.9582	0.4989	0.4840	NA ⁶	--	0
Concrete Trucks	Diesel	400	0.43	2.6208	0.1800	1.4837	0.8209	0.3036	0.2945	NA ⁶	--	0
Fuel & Grease Trucks	Diesel	175	0.59	2.9086	0.2150	1.5197	0.8207	0.4583	0.4445	NA ⁶	--	0
Backhoes	Diesel	300	0.21	3.3725	0.4618	2.2016	0.9578	0.5197	0.5041	4	60	75%
Cranes	Diesel	250	0.43	2.8391	0.2017	0.8566	0.8127	0.2150	0.2086	2	10	75%
Draglines	Diesel	225	0.43	2.8391	0.2017	0.8566	0.8127	0.2150	0.2086	0	0	0%
Front End Loaders ⁷	Diesel	150	0.59	2.9086	0.2150	1.5197	0.8207	0.4583	0.4445	2	60	75%
Bulldozers ⁸	Diesel	200	0.59	2.9013	0.2117	1.3107	0.8208	0.3168	0.3073	2	60	50%
Sidebooms	Diesel	200	0.43	2.8391	0.2017	0.8566	0.8127	0.2150	0.2086	0	0	0%
Boring Machines	Diesel	200	0.43	2.8391	0.2017	0.8566	0.8127	0.2150	0.2086	0	0	0%
Directional Drill Units	Diesel	800	0.43	4.5696	0.1973	0.8414	0.8127	0.1911	0.1854	0	0	0%
Padding Machine	Diesel	200	0.43	2.8391	0.2017	0.8566	0.8127	0.2150	0.2086	0	0	0%
Bending machine	Diesel	150	0.43	2.8468	0.2048	0.9932	0.8126	0.3119	0.3026	0	0	0%
Bending Mandrel	Diesel	200	4.3	2.6208	0.1800	2.3372	0.8209	0.3036	0.2945	0	0	0%
Paving Machine	Diesel	175	0.59	2.9086	0.2150	1.5197	0.8207	0.4583	0.4445	0	0	0%
Bobcats	Diesel	70	0.59	3.2663	0.1782	0.6440	0.9127	0.0866	0.0840	2	40	50%
Road Sweepers ⁹	Diesel	70	0.43	3.2949	0.1755	0.5059	0.9037	0.0708	0.0687	0	0	0%
Farm Tractors	Diesel	30	0.59	3.0240	0.1349	0.1761	0.9129	0.0036	0.0035	0	0	0%
Log Skidder	Diesel	200	0.21	3.3725	0.4618	2.2016	0.9578	0.5197	0.5041	0	0	0%
Mulching Machine	Diesel	40	0.43	3.0240	0.1349	0.1761	0.9039	0.0038	0.0037	0	0	0%
Air Compressors	Diesel	80	0.43	3.2949	0.2237	2.7109	0.9035	0.4441	0.4308	4	40	100%
Concrete Saws	Gasoline	25	0.78	2.7700	4.1600	352.5700	0.2179	0.0600	0.0552	0	0	0%
Ditch Witches	Gasoline	10	0.66	2.7700	4.1600	352.5700	0.2179	0.0600	0.0552	0	0	0%
Generator	Gasoline	15	0.68	2.7700	4.1600	352.5700	0.2179	0.0600	0.0552	2	60	100%
Power Washers	Gasoline	10	0.85	2.7700	4.1600	352.5700	0.2179	0.0600	0.0552	0	0	0%
Water Pumps	Gasoline	10	0.69	2.7700	4.1600	352.5700	0.2179	0.0600	0.0552	2	20	50%
Water Trucks	Diesel	175	0.59	2.9086	0.2150	1.5197	0.8207	0.4583	0.4445	1	30	25%
Welding Machines	Gasoline	55	0.68	0.6900	0.2700	11.9400	0.1442	0.0600	0.0552	2	20	50%
Welding Trucks	Gasoline	110	0.8	0.6900	0.2700	11.9400	0.1442	0.0600	0.0552	0	0	0%
Carry-All 4x4	Gasoline	30	0.8	0.6900	0.2700	11.9400	0.1442	0.0600	0.0552	0	0	0%

**Table 9A-27
Rover Construction Activity Tailpipe Emissions - Compressor Stations**

Mainline CS 1 Compressor Station						Project Duration: 44 weeks					
Equipment Type ¹	Pipeline Placement ³				Total Operation (hr/project)	Project Emission Rate ⁵					
	Quantity	Single Unit Operation				NOx (tons/project)	VOC (tons/project)	CO (tons/project)	SO2 (tons/project)	PM10 (tons/project)	PM2.5 (tons/project)
		(hr/wk)	(wks/project)	(hr/project)							
1/2 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
1 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
2 1/2 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
Tractor Trailers	0	0	0	0	0	-	-	-	-	-	-
Dump Trucks	0	0	0	0	0	-	-	-	-	-	-
Concrete Trucks	0	0	0	0	0	-	-	-	-	-	-
Fuel Trucks	0	0	0	0	0	-	-	-	-	-	-
Backhoes	4	60	33	1980	7920	1.9	0.3	1.2	0.5	0.3	0.3
Cranes	2	10	33	330	660	0.2	0.0	0.1	0.1	0.0	0.0
Draglines	0	0	0	0	0	-	-	-	-	-	-
Front End Loaders	2	60	33	1980	3960	1.1	0.1	0.6	0.3	0.2	0.2
Bulldozers	2	60	22	1320	2640	1.0	0.1	0.5	0.3	0.1	0.1
Sidebooms	0	0	0	0	0	-	-	-	-	-	-
Boring Machines	0	0	0	0	0	-	-	-	-	-	-
Directional Drill Units	0	0	0	0	0	-	-	-	-	-	-
Padding Machine	0	0	0	0	0	-	-	-	-	-	-
Bending Machine	0	0	0	0	0	-	-	-	-	-	-
Bending Mandrel	0	0	0	0	0	-	-	-	-	-	-
Paving Machine	0	0	0	0	0	-	-	-	-	-	-
Bobcats	2	40	22	880	1760	0.3	0.0	0.1	0.1	0.0	0.0
Road Sweepers	0	0	0	0	0	-	-	-	-	-	-
Farm Tractors	0	0	0	0	0	-	-	-	-	-	-
Log Skidder	0	0	0	0	0	-	-	-	-	-	-
Mulching Machine	0	0	0	0	0	-	-	-	-	-	-
Air Compressors	4	40	44	1760	7040	0.9	0.1	0.7	0.2	0.1	0.1
Concrete Saws	0	0	0	0	0	-	-	-	-	-	-
Ditch Witches	0	0	0	0	0	-	-	-	-	-	-
Generators	2	60	44	2640	5280	0.2	0.2	20.9	0.0	0.0	0.0
Power Washers	0	0	0	0	0	-	-	-	-	-	-
Water Pumps	2	20	22	440	880	0.0	0.0	2.4	0.0	0.0	0.0
Water Trucks	1	30	11	330	330	0.1	0.0	0.1	0.0	0.0	0.0
Welding Machines	2	20	22	440	880	0.0	0.0	0.4	0.0	0.0	0.0
Welding Trucks	0	0	0	0	0	-	-	-	-	-	-
Carry-All 4x4	0	0	0	0	0	-	-	-	-	-	-
Mainline CS 1 Compressor Station Emissions						5.7	0.8	26.9	1.6	0.7	0.7

**Table 9A-27
Rover Construction Activity Tailpipe Emissions - Compressor Stations**

Mainline CS 2 Compressor Station						Project Duration: 44 weeks					
Equipment Type ¹	Pipeline Placement ³				Total Operation (hr/project)	Project Emission Rate ⁵					
	Quantity	Single Unit Operation				NOx (tons/project)	VOC (tons/project)	CO (tons/project)	SO2 (tons/project)	PM10 (tons/project)	PM2.5 (tons/project)
		(hr/wk)	(wks/project)	(hr/project)							
1/2 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
1 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
2 1/2 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
Tractor Trailers	0	0	0	0	0	-	-	-	-	-	-
Dump Trucks	0	0	0	0	0	-	-	-	-	-	-
Concrete Trucks	0	0	0	0	0	-	-	-	-	-	-
Fuel Trucks	0	0	0	0	0	-	-	-	-	-	-
Backhoes	4	60	33	1980	7920	1.9	0.3	1.2	0.5	0.3	0.3
Cranes	2	10	33	330	660	0.2	0.0	0.1	0.1	0.0	0.0
Draglines	0	0	0	0	0	-	-	-	-	-	-
Front End Loaders	2	60	33	1980	3960	1.1	0.1	0.6	0.3	0.2	0.2
Bulldozers	2	60	22	1320	2640	1.0	0.1	0.5	0.3	0.1	0.1
Sidebooms	0	0	0	0	0	-	-	-	-	-	-
Boring Machines	0	0	0	0	0	-	-	-	-	-	-
Directional Drill Units	0	0	0	0	0	-	-	-	-	-	-
Padding Machine	0	0	0	0	0	-	-	-	-	-	-
Bending Machine	0	0	0	0	0	-	-	-	-	-	-
Bending Mandrel	0	0	0	0	0	-	-	-	-	-	-
Paving Machine	0	0	0	0	0	-	-	-	-	-	-
Bobcats	2	40	22	880	1760	0.3	0.0	0.1	0.1	0.0	0.0
Road Sweepers	0	0	0	0	0	-	-	-	-	-	-
Farm Tractors	0	0	0	0	0	-	-	-	-	-	-
Log Skidder	0	0	0	0	0	-	-	-	-	-	-
Mulching Machine	0	0	0	0	0	-	-	-	-	-	-
Air Compressors	4	40	44	1760	7040	0.9	0.1	0.7	0.2	0.1	0.1
Concrete Saws	0	0	0	0	0	-	-	-	-	-	-
Ditch Witches	0	0	0	0	0	-	-	-	-	-	-
Generators	2	60	44	2640	5280	0.2	0.2	20.9	0.0	0.0	0.0
Power Washers	0	0	0	0	0	-	-	-	-	-	-
Water Pumps	2	20	22	440	880	0.0	0.0	2.4	0.0	0.0	0.0
Water Trucks	1	30	11	330	330	0.1	0.0	0.1	0.0	0.0	0.0
Welding Machines	2	20	22	440	880	0.0	0.0	0.4	0.0	0.0	0.0
Welding Trucks	0	0	0	0	0	-	-	-	-	-	-
Carry-All 4x4	0	0	0	0	0	-	-	-	-	-	-
Mainline CS 2 Compressor Station Emissions						5.7	0.8	26.9	1.6	0.7	0.7

**Table 9A-27
Rover Construction Activity Tailpipe Emissions - Compressor Stations**

Mainline CS 3 Compressor Station						Project Duration: 44 weeks					
Equipment Type ¹	Pipeline Placement ³				Total Operation (hr/project)	Project Emission Rate ⁵					
	Quantity	Single Unit Operation				NOx (tons/project)	VOC (tons/project)	CO (tons/project)	SO2 (tons/project)	PM10 (tons/project)	PM2.5 (tons/project)
		(hr/wk)	(wks/project)	(hr/project)							
1/2 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
1 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
2 1/2 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
Tractor Trailers	0	0	0	0	0	-	-	-	-	-	-
Dump Trucks	0	0	0	0	0	-	-	-	-	-	-
Concrete Trucks	0	0	0	0	0	-	-	-	-	-	-
Fuel Trucks	0	0	0	0	0	-	-	-	-	-	-
Backhoes	4	60	33	1980	7920	1.9	0.3	1.2	0.5	0.3	0.3
Cranes	2	10	33	330	660	0.2	0.0	0.1	0.1	0.0	0.0
Draglines	0	0	0	0	0	-	-	-	-	-	-
Front End Loaders	2	60	33	1980	3960	1.1	0.1	0.6	0.3	0.2	0.2
Bulldozers	2	60	22	1320	2640	1.0	0.1	0.5	0.3	0.1	0.1
Sidebooms	0	0	0	0	0	-	-	-	-	-	-
Boring Machines	0	0	0	0	0	-	-	-	-	-	-
Directional Drill Units	0	0	0	0	0	-	-	-	-	-	-
Padding Machine	0	0	0	0	0	-	-	-	-	-	-
Bending Machine	0	0	0	0	0	-	-	-	-	-	-
Bending Mandrel	0	0	0	0	0	-	-	-	-	-	-
Paving Machine	0	0	0	0	0	-	-	-	-	-	-
Bobcats	2	40	22	880	1760	0.3	0.0	0.1	0.1	0.0	0.0
Road Sweepers	0	0	0	0	0	-	-	-	-	-	-
Farm Tractors	0	0	0	0	0	-	-	-	-	-	-
Log Skidder	0	0	0	0	0	-	-	-	-	-	-
Mulching Machine	0	0	0	0	0	-	-	-	-	-	-
Air Compressors	4	40	44	1760	7040	0.9	0.1	0.7	0.2	0.1	0.1
Concrete Saws	0	0	0	0	0	-	-	-	-	-	-
Ditch Witches	0	0	0	0	0	-	-	-	-	-	-
Generators	2	60	44	2640	5280	0.2	0.2	20.9	0.0	0.0	0.0
Power Washers	0	0	0	0	0	-	-	-	-	-	-
Water Pumps	2	20	22	440	880	0.0	0.0	2.4	0.0	0.0	0.0
Water Trucks	1	30	11	330	330	0.1	0.0	0.1	0.0	0.0	0.0
Welding Machines	2	20	22	440	880	0.0	0.0	0.4	0.0	0.0	0.0
Welding Trucks	0	0	0	0	0	-	-	-	-	-	-
Carry-All 4x4	0	0	0	0	0	-	-	-	-	-	-
Mainline CS 3 Compressor Station Emissions						5.7	0.8	26.9	1.6	0.7	0.7

**Table 9A-27
Rover Construction Activity Tailpipe Emissions - Compressor Stations**

Defiance Compressor Station						Project Duration: 44 weeks					
Equipment Type ¹	Pipeline Placement ³				Total Operation (hr/project)	Project Emission Rate ⁵					
	Quantity	Single Unit Operation				NOx (tons/project)	VOC (tons/project)	CO (tons/project)	SO2 (tons/project)	PM10 (tons/project)	PM2.5 (tons/project)
		(hr/wk)	(wks/project)	(hr/project)							
1/2 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
1 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
2 1/2 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
Tractor Trailers	0	0	0	0	0	-	-	-	-	-	-
Dump Trucks	0	0	0	0	0	-	-	-	-	-	-
Concrete Trucks	0	0	0	0	0	-	-	-	-	-	-
Fuel Trucks	0	0	0	0	0	-	-	-	-	-	-
Backhoes	4	60	33	1980	7920	1.9	0.3	1.2	0.5	0.3	0.3
Cranes	2	10	33	330	660	0.2	0.0	0.1	0.1	0.0	0.0
Draglines	0	0	0	0	0	-	-	-	-	-	-
Front End Loaders	2	60	33	1980	3960	1.1	0.1	0.6	0.3	0.2	0.2
Bulldozers	2	60	22	1320	2640	1.0	0.1	0.5	0.3	0.1	0.1
Sidebooms	0	0	0	0	0	-	-	-	-	-	-
Boring Machines	0	0	0	0	0	-	-	-	-	-	-
Directional Drill Units	0	0	0	0	0	-	-	-	-	-	-
Padding Machine	0	0	0	0	0	-	-	-	-	-	-
Bending Machine	0	0	0	0	0	-	-	-	-	-	-
Bending Mandrel	0	0	0	0	0	-	-	-	-	-	-
Paving Machine	0	0	0	0	0	-	-	-	-	-	-
Bobcats	2	40	22	880	1760	0.3	0.0	0.1	0.1	0.0	0.0
Road Sweepers	0	0	0	0	0	-	-	-	-	-	-
Farm Tractors	0	0	0	0	0	-	-	-	-	-	-
Log Skidder	0	0	0	0	0	-	-	-	-	-	-
Mulching Machine	0	0	0	0	0	-	-	-	-	-	-
Air Compressors	4	40	44	1760	7040	0.9	0.1	0.7	0.2	0.1	0.1
Concrete Saws	0	0	0	0	0	-	-	-	-	-	-
Ditch Witches	0	0	0	0	0	-	-	-	-	-	-
Generators	2	60	44	2640	5280	0.2	0.2	20.9	0.0	0.0	0.0
Power Washers	0	0	0	0	0	-	-	-	-	-	-
Water Pumps	2	20	22	440	880	0.0	0.0	2.4	0.0	0.0	0.0
Water Trucks	1	30	11	330	330	0.1	0.0	0.1	0.0	0.0	0.0
Welding Machines	2	20	22	440	880	0.0	0.0	0.4	0.0	0.0	0.0
Welding Trucks	0	0	0	0	0	-	-	-	-	-	-
Carry-All 4x4	0	0	0	0	0	-	-	-	-	-	-
Defiance Compressor Station Emissions						5.7	0.8	26.9	1.6	0.7	0.7

**Table 9A-27
Rover Construction Activity Tailpipe Emissions - Compressor Stations**

Stand-Alone Metering Stations		Project Duration: 40 weeks									
Equipment Type ¹	Pipeline Placement ³				Total Operation (hr/project)	Project Emission Rate ⁵					
	Quantity	Single Unit Operation				NOx (tons/project)	VOC (tons/project)	CO (tons/project)	SO2 (tons/project)	PM10 (tons/project)	PM2.5 (tons/project)
		(hr/wk)	(wks/project)	(hr/project)							
1/2 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
1 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
2 1/2 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
Tractor Trailers	0	0	0	0	0	-	-	-	-	-	-
Dump Trucks	0	0	0	0	0	-	-	-	-	-	-
Concrete Trucks	0	0	0	0	0	-	-	-	-	-	-
Fuel Trucks	0	0	0	0	0	-	-	-	-	-	-
Backhoes	4	60	29.7	1782	7128	1.7	0.2	1.1	0.5	0.3	0.2
Cranes	2	10	29.7	297	594	0.2	0.0	0.1	0.1	0.0	0.0
Draglines	0	0	0	0	0	-	-	-	-	-	-
Front End Loaders	2	60	29.7	1782	3564	1.0	0.1	0.5	0.3	0.2	0.2
Bulldozers	2	60	19.8	1188	2376	0.9	0.1	0.4	0.3	0.1	0.1
Sidebooms	0	0	0	0	0	-	-	-	-	-	-
Boring Machines	0	0	0	0	0	-	-	-	-	-	-
Directional Drill Units	0	0	0	0	0	-	-	-	-	-	-
Padding Machine	0	0	0	0	0	-	-	-	-	-	-
Bending Machine	0	0	0	0	0	-	-	-	-	-	-
Bending Mandrel	0	0	0	0	0	-	-	-	-	-	-
Paving Machine	0	0	0	0	0	-	-	-	-	-	-
Bobcats	2	40	19.8	792	1584	0.2	0.0	0.0	0.1	0.0	0.0
Road Sweepers	0	0	0	0	0	-	-	-	-	-	-
Farm Tractors	0	0	0	0	0	-	-	-	-	-	-
Log Skidder	0	0	0	0	0	-	-	-	-	-	-
Mulching Machine	0	0	0	0	0	-	-	-	-	-	-
Air Compressors	4	40	39.6	1584	6336	0.8	0.1	0.7	0.2	0.1	0.1
Concrete Saws	0	0	0	0	0	-	-	-	-	-	-
Ditch Witches	0	0	0	0	0	-	-	-	-	-	-
Generators	2	60	39.6	2376	4752	0.1	0.2	18.8	0.0	0.0	0.0
Power Washers	0	0	0	0	0	-	-	-	-	-	-
Water Pumps	2	20	19.8	396	792	0.0	0.0	2.1	0.0	0.0	0.0
Water Trucks	1	30	9.9	297	297	0.1	0.0	0.1	0.0	0.0	0.0
Welding Machines	2	20	19.8	396	792	0.0	0.0	0.4	0.0	0.0	0.0
Welding Trucks	0	0	0	0	0	-	-	-	-	-	-
Carry-All 4x4	0	0	0	0	0	-	-	-	-	-	-
Stand-Alone Metering Stations Emissions						5.1	0.7	24.2	1.4	0.7	0.6

**Table 9A-27
Rover Construction Activity Tailpipe Emissions - Compressor Stations**

Sherwood Compressor Station						Project Duration: 40 weeks					
Equipment Type ¹	Pipeline Placement ³				Total Operation (hr/project)	Project Emission Rate ⁵					
	Quantity	Single Unit Operation				NOx (tons/project)	VOC (tons/project)	CO (tons/project)	SO2 (tons/project)	PM10 (tons/project)	PM2.5 (tons/project)
		(hr/wk)	(wks/project)	(hr/project)							
1/2 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
1 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
2 1/2 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
Tractor Trailers	0	0	0	0	0	-	-	-	-	-	-
Dump Trucks	0	0	0	0	0	-	-	-	-	-	-
Concrete Trucks	0	0	0	0	0	-	-	-	-	-	-
Fuel Trucks	0	0	0	0	0	-	-	-	-	-	-
Backhoes	4	60	29.7	1782	7128	1.7	0.2	1.1	0.5	0.3	0.2
Cranes	2	10	29.7	297	594	0.2	0.0	0.1	0.1	0.0	0.0
Draglines	0	0	0	0	0	-	-	-	-	-	-
Front End Loaders	2	60	29.7	1782	3564	1.0	0.1	0.5	0.3	0.2	0.2
Bulldozers	2	60	19.8	1188	2376	0.9	0.1	0.4	0.3	0.1	0.1
Sidebooms	0	0	0	0	0	-	-	-	-	-	-
Boring Machines	0	0	0	0	0	-	-	-	-	-	-
Directional Drill Units	0	0	0	0	0	-	-	-	-	-	-
Padding Machine	0	0	0	0	0	-	-	-	-	-	-
Bending Machine	0	0	0	0	0	-	-	-	-	-	-
Bending Mandrel	0	0	0	0	0	-	-	-	-	-	-
Paving Machine	0	0	0	0	0	-	-	-	-	-	-
Bobcats	2	40	19.8	792	1584	0.2	0.0	0.0	0.1	0.0	0.0
Road Sweepers	0	0	0	0	0	-	-	-	-	-	-
Farm Tractors	0	0	0	0	0	-	-	-	-	-	-
Log Skidder	0	0	0	0	0	-	-	-	-	-	-
Mulching Machine	0	0	0	0	0	-	-	-	-	-	-
Air Compressors	4	40	39.6	1584	6336	0.8	0.1	0.7	0.2	0.1	0.1
Concrete Saws	0	0	0	0	0	-	-	-	-	-	-
Ditch Witches	0	0	0	0	0	-	-	-	-	-	-
Generators	2	60	39.6	2376	4752	0.1	0.2	18.8	0.0	0.0	0.0
Power Washers	0	0	0	0	0	-	-	-	-	-	-
Water Pumps	2	20	19.8	396	792	0.0	0.0	2.1	0.0	0.0	0.0
Water Trucks	1	30	9.9	297	297	0.1	0.0	0.1	0.0	0.0	0.0
Welding Machines	2	20	19.8	396	792	0.0	0.0	0.4	0.0	0.0	0.0
Welding Trucks	0	0	0	0	0	-	-	-	-	-	-
Carry-All 4x4	0	0	0	0	0	-	-	-	-	-	-
Sherwood Compressor Station Emissions						5.1	0.7	24.2	1.4	0.7	0.6

**Table 9A-27
Rover Construction Activity Tailpipe Emissions - Compressor Stations**

Seneca Compressor Station						Project Duration: 40 weeks					
Equipment Type ¹	Pipeline Placement ³				Total Operation (hr/project)	Project Emission Rate ⁵					
	Quantity	Single Unit Operation				NOx (tons/project)	VOC (tons/project)	CO (tons/project)	SO2 (tons/project)	PM10 (tons/project)	PM2.5 (tons/project)
		(hr/wk)	(wks/project)	(hr/project)							
1/2 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
1 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
2 1/2 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
Tractor Trailers	0	0	0	0	0	-	-	-	-	-	-
Dump Trucks	0	0	0	0	0	-	-	-	-	-	-
Concrete Trucks	0	0	0	0	0	-	-	-	-	-	-
Fuel Trucks	0	0	0	0	0	-	-	-	-	-	-
Backhoes	4	60	29.7	1782	7128	1.7	0.2	1.1	0.5	0.3	0.2
Cranes	2	10	29.7	297	594	0.2	0.0	0.1	0.1	0.0	0.0
Draglines	0	0	0	0	0	-	-	-	-	-	-
Front End Loaders	2	60	29.7	1782	3564	1.0	0.1	0.5	0.3	0.2	0.2
Bulldozers	2	60	19.8	1188	2376	0.9	0.1	0.4	0.3	0.1	0.1
Sidebooms	0	0	0	0	0	-	-	-	-	-	-
Boring Machines	0	0	0	0	0	-	-	-	-	-	-
Directional Drill Units	0	0	0	0	0	-	-	-	-	-	-
Padding Machine	0	0	0	0	0	-	-	-	-	-	-
Bending Machine	0	0	0	0	0	-	-	-	-	-	-
Bending Mandrel	0	0	0	0	0	-	-	-	-	-	-
Paving Machine	0	0	0	0	0	-	-	-	-	-	-
Bobcats	2	40	19.8	792	1584	0.2	0.0	0.0	0.1	0.0	0.0
Road Sweepers	0	0	0	0	0	-	-	-	-	-	-
Farm Tractors	0	0	0	0	0	-	-	-	-	-	-
Log Skidder	0	0	0	0	0	-	-	-	-	-	-
Mulching Machine	0	0	0	0	0	-	-	-	-	-	-
Air Compressors	4	40	39.6	1584	6336	0.8	0.1	0.7	0.2	0.1	0.1
Concrete Saws	0	0	0	0	0	-	-	-	-	-	-
Ditch Witches	0	0	0	0	0	-	-	-	-	-	-
Generators	2	60	39.6	2376	4752	0.1	0.2	18.8	0.0	0.0	0.0
Power Washers	0	0	0	0	0	-	-	-	-	-	-
Water Pumps	2	20	19.8	396	792	0.0	0.0	2.1	0.0	0.0	0.0
Water Trucks	1	30	9.9	297	297	0.1	0.0	0.1	0.0	0.0	0.0
Welding Machines	2	20	19.8	396	792	0.0	0.0	0.4	0.0	0.0	0.0
Welding Trucks	0	0	0	0	0	-	-	-	-	-	-
Carry-All 4x4	0	0	0	0	0	-	-	-	-	-	-
Seneca Compressor Station Emissions						5.1	0.7	24.2	1.4	0.7	0.6

**Table 9A-27
Rover Construction Activity Tailpipe Emissions - Compressor Stations**

Clarington Compressor Station						Project Duration: 40 weeks					
Equipment Type ¹	Pipeline Placement ³				Total Operation (hr/project)	Project Emission Rate ⁵					
	Quantity	Single Unit Operation				NOx (tons/project)	VOC (tons/project)	CO (tons/project)	SO2 (tons/project)	PM10 (tons/project)	PM2.5 (tons/project)
		(hr/wk)	(wks/project)	(hr/project)							
1/2 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
1 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
2 1/2 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
Tractor Trailers	0	0	0	0	0	-	-	-	-	-	-
Dump Trucks	0	0	0	0	0	-	-	-	-	-	-
Concrete Trucks	0	0	0	0	0	-	-	-	-	-	-
Fuel Trucks	0	0	0	0	0	-	-	-	-	-	-
Backhoes	4	60	29.7	1782	7128	1.7	0.2	1.1	0.5	0.3	0.2
Cranes	2	10	29.7	297	594	0.2	0.0	0.1	0.1	0.0	0.0
Draglines	0	0	0	0	0	-	-	-	-	-	-
Front End Loaders	2	60	29.7	1782	3564	1.0	0.1	0.5	0.3	0.2	0.2
Bulldozers	2	60	19.8	1188	2376	0.9	0.1	0.4	0.3	0.1	0.1
Sidebooms	0	0	0	0	0	-	-	-	-	-	-
Boring Machines	0	0	0	0	0	-	-	-	-	-	-
Directional Drill Units	0	0	0	0	0	-	-	-	-	-	-
Padding Machine	0	0	0	0	0	-	-	-	-	-	-
Bending Machine	0	0	0	0	0	-	-	-	-	-	-
Bending Mandrel	0	0	0	0	0	-	-	-	-	-	-
Paving Machine	0	0	0	0	0	-	-	-	-	-	-
Bobcats	2	40	19.8	792	1584	0.2	0.0	0.0	0.1	0.0	0.0
Road Sweepers	0	0	0	0	0	-	-	-	-	-	-
Farm Tractors	0	0	0	0	0	-	-	-	-	-	-
Log Skidder	0	0	0	0	0	-	-	-	-	-	-
Mulching Machine	0	0	0	0	0	-	-	-	-	-	-
Air Compressors	4	40	39.6	1584	6336	0.8	0.1	0.7	0.2	0.1	0.1
Concrete Saws	0	0	0	0	0	-	-	-	-	-	-
Ditch Witches	0	0	0	0	0	-	-	-	-	-	-
Generators	2	60	39.6	2376	4752	0.1	0.2	18.8	0.0	0.0	0.0
Power Washers	0	0	0	0	0	-	-	-	-	-	-
Water Pumps	2	20	19.8	396	792	0.0	0.0	2.1	0.0	0.0	0.0
Water Trucks	1	30	9.9	297	297	0.1	0.0	0.1	0.0	0.0	0.0
Welding Machines	2	20	19.8	396	792	0.0	0.0	0.4	0.0	0.0	0.0
Welding Trucks	0	0	0	0	0	-	-	-	-	-	-
Carry-All 4x4	0	0	0	0	0	-	-	-	-	-	-
Clarington Compressor Station Emissions						5.1	0.7	24.2	1.4	0.7	0.6

**Table 9A-27
Rover Construction Activity Tailpipe Emissions - Compressor Stations**

Majorsville Compressor Station						Project Duration: 40 weeks					
Equipment Type ¹	Pipeline Placement ³				Total Operation (hr/project)	Project Emission Rate ⁵					
	Quantity	Single Unit Operation				NOx (tons/project)	VOC (tons/project)	CO (tons/project)	SO2 (tons/project)	PM10 (tons/project)	PM2.5 (tons/project)
		(hr/wk)	(wks/project)	(hr/project)							
1/2 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
1 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
2 1/2 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
Tractor Trailers	0	0	0	0	0	-	-	-	-	-	-
Dump Trucks	0	0	0	0	0	-	-	-	-	-	-
Concrete Trucks	0	0	0	0	0	-	-	-	-	-	-
Fuel Trucks	0	0	0	0	0	-	-	-	-	-	-
Backhoes	4	60	29.7	1782	7128	1.7	0.2	1.1	0.5	0.3	0.2
Cranes	2	10	29.7	297	594	0.2	0.0	0.1	0.1	0.0	0.0
Draglines	0	0	0	0	0	-	-	-	-	-	-
Front End Loaders	2	60	29.7	1782	3564	1.0	0.1	0.5	0.3	0.2	0.2
Bulldozers	2	60	19.8	1188	2376	0.9	0.1	0.4	0.3	0.1	0.1
Sidebooms	0	0	0	0	0	-	-	-	-	-	-
Boring Machines	0	0	0	0	0	-	-	-	-	-	-
Directional Drill Units	0	0	0	0	0	-	-	-	-	-	-
Padding Machine	0	0	0	0	0	-	-	-	-	-	-
Bending Machine	0	0	0	0	0	-	-	-	-	-	-
Bending Mandrel	0	0	0	0	0	-	-	-	-	-	-
Paving Machine	0	0	0	0	0	-	-	-	-	-	-
Bobcats	2	40	19.8	792	1584	0.2	0.0	0.0	0.1	0.0	0.0
Road Sweepers	0	0	0	0	0	-	-	-	-	-	-
Farm Tractors	0	0	0	0	0	-	-	-	-	-	-
Log Skidder	0	0	0	0	0	-	-	-	-	-	-
Mulching Machine	0	0	0	0	0	-	-	-	-	-	-
Air Compressors	4	40	39.6	1584	6336	0.8	0.1	0.7	0.2	0.1	0.1
Concrete Saws	0	0	0	0	0	-	-	-	-	-	-
Ditch Witches	0	0	0	0	0	-	-	-	-	-	-
Generators	2	60	39.6	2376	4752	0.1	0.2	18.8	0.0	0.0	0.0
Power Washers	0	0	0	0	0	-	-	-	-	-	-
Water Pumps	2	20	19.8	396	792	0.0	0.0	2.1	0.0	0.0	0.0
Water Trucks	1	30	9.9	297	297	0.1	0.0	0.1	0.0	0.0	0.0
Welding Machines	2	20	19.8	396	792	0.0	0.0	0.4	0.0	0.0	0.0
Welding Trucks	0	0	0	0	0	-	-	-	-	-	-
Carry-All 4x4	0	0	0	0	0	-	-	-	-	-	-
Majorsville Compressor Station Emissions						5.1	0.7	24.2	1.4	0.7	0.6

**Table 9A-27
Rover Construction Activity Tailpipe Emissions - Compressor Stations**

Cadiz Compressor Station		Project Duration: 40 weeks									
Equipment Type ¹	Pipeline Placement ³				Total Operation (hr/project)	Project Emission Rate ⁵					
	Quantity	Single Unit Operation				NOx (tons/project)	VOC (tons/project)	CO (tons/project)	SO2 (tons/project)	PM10 (tons/project)	PM2.5 (tons/project)
		(hr/wk)	(wks/project)	(hr/project)							
1/2 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
1 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
2 1/2 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
Tractor Trailers	0	0	0	0	0	-	-	-	-	-	-
Dump Trucks	0	0	0	0	0	-	-	-	-	-	-
Concrete Trucks	0	0	0	0	0	-	-	-	-	-	-
Fuel Trucks	0	0	0	0	0	-	-	-	-	-	-
Backhoes	4	60	29.7	1782	7128	1.7	0.2	1.1	0.5	0.3	0.2
Cranes	2	10	29.7	297	594	0.2	0.0	0.1	0.1	0.0	0.0
Draglines	0	0	0	0	0	-	-	-	-	-	-
Front End Loaders	2	60	29.7	1782	3564	1.0	0.1	0.5	0.3	0.2	0.2
Bulldozers	2	60	19.8	1188	2376	0.9	0.1	0.4	0.3	0.1	0.1
Sidebooms	0	0	0	0	0	-	-	-	-	-	-
Boring Machines	0	0	0	0	0	-	-	-	-	-	-
Directional Drill Units	0	0	0	0	0	-	-	-	-	-	-
Padding Machine	0	0	0	0	0	-	-	-	-	-	-
Bending Machine	0	0	0	0	0	-	-	-	-	-	-
Bending Mandrel	0	0	0	0	0	-	-	-	-	-	-
Paving Machine	0	0	0	0	0	-	-	-	-	-	-
Bobcats	2	40	19.8	792	1584	0.2	0.0	0.0	0.1	0.0	0.0
Road Sweepers	0	0	0	0	0	-	-	-	-	-	-
Farm Tractors	0	0	0	0	0	-	-	-	-	-	-
Log Skidder	0	0	0	0	0	-	-	-	-	-	-
Mulching Machine	0	0	0	0	0	-	-	-	-	-	-
Air Compressors	4	40	39.6	1584	6336	0.8	0.1	0.7	0.2	0.1	0.1
Concrete Saws	0	0	0	0	0	-	-	-	-	-	-
Ditch Witches	0	0	0	0	0	-	-	-	-	-	-
Generators	2	60	39.6	2376	4752	0.1	0.2	18.8	0.0	0.0	0.0
Power Washers	0	0	0	0	0	-	-	-	-	-	-
Water Pumps	2	20	19.8	396	792	0.0	0.0	2.1	0.0	0.0	0.0
Water Trucks	1	30	9.9	297	297	0.1	0.0	0.1	0.0	0.0	0.0
Welding Machines	2	20	19.8	396	792	0.0	0.0	0.4	0.0	0.0	0.0
Welding Trucks	0	0	0	0	0	-	-	-	-	-	-
Carry-All 4x4	0	0	0	0	0	-	-	-	-	-	-
Cadiz Compressor Station Emissions						5.1	0.7	24.2	1.4	0.7	0.6

**Table 9A-27
Rover Construction Activity Tailpipe Emissions - Compressor Stations**

Burgettstown Compressor Station						Project Duration: 40 weeks					
Equipment Type ¹	Pipeline Placement ³				Total Operation (hr/project)	Project Emission Rate ⁵					
	Quantity	Single Unit Operation				NOx (tons/project)	VOC (tons/project)	CO (tons/project)	SO2 (tons/project)	PM10 (tons/project)	PM2.5 (tons/project)
		(hr/wk)	(wks/project)	(hr/project)							
1/2 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
1 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
2 1/2 Ton Trucks	0	0	0	0	0	-	-	-	-	-	-
Tractor Trailers	0	0	0	0	0	-	-	-	-	-	-
Dump Trucks	0	0	0	0	0	-	-	-	-	-	-
Concrete Trucks	0	0	0	0	0	-	-	-	-	-	-
Fuel Trucks	0	0	0	0	0	-	-	-	-	-	-
Backhoes	4	60	29.7	1782	7128	1.7	0.2	1.1	0.5	0.3	0.2
Cranes	2	10	29.7	297	594	0.2	0.0	0.1	0.1	0.0	0.0
Draglines	0	0	0	0	0	-	-	-	-	-	-
Front End Loaders	2	60	29.7	1782	3564	1.0	0.1	0.5	0.3	0.2	0.2
Bulldozers	2	60	19.8	1188	2376	0.9	0.1	0.4	0.3	0.1	0.1
Sidebooms	0	0	0	0	0	-	-	-	-	-	-
Boring Machines	0	0	0	0	0	-	-	-	-	-	-
Directional Drill Units	0	0	0	0	0	-	-	-	-	-	-
Padding Machine	0	0	0	0	0	-	-	-	-	-	-
Bending Machine	0	0	0	0	0	-	-	-	-	-	-
Bending Mandrel	0	0	0	0	0	-	-	-	-	-	-
Paving Machine	0	0	0	0	0	-	-	-	-	-	-
Bobcats	2	40	19.8	792	1584	0.2	0.0	0.0	0.1	0.0	0.0
Road Sweepers	0	0	0	0	0	-	-	-	-	-	-
Farm Tractors	0	0	0	0	0	-	-	-	-	-	-
Log Skidder	0	0	0	0	0	-	-	-	-	-	-
Mulching Machine	0	0	0	0	0	-	-	-	-	-	-
Air Compressors	4	40	39.6	1584	6336	0.8	0.1	0.7	0.2	0.1	0.1
Concrete Saws	0	0	0	0	0	-	-	-	-	-	-
Ditch Witches	0	0	0	0	0	-	-	-	-	-	-
Generators	2	60	39.6	2376	4752	0.1	0.2	18.8	0.0	0.0	0.0
Power Washers	0	0	0	0	0	-	-	-	-	-	-
Water Pumps	2	20	19.8	396	792	0.0	0.0	2.1	0.0	0.0	0.0
Water Trucks	1	30	9.9	297	297	0.1	0.0	0.1	0.0	0.0	0.0
Welding Machines	2	20	19.8	396	792	0.0	0.0	0.4	0.0	0.0	0.0
Welding Trucks	0	0	0	0	0	-	-	-	-	-	-
Carry-All 4x4	0	0	0	0	0	-	-	-	-	-	-

Burgettstown Compressor Station Emissions 5.1 0.7 24.2 1.4 0.7 0.6

¹ List includes representative equipment for all activities (clearing & grading, ditching, bending, etc.) and crew types (welding crew, coating crew, lowering crew, etc.).
² Based on values presented in EPA guidance document "Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling" (EPA420-P-04-005 dated April 2004).
³ Information on the number of vehicles and vehicle operation is based on a pipeline construction spread of approximately 200 miles, and average compressor station size.
⁴ Factors developed using methodology presented in EPA guidance documents "Exhaust and Crankcase Emission Factors for Nonroad Engine Emissions Modeling--Compression-Ignition" and "Exhaust Emission Factors for Nonroad Engine Modeling: Spark Ignition"
⁵ Project Emissions Rate = Engine Rating (hp) x Load Factor x Total Operation (hr/project) x Exhaust Emission Factor (g/hp-hr) / 453.6 grams/lb / 2000 lb/ton
⁶ Emissions are captured as on-road emissions
⁷ Includes Hydro-Axes, ASV with flail, and Morooka 1500
⁸ Includes D7 and D8 tow tractors
⁹ Includes motorgrader #14

**Table 9A-28
Rover Construction Activity Green House Gas Emissions -Compressor Stations**

Equipment Type	Fuel	Engine Rating (Horsepower) ¹	Fuel Use	Emission Factors (g/gal) ²		
			gal/hr	CO ₂	N ₂ O	CH ₄
1/2 Ton Trucks	Gasoline	150	8.14927	8780	0.22	0.5
1 Ton Trucks	Gasoline	175	9.507482	8780	0.22	0.5
2 1/2 Ton Trucks	Diesel	250	13.58212	10210	0.26	0.57
Tractor Trailers	Diesel	250	13.58212	10210	0.26	0.57
Dump Trucks	Diesel	400	21.73139	10210	0.26	0.57
Concrete Trucks	Diesel	400	21.73139	10210	0.26	0.57
Fuel Trucks	Diesel	175	9.507482	10210	0.26	0.57
Backhoes	Diesel	300	16.29854	10210	0.26	0.57
Cranes	Diesel	250	13.58212	10210	0.26	0.57
Draglines	Diesel	225	12.22391	10210	0.26	0.57
Front End Loaders	Diesel	150	8.14927	10210	0.26	0.57
Bulldozers	Diesel	200	10.86569	10210	0.26	0.57
Sidebooms	Diesel	200	10.86569	10210	0.26	0.57
Boring Machines	Diesel	200	10.86569	10210	0.26	0.57
Directional Drill Units	Diesel	800	43.46277	10210	0.26	0.57
Padding Machine	Diesel	200	10.86569	10210	0.26	0.57
Bending Machine	Diesel	150	8.14927	10210	0.26	0.57
Bending Mandrel	Diesel	200	10.86569	10210	0.26	0.57
Paving Machine	Diesel	175	9.507482	10210	0.26	0.57
Bobcats	Diesel	70	3.802993	10210	0.26	0.57
Road Sweepers	Diesel	70	3.802993	10210	0.26	0.57
Farm Tractors	Diesel	30	1.629854	10210	0.26	0.57
Log Skidder	Diesel	200	10.86569	10210	0.26	0.57
Mulching Machine	Diesel	40	2.173139	10210	0.26	0.57
Air Compressors	Diesel	80	4.346277	10210	0.26	0.57
Concrete Saws	Gasoline	25	1.358212	8780	0.22	0.5
Ditch Witches	Gasoline	10	0.543285	8780	0.22	0.5
Generators	Gasoline	15	0.814927	8780	0.22	0.5
Power Washers	Gasoline	10	0.543285	8780	0.22	0.5
Water Pumps	Gasoline	10	0.543285	8780	0.22	0.5
Water Trucks	Diesel	175	9.507482	10210	0.26	0.57
Welding Machines	Gasoline	55	2.988066	8780	0.22	0.5
Welding Trucks	Gasoline	110	5.976131	8780	0.22	0.5
Carry-All 4x4	Gasoline	30	1.629854	8780	0.22	0.5

¹ Horsepowers are estimated

² Source of emission factors - Emission Factors for Greenhouse Gas Inventories, 4 April 2014

³ Emissions Equation = EF g/gal * Gallons of fuel total / 453.6g/lb / 2000lb/ton

⁴ CO₂e based on global warming potential of CO₂=1, N₂O=298, CH₄=25

**Table 9A-28
Rover Construction Activity Green House Gas Emissions -Compressor Stations**

Mainline CS 1 Compressor Station						
Equipment type	total operational hours	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
1/2 Ton Trucks	0	0	0	0	0	0
1 Ton Trucks	0	0	0	0	0	0
2 1/2 Ton Trucks	0	0	0	0	0	0
Tractor Trailers	0	0	0	0	0	0
Dump Trucks	0	0	0	0	0	0
Concrete Trucks	0	0	0	0	0	0
Fuel Trucks	0	0	0	0	0	0
Backhoes	7920	129084.438	1452.769	0.036995	0.081105	1465.821
Cranes	660	8964.19708	100.8867	0.002569	0.005632	101.7931
Draglines	0	0	0	0	0	0
Front End Loaders	3960	32271.10949	363.1923	0.009249	0.020276	366.4553
Bulldozers	2640	28685.43066	322.8376	0.008221	0.018023	325.7381
Sidebooms	0	0	0	0	0	0
Boring Machines	0	0	0	0	0	0
Directional Drill Units	0	0	0	0	0	0
Padding Machine	0	0	0	0	0	0
Bending Machine	0	0	0	0	0	0
Bending Mandrel	0	0	0	0	0	0
Paving Machine	0	0	0	0	0	0
Bobcats	1760	6693.267153	75.32877	0.001918	0.004205	76.00555
Road Sweepers	0	0	0	0	0	0
Farm Tractors	0	0	0	0	0	0
Log Skidder	0	0	0	0	0	0
Mulching Machine	0	0	0	0	0	0
Air Compressors	7040	30597.7927	344.3601	0.008769	0.019225	347.4539
Concrete Saws	0	0	0	0	0	0
Ditch Witches	0	0	0	0	0	0
Generators	5280	4302.814599	41.6432	0.001043	0.002371	42.01344
Power Washers	0	0	0	0	0	0
Water Pumps	880	478.0905109	4.627022	0.000116	0.000263	4.66816
Water Trucks	330	3137.468978	35.31036	0.000899	0.001971	35.6276
Welding Machines	880	2629.49781	25.44862	0.000638	0.001449	25.67488
Welding Trucks	0	0	0	0	0	0
Carry-All 4x4	0	0	0	0	0	0
total			2766.404	0.070418	0.154522	2791.251

**Table 9A-28
Rover Construction Activity Green House Gas Emissions -Compressor Stations**

Mainline CS 2 Compressor Station						
Equipment type	total operational hours	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
1/2 Ton Trucks	0	0	0	0	0	0
1 Ton Trucks	0	0	0	0	0	0
2 1/2 Ton Trucks	0	0	0	0	0	0
Tractor Trailers	0	0	0	0	0	0
Dump Trucks	0	0	0	0	0	0
Concrete Trucks	0	0	0	0	0	0
Fuel Trucks	0	0	0	0	0	0
Backhoes	7920	129084.438	1452.769	0.036995	0.081105	1465.821
Cranes	660	8964.19708	100.8867	0.002569	0.005632	101.7931
Draglines	0	0	0	0	0	0
Front End Loaders	3960	32271.10949	363.1923	0.009249	0.020276	366.4553
Bulldozers	2640	28685.43066	322.8376	0.008221	0.018023	325.7381
Sidebooms	0	0	0	0	0	0
Boring Machines	0	0	0	0	0	0
Directional Drill Units	0	0	0	0	0	0
Padding Machine	0	0	0	0	0	0
Bending Machine	0	0	0	0	0	0
Bending Mandrel	0	0	0	0	0	0
Paving Machine	0	0	0	0	0	0
Bobcats	1760	6693.267153	75.32877	0.001918	0.004205	76.00555
Road Sweepers	0	0	0	0	0	0
Farm Tractors	0	0	0	0	0	0
Log Skidder	0	0	0	0	0	0
Mulching Machine	0	0	0	0	0	0
Air Compressors	7040	30597.7927	344.3601	0.008769	0.019225	347.4539
Concrete Saws	0	0	0	0	0	0
Ditch Witches	0	0	0	0	0	0
Generators	5280	4302.814599	41.6432	0.001043	0.002371	42.01344
Power Washers	0	0	0	0	0	0
Water Pumps	880	478.0905109	4.627022	0.000116	0.000263	4.66816
Water Trucks	330	3137.468978	35.31036	0.000899	0.001971	35.6276
Welding Machines	880	2629.49781	25.44862	0.000638	0.001449	25.67488
Welding Trucks	0	0	0	0	0	0
Carry-All 4x4	0	0	0	0	0	0
total			2766.404	0.070418	0.154522	2791.251

**Table 9A-28
Rover Construction Activity Green House Gas Emissions -Compressor Stations**

Mainline CS 3 Compressor Station						
Equipment type	total operational hours	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
1/2 Ton Trucks	0	0	0	0	0	0
1 Ton Trucks	0	0	0	0	0	0
2 1/2 Ton Trucks	0	0	0	0	0	0
Tractor Trailers	0	0	0	0	0	0
Dump Trucks	0	0	0	0	0	0
Concrete Trucks	0	0	0	0	0	0
Fuel Trucks	0	0	0	0	0	0
Backhoes	7920	129084.438	1452.769	0.036995	0.081105	1465.821
Cranes	660	8964.19708	100.8867	0.002569	0.005632	101.7931
Draglines	0	0	0	0	0	0
Front End Loaders	3960	32271.10949	363.1923	0.009249	0.020276	366.4553
Bulldozers	2640	28685.43066	322.8376	0.008221	0.018023	325.7381
Sidebooms	0	0	0	0	0	0
Boring Machines	0	0	0	0	0	0
Directional Drill Units	0	0	0	0	0	0
Padding Machine	0	0	0	0	0	0
Bending Machine	0	0	0	0	0	0
Bending Mandrel	0	0	0	0	0	0
Paving Machine	0	0	0	0	0	0
Bobcats	1760	6693.267153	75.32877	0.001918	0.004205	76.00555
Road Sweepers	0	0	0	0	0	0
Farm Tractors	0	0	0	0	0	0
Log Skidder	0	0	0	0	0	0
Mulching Machine	0	0	0	0	0	0
Air Compressors	7040	30597.7927	344.3601	0.008769	0.019225	347.4539
Concrete Saws	0	0	0	0	0	0
Ditch Witches	0	0	0	0	0	0
Generators	5280	4302.814599	41.6432	0.001043	0.002371	42.01344
Power Washers	0	0	0	0	0	0
Water Pumps	880	478.0905109	4.627022	0.000116	0.000263	4.66816
Water Trucks	330	3137.468978	35.31036	0.000899	0.001971	35.6276
Welding Machines	880	2629.49781	25.44862	0.000638	0.001449	25.67488
Welding Trucks	0	0	0	0	0	0
Carry-All 4x4	0	0	0	0	0	0
total			2766.404	0.070418	0.154522	2791.251

**Table 9A-28
Rover Construction Activity Green House Gas Emissions -Compressor Stations**

Defiance Compressor Station						
Equipment type	total operational hours	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
1/2 Ton Trucks	0	0	0	0	0	0
1 Ton Trucks	0	0	0	0	0	0
2 1/2 Ton Trucks	0	0	0	0	0	0
Tractor Trailers	0	0	0	0	0	0
Dump Trucks	0	0	0	0	0	0
Concrete Trucks	0	0	0	0	0	0
Fuel Trucks	0	0	0	0	0	0
Backhoes	7920	129084.438	1452.769	0.036995	0.081105	1465.821
Cranes	660	8964.19708	100.8867	0.002569	0.005632	101.7931
Draglines	0	0	0	0	0	0
Front End Loaders	3960	32271.10949	363.1923	0.009249	0.020276	366.4553
Bulldozers	2640	28685.43066	322.8376	0.008221	0.018023	325.7381
Sidebooms	0	0	0	0	0	0
Boring Machines	0	0	0	0	0	0
Directional Drill Units	0	0	0	0	0	0
Padding Machine	0	0	0	0	0	0
Bending Machine	0	0	0	0	0	0
Bending Mandrel	0	0	0	0	0	0
Paving Machine	0	0	0	0	0	0
Bobcats	1760	6693.267153	75.32877	0.001918	0.004205	76.00555
Road Sweepers	0	0	0	0	0	0
Farm Tractors	0	0	0	0	0	0
Log Skidder	0	0	0	0	0	0
Mulching Machine	0	0	0	0	0	0
Air Compressors	7040	30597.7927	344.3601	0.008769	0.019225	347.4539
Concrete Saws	0	0	0	0	0	0
Ditch Witches	0	0	0	0	0	0
Generators	5280	4302.814599	41.6432	0.001043	0.002371	42.01344
Power Washers	0	0	0	0	0	0
Water Pumps	880	478.0905109	4.627022	0.000116	0.000263	4.66816
Water Trucks	330	3137.468978	35.31036	0.000899	0.001971	35.6276
Welding Machines	880	2629.49781	25.44862	0.000638	0.001449	25.67488
Welding Trucks	0	0	0	0	0	0
Carry-All 4x4	0	0	0	0	0	0
total			2766.404	0.070418	0.154522	2791.251

**Table 9A-28
Rover Construction Activity Green House Gas Emissions -Compressor Stations**

Stand-Alone Metering Stations						
Equipment type	total operational hours	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
1/2 Ton Trucks	0	0	0	0	0	0
1 Ton Trucks	0	0	0	0	0	0
2 1/2 Ton Trucks	0	0	0	0	0	0
Tractor Trailers	0	0	0	0	0	0
Dump Trucks	0	0	0	0	0	0
Concrete Trucks	0	0	0	0	0	0
Fuel Trucks	0	0	0	0	0	0
Backhoes	7128	116175.9942	1307.492	0.033296	0.072994	1319.239
Cranes	594	8067.777372	90.79807	0.002312	0.005069	91.61383
Draglines	0	0	0	0	0	0
Front End Loaders	3564	29043.99854	326.873	0.008324	0.018249	329.8098
Bulldozers	2376	25816.88759	290.5538	0.007399	0.016221	293.1642
Sidebooms	0	0	0	0	0	0
Boring Machines	0	0	0	0	0	0
Directional Drill Units	0	0	0	0	0	0
Padding Machine	0	0	0	0	0	0
Bending Machine	0	0	0	0	0	0
Bending Mandrel	0	0	0	0	0	0
Paving Machine	0	0	0	0	0	0
Bobcats	1584	6023.940438	67.79589	0.001726	0.003785	68.40499
Road Sweepers	0	0	0	0	0	0
Farm Tractors	0	0	0	0	0	0
Log Skidder	0	0	0	0	0	0
Mulching Machine	0	0	0	0	0	0
Air Compressors	6336	27538.01343	309.9241	0.007892	0.017302	312.7085
Concrete Saws	0	0	0	0	0	0
Ditch Witches	0	0	0	0	0	0
Generators	4752	3872.533139	37.47888	0.000939	0.002134	37.81209
Power Washers	0	0	0	0	0	0
Water Pumps	792	430.2814599	4.16432	0.000104	0.000237	4.201344
Water Trucks	297	2823.72208	31.77932	0.000809	0.001774	32.06484
Welding Machines	792	2366.548029	22.90376	0.000574	0.001304	23.10739
Welding Trucks	0	0	0	0	0	0
Carry-All 4x4	0	0	0	0	0	0
total			2489.763	0.063376	0.13907	2512.126

**Table 9A-28
Rover Construction Activity Green House Gas Emissions -Compressor Stations**

Sherwood Compressor Station						
Equipment type	total operational hours	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
1/2 Ton Trucks	0	0	0	0	0	0
1 Ton Trucks	0	0	0	0	0	0
2 1/2 Ton Trucks	0	0	0	0	0	0
Tractor Trailers	0	0	0	0	0	0
Dump Trucks	0	0	0	0	0	0
Concrete Trucks	0	0	0	0	0	0
Fuel Trucks	0	0	0	0	0	0
Backhoes	7128	116175.9942	1307.492	0.033296	0.072994	1319.239
Cranes	594	8067.777372	90.79807	0.002312	0.005069	91.61383
Draglines	0	0	0	0	0	0
Front End Loaders	3564	29043.99854	326.873	0.008324	0.018249	329.8098
Bulldozers	2376	25816.88759	290.5538	0.007399	0.016221	293.1642
Sidebooms	0	0	0	0	0	0
Boring Machines	0	0	0	0	0	0
Directional Drill Units	0	0	0	0	0	0
Padding Machine	0	0	0	0	0	0
Bending Machine	0	0	0	0	0	0
Bending Mandrel	0	0	0	0	0	0
Paving Machine	0	0	0	0	0	0
Bobcats	1584	6023.940438	67.79589	0.001726	0.003785	68.40499
Road Sweepers	0	0	0	0	0	0
Farm Tractors	0	0	0	0	0	0
Log Skidder	0	0	0	0	0	0
Mulching Machine	0	0	0	0	0	0
Air Compressors	6336	27538.01343	309.9241	0.007892	0.017302	312.7085
Concrete Saws	0	0	0	0	0	0
Ditch Witches	0	0	0	0	0	0
Generators	4752	3872.533139	37.47888	0.000939	0.002134	37.81209
Power Washers	0	0	0	0	0	0
Water Pumps	792	430.2814599	4.16432	0.000104	0.000237	4.201344
Water Trucks	297	2823.72208	31.77932	0.000809	0.001774	32.06484
Welding Machines	792	2366.548029	22.90376	0.000574	0.001304	23.10739
Welding Trucks	0	0	0	0	0	0
Carry-All 4x4	0	0	0	0	0	0
total			2489.763	0.063376	0.13907	2512.126

**Table 9A-28
Rover Construction Activity Green House Gas Emissions -Compressor Stations**

Seneca Compressor Station						
Equipment type	total operational hours	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
1/2 Ton Trucks	0	0	0	0	0	0
1 Ton Trucks	0	0	0	0	0	0
2 1/2 Ton Trucks	0	0	0	0	0	0
Tractor Trailers	0	0	0	0	0	0
Dump Trucks	0	0	0	0	0	0
Concrete Trucks	0	0	0	0	0	0
Fuel Trucks	0	0	0	0	0	0
Backhoes	7128	116175.9942	1307.492	0.033296	0.072994	1319.239
Cranes	594	8067.777372	90.79807	0.002312	0.005069	91.61383
Draglines	0	0	0	0	0	0
Front End Loaders	3564	29043.99854	326.873	0.008324	0.018249	329.8098
Bulldozers	2376	25816.88759	290.5538	0.007399	0.016221	293.1642
Sidebooms	0	0	0	0	0	0
Boring Machines	0	0	0	0	0	0
Directional Drill Units	0	0	0	0	0	0
Padding Machine	0	0	0	0	0	0
Bending Machine	0	0	0	0	0	0
Bending Mandrel	0	0	0	0	0	0
Paving Machine	0	0	0	0	0	0
Bobcats	1584	6023.940438	67.79589	0.001726	0.003785	68.40499
Road Sweepers	0	0	0	0	0	0
Farm Tractors	0	0	0	0	0	0
Log Skidder	0	0	0	0	0	0
Mulching Machine	0	0	0	0	0	0
Air Compressors	6336	27538.01343	309.9241	0.007892	0.017302	312.7085
Concrete Saws	0	0	0	0	0	0
Ditch Witches	0	0	0	0	0	0
Generators	4752	3872.533139	37.47888	0.000939	0.002134	37.81209
Power Washers	0	0	0	0	0	0
Water Pumps	792	430.2814599	4.16432	0.000104	0.000237	4.201344
Water Trucks	297	2823.72208	31.77932	0.000809	0.001774	32.06484
Welding Machines	792	2366.548029	22.90376	0.000574	0.001304	23.10739
Welding Trucks	0	0	0	0	0	0
Carry-All 4x4	0	0	0	0	0	0
total			2489.763	0.063376	0.13907	2512.126

**Table 9A-28
Rover Construction Activity Green House Gas Emissions -Compressor Stations**

Clarington Compressor Station						
Equipment type	total operational hours	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
1/2 Ton Trucks	0	0	0	0	0	0
1 Ton Trucks	0	0	0	0	0	0
2 1/2 Ton Trucks	0	0	0	0	0	0
Tractor Trailers	0	0	0	0	0	0
Dump Trucks	0	0	0	0	0	0
Concrete Trucks	0	0	0	0	0	0
Fuel Trucks	0	0	0	0	0	0
Backhoes	7128	116175.9942	1307.492	0.033296	0.072994	1319.239
Cranes	594	8067.777372	90.79807	0.002312	0.005069	91.61383
Draglines	0	0	0	0	0	0
Front End Loaders	3564	29043.99854	326.873	0.008324	0.018249	329.8098
Bulldozers	2376	25816.88759	290.5538	0.007399	0.016221	293.1642
Sidebooms	0	0	0	0	0	0
Boring Machines	0	0	0	0	0	0
Directional Drill Units	0	0	0	0	0	0
Padding Machine	0	0	0	0	0	0
Bending Machine	0	0	0	0	0	0
Bending Mandrel	0	0	0	0	0	0
Paving Machine	0	0	0	0	0	0
Bobcats	1584	6023.940438	67.79589	0.001726	0.003785	68.40499
Road Sweepers	0	0	0	0	0	0
Farm Tractors	0	0	0	0	0	0
Log Skidder	0	0	0	0	0	0
Mulching Machine	0	0	0	0	0	0
Air Compressors	6336	27538.01343	309.9241	0.007892	0.017302	312.7085
Concrete Saws	0	0	0	0	0	0
Ditch Witches	0	0	0	0	0	0
Generators	4752	3872.533139	37.47888	0.000939	0.002134	37.81209
Power Washers	0	0	0	0	0	0
Water Pumps	792	430.2814599	4.16432	0.000104	0.000237	4.201344
Water Trucks	297	2823.72208	31.77932	0.000809	0.001774	32.06484
Welding Machines	792	2366.548029	22.90376	0.000574	0.001304	23.10739
Welding Trucks	0	0	0	0	0	0
Carry-All 4x4	0	0	0	0	0	0
total			2489.763	0.063376	0.13907	2512.126

**Table 9A-28
Rover Construction Activity Green House Gas Emissions -Compressor Stations**

Majorsville Compressor Station						
Equipment type	total operational hours	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
1/2 Ton Trucks	0	0	0	0	0	0
1 Ton Trucks	0	0	0	0	0	0
2 1/2 Ton Trucks	0	0	0	0	0	0
Tractor Trailers	0	0	0	0	0	0
Dump Trucks	0	0	0	0	0	0
Concrete Trucks	0	0	0	0	0	0
Fuel Trucks	0	0	0	0	0	0
Backhoes	7128	116175.9942	1307.492	0.033296	0.072994	1319.239
Cranes	594	8067.777372	90.79807	0.002312	0.005069	91.61383
Draglines	0	0	0	0	0	0
Front End Loaders	3564	29043.99854	326.873	0.008324	0.018249	329.8098
Bulldozers	2376	25816.88759	290.5538	0.007399	0.016221	293.1642
Sidebooms	0	0	0	0	0	0
Boring Machines	0	0	0	0	0	0
Directional Drill Units	0	0	0	0	0	0
Padding Machine	0	0	0	0	0	0
Bending Machine	0	0	0	0	0	0
Bending Mandrel	0	0	0	0	0	0
Paving Machine	0	0	0	0	0	0
Bobcats	1584	6023.940438	67.79589	0.001726	0.003785	68.40499
Road Sweepers	0	0	0	0	0	0
Farm Tractors	0	0	0	0	0	0
Log Skidder	0	0	0	0	0	0
Mulching Machine	0	0	0	0	0	0
Air Compressors	6336	27538.01343	309.9241	0.007892	0.017302	312.7085
Concrete Saws	0	0	0	0	0	0
Ditch Witches	0	0	0	0	0	0
Generators	4752	3872.533139	37.47888	0.000939	0.002134	37.81209
Power Washers	0	0	0	0	0	0
Water Pumps	792	430.2814599	4.16432	0.000104	0.000237	4.201344
Water Trucks	297	2823.72208	31.77932	0.000809	0.001774	32.06484
Welding Machines	792	2366.548029	22.90376	0.000574	0.001304	23.10739
Welding Trucks	0	0	0	0	0	0
Carry-All 4x4	0	0	0	0	0	0
total			2489.763	0.063376	0.13907	2512.126

**Table 9A-28
Rover Construction Activity Green House Gas Emissions -Compressor Stations**

Cadiz Compressor Station						
Equipment type	total operational hours	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
1/2 Ton Trucks	0	0	0	0	0	0
1 Ton Trucks	0	0	0	0	0	0
2 1/2 Ton Trucks	0	0	0	0	0	0
Tractor Trailers	0	0	0	0	0	0
Dump Trucks	0	0	0	0	0	0
Concrete Trucks	0	0	0	0	0	0
Fuel Trucks	0	0	0	0	0	0
Backhoes	7128	116175.9942	1307.492	0.033296	0.072994	1319.239
Cranes	594	8067.777372	90.79807	0.002312	0.005069	91.61383
Draglines	0	0	0	0	0	0
Front End Loaders	3564	29043.99854	326.873	0.008324	0.018249	329.8098
Bulldozers	2376	25816.88759	290.5538	0.007399	0.016221	293.1642
Sidebooms	0	0	0	0	0	0
Boring Machines	0	0	0	0	0	0
Directional Drill Units	0	0	0	0	0	0
Padding Machine	0	0	0	0	0	0
Bending Machine	0	0	0	0	0	0
Bending Mandrel	0	0	0	0	0	0
Paving Machine	0	0	0	0	0	0
Bobcats	1584	6023.940438	67.79589	0.001726	0.003785	68.40499
Road Sweepers	0	0	0	0	0	0
Farm Tractors	0	0	0	0	0	0
Log Skidder	0	0	0	0	0	0
Mulching Machine	0	0	0	0	0	0
Air Compressors	6336	27538.01343	309.9241	0.007892	0.017302	312.7085
Concrete Saws	0	0	0	0	0	0
Ditch Witches	0	0	0	0	0	0
Generators	4752	3872.533139	37.47888	0.000939	0.002134	37.81209
Power Washers	0	0	0	0	0	0
Water Pumps	792	430.2814599	4.16432	0.000104	0.000237	4.201344
Water Trucks	297	2823.72208	31.77932	0.000809	0.001774	32.06484
Welding Machines	792	2366.548029	22.90376	0.000574	0.001304	23.10739
Welding Trucks	0	0	0	0	0	0
Carry-All 4x4	0	0	0	0	0	0
total			2489.763	0.063376	0.13907	2512.126

**Table 9A-28
Rover Construction Activity Green House Gas Emissions -Compressor Stations**

Burgettstown Compressor Station						
Equipment type	total operational hours	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
1/2 Ton Trucks	0	0	0	0	0	0
1 Ton Trucks	0	0	0	0	0	0
2 1/2 Ton Trucks	0	0	0	0	0	0
Tractor Trailers	0	0	0	0	0	0
Dump Trucks	0	0	0	0	0	0
Concrete Trucks	0	0	0	0	0	0
Fuel Trucks	0	0	0	0	0	0
Backhoes	7128	116175.9942	1307.492	0.033296	0.072994	1319.239
Cranes	594	8067.777372	90.79807	0.002312	0.005069	91.61383
Draglines	0	0	0	0	0	0
Front End Loaders	3564	29043.99854	326.873	0.008324	0.018249	329.8098
Bulldozers	2376	25816.88759	290.5538	0.007399	0.016221	293.1642
Sidebooms	0	0	0	0	0	0
Boring Machines	0	0	0	0	0	0
Directional Drill Units	0	0	0	0	0	0
Padding Machine	0	0	0	0	0	0
Bending Machine	0	0	0	0	0	0
Bending Mandrel	0	0	0	0	0	0
Paving Machine	0	0	0	0	0	0
Bobcats	1584	6023.940438	67.79589	0.001726	0.003785	68.40499
Road Sweepers	0	0	0	0	0	0
Farm Tractors	0	0	0	0	0	0
Log Skidder	0	0	0	0	0	0
Mulching Machine	0	0	0	0	0	0
Air Compressors	6336	27538.01343	309.9241	0.007892	0.017302	312.7085
Concrete Saws	0	0	0	0	0	0
Ditch Witches	0	0	0	0	0	0
Generators	4752	3872.533139	37.47888	0.000939	0.002134	37.81209
Power Washers	0	0	0	0	0	0
Water Pumps	792	430.2814599	4.16432	0.000104	0.000237	4.201344
Water Trucks	297	2823.72208	31.77932	0.000809	0.001774	32.06484
Welding Machines	792	2366.548029	22.90376	0.000574	0.001304	23.10739
Welding Trucks	0	0	0	0	0	0
Carry-All 4x4	0	0	0	0	0	0
total			2489.763	0.063376	0.13907	2512.126

**Table 9A-29
Rover On-Road Commuter and Truck Tailpipe Emissions**

Project Components	Project Duration (days)
Spread 1 & 2 Mainline A & B Pipeline	93.4
Spread 3 Mainline A & B Pipeline	62
Spread 4 Mainline A & B Pipeline	84.5
Spread 5 & 6 Mainline A & B Pipeline - precision	130
Spread 7 & 8 Market Segment Pipeline	83
Majorsville Lateral	34
Clarrington & Cadiz Lateral	50
Berne Lateral	5
Sherwood & CGT Lateral	82
Burgettstown Lateral	60.2
Seneca Latera	30.1
Mainline CS 1 Compressor Station	264
Mainline CS 2 Compressor Station	264
Mainline CS 3 Compressor Station	264
Defiance Compressor Station	264
Stand-Alone Metering Stations	238
Sherwood Compressor Station	238
Seneca Compressor Station	238
Clarrington Compressor Station	238
Majorsville Compressor Station	238
Cadiz Compressor Station	238
Burgettstown Compressor Station	238

Project Component	# of commuters ²	round trip (mi)	Miles per day	Emission Factors (g/mile) ¹						Emissions (tpy)					
				NOx	CO	VOC	SOx	PM10	PM2.5	NOx	CO	VOC	SOx	PM10	PM2.5
Spread 1 & 2 Mainline A & B Pipeline	600	30	18000	0.824	16.95	1.599	0.0088	0.135	0.1215	1.527016	31.41131	2.963226	0.016308	0.250179	0.225161
Spread 3 Mainline A & B Pipeline	924	20	18480	0.824	16.95	1.599	0.0088	0.135	0.1215	1.040681	21.40722	2.019478	0.011114	0.1705	0.15345
Spread 4 Mainline A & B Pipeline	800	40	32000	0.824	16.95	1.599	0.0088	0.135	0.1215	2.456014	50.52116	4.765979	0.026229	0.402381	0.362143
Spread 5 & 6 Mainline A & B Pipeline	600	40	24000	0.824	16.95	1.599	0.0088	0.135	0.1215	2.833862	58.29365	5.499206	0.030265	0.464286	0.417857
Spread 7 & 8 Market Segment Pipeline	600	40	24000	0.824	16.95	1.599	0.0088	0.135	0.1215	1.809312	37.21825	3.511032	0.019323	0.296429	0.266786
Majorsville Lateral	600	40	24000	0.824	16.95	1.599	0.0088	0.135	0.1215	0.741164	15.24603	1.438254	0.007915	0.121429	0.109286
Clarrington Lateral	824	12	9888	0.824	16.95	1.599	0.0088	0.135	0.1215	0.449058	9.237302	0.871413	0.004796	0.073571	0.066214
Berne Lateral	600	40	24000	0.824	16.95	1.599	0.0088	0.135	0.1215	0.108995	2.242063	0.211508	0.001164	0.017857	0.016071
Sherwood & CGT Lateral	600	40	24000	0.824	16.95	1.599	0.0088	0.135	0.1215	1.787513	36.76984	3.46873	0.01909	0.292857	0.263571
Burgettstown Lateral	600	40	24000	0.824	16.95	1.599	0.0088	0.135	0.1215	1.312296	26.99444	2.546556	0.014015	0.215	0.1935
Seneca Lateral	543	100	54300	0.824	16.95	1.599	0.0088	0.135	0.1215	1.484535	30.53747	2.880791	0.015854	0.243219	0.218897
Mainline CS 1 Compressor Station	56	55	3080	0.824	16.95	1.599	0.0088	0.135	0.1215	0.738548	15.19222	1.433178	0.007887	0.121	0.1089
Mainline CS 2 Compressor Station	56	55	3080	0.824	16.95	1.599	0.0088	0.135	0.1215	0.738548	15.19222	1.433178	0.007887	0.121	0.1089
Mainline CS 3 Compressor Station	56	55	3080	0.824	16.95	1.599	0.0088	0.135	0.1215	0.738548	15.19222	1.433178	0.007887	0.121	0.1089
Defiance Compressor Station	56	55	3080	0.824	16.95	1.599	0.0088	0.135	0.1215	0.738548	15.19222	1.433178	0.007887	0.121	0.1089
Stand-Alone Metering Stations	36	55	1980	0.824	16.95	1.599	0.0088	0.135	0.1215	0.427303	8.789786	0.829196	0.004563	0.070007	0.063006
Sherwood Compressor Station	36	55	1980	0.824	16.95	1.599	0.0088	0.135	0.1215	0.427303	8.789786	0.829196	0.004563	0.070007	0.063006
Seneca Compressor Station	36	55	1980	0.824	16.95	1.599	0.0088	0.135	0.1215	0.427303	8.789786	0.829196	0.004563	0.070007	0.063006
Clarrington Compressor Station	36	55	1980	0.824	16.95	1.599	0.0088	0.135	0.1215	0.427303	8.789786	0.829196	0.004563	0.070007	0.063006
Majorsville Compressor Station	36	55	1980	0.824	16.95	1.599	0.0088	0.135	0.1215	0.427303	8.789786	0.829196	0.004563	0.070007	0.063006
Cadiz Compressor Station	36	55	1980	0.824	16.95	1.599	0.0088	0.135	0.1215	0.427303	8.789786	0.829196	0.004563	0.070007	0.063006
Burgettstown Compressor Station	36	55	1980	0.824	16.95	1.599	0.0088	0.135	0.1215	0.427303	8.789786	0.829196	0.004563	0.070007	0.063006

¹ Source of Emission Factors - U.S. EPA MOBILE6.2. Summer 2008 LGT12 emission factors used for project component emissions.

² Assumes 20% of workforce carpools.

Equipment	fuel	Quantity	Average Distance Traveled by Truck per Hour of Use (mi)	Relative use (%)	hours of use per engine	hours of use per category	Emission Factors (g/mi) ¹						Emissions (tons per year)															
							NOx	CO	VOC	SO2	PM10	PM2.5	NOx	CO	VOC	SO2	PM10	PM2.5										
Spread 1 & 2 - Mainline A & B																												
1/2 Ton Trucks	Gasoline	10	30	75%	700.5	7005	1.21	23.49	2.77	0.01	0.1368	0.1232	0.279829	5.441384	0.642125	0.002640774	0.031689	0.028539										
1 Ton Trucks	Gasoline	30	25	75%	700.5	21015	1.21	23.49	2.77	0.01	0.1368	0.1232	0.699573	13.60346	1.605313	0.006601935	0.079223	0.071347										
2 1/2 Ton Trucks	Diesel	10	20	75%	700.5	7005	6.783	1.736	0.379	0.0378	0.3053	0.2626	1.047507	0.268093	0.058529	0.0058375	0.047148	0.040554										
Tractor Trailers	Diesel	20	15	50%	467	9340	6.783	1.736	0.379	0.0378	0.3053	0.2626	1.047507	0.268093	0.058529	0.0058375	0.047148	0.040554										
Dump Trucks	Diesel	10	15	100%	934	9340	6.783	1.736	0.379	0.0378	0.3053	0.2626	1.047507	0.268093	0.058529	0.0058375	0.047148	0.040554										
Total													4.121924	19.84912	2.423026	0.026755208	0.252356	0.221547										

**Table 9A-29
Rover On-Road Commuter and Truck Tailpipe Emissions**

Spread 3 - Mainline A & B																		
1/2 Ton Trucks	Gasoline	10	30	75%	465	4650	1.21	23.49	2.77	0.01	0.1368	0.1232	0.185754	3.612054	0.42625	0.001752976	0.021036	0.018944
1 Ton Trucks	Gasoline	30	25	75%	465	13950	1.21	23.49	2.77	0.01	0.1368	0.1232	0.464385	9.030134	1.065625	0.00438244	0.052589	0.047361
2 1/2 Ton Trucks	Diesel	10	20	75%	465	4650	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.695347	0.177963	0.038853	0.003875	0.031297	0.02692
Tractor Trailers	Diesel	20	15	50%	310	6200	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.695347	0.177963	0.038853	0.003875	0.031297	0.02692
Dump Trucks	Diesel	10	15	100%	620	6200	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.695347	0.177963	0.038853	0.003875	0.031297	0.02692
Total													2.736181	13.17608	1.608433	0.017760417	0.167517	0.147065
Spread 4 - Mainline A & B																		
1/2 Ton Trucks	Gasoline	10	30	75%	633.75	6337.5	1.21	23.49	2.77	0.01	0.1368	0.1232	0.253165	4.922879	0.580938	0.002389137	0.02867	0.025819
1 Ton Trucks	Gasoline	30	25	75%	633.75	19012.5	1.21	23.49	2.77	0.01	0.1368	0.1232	0.632912	12.3072	1.452344	0.005972842	0.071674	0.064549
2 1/2 Ton Trucks	Diesel	10	20	75%	633.75	6337.5	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.947691	0.242546	0.052952	0.00528125	0.042655	0.036689
Tractor Trailers	Diesel	20	15	50%	422.5	8450	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.947691	0.242546	0.052952	0.00528125	0.042655	0.036689
Dump Trucks	Diesel	10	15	100%	845	8450	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.947691	0.242546	0.052952	0.00528125	0.042655	0.036689
Total													3.729149	17.95772	2.192138	0.024205729	0.228309	0.200436
Spread 5 & 6 - Mainline A & B																		
1/2 Ton Trucks	Gasoline	10	30	75%	975	9750	1.21	23.49	2.77	0.01	0.1368	0.1232	0.389484	7.573661	0.89375	0.003675595	0.044107	0.039722
1 Ton Trucks	Gasoline	30	25	75%	975	29250	1.21	23.49	2.77	0.01	0.1368	0.1232	0.97371	18.93415	2.234375	0.009188988	0.110268	0.099306
2 1/2 Ton Trucks	Diesel	10	20	75%	975	9750	6.783	1.736	0.379	0.0378	0.3053	0.2626	1.457986	0.373148	0.081465	0.008125	0.065623	0.056445
Tractor Trailers	Diesel	20	15	50%	650	13000	6.783	1.736	0.379	0.0378	0.3053	0.2626	1.457986	0.373148	0.081465	0.008125	0.065623	0.056445
Dump Trucks	Diesel	10	15	100%	1300	13000	6.783	1.736	0.379	0.0378	0.3053	0.2626	1.457986	0.373148	0.081465	0.008125	0.065623	0.056445
Total													5.737153	27.62726	3.37252	0.037239583	0.351245	0.308363
Spread 7 & 8 - Market Segment Pipeline																		
1/2 Ton Trucks	Gasoline	10	30	75%	622.5	6225	1.21	23.49	2.77	0.01	0.1368	0.1232	0.248671	4.835491	0.570625	0.002346726	0.028161	0.025361
1 Ton Trucks	Gasoline	30	25	75%	622.5	18675	1.21	23.49	2.77	0.01	0.1368	0.1232	0.621677	12.08873	1.426563	0.005866815	0.070402	0.063403
2 1/2 Ton Trucks	Diesel	10	20	75%	622.5	6225	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.930868	0.238241	0.052012	0.0051875	0.041898	0.036038
Tractor Trailers	Diesel	20	15	50%	415	8300	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.930868	0.238241	0.052012	0.0051875	0.041898	0.036038
Dump Trucks	Diesel	10	15	100%	830	8300	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.930868	0.238241	0.052012	0.0051875	0.041898	0.036038
Total													3.662951	17.63894	2.153224	0.023776042	0.224256	0.196878
Majorsville Lateral																		
1/2 Ton Trucks	Gasoline	10	30	75%	255	2550	1.21	23.49	2.77	0.01	0.1368	0.1232	0.101865	1.980804	0.23375	0.00096131	0.011536	0.010389
1 Ton Trucks	Gasoline	30	25	75%	255	7650	1.21	23.49	2.77	0.01	0.1368	0.1232	0.254663	4.952009	0.584375	0.002403274	0.028839	0.025972
2 1/2 Ton Trucks	Diesel	10	20	75%	255	2550	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.381319	0.097593	0.021306	0.002125	0.017163	0.014763
Tractor Trailers	Diesel	20	15	50%	170	3400	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.381319	0.097593	0.021306	0.002125	0.017163	0.014763
Dump Trucks	Diesel	10	15	100%	340	3400	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.381319	0.097593	0.021306	0.002125	0.017163	0.014763
Total													1.500486	7.22559	0.882044	0.009739583	0.091864	0.080649
Clarrington Lateral																		
1/2 Ton Trucks	Gasoline	10	30	75%	375	3750	1.21	23.49	2.77	0.01	0.1368	0.1232	0.149802	2.912946	0.34375	0.00141369	0.016964	0.015278
1 Ton Trucks	Gasoline	30	25	75%	375	11250	1.21	23.49	2.77	0.01	0.1368	0.1232	0.374504	7.282366	0.859375	0.003534226	0.042411	0.038194
2 1/2 Ton Trucks	Diesel	10	20	75%	375	3750	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.560764	0.143519	0.031333	0.003125	0.02524	0.02171
Tractor Trailers	Diesel	20	15	50%	250	5000	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.560764	0.143519	0.031333	0.003125	0.02524	0.02171
Dump Trucks	Diesel	10	15	100%	500	5000	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.560764	0.143519	0.031333	0.003125	0.02524	0.02171
Total													2.206597	10.62587	1.297123	0.014322917	0.135094	0.118601

**Table 9A-29
Rover On-Road Commuter and Truck Tailpipe Emissions**

Berne Lateral																		
1/2 Ton Trucks	Gasoline	10	30	75%	37.5	375	1.21	23.49	2.77	0.01	0.1368	0.1232	0.01498	0.291295	0.034375	0.000141369	0.001696	0.001528
1 Ton Trucks	Gasoline	30	25	75%	37.5	1125	1.21	23.49	2.77	0.01	0.1368	0.1232	0.03745	0.728237	0.085938	0.000353423	0.004241	0.003819
2 1/2 Ton Trucks	Diesel	10	20	75%	37.5	375	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.056076	0.014352	0.003133	0.0003125	0.002524	0.002171
Tractor Trailers	Diesel	20	15	50%	25	500	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.056076	0.014352	0.003133	0.0003125	0.002524	0.002171
Dump Trucks	Diesel	10	15	100%	50	500	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.056076	0.014352	0.003133	0.0003125	0.002524	0.002171
Total													0.22066	1.062587	0.129712	0.001432292	0.013509	0.01186
Sherwood & CGT Lateral																		
1/2 Ton Trucks	Gasoline	10	30	75%	615	6150	1.21	23.49	2.77	0.01	0.1368	0.1232	0.245675	4.777232	0.56375	0.002318452	0.027821	0.025056
1 Ton Trucks	Gasoline	30	25	75%	615	18450	1.21	23.49	2.77	0.01	0.1368	0.1232	0.614187	11.94308	1.409375	0.005796131	0.069554	0.062639
2 1/2 Ton Trucks	Diesel	10	20	75%	615	6150	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.919653	0.23537	0.051386	0.005125	0.041393	0.035604
Tractor Trailers	Diesel	20	15	50%	410	8200	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.919653	0.23537	0.051386	0.005125	0.041393	0.035604
Dump Trucks	Diesel	10	15	100%	820	8200	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.919653	0.23537	0.051386	0.005125	0.041393	0.035604
Total													3.618819	17.42642	2.127282	0.023489583	0.221555	0.194506
Burgettstown Lateral																		
1/2 Ton Trucks	Gasoline	10	30	75%	451.5	4515	1.21	23.49	2.77	0.01	0.1368	0.1232	0.180361	3.507188	0.413875	0.001702083	0.020425	0.018394
1 Ton Trucks	Gasoline	30	25	75%	451.5	13545	1.21	23.49	2.77	0.01	0.1368	0.1232	0.450903	8.767969	1.034688	0.004255208	0.051063	0.045986
2 1/2 Ton Trucks	Diesel	10	20	75%	451.5	4515	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.67516	0.172796	0.037725	0.0037625	0.030389	0.026138
Tractor Trailers	Diesel	20	15	50%	301	6020	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.67516	0.172796	0.037725	0.0037625	0.030389	0.026138
Dump Trucks	Diesel	10	15	100%	602	6020	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.67516	0.172796	0.037725	0.0037625	0.030389	0.026138
Total													2.656743	12.79355	1.561736	0.017244792	0.162653	0.142796
Seneca Lateral																		
1/2 Ton Trucks	Gasoline	10	30	75%	225.75	2257.5	1.21	23.49	2.77	0.01	0.1368	0.1232	0.090181	1.753594	0.206938	0.000851042	0.010213	0.009197
1 Ton Trucks	Gasoline	30	25	75%	225.75	6772.5	1.21	23.49	2.77	0.01	0.1368	0.1232	0.225451	4.383984	0.517344	0.002127604	0.025531	0.022993
2 1/2 Ton Trucks	Diesel	10	20	75%	225.75	2257.5	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.33758	0.086398	0.018862	0.00188125	0.015194	0.013069
Tractor Trailers	Diesel	20	15	50%	150.5	3010	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.33758	0.086398	0.018862	0.00188125	0.015194	0.013069
Dump Trucks	Diesel	10	15	100%	301	3010	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.33758	0.086398	0.018862	0.00188125	0.015194	0.013069
Total													1.328372	6.396773	0.780868	0.008622396	0.081327	0.071398
Mainline CS 1 Compressor Station																		
1/2 Ton Trucks	Gasoline	3	30	75%	1980	5940	1.21	23.49	2.77	0.01	0.1368	0.1232	0.237286	4.614107	0.5445	0.002239286	0.026871	0.0242
1 Ton Trucks	Gasoline	10	25	75%	1980	19800	1.21	23.49	2.77	0.01	0.1368	0.1232	0.659127	12.81696	1.5125	0.006220238	0.074643	0.067222
2 1/2 Ton Trucks	Diesel	3	20	75%	1980	5940	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.88825	0.227333	0.049631	0.00495	0.03998	0.034388
Tractor Trailers	Diesel	5	15	50%	1320	6600	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.740208	0.189444	0.041359	0.004125	0.033316	0.028657
Dump Trucks	Diesel	3	15	75%	1980	5940	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.666188	0.1705	0.037223	0.0037125	0.029985	0.025791
Concrete Trucks	Diesel	2	15	50%	1320	2640	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.296083	0.075778	0.016544	0.00165	0.013327	0.011463
Total													3.487142	18.09413	2.201757	0.022897024	0.218122	0.191721
Mainline CS 2 Compressor Station																		
1/2 Ton Trucks	Gasoline	3	30	75%	1980	5940	1.21	23.49	2.77	0.01	0.1368	0.1232	0.237286	4.614107	0.5445	0.002239286	0.026871	0.0242
1 Ton Trucks	Gasoline	10	25	75%	1980	19800	1.21	23.49	2.77	0.01	0.1368	0.1232	0.659127	12.81696	1.5125	0.006220238	0.074643	0.067222
2 1/2 Ton Trucks	Diesel	3	20	75%	1980	5940	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.88825	0.227333	0.049631	0.00495	0.03998	0.034388
Tractor Trailers	Diesel	5	15	50%	1320	6600	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.740208	0.189444	0.041359	0.004125	0.033316	0.028657
Dump Trucks	Diesel	3	15	75%	1980	5940	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.666188	0.1705	0.037223	0.0037125	0.029985	0.025791
Concrete Trucks	Diesel	2	15	50%	1320	2640	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.296083	0.075778	0.016544	0.00165	0.013327	0.011463
Total													3.487142	18.09413	2.201757	0.022897024	0.218122	0.191721
Mainline CS 3 Compressor Station																		
1/2 Ton Trucks	Gasoline	3	30	75%	1980	5940	1.21	23.49	2.77	0.01	0.1368	0.1232	0.237286	4.614107	0.5445	0.002239286	0.026871	0.0242
1 Ton Trucks	Gasoline	10	25	75%	1980	19800	1.21	23.49	2.77	0.01	0.1368	0.1232	0.659127	12.81696	1.5125	0.006220238	0.074643	0.067222
2 1/2 Ton Trucks	Diesel	3	20	75%	1980	5940	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.88825	0.227333	0.049631	0.00495	0.03998	0.034388
Tractor Trailers	Diesel	5	15	50%	1320	6600	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.740208	0.189444	0.041359	0.004125	0.033316	0.028657
Dump Trucks	Diesel	3	15	75%	1980	5940	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.666188	0.1705	0.037223	0.0037125	0.029985	0.025791

**Table 9A-29
Rover On-Road Commuter and Truck Tailpipe Emissions**

Concrete Trucks	Diesel	2	15	50%	1320	2640	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.296083	0.075778	0.016544	0.00165	0.013327	0.011463	
Total													3.487142	18.09413	2.201757	0.022897024	0.218122	0.191721	
Defiance Compressor Station																			
1/2 Ton Trucks	Gasoline	3	30	75%	1980	5940	1.21	23.49	2.77	0.01	0.1368	0.1232	0.237286	4.614107	0.5445	0.002239286	0.026871	0.0242	
1 Ton Trucks	Gasoline	10	25	75%	1980	19800	1.21	23.49	2.77	0.01	0.1368	0.1232	0.659127	12.81696	1.5125	0.006220238	0.074643	0.067222	
2 1/2 Ton Trucks	Diesel	3	20	75%	1980	5940	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.88825	0.227333	0.049631	0.00495	0.03998	0.034388	
Tractor Trailers	Diesel	5	15	50%	1320	6600	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.740208	0.189444	0.041359	0.004125	0.033316	0.028657	
Dump Trucks	Diesel	3	15	75%	1980	5940	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.666188	0.1705	0.037223	0.0037125	0.029985	0.025791	
Concrete Trucks	Diesel	2	15	50%	1320	2640	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.296083	0.075778	0.016544	0.00165	0.013327	0.011463	
Total													3.487142	18.09413	2.201757	0.022897024	0.218122	0.191721	
Stand-Alone Metering Stations																			
1/2 Ton Trucks	Gasoline	2	30	75%	1782	3564	1.21	23.49	2.77	0.01	0.1368	0.1232	0.142371	2.768464	0.3267	0.001343571	0.016123	0.01452	
1 Ton Trucks	Gasoline	4	25	75%	1782	7128	1.21	23.49	2.77	0.01	0.1368	0.1232	0.237286	4.614107	0.5445	0.002239286	0.026871	0.0242	
2 1/2 Ton Trucks	Diesel	2	20	75%	1782	3564	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.53295	0.1364	0.029779	0.00297	0.023988	0.020633	
Tractor Trailers	Diesel	1	15	50%	1188	1188	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.133238	0.0341	0.007445	0.0007425	0.005997	0.005158	
Dump Trucks	Diesel	2	15	75%	1782	3564	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.399713	0.1023	0.022334	0.0022275	0.017991	0.015475	
Concrete Trucks	Diesel	1	15	50%	1188	1188	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.133238	0.0341	0.007445	0.0007425	0.005997	0.005158	
Total													1.578795	7.689471	0.938202	0.010265357	0.096967	0.085144	
Sherwood Compressor Station																			
1/2 Ton Trucks	Gasoline	2	30	75%	1782	3564	1.21	23.49	2.77	0.01	0.1368	0.1232	0.142371	2.768464	0.3267	0.001343571	0.016123	0.01452	
1 Ton Trucks	Gasoline	6	25	75%	1782	10692	1.21	23.49	2.77	0.01	0.1368	0.1232	0.355929	6.921161	0.81675	0.003358929	0.040307	0.0363	
2 1/2 Ton Trucks	Diesel	2	20	75%	1782	3564	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.53295	0.1364	0.029779	0.00297	0.023988	0.020633	
Tractor Trailers	Diesel	3	15	50%	1188	3564	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.399713	0.1023	0.022334	0.0022275	0.017991	0.015475	
Dump Trucks	Diesel	2	15	75%	1782	3564	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.399713	0.1023	0.022334	0.0022275	0.017991	0.015475	
Concrete Trucks	Diesel	2	15	50%	1188	2376	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.266475	0.0682	0.014889	0.001485	0.011994	0.010316	
Total													2.09715	10.09883	1.232786	0.0136125	0.128394	0.112719	
Seneca Compressor Station																			
1/2 Ton Trucks	Gasoline	2	30	75%	1782	3564	1.21	23.49	2.77	0.01	0.1368	0.1232	0.142371	2.768464	0.3267	0.001343571	0.016123	0.01452	
1 Ton Trucks	Gasoline	6	25	75%	1782	10692	1.21	23.49	2.77	0.01	0.1368	0.1232	0.355929	6.921161	0.81675	0.003358929	0.040307	0.0363	
2 1/2 Ton Trucks	Diesel	2	20	75%	1782	3564	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.53295	0.1364	0.029779	0.00297	0.023988	0.020633	
Tractor Trailers	Diesel	3	15	50%	1188	3564	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.399713	0.1023	0.022334	0.0022275	0.017991	0.015475	
Dump Trucks	Diesel	2	15	75%	1782	3564	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.399713	0.1023	0.022334	0.0022275	0.017991	0.015475	
Concrete Trucks	Diesel	2	15	50%	1188	2376	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.266475	0.0682	0.014889	0.001485	0.011994	0.010316	
Total													2.09715	10.09883	1.232786	0.0136125	0.128394	0.112719	

**Table 9A-29
Rover On-Road Commuter and Truck Tailpipe Emissions**

Clarington Compressor Station																			
1/2 Ton Trucks	Gasoline	2	30	75%	1782	3564	1.21	23.49	2.77	0.01	0.1368	0.1232	0.142371	2.768464	0.3267	0.001343571	0.016123	0.01452	
1 Ton Trucks	Gasoline	6	25	75%	1782	10692	1.21	23.49	2.77	0.01	0.1368	0.1232	0.355929	6.921161	0.81675	0.003358929	0.040307	0.0363	
2 1/2 Ton Trucks	Diesel	2	20	75%	1782	3564	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.53295	0.1364	0.029779	0.00297	0.023988	0.020633	
Tractor Trailers	Diesel	3	15	50%	1188	3564	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.399713	0.1023	0.022334	0.0022275	0.017991	0.015475	
Dump Trucks	Diesel	2	15	75%	1782	3564	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.399713	0.1023	0.022334	0.0022275	0.017991	0.015475	
Concrete Trucks	Diesel	2	15	50%	1188	2376	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.266475	0.0682	0.014889	0.001485	0.011994	0.010316	
Total														2.09715	10.09883	1.232786	0.0136125	0.128394	0.112719
Majorsville Compressor Station																			
1/2 Ton Trucks	Gasoline	2	30	75%	1782	3564	1.21	23.49	2.77	0.01	0.1368	0.1232	0.142371	2.768464	0.3267	0.001343571	0.016123	0.01452	
1 Ton Trucks	Gasoline	6	25	75%	1782	10692	1.21	23.49	2.77	0.01	0.1368	0.1232	0.355929	6.921161	0.81675	0.003358929	0.040307	0.0363	
2 1/2 Ton Trucks	Diesel	2	20	75%	1782	3564	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.53295	0.1364	0.029779	0.00297	0.023988	0.020633	
Tractor Trailers	Diesel	3	15	50%	1188	3564	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.399713	0.1023	0.022334	0.0022275	0.017991	0.015475	
Dump Trucks	Diesel	2	15	75%	1782	3564	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.399713	0.1023	0.022334	0.0022275	0.017991	0.015475	
Concrete Trucks	Diesel	2	15	50%	1188	2376	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.266475	0.0682	0.014889	0.001485	0.011994	0.010316	
Total														2.09715	10.09883	1.232786	0.0136125	0.128394	0.112719
Cadiz Compressor Station																			
1/2 Ton Trucks	Gasoline	2	30	75%	1782	3564	1.21	23.49	2.77	0.01	0.1368	0.1232	0.142371	2.768464	0.3267	0.001343571	0.016123	0.01452	
1 Ton Trucks	Gasoline	6	25	75%	1782	10692	1.21	23.49	2.77	0.01	0.1368	0.1232	0.355929	6.921161	0.81675	0.003358929	0.040307	0.0363	
2 1/2 Ton Trucks	Diesel	2	20	75%	1782	3564	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.53295	0.1364	0.029779	0.00297	0.023988	0.020633	
Tractor Trailers	Diesel	3	15	50%	1188	3564	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.399713	0.1023	0.022334	0.0022275	0.017991	0.015475	
Dump Trucks	Diesel	2	15	75%	1782	3564	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.399713	0.1023	0.022334	0.0022275	0.017991	0.015475	
Concrete Trucks	Diesel	2	15	50%	1188	2376	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.266475	0.0682	0.014889	0.001485	0.011994	0.010316	
Total														2.09715	10.09883	1.232786	0.0136125	0.128394	0.112719
Burgettstown Compressor Station																			
1/2 Ton Trucks	Gasoline	2	30	75%	1782	3564	1.21	23.49	2.77	0.01	0.1368	0.1232	0.142371	2.768464	0.3267	0.001343571	0.016123	0.01452	
1 Ton Trucks	Gasoline	6	25	75%	1782	10692	1.21	23.49	2.77	0.01	0.1368	0.1232	0.355929	6.921161	0.81675	0.003358929	0.040307	0.0363	
2 1/2 Ton Trucks	Diesel	2	20	75%	1782	3564	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.53295	0.1364	0.029779	0.00297	0.023988	0.020633	
Tractor Trailers	Diesel	3	15	50%	1188	3564	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.399713	0.1023	0.022334	0.0022275	0.017991	0.015475	
Dump Trucks	Diesel	2	15	75%	1782	3564	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.399713	0.1023	0.022334	0.0022275	0.017991	0.015475	
Concrete Trucks	Diesel	2	15	50%	1188	2376	6.783	1.736	0.379	0.0378	0.3053	0.2626	0.266475	0.0682	0.014889	0.001485	0.011994	0.010316	
Total														2.09715	10.09883	1.232786	0.0136125	0.128394	0.112719

**Table 9A-30
Rover On-Road Construction Activity Green House Gas Emissions**

Equipment Type	Fuel	Average MPG ¹	Emission Factors ²		
			CO ₂ (g/gal)	N ₂ O (g/VMT)	CH ₄ (g/VMT)
Commuter Vehicles	Gasoline	20	8780	0.0036	0.0173
1/2 Ton Trucks	Gasoline	8	8780	0.0134	0.0333
1 Ton Trucks	Gasoline	8	8780	0.0134	0.0333
2 1/2 Ton Trucks	Diesel	6	10210	0.0078	0.0048
Tractor Trailers	Diesel	6	10210	0.0078	0.0048
Dump Trucks	Diesel	6	10210	0.0078	0.0048
Concrete Trucks	Diesel	6	10210	0.0078	0.0048

¹ Average MPG estimated
² Source of emission factors - EPA (2014) Inventory of US Greenhouse Gas Emissions and Sinks
³ Emissions Equation (CO₂) = EF g/gal * Gallons of fuel total / 453. g/lb / 2000lb/ton Emission Equation (N₂O & CH₄) = EFg/gal * VMT / 453.6g/lb / 2000lb/ton
⁴ CO₂e based on global warming potential of CO₂=1, N₂O=298, CH₄=25

Spread 1 & 2 Mainline A & B Pipeline

Vehicle	VMT	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Commuter Vehicle	1681200	84060	813.54365	0.0066714	0.0320599	816.3332345
1/2 Ton Trucks	210150	26268.75	254.23239	0.0031041	0.0077138	255.350249
1 Ton Trucks	525375	65671.875	635.58098	0.0077602	0.0192846	638.3756224
2 1/2 Ton Trucks	140100	23350	262.79045	0.0012046	0.0007413	263.1679458
Tractor Trailers	140100	23350	262.79045	0.0012046	0.0007413	263.1679458
Dump Trucks	140100	23350	262.79045	0.0012046	0.0007413	263.1679458
total			2491.728	0.021149	0.061282	2499.562943

Spread 3 Mainline A & B Pipeline

Vehicle	VMT	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Commuter Vehicle	1145760	57288	554.44074	0.0045467	0.0218493	556.3418789
1/2 Ton Trucks	139500	17437.5	168.7624	0.0020605	0.0051205	169.5044479
1 Ton Trucks	348750	43593.75	421.906	0.0051513	0.0128013	423.7611198
2 1/2 Ton Trucks	93000	15500	174.44334	0.0007996	0.0004921	174.6939255
Tractor Trailers	93000	15500	174.44334	0.0007996	0.0004921	174.6939255
Dump Trucks	93000	15500	174.44334	0.0007996	0.0004921	174.6939255
total			1668.439	0.014157	0.041247	1673.689223

Spread 4 Mainline A & B Pipeline

Vehicle	VMT	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Commuter Vehicle	2704000	135200	1308.4832	0.0107302	0.0515644	1312.969942
1/2 Ton Trucks	190125	23765.625	230.00682	0.0028083	0.0069788	231.0181589
1 Ton Trucks	475312.5	59414.0625	575.01705	0.0070207	0.017447	577.5453971
2 1/2 Ton Trucks	126750	21125	237.74939	0.0010898	0.0006706	238.0909146
Tractor Trailers	126750	21125	237.74939	0.0010898	0.0006706	238.0909146
Dump Trucks	126750	21125	237.74939	0.0010898	0.0006706	238.0909146
total			2826.755	0.023828	0.078002	2835.806242

Spread 5 & 6 Mainline A & B Pipeline

Vehicle	VMT	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Commuter Vehicle	3120000	156000	1509.7884	0.012381	0.0594974	1514.965317
1/2 Ton Trucks	292500	36562.5	353.85665	0.0043204	0.0107366	355.4125521
1 Ton Trucks	731250	91406.25	884.64162	0.0108011	0.0268415	888.5313802
2 1/2 Ton Trucks	195000	32500	365.7683	0.0016766	0.0010317	366.2937147
Tractor Trailers	195000	32500	365.7683	0.0016766	0.0010317	366.2937147
Dump Trucks	195000	32500	365.7683	0.0016766	0.0010317	366.2937147
total			3845.592	0.032532	0.100171	3857.790394

Spread 7 & 8 Market Segment Pipeline

Vehicle	VMT	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Commuter Vehicle	1992000	99600	963.9418	0.0079048	0.0379868	967.2470873
1/2 Ton Trucks	186750	23343.75	225.92386	0.0027584	0.0068549	226.9172448
1 Ton Trucks	466875	58359.375	564.80965	0.0068961	0.0171373	567.293112
2 1/2 Ton Trucks	124500	20750	233.52899	0.0010704	0.0006587	233.8644486
Tractor Trailers	124500	20750	233.52899	0.0010704	0.0006587	233.8644486
Dump Trucks	124500	20750	233.52899	0.0010704	0.0006587	233.8644486
total			2455.262	0.020771	0.063955	2463.05079

Majorsville Lateral

**Table 9A-30
Rover On-Road Construction Activity Green House Gas Emissions**

Vehicle	VMT	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Commuter Vehicle	816000	40800	394.86772	0.0032381	0.0155608	396.2216984
1/2 Ton Trucks	76500	9562.5	92.547123	0.00113	0.002808	92.95405208
1 Ton Trucks	191250	23906.25	231.36781	0.0028249	0.0070201	232.3851302
2 1/2 Ton Trucks	51000	8500	95.662478	0.0004385	0.0002698	95.79989462
Tractor Trailers	51000	8500	95.662478	0.0004385	0.0002698	95.79989462
Dump Trucks	51000	8500	95.662478	0.0004385	0.0002698	95.79989462
total			1005.77	0.008508	0.026198	1008.960565
Clarington Lateral						
Vehicle	VMT	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Commuter Vehicle	494400	24720	239.24339	0.0019619	0.009428	240.0637349
1/2 Ton Trucks	112500	14062.5	136.09871	0.0016617	0.0041295	136.6971354
1 Ton Trucks	281250	35156.25	340.24678	0.0041543	0.0103237	341.7428385
2 1/2 Ton Trucks	75000	12500	140.68011	0.0006448	0.0003968	140.882198
Tractor Trailers	75000	12500	140.68011	0.0006448	0.0003968	140.882198
Dump Trucks	75000	12500	140.68011	0.0006448	0.0003968	140.882198
total			1137.629	0.009712	0.025072	1141.150303
Berne Lateral						
Vehicle	VMT	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Commuter Vehicle	120000	6000	58.068783	0.0004762	0.0022884	58.26789683
1/2 Ton Trucks	11250	1406.25	13.609871	0.0001662	0.0004129	13.66971354
1 Ton Trucks	28125	3515.625	34.024678	0.0004154	0.0010324	34.17428385
2 1/2 Ton Trucks	7500	1250	14.068011	6.448E-05	3.968E-05	14.0882198
Tractor Trailers	7500	1250	14.068011	6.448E-05	3.968E-05	14.0882198
Dump Trucks	7500	1250	14.068011	6.448E-05	3.968E-05	14.0882198
total			147.9074	0.001251	0.003853	148.3765536
Sherwood & CGT Lateral						
Vehicle	VMT	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Commuter Vehicle	1968000	98400	952.32804	0.0078095	0.0375291	955.5935079
1/2 Ton Trucks	184500	23062.5	223.20188	0.0027252	0.0067723	224.1833021
1 Ton Trucks	461250	57656.25	558.00471	0.006813	0.0169308	560.4582552
2 1/2 Ton Trucks	123000	20500	230.71539	0.0010575	0.0006508	231.0468047
Tractor Trailers	123000	20500	230.71539	0.0010575	0.0006508	231.0468047
Dump Trucks	123000	20500	230.71539	0.0010575	0.0006508	231.0468047
total			2425.681	0.02052	0.063185	2433.375479
Burgettstown Lateral						
Vehicle	VMT	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Commuter Vehicle	1444800	72240	699.14815	0.0057333	0.0275519	701.5454778
1/2 Ton Trucks	135450	16931.25	163.86285	0.0020007	0.0049719	164.583351
1 Ton Trucks	338625	42328.125	409.65712	0.0050017	0.0124297	411.4583776
2 1/2 Ton Trucks	90300	15050	169.37886	0.0007764	0.0004778	169.6221664
Tractor Trailers	90300	15050	169.37886	0.0007764	0.0004778	169.6221664
Dump Trucks	90300	15050	169.37886	0.0007764	0.0004778	169.6221664
total			1780.805	0.015065	0.046387	1786.453705
Seneca Lateral						
Vehicle	VMT	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Commuter Vehicle	1634430	81721.5	790.91134	0.0064858	0.031168	793.6233217
1/2 Ton Trucks	67725	8465.625	81.931424	0.0010003	0.0024859	82.29167552
1 Ton Trucks	169312.5	21164.0625	204.82856	0.0025009	0.0062148	205.7291888
2 1/2 Ton Trucks	45150	7525	84.689429	0.0003882	0.0002389	84.81108318
Tractor Trailers	45150	7525	84.689429	0.0003882	0.0002389	84.81108318
Dump Trucks	45150	7525	84.689429	0.0003882	0.0002389	84.81108318
total			1331.74	0.011152	0.040585	1336.077436

**Table 9A-30
Rover On-Road Construction Activity Green House Gas Emissions**

Mainline CS 1 Compressor Station						
Vehicle	VMT	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Commuter Vehicle	813120	40656	393.47407	0.0032267	0.0155059	394.8232689
1/2 Ton Trucks	178200	22275	215.58036	0.0026321	0.0065411	216.5282625
1 Ton Trucks	495000	61875	598.83433	0.0073115	0.0181696	601.4673958
2 1/2 Ton Trucks	118800	19800	222.8373	0.0010214	0.0006286	223.1574016
Tractor Trailers	99000	16500	185.69775	0.0008512	0.0005238	185.9645013
Dump Trucks	89100	14850	167.12798	0.0007661	0.0004714	167.3680512
Concrete Trucks	39600	6600	74.279101	0.0003405	0.0002095	74.38580053
total			1857.831	0.016149	0.04205	1863.694682
Mainline CS 2 Compressor Station						
Vehicle	VMT	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Commuter Vehicle	813120	40656	393.47407	0.0032267	0.0155059	394.8232689
1/2 Ton Trucks	178200	22275	215.58036	0.0026321	0.0065411	216.5282625
1 Ton Trucks	495000	61875	598.83433	0.0073115	0.0181696	601.4673958
2 1/2 Ton Trucks	118800	19800	222.8373	0.0010214	0.0006286	223.1574016
Tractor Trailers	99000	16500	185.69775	0.0008512	0.0005238	185.9645013
Dump Trucks	89100	14850	167.12798	0.0007661	0.0004714	167.3680512
Concrete Trucks	39600	6600	74.279101	0.0003405	0.0002095	74.38580053
total			1857.831	0.016149	0.04205	1863.694682
Mainline CS 3 Compressor Station						
Vehicle	VMT	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Commuter Vehicle	813120	40656	393.47407	0.0032267	0.0155059	394.8232689
1/2 Ton Trucks	178200	22275	215.58036	0.0026321	0.0065411	216.5282625
1 Ton Trucks	495000	61875	598.83433	0.0073115	0.0181696	601.4673958
2 1/2 Ton Trucks	118800	19800	222.8373	0.0010214	0.0006286	223.1574016
Tractor Trailers	99000	16500	185.69775	0.0008512	0.0005238	185.9645013
Dump Trucks	89100	14850	167.12798	0.0007661	0.0004714	167.3680512
Concrete Trucks	39600	6600	74.279101	0.0003405	0.0002095	74.38580053
total			1857.831	0.016149	0.04205	1863.694682
Defiance Compressor Station						
Vehicle	VMT	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Commuter Vehicle	813120	40656	393.47407	0.0032267	0.0155059	394.8232689
1/2 Ton Trucks	178200	22275	215.58036	0.0026321	0.0065411	216.5282625
1 Ton Trucks	495000	61875	598.83433	0.0073115	0.0181696	601.4673958
2 1/2 Ton Trucks	118800	19800	222.8373	0.0010214	0.0006286	223.1574016
Tractor Trailers	99000	16500	185.69775	0.0008512	0.0005238	185.9645013
Dump Trucks	89100	14850	167.12798	0.0007661	0.0004714	167.3680512
Concrete Trucks	39600	6600	74.279101	0.0003405	0.0002095	74.38580053
total			1857.831	0.016149	0.04205	1863.694682
Stand-Alone Metering Stations						
Vehicle	VMT	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Commuter Vehicle	470448	23522.4	227.65286	0.0018669	0.0089713	228.4334627
1/2 Ton Trucks	106920	13365	129.34821	0.0015793	0.0039246	129.9169575
1 Ton Trucks	178200	22275	215.58036	0.0026321	0.0065411	216.5282625
2 1/2 Ton Trucks	71280	11880	133.70238	0.0006129	0.0003771	133.894441
Tractor Trailers	17820	2970	33.425595	0.0001532	9.429E-05	33.47361024
Dump Trucks	53460	8910	100.27679	0.0004596	0.0002829	100.4208307
Concrete Trucks	17820	2970	33.425595	0.0001532	9.429E-05	33.47361024
total			873.4118	0.007457	0.020286	876.1411749

**Table 9A-30
Rover On-Road Construction Activity Green House Gas Emissions**

Sherwood Compressor Station						
Vehicle	VMT	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Commuter Vehicle	470448	23522.4	227.65286	0.0018669	0.0089713	228.4334627
1/2 Ton Trucks	106920	13365	129.34821	0.0015793	0.0039246	129.9169575
1 Ton Trucks	267300	33412.5	323.37054	0.0039482	0.0098116	324.7923938
2 1/2 Ton Trucks	71280	11880	133.70238	0.0006129	0.0003771	133.894441
Tractor Trailers	53460	8910	100.27679	0.0004596	0.0002829	100.4208307
Dump Trucks	53460	8910	100.27679	0.0004596	0.0002829	100.4208307
Concrete Trucks	35640	5940	66.85119	0.0003064	0.0001886	66.94722048
total			1081.479	0.009233	0.023839	1084.826137
Seneca Compressor Station						
Vehicle	VMT	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Commuter Vehicle	470448	23522.4	227.65286	0.0018669	0.0089713	228.4334627
1/2 Ton Trucks	106920	13365	129.34821	0.0015793	0.0039246	129.9169575
1 Ton Trucks	267300	33412.5	323.37054	0.0039482	0.0098116	324.7923938
2 1/2 Ton Trucks	71280	11880	133.70238	0.0006129	0.0003771	133.894441
Tractor Trailers	53460	8910	100.27679	0.0004596	0.0002829	100.4208307
Dump Trucks	53460	8910	100.27679	0.0004596	0.0002829	100.4208307
Concrete Trucks	35640	5940	66.85119	0.0003064	0.0001886	66.94722048
total			1081.479	0.009233	0.023839	1084.826137
Clarlington Compressor Station						
Vehicle	VMT	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Commuter Vehicle	470448	23522.4	227.65286	0.0018669	0.0089713	228.4334627
1/2 Ton Trucks	106920	13365	129.34821	0.0015793	0.0039246	129.9169575
1 Ton Trucks	267300	33412.5	323.37054	0.0039482	0.0098116	324.7923938
2 1/2 Ton Trucks	71280	11880	133.70238	0.0006129	0.0003771	133.894441
Tractor Trailers	53460	8910	100.27679	0.0004596	0.0002829	100.4208307
Dump Trucks	53460	8910	100.27679	0.0004596	0.0002829	100.4208307
Concrete Trucks	35640	5940	66.85119	0.0003064	0.0001886	66.94722048
total			1081.479	0.009233	0.023839	1084.826137
Majorsville Compressor Station						
Vehicle	VMT	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Commuter Vehicle	470448	23522.4	227.65286	0.0018669	0.0089713	228.4334627
1/2 Ton Trucks	106920	13365	129.34821	0.0015793	0.0039246	129.9169575
1 Ton Trucks	267300	33412.5	323.37054	0.0039482	0.0098116	324.7923938
2 1/2 Ton Trucks	71280	11880	133.70238	0.0006129	0.0003771	133.894441
Tractor Trailers	53460	8910	100.27679	0.0004596	0.0002829	100.4208307
Dump Trucks	53460	8910	100.27679	0.0004596	0.0002829	100.4208307
Concrete Trucks	35640	5940	66.85119	0.0003064	0.0001886	66.94722048
total			1081.479	0.009233	0.023839	1084.826137
Cadiz Compressor Station						
Vehicle	VMT	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Commuter Vehicle	470448	23522.4	227.65286	0.0018669	0.0089713	228.4334627
1/2 Ton Trucks	106920	13365	129.34821	0.0015793	0.0039246	129.9169575
1 Ton Trucks	267300	33412.5	323.37054	0.0039482	0.0098116	324.7923938
2 1/2 Ton Trucks	71280	11880	133.70238	0.0006129	0.0003771	133.894441
Tractor Trailers	53460	8910	100.27679	0.0004596	0.0002829	100.4208307
Dump Trucks	53460	8910	100.27679	0.0004596	0.0002829	100.4208307
Concrete Trucks	35640	5940	66.85119	0.0003064	0.0001886	66.94722048
total			1081.479	0.009233	0.023839	1084.826137
Burgettstown Compressor Station						
Vehicle	VMT	gallons of fuel total	Emissions (tons) ³			
			CO ₂	N ₂ O	CH ₄	CO ₂ e ⁴
Commuter Vehicle	470448	23522.4	227.65286	0.0018669	0.0089713	228.4334627
1/2 Ton Trucks	106920	13365	129.34821	0.0015793	0.0039246	129.9169575
1 Ton Trucks	267300	33412.5	323.37054	0.0039482	0.0098116	324.7923938
2 1/2 Ton Trucks	71280	11880	133.70238	0.0006129	0.0003771	133.894441
Tractor Trailers	53460	8910	100.27679	0.0004596	0.0002829	100.4208307
Dump Trucks	53460	8910	100.27679	0.0004596	0.0002829	100.4208307
Concrete Trucks	35640	5940	66.85119	0.0003064	0.0001886	66.94722048
total			1081.479	0.009233	0.023839	1084.826137