APPENDIX 8.1E

Construction Emissions and Support Data

APPENDIX 8.1E

Construction Emissions and Impact Analysis

8.1E.1 Construction Phases

Construction of SVEP is expected to last approximately 12 months. The construction will occur in the following four main phases:

- Site preparation;
- Foundation work;
- Construction/installation of major structures; and,
- Installation of major equipment.

The site is approximately 22.89 acres in size and is essentially flat. The site was previously used as warehouse site. The warehouse will be demolished by the City of Industry as part of its redevelopment plans. As such, the site will require only minimum grading and leveling prior to construction of the power blocks, support systems, and site buildings. Site preparation includes finish grading, excavation of footings and foundations, and backfilling operations. After site preparation is finished, the construction of the foundations and structures is expected to begin. Once the foundations and structures are finished, installation and assembly of the mechanical and electrical equipment are scheduled to commence.

Fugitive dust emissions from the construction of SVEP will result from:

- Dust entrained during site preparation and finish grading/excavation at the construction site;
- Dust entrained during onsite travel on paved and unpaved surfaces;
- Dust entrained during aggregate and soil loading and unloading operations; and
- Wind erosion of areas disturbed during construction activities.

Combustion emissions during construction will result from:

- Exhaust from the diesel construction equipment used for site preparation, grading, excavation, and construction of onsite structures;
- Exhaust from water trucks used to control construction dust emissions;
- Exhaust from diesel-powered welding machines, electric generators, air compressors, and water pumps;
- Exhaust from pickup trucks and diesel trucks used to transport workers and materials around the construction site;
- Exhaust from diesel trucks used to deliver concrete, fuel, and construction supplies to the construction site;

- Exhaust from locomotives used to deliver mechanical equipment to the project area; and
- Exhaust from automobiles used by workers to commute to the construction site.

To determine the potential worst-case daily construction impacts, exhaust and dust emission rates have been evaluated for each source of emissions. Worst-case daily dust emissions are expected to occur during the first month of construction when site preparation occurs. The worst-case daily exhaust emissions are expected to occur during the middle of the construction schedule during the installation of the major mechanical equipment. Annual emissions are based on the average equipment mix during the 12-month construction period.

8.1E.2 Available Mitigation Measures

The following mitigation measures are proposed to control exhaust emissions from the diesel heavy equipment used during construction of SVEP:

- Operational measures, such as limiting time spent with the engine idling by shutting down equipment when not in use;
- Regular preventive maintenance to prevent emission increases due to engine problems;
- Use of low sulfur and low aromatic fuel meeting California standards for motor vehicle diesel fuel; and
- Use of low-emitting gas and diesel engines meeting state and federal emissions standards (Tier I and II) for construction equipment, including, but not limited to catalytic converter systems and particulate filter systems.

The following mitigation measures are proposed to control fugitive dust emissions during construction of the project:

- Use either water application or chemical dust suppressant application to control dust emissions from on-site unpaved road travel and unpaved parking areas;
- Use vacuum sweeping and/or water flushing of paved road surface to remove buildup of loose material to control dust emissions from travel on the paved access road (including adjacent public streets impacted by construction activities) and paved parking areas;
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least two feet of freeboard;
- Limit traffic speeds on all unpaved site areas to 5 mph;
- Install sandbags or other erosion control measures to prevent silt runoff to roadways;
- Replant vegetation in disturbed areas as quickly as possible;
- Use wheel washers or wash off tires of all trucks exiting construction site; and
- Mitigate fugitive dust emissions from wind erosion of areas disturbed from construction activities (including storage piles) by application of either water or chemical dust suppressant.

8.1E.3 Estimation of Emissions with Mitigation Measures

Tables 8.1E-1 through 8.1E-3 show the estimated maximum daily and annual heavy equipment exhaust and fugitive dust emissions with recommended mitigation measures. Detailed emission calculations are included in Tables 8.1E-5 through 8.1E-12.

TABLE 8.1E-1
Maximum Daily Emissions During Construction (fugitive dust), pounds per day

	NO_x	CO	VOC	SO_x	PM_{10}
Onsite					
Construction fugitive dust	0	0	0	0	9.17
Offsite					
Worker travel, truck/rail deliveries	0	0	0	0	1.55
Total =	**0**	**0**	**0**	**0**	**10.72**

TABLE 8.1E-2
Maximum Daily Emissions During Construction (exhaust emissions), pounds per day

	NO_x	CO	VOC	SO_x	PM_{10}
Onsite and Offsite					
Construction equipment, worker travel, truck/rail deliveries	150.2	122.6	20.6	11.7	7.4
Total =	**150.2**	**122.6**	**20.6**	**11.7**	**7.4**

TABLE 8.1E-3
Annual Emissions During Construction, tons per year

	NO_x	CO	VOC	SO_x	PM_{10}
Onsite and Offsite					
Construction equipment, fugitive dust, worker travel, truck/rail deliveries	14.3	13.5	1.9	0.6	0.5
Total =	**14.3**	**13.5**	**1.9**	**0.6**	**0.5**
Construction period total emissions (including offsite linears)	14.3	13.5	1.9	0.6	0.5
Total Construction Period =	**14.3**	**13.5**	**1.9**	**0.6**	**0.5**

8.1E.4 Analysis of Ambient Impacts from Facility Construction

Ambient air quality impacts from emissions during the construction of SVEC were estimated using an air quality dispersion modeling analysis. The modeling analysis considers the construction site location, the surrounding topography, and the sources of emissions during construction, including vehicle and equipment exhaust emissions and fugitive dust.

8.1E.4.1 Existing Ambient Levels

As with the modeling analysis of project operating impacts (Section 8.1), monitoring stations delineated in Section 8.1.3 were used to establish the ambient background levels for the construction impact modeling analysis. Table 8.1-24 showed the maximum concentrations of NO_x, SO_2, CO and PM_{10} recorded for 1996 through 2004 at those monitoring stations.

8.1E.4.2 Dispersion Model

As in the analysis of project operating impacts, the USEPA-approved Industrial Source Complex Short Term (ISCST3) model was used to estimate ambient impacts from construction activities. A detailed discussion of the ISCST3 dispersion model is included in Section 8.1.5.

The emission sources for the construction site were grouped into two categories: exhaust emissions and dust emissions. An effective emission plume height of 2.0 meters was used for all exhaust emissions. For construction dust emissions, an effective plume height of 0.5 meters was used in the modeling analysis. The exhaust and dust emissions were modeled as a single area source that covered the total area of the construction site. The construction impacts modeling analysis used the same receptor locations as used for the project operating impact analysis. A detailed discussion of the receptor locations is included in Section 8.1.5.

To determine the construction impacts on short-term ambient standards (24 hours and less), the worst-case daily onsite construction emission levels shown in Tables 8.1E-1 and 8.1E-2 were used. For pollutants with annual average ambient standards, the annual onsite emission levels shown in Table 8.1E-3 were used. As with the project operating impact analysis, the meteorological data set used for the construction emission impacts analysis is data collected from the AQMD Walnut met station for 1981.

8.1E.4.3 Modeling Results

Based on the emission rates of NO_x, SO_2, CO, and PM_{10} and the meteorological data, the ISCST3 model calculates hourly and annual ambient impacts for each pollutant. As mentioned above, the modeled 1-hour, 3-hour 8-hour, and 24-hour ambient impacts are based on the worst-case daily emission rates of NO_x, SO_2, CO, and PM_{10}. The annual impacts are based on the annual emission rates of these pollutants.

The one-hour and annual average concentrations of NO_2 were computed following the revised USEPA guidance for computing these concentrations (August 9, 1995 Federal Register, 60 FR 40465. The annual average was calculated using the ambient ratio method (ARM) with the national default value of 0.75 for the annual average NO_2/NO_x ratio.

The modeling analysis results are shown in Table 8.1E-4. Also included in the table are the maximum background levels that have occurred in the last three years and the resulting total ambient impacts. As shown in Table 8.1E-4, construction impacts for all modeled pollutants are expected to be below the most stringent state and national standards. However, the state and federal 24-hour and annual average PM_{10} standards are exceeded in the absence of the construction emissions for SVEP.

TABLE 8.1E-4
Modeled Maximum Construction Impacts

Pollutant	Averaging Time	Maximum Construction Impacts (µg/m^3)	Background (µg/m^3)	Total Impact (µg/m^3)	State Standard (µg/m^3)	Federal Standard (µg/m^3)
NO_2[a]	1-hour	72.6	188	260.6	470	-
	annual	1.3	45.3	46.6	-	100
SO_2	1-hour	9.9	52.4	62.3	650	-
	3-hour	7.4	52.4	59.8	-	1,300
	24-hour	2.5	39.4	41.9	109	365
	annual	0.2	8	8.2	-	80
CO	1-hour	44	8,000	8,044	23,000	40,000
	8-hour	24	4,333	4,357	10,000	10,000
PM_{10}	24-hour	34.4	164	198.4	50	150
	annual[b]	7.2	58.5	65.7	30	-

[a] ARM applied for annual average, using national default 0.75 ratio.
[b] Annual arithmetic mean.
[c] Based on maximum daily emissions.
[d] Based on maximum daily emissions.

The ISCST3 model over predicts construction emission impacts due to the cold plume (i.e., ambient temperature) effect of dust emissions. Most of the plume dispersion characteristics in the ISCST3 model are derived from observations of hot plumes associated with typical smoke stacks. The ISCST3 model does compensate for plume temperature; however, for ambient temperature plumes the model assumes negligible buoyancy and dispersion. Consequently, the ambient concentrations in cold plumes remain high even at significant distances from a source. SVEP construction site impacts are not unusual in comparison to most construction sites; construction sites that use good dust suppression techniques and low-emitting vehicles typically do not cause violations of air quality standards. The input and output modeling files are being provided electronically.

Table 8.1E-5 CONSTRUCTION PHASE-Equipment Exhaust Emissions

Project: Edison Mission Energy-Sun Valley Energy Project

Projected Construction Year(s): 2007-2008

Equip. Type	# On Site	Est. HP Each (a)	Fuel Type (b)	Avg.Load Factor % (c)	Avg.Daily Hours (d)	Adj.Daily Hours (e)	Total Days (f)	Total Adj. Hours (g)	Total HP/Hrs	Total Un-Adj Hours
Dozer	0	120	D	67.9	10	0.00	0	0.0	0.0	0
Loader	1	175	D	53.5	10	5.35	15	80.2	14031.2	150
Scraper	0	250	D	75.9	10	0.00	0	0.0	0.0	0
Grader	1	175	D	52.9	10	5.29	10	52.9	9257.5	100
Crane	1	175	D	49.4	10	4.94	220	1086.9	190205.4	2200
Forklift	2	120	D	34.5	10	6.90	220	1518.0	182160.0	2200
Backhoe	2	50	D	53.5	10	10.69	60	641.4	32071.2	600
Dump Truck	1	250	D	43.7	8	3.50	15	52.4	13110.0	120
Water Truck	1	175	D	43.7	10	4.37	45	196.7	34413.8	450
Service Truck	1	175	D	43.7	10	4.37	180	786.6	137655.0	1800
Fuel Truck	1	175	D	43.7	8	3.50	180	629.3	110124.0	1440
Boom Truck	1	175	D	49.4	10	4.94	60	296.4	51874.2	600
Concrete Pump	1	175	D	71.3	8	5.70	30	171.1	29946.0	240
Port.Air Comp.	2	50	D	55.2	8	8.83	180	1589.8	79488.0	1440
Port. Elec. Gen	2	25	D	85.1	8	13.62	90	1225.4	30636.0	720
Port. Light Plant	2	25	D	71.3	8	11.41	30	342.2	8556.0	240
Trencher	2	120	D	79.9	8	12.79	60	767.5	92100.1	480
Compactor	1	120	D	66.1	8	5.29	4	21.2	2540.1	32
Paver	1	120	D	68.1	8	5.45	3	16.3	1960.7	24
***	0	0	D	0.0	0	0.00	0	0.0	0.0	0
***	0	0	D	0.0	0	0.00	0	0.0	0.0	0

(a) Ref: South Coast AQMD-CEQA Handbook, Table A9-8-C, and updated CEC data (see at end of this Appendix).
(b) D=diesel, G=gasoline
(c) Ref (a) Table A9-8-D, increased by 15% to adj for updated load levels
(d) Ref (a) Table A9-8-C (at 100% load)
(e) Adjusted daily hours at average load factor.
(f) Total estimated days on site from construction schedule.
(g) Total operational hours during construction phase at average load factor.

Note: Equipment exhaust emissions factors are based on data derived from the SCAQMD website (Air Quality Planning section) and data supplied by CEC for selected equipment categories, etc. (August 2005)

EMISSIONS FACTORS (h)

Equipment Exhaust Data

Equip. Type	HP	lbs/hp-hr CO	g/hp-hr	lbs/hp-hr VOC	g/hp-hr	lbs/hp-hr NOx	g/hp-hr	lbs/hp-hr SOx	g/hp-hr	lbs/hp-hr PM10	g/hp-hr
Dozer	120	0.0041	1.9	0.0012	0.5	0.0084	3.8	0.0012	0.5	0.0008	0.4
Loader	175	0.0033	1.5	0.0007	0.3	0.007	3.2	0.0013	0.6	0.0004	0.2
Scraper	250	0.0024	1.1	0.0007	0.3	0.0104	4.7	0.0017	0.8	0.0004	0.2
Grader	175	0.0038	1.7	0.0008	0.4	0.0084	3.8	0.0015	0.7	0.0005	0.2
Crane	175	0.0026	1.2	0.0006	0.3	0.0055	2.5	0.001	0.5	0.0003	0.1
Forklift	120	0.0021	1.0	0.0007	0.3	0.0041	1.9	0.00001	0.0	0.0005	0.2
Backhoe	50	0.0094	4.3	0.0036	1.6	0.0071	3.2	0.0014	0.6	0.001	0.5
Dump Truck	250	0.0016	0.7	0.0005	0.2	0.0079	3.6	0.0014	0.6	0.0003	0.1
Water Truck	175	0.0042	1.9	0.001	0.5	0.0092	4.2	0.0015	0.7	0.0006	0.3
Service Truck	175	0.0042	1.9	0.001	0.5	0.0092	4.2	0.0015	0.7	0.0006	0.3
Fuel Truck	175	0.0042	1.9	0.001	0.5	0.0092	4.2	0.0015	0.7	0.0006	0.3
Boom Truck	175	0.0042	1.9	0.001	0.5	0.0092	4.2	0.0015	0.7	0.0006	0.3
Concrete Pump	175	0.02	9.1	0.003	1.4	0.024	10.9	0.002	0.9	0.0015	0.7
Port.Air Comp.	50	0.0067	3.0	0.0027	1.2	0.0062	2.8	0.0013	0.6	0.0007	0.3
Port. Elec. Gen	25	0.0021	1.0	0.0014	0.6	0.0038	1.7	0.00001	0.0	0.0005	0.2
Port. Light Plant	25	0.0021	1.0	0.0014	0.6	0.0038	1.7	0.00001	0.0	0.0005	0.2
Trencher	120	0.0034	1.5	0.0008	0.4	0.0061	2.8	0.0012	0.5	0.0006	0.3
Compactor	120	0.0032	1.5	0.0008	0.4	0.0058	2.6	0.0011	0.5	0.0006	0.3
Paver	120	0.0038	1.7	0.0009	0.4	0.0069	3.1	0.0013	0.6	0.0007	0.3
***	0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
***	0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

(h) Ref: Updated factors provided by CEC, August 2005 (2006 factors used), i.e., estimated construction period.
(see EF sheets at end of this Appendix)

Construction Equipment Emissions

Equip. Type	CO lbs/hr	CO lbs/day	CO tons*	VOC lbs/hr	VOC lbs/day	VOC tons*	NOx lbs/hr	NOx lbs/day	NOx tons*	SOx lbs/hr	SOx lbs/day	SOx tons*	PM10 lbs/hr	PM10 lbs/day	PM10 tons*
Dozer	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Loader	0.31	2.47	0.02	0.07	0.52	0.00	0.65	5.24	0.05	0.12	0.97	0.01	0.04	0.30	0.00
Scraper	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grader	0.35	2.81	0.02	0.07	0.59	0.00	0.78	6.22	0.04	0.14	1.11	0.01	0.05	0.37	0.00
Crane	0.22	1.80	0.25	0.05	0.41	0.06	0.48	3.80	0.52	0.09	0.69	0.10	0.03	0.21	0.03
Forklift	0.17	1.39	0.19	0.06	0.46	0.06	0.34	2.72	0.37	0.00	0.01	0.00	0.04	0.33	0.05
Backhoe	0.50	4.02	0.15	0.19	1.54	0.06	0.38	3.04	0.11	0.07	0.60	0.02	0.05	0.43	0.02
Dump Truck	0.17	1.40	0.01	0.05	0.44	0.00	0.86	6.90	0.05	0.15	1.22	0.01	0.03	0.26	0.00
Water Truck	0.32	2.57	0.07	0.08	0.61	0.02	0.70	5.63	0.16	0.11	0.92	0.03	0.05	0.37	0.01
Service Truck	0.32	2.57	0.29	0.08	0.61	0.07	0.70	5.63	0.63	0.11	0.92	0.10	0.05	0.37	0.04
Fuel Truck	0.32	2.57	0.23	0.08	0.61	0.06	0.70	5.63	0.51	0.11	0.92	0.08	0.05	0.37	0.03
Boom Truck	0.36	2.90	0.11	0.09	0.69	0.03	0.80	6.36	0.24	0.13	1.04	0.04	0.05	0.41	0.02
Concrete Pump	2.50	19.96	0.30	0.37	2.99	0.04	2.99	23.96	0.36	0.25	2.00	0.03	0.19	1.50	0.02
Port.Air Comp.	0.37	2.96	0.27	0.15	1.19	0.11	0.34	2.74	0.25	0.07	0.57	0.05	0.04	0.31	0.03
Port. Elec. Gen	0.09	0.71	0.03	0.06	0.48	0.02	0.16	1.29	0.06	0.00	0.00	0.00	0.02	0.17	0.01
Port. Light Plant	0.07	0.60	0.01	0.05	0.40	0.01	0.14	1.08	0.02	0.00	0.00	0.00	0.02	0.14	0.00
Trencher	0.65	5.22	0.16	0.15	1.23	0.04	1.17	9.36	0.28	0.23	1.84	0.06	0.12	0.92	0.03
Compactor	0.25	2.03	0.00	0.06	0.51	0.00	0.46	3.68	0.01	0.09	0.70	0.00	0.05	0.38	0.00
Paver	0.31	2.48	0.00	0.07	0.59	0.00	0.56	4.51	0.01	0.11	0.85	0.00	0.06	0.46	0.00
***	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
***	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Totals	**6.09**	**48.74**	**1.95**	1.45	11.56	0.54	**10.03**	**80.24**	**3.37**	1.37	10.97	0.48	**0.69**	**5.53**	**0.26**

*tons = tons emitted during construction phase

CONSTRUCTION PHASE-Fugitive Dust Emissions

Total Site Acreage:	22.89	Site Acreage Subject to Construction Activity: (site plus linear areas)	10
Emission Factor:	0.11	tons/acre/month of activity (see Ref.)	
Month =	720	Hrs (avg)	
lbs/hr =	0.306	PM10 emissions-unadjusted	

Additional PM10 Control Techniques

Type	Used	Avg. % PM10 Reduction
Watering	Yes	50
Surface Sealant	No	0
Dust Suppressant	No	0
Speed Control	Yes	25

% Control: 75

Release Factor: 0.25

Construction Site Activity Levels

Hrs/Day:	12		
Days/Wk:	6		
Day/Month:	26		
Months/Construction:	3	**	
Annual Const Hours:	3744		
Total Construction Hrs:	936.0		

Unadjusted Controlled PM10 Emissions:

lbs/hr:	3.1
lbs/day:	36.7
tons* :	1.4

Total Const Period: 12 months

Controlled PM10 Emissions:

lbs/hr:	**0.8**
lbs/day:	**9.17**
tons* :	**0.358**
Annualized g/sec:	**0.01**
24 hr g/sec value:	**0.048**

*tons - tons emitted during the construction phase

Ref: MRI Report, assumes 50% control due to watering, for intensive earth moving activities.
This factor has been further reduced due to the additional controls of more watering and speed controls on-site.

** Although the complete cosntruction period is 12 months, the maximum fugitive dust emissions will occur in the early phase of construction, and are not expected to last more than 3 months. After month 3, fugitive dust emissions will be well below the maximum hourly and daily values presented above.

CONSTRUCTION PHASE - Truck Delivery Emissions

Max # deliveries/day:	18			Emissions Factors (lbs/vmt)				
Avg Haul Distance (miles)	90	see note below	NOx	CO	VOC	SOx	PM10	
VMT/Day:	1620		0.03893	0.005932	0.001321	0.000405	0.00073	Ref: SCAQMD Emfac 2002 Ver 2.2, 4-03 (website)
Work days/yr:	312							On-Road Heavy Duty Diesels (2006)
Total Const Work Days:	312			Daily Emissions (lbs)				
			NOx	CO	VOC	SOx	PM10	
			63.067	9.610	2.140	0.656	1.183	

Haul distance assumption: approximate round trip distance from site to Ontario/Riverside intermodal warehouse district.

Construction Period Emissions (tons)

NOx	CO	VOC	SOx	PM10
9.838	**1.499**	**0.334**	**0.102**	**0.184**

CONSTRUCTION PHASE - Rail Delivery Emissions

Railway emissions calculations should be performed using the updated Locomotive Emissions calcualtion procedures, with the final values in terms of tons per const period entered in the appropriate cells below.

The Locomotive Emissions Calculation procedures are attached.

Railway Delivery Emissions
Construction Period Emissions (tons)

	NOx	CO	VOC	SOx	PM10
Data from Locomotive Emissions Calculations > > > > > >	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**

Edison Mission Energy is not projecting any rail deliveries for this project.

CONSTRUCTION PHASE - Worker Travel - Emissions

Avg # of Workers/Day:	123	
Avg Occupancy/Vehicle:	1.2	
Round Trips/Day:	103	
Avg Roundtrip Distance:	45	miles
VMT/Day:	4613	
VMT/Year:	1439100	
VMT/Const Period:	1439100	

Max # of Workers/Day:	228
Max Work Month:	8
Round Trips/Day:	190
VMT/Day:	8550

Emissions Factors (lbs/VMT)

NOx	CO	VOC	SOx	PM10
0.001489	0.013925	0.001497	0.000009	0.00008

Ref: SCAQMD Emfac 2002 Ver 2.2, 4-03 (website)
On-Road Vehicles (2006)

Avg. Daily Emissions (lbs)

NOx	CO	VOC	SOx	PM10
6.868	64.229	6.905	0.042	0.369

Monthly Emissions (lbs)

NOx	CO	VOC	SOx	PM10
178.57	1669.96	179.53	1.08	9.59

Maximum Daily Emissions (lbs) Month 8

NOx	CO	VOC	SOx	PM10
12.731	119.059	12.799	0.077	0.684

Construction Period Emissions (tons)

NOx	**CO**	**VOC**	**SOx**	**PM10**
1.071	**10.020**	**1.077**	**0.006**	**0.058**

CONSTRUCTION PHASE - Emissions Summary

	PM10	Avg.
Construction Dust:	0.8	lbs/hr
	9.2	lbs/day
	0.4	tons/const period
	0.048	g/sec (24 hr basis)
	0.01	annualized g/sec

		Avg lbs/day	tons/construction period	annualized g/sec
Combustion Equipment:	**NOx**	150.2	14.3	0.4111
	CO	122.6	13.5	0.3878
	VOC*	20.6	1.9	0.0561
	SOx	11.7	0.6	0.0168
	PM10	7.4	0.5	0.0144

Table 8.1E-6 SCAQMD Emfac Data (Years 2003-2025)

Highest (Most Conservative) EMFAC 2002 (version 2.2) Emission Factors for On-Road Vehicles

Projects in the SCAQMD (Scenario Years 2003 - 2025)

Derived from Wintertime Emissions Inventory (except Annual Average CO for passenger vehicles)
Passenger Vehicles (<8500 pounds), Delivery Trucks (>8500 pounds)

The following emission factors were compiled by running the California Air Resources Board's EMFAC2002 (version 2.2) Burden Model, taking the weighted average of vehicle types and simplifying into two categories which can be used to calculate on-road mobile source emissions. Use the following equation:

Emissions (pounds per day) = N x TL x EF

where N = number of trips, TL = trip length (miles/day), and EF = emission factor (pounds per mile)

This methodology replaces the old EMFAC emission factors in Tables A-9-5-J-1 through A-9-5-L in Appendix A9 of the current SCAQMD CEQA Handbook. All the emission factors account for the emissions from start, running and idling exhaust. In addition, the ROG emission factors take into account diurnal, hot soak, running and resting emissions, and PM10 emission factor takes into account the tire and brake wear.

Scenario Year: 2003 -- Model Years: 1965 to 2003

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.01815	CO	0.025508
NOx	0.002014	NOx	0.031208
ROG	0.001935	ROG	0.003362
SOx	0.00001	SOx	0.000241
PM10	0.000078	PM10	0.000540

Scenario Year: 2004 -- Model Years: 1965 to 2004

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.016559	CO	0.02309
NOx	0.0018	NOx	0.029607
ROG	0.001771	ROG	0.003148
SOx	0.00001	SOx	0.000243
PM10	0.000079	PM10	0.000519

Scenario Year: 2005 -- Model Years: 1965 to 2005

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.015165	CO	0.020984
NOx	0.001634	NOx	0.028142
ROG	0.001626	ROG	0.002955
SOx	0.00001	SOx	0.000246
PM10	0.000079	PM10	0.000500

Scenario Year: 2006 -- Model Years: 1965 to 2006 

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.013925	CO	0.019135
NOx	0.001489	NOx	0.026756
ROG	0.001497	ROG	0.002779
SOx	0.000009	SOx	0.000248
PM10	0.000080	PM10	0.000483

EMFAC 2002 Emission Factors for On-Road Mobile Sources (continued)

Scenario Year: 2007 -- Model Years: 1965 to 2007

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.01282	CO	0.017455
NOx	0.001361	NOx	0.024978
ROG	0.001383	ROG	0.002608
SOx	0.000009	SOx	0.000033
PM10	0.000080	PM10	0.000440

Scenario Year: 2008 -- Model Years: 1965 to 2008

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.011798	CO	0.015942
NOx	0.001245	NOx	0.023199
ROG	0.001277	ROG	0.00245
SOx	0.000009	SOx	0.000033
PM10	0.000080	PM10	0.000419

Scenario Year: 2009 -- Model Years: 1965 to 2009

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.010849	CO	0.01454
NOx	0.001138	NOx	0.021501
ROG	0.001179	ROG	0.002295
SOx	0.000009	SOx	0.000033
PM10	0.000081	PM10	0.000400

Scenario Year: 2010 -- Model Years: 1965 to 2010

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.009954	CO	0.013168
NOx	0.001038	NOx	0.019339
ROG	0.001087	ROG	0.002141
SOx	0.000009	SOx	0.000033
PM10	0.000081	PM10	0.000374

Scenario Year: 2011 -- Model Years: 1966 to 2011

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.009268	CO	0.012065
NOx	0.000952	NOx	0.01704
ROG	0.001015	ROG	0.002031
SOx	0.000009	SOx	0.000033
PM10	0.000083	PM10	0.000357

EMFAC 2002 Emission Factors for On-Road Mobile Sources (continued)

Scenario Year: 2012 -- Model Years: 1967 to 2012

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.008512	CO	0.010982
NOx	0.000868	NOx	0.01529
ROG	0.000941	ROG	0.001909
SOx	0.000009	SOx	0.000034
PM10	0.000083	PM10	0.000337

Scenario Year: 2013 -- Model Years: 1968 to 2013

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.007818	CO	0.010047
NOx	0.000791	NOx	0.013737
ROG	0.000874	ROG	0.001803
SOx	0.000009	SOx	0.000034
PM10	0.000083	PM10	0.000318

Scenario Year: 2014 -- Model Years: 1969 to 2014

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.007186	CO	0.009273
NOx	0.000721	NOx	0.012369
ROG	0.000813	ROG	0.001712
SOx	0.000009	SOx	0.000034
PM10	0.000084	PM10	0.000303

Scenario Year: 2015 -- Model Years: 1970 to 2015

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.006611	CO	0.008582
NOx	0.000659	NOx	0.01116
ROG	0.000759	ROG	0.001635
SOx	0.000009	SOx	0.000034
PM10	0.000084	PM10	0.000289

Scenario Year: 2016 -- Model Years: 1971 to 2016

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.006089	CO	0.00799
NOx	0.000602	NOx	0.010108
ROG	0.00071	ROG	0.001568
SOx	0.000009	SOx	0.000035
PM10	0.000084	PM10	0.000278

EMFAC 2002 Emission Factors for On-Road Mobile Sources (continued)

Scenario Year: 2017 -- Model Years: 1972 to 2017

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.005605	CO	0.007439
NOx	0.000551	NOx	0.009175
ROG	0.000664	ROG	0.001503
SOx	0.000009	SOx	0.000035
PM10	0.000084	PM10	0.000267

Scenario Year: 2018 -- Model Years: 1973 to 2018

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.005162	CO	0.006932
NOx	0.000505	NOx	0.008346
ROG	0.000621	ROG	0.001439
SOx	0.000009	SOx	0.000035
PM10	0.000084	PM10	0.000257

Scenario Year: 2019 -- Model Years: 1974 to 2019

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.004778	CO	0.006512
NOx	0.000465	NOx	0.007615
ROG	0.000585	ROG	0.001382
SOx	0.000009	SOx	0.000035
PM10	0.000084	PM10	0.000248

Scenario Year: 2020 -- Model Years: 1975 to 2020

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.004438	CO	0.006139
NOx	0.00043	NOx	0.006975
ROG	0.000553	ROG	0.001328
SOx	0.000009	SOx	0.000035
PM10	0.000084	PM10	0.000241

Scenario Year: 2021 -- Model Years: 1976 to 2021

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.004166	CO	0.005863
NOx	0.000401	NOx	0.006414
ROG	0.000528	ROG	0.00129
SOx	0.000009	SOx	0.000035
PM10	0.000085	PM10	0.000238

EMFAC 2002 Emission Factors for On-Road Mobile Sources (continued)

Scenario Year: 2022 -- Model Years: 1977 to 2022

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.003883	CO	0.005585
NOx	0.000373	NOx	0.005968
ROG	0.000502	ROG	0.001248
SOx	0.000009	SOx	0.000035
PM10	0.000085	PM10	0.000232

Scenario Year: 2023 -- Model Years: 1978 to 2023

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.003628	CO	0.005344
NOx	0.000348	NOx	0.005585
ROG	0.000477	ROG	0.001211
SOx	0.000009	SOx	0.000035
PM10	0.000085	PM10	0.000228

Scenario Year: 2024 -- Model Years: 1979 to 2024

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.003404	CO	0.005134
NOx	0.000325	NOx	0.005258
ROG	0.000454	ROG	0.001176
SOx	0.000009	SOx	0.000035
PM10	0.000085	PM10	0.000224

Scenario Year: 2025 -- Model Years: 1980 to 2025

Passenger Vehicles (pounds/mile)		Delivery Trucks (pounds/mile)	
CO	0.003216	CO	0.004958
NOx	0.000304	NOx	0.004983
ROG	0.000433	ROG	0.00114
SOx	0.000009	SOx	0.000035
PM10	0.000085	PM10	0.000220

Highest (Most Conservative) EMFAC 2002 (version 2.2, April 23, 2003) Emission Factors for On-Road Heavy Heavy Duty Diesel Trucks

Projects in the SCAQMD (Scenario Years 2005 - 2025)

Derived from Wintertime Emissions Inventory

Heavy Heavy Duty Diesel Trucks (33,001 to 60,000 pounds)

The following emission factors were compiled by running the California Air Resources Board's EMFAC2002 (version 2.2) Burden Model and extracting the Heavy Heavy Duty Diesel Truck (HHDT) Emission Factors. When calculating on-road mobile source emissions from HHDT, use the following equation:

Emissions (pounds per day) = N x TL x EF

where N = number of trips, TL = trip length (miles/day), and EF = emission factor (pounds per mile)

The emission factors account for all emissions from start, running and idling exhaust. In addition, the ROG emission factors take into account diurnal, hot soak, running and resting emissions, and PM10 emission factor takes into account the tire and brake wear.

Scenario Year: 2005 -- Model Years: 1965 to 2005

HHDT-DSL	(pounds/mile)
ROG	0.001403
CO	0.006308
NOx	0.041541
PM10	0.000774
SOx	0.000404

Scenario Year: 2006 -- Model Years: 1965 to 2006

HHDT-DSL	(pounds/mile)
ROG	0.001321
CO	0.005932
NOx	0.03893
PM10	0.00073
SOx	0.000405

Scenario Year: 2007 -- Model Years: 1965 to 2007

HHDT-DSL	(pounds/mile)
ROG	0.001227
CO	0.00552
NOx	0.035635
PM10	0.000644
SOx	4.57E-05

Scenario Year: 2008 -- Model Years: 1965 to 2008

HHDT-DSL	(pounds/mile)
ROG	0.001133
CO	0.005117
NOx	0.032442
PM10	0.000598
SOx	4.6E-05

Scenario Year: 2009 -- Model Years: 1965 to 2009

HHDT-DSL	(pounds/mile)
ROG	0.001042
CO	0.004738
NOx	0.029455
PM10	0.000559
SOx	4.61E-05

Scenario Year: 2010 -- Model Years: 1965 to 2010

HHDT-DSL	(pounds/mile)
ROG	0.000948
CO	0.004335
NOx	0.025802
PM10	0.000507
SOx	4.61E-05

Scenario Year: 2011 -- Model Years: 1966 to 2011

HHDT-DSL	(pounds/mile)
ROG	0.000888
CO	0.004069
NOx	0.022117
PM10	0.000475
SOx	4.61E-05

Scenario Year: 2012 -- Model Years: 1967 to 2012

HHDT-DSL	(pounds/mile)
ROG	0.000813
CO	0.003783
NOx	0.01938
PM10	0.000438
SOx	4.63E-05

Scenario Year: 2013 -- Model Years: 1968 to 2013

HHDT-DSL	(pounds/mile)
ROG	0.000749
CO	0.003551
NOx	0.017054
PM10	0.000408
SOx	4.66E-05

Scenario Year: 2014 -- Model Years: 1969 to 2014

HHDT-DSL	(pounds/mile)
ROG	0.000696
CO	0.003364
NOx	0.0151
PM10	0.000383
SOx	4.71E-05

Highest (Most Conservative) EMFAC 2002 (version 2.2, April 23, 2003)
Emission Factors for On-Road Heavy Heavy Duty Diesel Trucks (concluded)

Scenario Year: 2015 -- Model Years: 1970 to 2015
HHDT-DSL (pounds/mile)

ROG	0.000651
CO	0.003217
NOx	0.013437
PM10	0.000362
SOx	4.62E-05

Scenario Year: 2016 -- Model Years: 1971 to 2016
HHDT-DSL (pounds/mile)

ROG	0.000615
CO	0.003102
NOx	0.012038
PM10	0.000344
SOx	4.7E-05

Scenario Year: 2017-- Model Years: 1972 to 2017
HHDT-DSL (pounds/mile)

ROG	0.000585
CO	0.003005
NOx	0.010831
PM10	0.00033
SOx	4.63E-05

Scenario Year: 2018-- Model Years: 1973 to 2018
HHDT-DSL (pounds/mile)

ROG	0.000558
CO	0.002928
NOx	0.009786
PM10	0.000317
SOx	4.71E-05

Scenario Year: 2019 -- Model Years: 1974 to 2019
HHDT-DSL (pounds/mile)

ROG	0.000536
CO	0.002862
NOx	0.00888
PM10	0.000305
SOx	4.65E-05

Scenario Year: 2020 -- Model Years: 1975 to 2020
HHDT-DSL (pounds/mile)

ROG	0.000518
CO	0.002807
NOx	0.008102
PM10	0.000295
SOx	4.73E-05

Scenario Year: 2021 -- Model Years: 1976 to 2021
HHDT-DSL (pounds/mile)

ROG	0.000512
CO	0.002807
NOx	0.007438
PM10	0.00029
SOx	4.72E-05

Scenario Year: 2022 -- Model Years: 1977 to 2022
HHDT-DSL (pounds/mile)

ROG	0.000501
CO	0.002782
NOx	0.006926
PM10	0.000283
SOx	4.7E-05

Scenario Year: 2023 -- Model Years: 1978 to 2023
HHDT-DSL (pounds/mile)

ROG	0.000492
CO	0.002759
NOx	0.006491
PM10	0.000278
SOx	4.68E-05

Scenario Year: 2024 -- Model Years: 1979 to 2024
HHDT-DSL (pounds/mile)

ROG	0.000483
CO	0.002737
NOx	0.006126
PM10	0.000273
SOx	4.65E-05

Scenario Year: 2025 -- Model Years: 1980 to 2025
HHDT-DSL (pounds/mile)

ROG	0.000477
CO	0.002716
NOx	0.005822
PM10	0.000269
SOx	4.62E-05

Table 8.1E-7 Construction Equipment Emissions Factors (CEC)

Sum of Ems Factor #/hr		Year																								
		2005					2006					2007					2008					2009				
Eq Name	Hp	CO	NOx	PM10	SOx	VOC	CO	NOx	PM10	SOx	VOC	CO	NOx	PM10	SOx	VOC	CO	NOx	PM10	SOx	VOC	CO	NOx	PM10	SOx	VOC
Bore/Drill Rigs	15	0.035	0.07	0	0	0	0.069	0.069	0	0	0	0.069	0.069	0	0	0	0.068	0.068	0	0	0	0.068	0.068	0	0	0
	25	0.067	0.123	0	0	0	0.078	0.156	0	0	0	0.077	0.155	0	0	0	0.077	0.143	0	0	0	0.076	0.142	0	0	0
	50	0.228	0.28	0.027	0.073	0.058	0.207	0.272	0.025	0.075	0.038	0.19	0.263	0.021	0.075	0.038	0.181	0.257	0.017	0.075	0.019	0.173	0.257	0.017	0.075	0.019
	120	0.471	0.822	0.072	0.166	0.101	0.455	0.755	0.056	0.167	0.075	0.444	0.698	0.043	0.167	0.05	0.436	0.626	0.035	0.167	0.037	0.431	0.53	0.03	0.167	0.024
	175	0.693	1.295	0.062	0.291	0.109	0.693	1.165	0.051	0.294	0.081	0.688	1.023	0.043	0.294	0.054	0.691	0.848	0.037	0.294	0.053	0.695	0.711	0.037	0.294	0.026
	250	0.316	1.632	0.038	0.388	0.063	0.313	1.498	0.038	0.393	0.063	0.311	1.332	0.037	0.393	0.062	0.315	1.119	0.037	0.393	0.062	0.316	0.943	0.037	0.393	0.031
	500	0.516	2.294	0.06	0.563	0.085	0.516	2.072	0.059	0.563	0.071	0.517	1.77	0.059	0.563	0.07	0.516	1.513	0.059	0.563	0.07	0.515	1.355	0.058	0.563	0.069
	750	1.035	4.806	0.111	1.146	0.123	1.037	4.28	0.11	1.145	0.122	1.025	3.607	0.109	1.145	0.121	1.039	3.057	0.107	1.145	0.119	1.028	2.695	0.106	1.145	0.118
	9999	1.549	9.819	0.214	1.719	0.516	1.54	9.504	0.204	1.714	0.511	1.537	8.762	0.188	1.714	0.433	1.536	7.929	0.179	1.714	0.357	1.534	7.261	0.17	1.714	0.283
	Composite	0.492	1.512	0.063	0.327	0.102	0.483	1.398	0.055	0.328	0.083	0.476	1.252	0.048	0.329	0.067	0.472	1.099	0.043	0.329	0.056	0.469	0.971	0.04	0.329	0.043
Cement and Mortar Mixers	15	0.032	0.058	0.005	0	0.012	0.041	0.07	0.006	0	0.012	0.04	0.065	0.005	0	0.011	0.04	0.061	0.005	0	0.011	0.039	0.057	0.005	0	0.011
	25	0.116	0.18	0.013	0	0	0.115	0.204	0.013	0	0	0.114	0.203	0.013	0	0	0.113	0.189	0.013	0	0	0.112	0.187	0.012	0	0
	Composite	0.039	0.068	0.005	0	0.011	0.047	0.081	0.006	0	0.011	0.046	0.076	0.005	0	0.01	0.046	0.072	0.005	0	0.01	0.045	0.068	0.005	0	0.01
Concrete/Industrial Saws	25	0	0.143	0	0	0	0	0.142	0	0	0	0	0.141	0	0	0	0	0.14	0	0	0	0	0.139	0	0	0
	50	0.354	0.337	0.044	0.08	0.177	0.343	0.326	0.044	0.077	0.176	0.358	0.323	0.044	0.077	0.087	0.364	0.321	0.043	0.077	0.087	0.362	0.319	0.043	0.077	0.086
	120	0.529	1.099	0.101	0.161	0.151	0.521	1.072	0.1	0.161	0.15	0.517	1.039	0.094	0.161	0.149	0.523	1.017	0.094	0.161	0.148	0.515	0.99	0.093	0.161	0.147
	175	1.029	2.353	0	0.294	0	1.014	2.029	0	0.282	0	1.007	2.014	0	0.282	0	1	2	0	0.282	0	0.993	1.986	0	0.282	0
	Composite	0.458	0.825	0.075	0.129	0.151	0.449	0.799	0.075	0.128	0.15	0.451	0.778	0.071	0.128	0.119	0.457	0.764	0.071	0.128	0.118	0.451	0.747	0.07	0.128	0.117
Cranes	50	0.313	0.252	0.034	0.055	0.136	0.298	0.247	0.03	0.053	0.101	0.282	0.238	0.03	0.053	0.101	0.267	0.237	0.03	0.053	0.1	0.258	0.232	0.03	0.053	0.066
	120	0.362	0.698	0.076	0.109	0.105	0.358	0.661	0.072	0.108	0.097	0.353	0.63	0.067	0.108	0.088	0.349	0.593	0.062	0.108	0.079	0.345	0.55	0.057	0.108	0.071
	175	0.456	1.024	0.065	0.167	0.108	0.455	0.968	0.061	0.167	0.1	0.454	0.904	0.057	0.167	0.09	0.454	0.827	0.053	0.167	0.082	0.455	0.755	0.049	0.167	0.075
	250	0.26	1.31	0.042	0.233	0.085	0.249	1.252	0.039	0.233	0.078	0.241	1.176	0.037	0.233	0.073	0.233	1.081	0.035	0.233	0.068	0.228	0.994	0.033	0.233	0.064
	500	0.405	1.88	0.062	0.326	0.117	0.382	1.752	0.058	0.326	0.107	0.369	1.605	0.055	0.326	0.102	0.358	1.464	0.052	0.326	0.097	0.351	1.338	0.049	0.326	0.092
	750	0.664	3.259	0.103	0.56	0.172	0.64	3.045	0.102	0.556	0.171	0.616	2.801	0.093	0.556	0.169	0.601	2.564	0.092	0.556	0.167	0.587	2.355	0.083	0.556	0.165
	Composite	0.368	1.157	0.059	0.196	0.102	0.36	1.095	0.056	0.196	0.094	0.355	1.023	0.052	0.196	0.086	0.35	0.941	0.049	0.196	0.08	0.347	0.864	0.045	0.196	0.073
Crawler Tractors	50	0.354	0.284	0.047	0.055	0.158	0.352	0.282	0.047	0.053	0.156	0.35	0.28	0.047	0.053	0.155	0.347	0.278	0.046	0.053	0.154	0.345	0.276	0.046	0.053	0.153
	120	0.501	1.043	0.103	0.142	0.153	0.496	1.012	0.101	0.142	0.147	0.494	0.99	0.1	0.142	0.143	0.493	0.969	0.099	0.142	0.14	0.492	0.94	0.098	0.142	0.136
	175	0.735	1.752	0.106	0.251	0.184	0.729	1.698	0.104	0.251	0.177	0.727	1.652	0.102	0.251	0.172	0.727	1.607	0.101	0.251	0.169	0.727	1.557	0.1	0.251	0.165
	250	0.599	2.256	0.095	0.345	0.179	0.562	2.183	0.09	0.345	0.168	0.536	2.121	0.086	0.345	0.161	0.515	2.06	0.083	0.345	0.156	0.493	1.993	0.079	0.345	0.15
	500	1.502	3.218	0.131	0.469	0.243	1.361	3.081	0.124	0.469	0.229	1.246	2.965	0.119	0.469	0.22	1.144	2.871	0.115	0.469	0.213	1.043	2.77	0.111	0.469	0.206
	750	2.47	5.819	0.229	0.86	0.433	2.254	5.599	0.221	0.857	0.429	2.072	5.41	0.212	0.857	0.364	1.918	5.234	0.21	0.857	0.36	1.756	5.055	0.196	0.857	0.356
	9999	4.253	9.458	0.334	1.219	0.743	3.933	9.28	0.325	1.215	0.735	3.666	9.1	0.309	1.215	0.727	3.423	8.945	0.3	1.215	0.659	3.18	8.763	0.279	1.215	0.653
	Composite	0.675	1.617	0.106	0.232	0.174	0.65	1.564	0.103	0.232	0.166	0.631	1.521	0.1	0.232	0.161	0.616	1.48	0.099	0.232	0.156	0.6	1.434	0.097	0.232	0.152
Crushing/Proc. Equipment	50	0.636	0.512	0.071	0.104	0.244	0.628	0.504	0.07	0.105	0.242	0.628	0.5	0.07	0.105	0.229	0.632	0.498	0.069	0.105	0.239	0.633	0.494	0.07	0.105	0.226
	120	0.634	1.322	0.131	0.18	0.194	0.629	1.283	0.128	0.179	0.188	0.626	1.255	0.127	0.179	0.183	0.625	1.228	0.126	0.179	0.178	0.624	1.192	0.125	0.179	0.172
	175	1.018	2.426	0.147	0.346	0.254	1.01	2.352	0.143	0.348	0.242	1.007	2.289	0.141	0.348	0.241	1.007	2.226	0.141	0.348	0.239	1.008	2.157	0.139	0.348	0.228
	250	0.888	3.335	0.138	0.513	0.296	0.833	3.234	0.127	0.515	0.294	0.788	3.123	0.126	0.515	0.195	0.763	3.043	0.126	0.515	0.193	0.729	2.946	0.115	0.515	0.192
	500	2.19	4.649	0.19	0.675	0.348	1.981	4.453	0.18	0.678	0.328	1.813	4.286	0.172	0.678	0.326	1.666	4.149	0.167	0.678	0.307	1.519	4.006	0.161	0.678	0.305
	750	3.148	7.222	0.185	0.926	0	2.752	7.156	0.183	1.053	0	2.727	6.909	0.182	1.053	0	2.321	6.607	0.179	1.053	0	2.143	6.607	0.179	1.053	0
	9999	8.704	18.889	0.556	2.407	1.852	8.073	18.53	0.55	2.281	1.835	7.273	18.36	0.545	2.281	1.818	6.786	17.86	0.536	2.281	1.786	6.429	17.68	0.536	2.281	1.786
	Composite	0.909	1.857	0.131	0.268	0.236	0.877	1.796	0.128	0.268	0.228	0.854	1.748	0.126	0.268	0.221	0.836	1.703	0.125	0.268	0.217	0.817	1.652	0.123	0.268	0.21
Dumpers/Tenders	25	0.045	0.078	0	0	0	0.044	0.077	0	0	0	0.044	0.077	0	0	0	0.022	0.076	0	0	0	0.022	0.076	0	0	0
	Composite	0.045	0.078	0	0	0	0.044	0.077	0	0	0	0.044	0.077	0	0	0	0.022	0.076	0	0	0	0.022	0.076	0	0	0
Excavators	25	0.049	0.113	0.007	0	0.07	0.063	0.161	0.007	0	0	0.062	0.146	0.007	0	0	0.062	0.138	0.007	0	0	0.062	0.137	0.007	0	0
	50	0.266	0.254	0.031	0.06	0.094	0.254	0.246	0.03	0.059	0.085	0.243	0.241	0.028	0.059	0.076	0.232	0.236	0.026	0.059	0.064	0.219	0.231	0.024	0.059	0.053
	120	0.497	0.917	0.096	0.159	0.135	0.491	0.878	0.089	0.159	0.122	0.484	0.839	0.081	0.159	0.108	0.477	0.781	0.073	0.159	0.094	0.469	0.705	0.063	0.159	0.078
	175	0.596	1.291	0.076	0.233	0.128	0.597	1.221	0.07	0.233	0.115	0.597	1.125	0.064	0.233	0.102	0.598	1.004	0.058	0.233	0.088	0.597	0.883	0.051	0.233	0.074
	250	0.312	1.681	0.047	0.329	0.096	0.302	1.603	0.044	0.329	0.088	0.296	1.491	0.041	0.329	0.081	0.292	1.344	0.039	0.329	0.075	0.289	1.195	0.037	0.329	0.069
	500	0.446	2.168	0.063	0.423	0.117	0.432	2.001	0.059	0.423	0.108	0.423	1.802	0.056	0.423	0.1	0.418	1.624	0.054	0.423	0.094	0.414	1.477	0.052	0.423	0.09
	750	0.722	3.783	0.095	0.722	0.19	0.715	3.518	0.094	0.721	0.188	0.707	3.144	0.074	0.721	0.186	0.681	2.833	0.074	0.721	0.184	0.674	2.55	0.073	0.721	0.182
	Composite	0.481	1.302	0.07	0.243	0.12	0.476	1.23	0.065	0.243	0.109	0.472	1.138	0.06	0.243	0.097	0.469	1.029	0.055	0.243	0.086	0.465	0.919	0.049	0.243	0.074
Forklifts	50	0.271	0.182	0.029	0	0.109	0.262	0.178	0.028	0	0.103	0.252	0.173	0.027	0	0.096	0.243	0.169	0.026	0	0.089	0.234	0.165	0.025	0	0.083
	120	0.257	0.521	0.06	0	0.084	0.253	0.494	0.057	0	0.079	0.25	0.468	0.055	0	0.074	0.247	0.442	0.052	0	0.069	0.244	0.416	0.05	0	0.065
	175	0.362	0.863	0.059	0.001	0.1	0.36	0.815	0.057	0.001	0.095	0.358	0.766	0.054	0.001	0.089	0.356	0.718	0.052	0.001	0.084	0.354	0.671	0.049	0.001	0.079
	250	0.271	1.103	0.048	0.001	0.091	0.254	1.042	0.045	0.001	0.085	0.237	0.981	0.041	0.001	0.079	0.221	0.921	0.038	0.001	0.074	0.205	0.861	0.035	0.001	0.068
	500	0.51	1.415	0.062	0.001	0.113	0.461	1.327	0.058	0.001	0.106	0.412	1.239	0.055	0.001	0.1	0.363	1.152	0.051	0.001	0.094	0.315	1.066	0.047	0.001	0.087
	Composite	0.268	0.508	0.054	0	0.09	0.263	0.482	0.052	0	0.084	0.259	0.457	0.05	0	0.079	0.254	0.432	0.048	0	0.074	0.249	0.406	0.045	0	0.069

Sum of Ems Factor #/hr		Year	Pollutant																							
		2005					2006					2007					2008					2009				
Eq Name	Hp	CO	NOx	PM10	SOx	VOC	CO	NOx	PM10	SOx	VOC	CO	NOx	PM10	SOx	VOC	CO	NOx	PM10	SOx	VOC	CO	NOx	PM10	SOx	VOC
Generator Sets	15	0.037	0.067	0.008	0	0.017	0.035	0.063	0.007	0	0.016	0.033	0.058	0.007	0	0.015	0.03	0.053	0.007	0	0.015	0.028	0.049	0.007	0	0.014
	25	0.057	0.101	0.013	0	0.036	0.053	0.096	0.013	0	0.034	0.049	0.09	0.013	0	0.033	0.044	0.085	0.013	0	0.031	0.04	0.08	0.013	0	0.03
	50	0.313	0.33	0.037	0	0.116	0.309	0.326	0.036	0	0.112	0.306	0.322	0.036	0	0.108	0.302	0.318	0.035	0	0.105	0.298	0.315	0.035	0	0.101
	120	0.529	1.108	0.094	0.001	0.152	0.525	1.074	0.092	0.001	0.146	0.52	1.041	0.089	0.001	0.14	0.516	1.008	0.087	0.001	0.134	0.512	0.975	0.085	0.001	0.128
	175	0.766	1.842	0.096	0.002	0.178	0.762	1.78	0.093	0.002	0.171	0.758	1.719	0.091	0.002	0.164	0.754	1.659	0.088	0.002	0.157	0.75	1.6	0.086	0.002	0.151
	250	0.666	2.588	0.09	0.002	0.185	0.635	2.499	0.086	0.002	0.176	0.604	2.411	0.083	0.002	0.167	0.574	2.324	0.079	0.002	0.158	0.544	2.237	0.075	0.002	0.149
	500	1.333	3.853	0.134	0.003	0.265	1.247	3.703	0.129	0.003	0.252	1.163	3.555	0.123	0.003	0.238	1.08	3.408	0.117	0.003	0.225	0.997	3.262	0.111	0.003	0.211
	750	2.157	6.356	0.218	0.005	0.441	2.017	6.113	0.209	0.005	0.418	1.879	5.873	0.201	0.005	0.395	1.742	5.635	0.193	0.005	0.372	1.607	5.4	0.185	0.005	0.35
	9999	5.189	14.059	0.487	0.01	1.109	4.899	13.73	0.466	0.01	1.063	4.612	13.4	0.445	0.01	1.017	4.328	13.08	0.424	0.01	0.972	4.048	12.76	0.404	0.01	0.927
	Composite	0.338	0.699	0.051	0.001	0.101	0.33	0.678	0.05	0.001	0.098	0.322	0.656	0.048	0.001	0.094	0.315	0.635	0.047	0.001	0.09	0.307	0.614	0.046	0.001	0.086
Graders	50	0.339	0.301	0.025	0.075	0.126	0.324	0.287	0.025	0.073	0.125	0.309	0.285	0.025	0.073	0.124	0.283	0.283	0.025	0.073	0.123	0.281	0.256	0.024	0.073	0.122
	120	0.521	1.029	0.103	0.162	0.148	0.515	0.977	0.097	0.162	0.137	0.508	0.926	0.092	0.162	0.125	0.501	0.869	0.085	0.162	0.114	0.494	0.806	0.078	0.162	0.1
	175	0.676	1.562	0.092	0.257	0.159	0.673	1.476	0.087	0.257	0.147	0.672	1.377	0.082	0.257	0.134	0.671	1.266	0.076	0.257	0.121	0.67	1.159	0.07	0.257	0.108
	250	0.414	1.988	0.064	0.357	0.13	0.379	1.889	0.058	0.357	0.116	0.364	1.78	0.054	0.357	0.107	0.352	1.645	0.051	0.357	0.098	0.343	1.514	0.048	0.357	0.092
	500	0.565	2.426	0.078	0.414	0.157	0.502	2.25	0.072	0.418	0.125	0.473	2.073	0.068	0.418	0.124	0.458	1.906	0.061	0.418	0.123	0.443	1.743	0.061	0.418	0.122
	750	0.976	5.366	0	0.732	0	0.964	5.06	0	0.92	0	0.941	4.235	0	0.92	0	0.941	4	0	0.92	0	0.93	3.721	0	0.92	0
	Composite	0.567	1.623	0.084	0.276	0.148	0.553	1.537	0.079	0.276	0.135	0.546	1.442	0.074	0.276	0.124	0.54	1.331	0.069	0.276	0.112	0.536	1.223	0.064	0.276	0.102
Off-Highway Tractors	120	0.6	1.4	0	0	0	0.594	1.386	0	0	0	0.588	1.373	0	0	0	0.577	1.346	0	0	0	0.769	1.346	0	0	0
	175	0.779	1.858	0.111	0.27	0.194	0.773	1.801	0.108	0.27	0.185	0.771	1.751	0.106	0.27	0.181	0.77	1.702	0.105	0.27	0.176	0.77	1.649	0.104	0.27	0.172
	250	0.461	1.745	0.072	0.27	0.137	0.433	1.689	0.068	0.27	0.128	0.413	1.64	0.065	0.27	0.122	0.397	1.592	0.063	0.27	0.118	0.38	1.539	0.06	0.27	0.114
	750	2.896	7.029	0.274	1.052	0.514	2.642	6.768	0.26	1.051	0.49	2.441	6.532	0.25	1.051	0.466	2.256	6.326	0.244	1.051	0.461	2.07	6.103	0.235	1.051	0.438
	9999	5.054	11.583	0.414	1.529	0.899	4.698	11.37	0.391	1.517	0.89	4.398	11.14	0.387	1.517	0.88	4.104	10.92	0.383	1.517	0.87	3.804	10.72	0.361	1.517	0.861
	Composite	0.744	2.076	0.101	0.31	0.184	0.716	2.011	0.097	0.31	0.176	0.695	1.953	0.095	0.31	0.169	0.679	1.898	0.093	0.31	0.165	0.661	1.838	0.09	0.311	0.16
Off-Highway Trucks	175	0.743	1.712	0.113	0.258	0.183	0.74	1.617	0.106	0.258	0.182	0.74	1.507	0.1	0.258	0.164	0.736	1.387	0.093	0.258	0.147	0.734	1.269	0.088	0.258	0.13
	250	0.443	2.087	0.074	0.345	0.147	0.404	1.981	0.067	0.345	0.132	0.387	1.867	0.063	0.345	0.122	0.374	1.726	0.059	0.345	0.115	0.363	1.588	0.055	0.345	0.11
	500	0.742	3.062	0.111	0.493	0.209	0.652	2.845	0.101	0.493	0.188	0.609	2.623	0.095	0.493	0.178	0.578	2.41	0.089	0.493	0.169	0.562	2.204	0.084	0.493	0.161
	750	1.172	5.069	0.179	0.819	0.341	1.038	4.735	0.164	0.819	0.306	0.976	4.378	0.155	0.819	0.295	0.931	4.033	0.147	0.819	0.277	0.907	3.699	0.139	0.819	0.266
	9999	2.58	8.709	0.265	1.157	0.659	2.298	8.402	0.247	1.157	0.602	2.049	8.006	0.228	1.157	0.562	1.814	7.572	0.211	1.157	0.507	1.616	7.141	0.196	1.157	0.453
	Composite	0.765	3.119	0.112	0.493	0.22	0.684	2.93	0.102	0.494	0.199	0.641	2.731	0.096	0.494	0.187	0.607	2.525	0.09	0.494	0.175	0.585	2.325	0.085	0.494	0.166
Other Construction Equipment	15	0.039	0.062	0.006	0.001	0.026	0.062	0.094	0.006	0.002	0.009	0.061	0.086	0.006	0.002	0.009	0.061	0.08	0.006	0.002	0.009	0.061	0.078	0.006	0.002	0.009
	25	0.047	0.105	0.01	0	0.052	0.062	0.13	0.01	0	0	0.057	0.129	0.01	0	0	0.056	0.118	0.005	0	0	0.056	0.117	0.005	0	0
	50	0.338	0.307	0.041	0.068	0.136	0.329	0.308	0.037	0.066	0.136	0.333	0.303	0.037	0.066	0.135	0.331	0.301	0.04	0.066	0.134	0.329	0.299	0.04	0.066	0.1
	120	0.578	1.206	0.111	0.175	0.165	0.572	1.169	0.106	0.175	0.163	0.568	1.142	0.105	0.175	0.162	0.566	1.114	0.105	0.175	0.161	0.564	1.079	0.102	0.175	0.14
	175	0.605	1.45	0.081	0.221	0.15	0.6	1.406	0.079	0.22	0.134	0.599	1.363	0.077	0.22	0.133	0.598	1.323	0.076	0.22	0.132	0.595	1.281	0.074	0.22	0.131
	500	1.203	3.011	0.112	0.459	0.212	1.098	2.88	0.105	0.46	0.198	1.015	2.768	0.102	0.46	0.19	0.941	2.677	0.099	0.46	0.183	0.867	2.578	0.094	0.46	0.175
	Composite	0.625	1.481	0.07	0.223	0.136	0.592	1.432	0.066	0.223	0.121	0.561	1.38	0.065	0.223	0.118	0.534	1.336	0.063	0.223	0.115	0.507	1.289	0.061	0.223	0.108
Pavers	25	0.092	0.214	0	0	0	0.121	0.212	0	0	0	0.091	0.211	0	0	0	0.06	0.21	0	0	0	0.06	0.208	0	0	0
	50	0.287	0.286	0.034	0.066	0.102	0.272	0.277	0.032	0.067	0.091	0.26	0.269	0.03	0.067	0.08	0.249	0.264	0.028	0.067	0.072	0.238	0.259	0.027	0.067	0.062
	120	0.458	0.865	0.086	0.15	0.123	0.452	0.824	0.08	0.15	0.112	0.447	0.789	0.074	0.15	0.1	0.441	0.742	0.068	0.15	0.089	0.435	0.682	0.061	0.15	0.078
	175	0.667	1.472	0.083	0.266	0.143	0.668	1.396	0.078	0.266	0.131	0.668	1.298	0.071	0.266	0.117	0.669	1.18	0.066	0.266	0.102	0.669	1.067	0.06	0.266	0.088
	250	0.389	2.057	0.058	0.401	0.115	0.378	1.965	0.054	0.401	0.115	0.364	1.84	0.051	0.401	0.114	0.356	1.683	0.045	0.401	0.085	0.351	1.535	0.045	0.401	0.084
	500	0.457	2.208	0.065	0.424	0.112	0.443	2.05	0.061	0.425	0.111	0.429	1.864	0.055	0.425	0.111	0.418	1.698	0.055	0.425	0.082	0.412	1.544	0.052	0.425	0.082
	Composite	0.449	0.894	0.067	0.165	0.12	0.442	0.849	0.062	0.165	0.109	0.435	0.802	0.058	0.165	0.098	0.429	0.745	0.053	0.165	0.086	0.423	0.685	0.049	0.165	0.075
Paving Equipment	25	0.049	0.098	0.01	0	0.041	0.057	0.124	0.01	0	0.014	0.057	0.118	0.009	0	0.014	0.052	0.114	0.009	0	0.013	0.052	0.11	0.008	0	0.013
	50	0.291	0.265	0.034	0.054	0.112	0.286	0.263	0.032	0.06	0.111	0.284	0.261	0.033	0.06	0.11	0.285	0.258	0.033	0.06	0.11	0.285	0.256	0.033	0.06	0.091
	120	0.39	0.815	0.075	0.118	0.114	0.387	0.791	0.073	0.118	0.11	0.385	0.772	0.072	0.118	0.106	0.383	0.754	0.071	0.118	0.103	0.381	0.73	0.07	0.118	0.1
	175	0.577	1.379	0.077	0.21	0.138	0.572	1.336	0.075	0.21	0.132	0.57	1.298	0.074	0.21	0.128	0.569	1.259	0.073	0.21	0.125	0.567	1.217	0.072	0.21	0.121
	250	0.407	1.566	0.061	0.254	0.117	0.382	1.516	0.057	0.254	0.107	0.364	1.469	0.055	0.254	0.106	0.35	1.424	0.053	0.254	0.105	0.335	1.376	0.05	0.254	0.095
	Composite	0.419	0.961	0.069	0.144	0.117	0.414	0.934	0.067	0.144	0.11	0.411	0.909	0.066	0.144	0.107	0.408	0.885	0.065	0.144	0.104	0.406	0.856	0.064	0.144	0.1
Plate Compactors	15	0.018	0.029	0.002	0	0.009	0.026	0.041	0.002	0	0.009	0.026	0.039	0.002	0	0.009	0.026	0.037	0.002	0	0	0.025	0.034	0.002	0	0
	Composite	0.018	0.029	0.002	0	0.009	0.026	0.041	0.002	0	0.009	0.026	0.039	0.002	0	0.009	0.026	0.037	0.002	0	0	0.025	0.034	0.002	0	0
Rollers	15	0.025	0.039	0.004	0.001	0.016	0.039	0.059	0.004	0.001	0.008	0.038	0.054	0.004	0.001	0.008	0.038	0.05	0.003	0.001	0.004	0.038	0.049	0.003	0.001	0.004
	25	0.051	0.103	0.009	0.001	0.038	0.06	0.131	0.008	0.002	0.019	0.058	0.125	0.008	0.002	0.019	0.057	0.122	0.008	0.002	0.018	0.056	0.116	0.008	0.002	0.009
	50	0.259	0.264	0.031	0.062	0.09	0.246	0.255	0.029	0.062	0.081	0.235	0.248	0.027	0.062	0.071	0.225	0.244	0.026	0.062	0.065	0.215	0.239	0.024	0.062	0.056
	120	0.387	0.732	0.071	0.127	0.104	0.382	0.696	0.067	0.128	0.094	0.377	0.667	0.061	0.128	0.084	0.373	0.628	0.056	0.128	0.074	0.368	0.577	0.05	0.128	0.064
	175	0.558	1.231	0.069	0.224	0.119	0.558	1.167	0.064	0.224	0.107	0.558	1.085	0.059	0.224	0.095	0.559	0.987	0.054	0.224	0.083	0.559	0.892	0.049	0.224	0.073
	250	0.306	1.606	0.044	0.317	0.089	0.295	1.536	0.042	0.318	0.088	0.286	1.436	0.041	0.318	0.078	0.28	1.316	0.037	0.318	0.068	0.274	1.197	0.035	0.318	0.067

Sum of Ems Factor #/hr		Year	Pollutant																								
		2005					2006					2007					2008					2009					
Eq Name	Hp	CO	NOx	PM10	SOx	VOC	CO	NOx	PM10	SOx	VOC	CO	NOx	PM10	SOx	VOC	CO	NOx	PM10	SOx	VOC	CO	NOx	PM10	SOx	VOC
Rollers	500	0.428	2.061	0.061	0.397	0.113	0.412	1.914	0.055	0.396	0.098	0.399	1.741	0.051	0.396	0.083	0.39	1.579	0.05	0.396	0.083	0.385	1.443	0.048	0.396	0.082
	Composite	0.371	0.774	0.059	0.139	0.097	0.368	0.738	0.055	0.139	0.086	0.364	0.697	0.051	0.139	0.077	0.36	0.648	0.046	0.139	0.068	0.356	0.593	0.042	0.139	0.06
Rough Terrain Forklifts	50	0.393	0.356	0.046	0.081	0.143	0.372	0.344	0.041	0.081	0.128	0.355	0.336	0.041	0.081	0.113	0.342	0.329	0.036	0.081	0.098	0.327	0.321	0.036	0.081	0.083
	120	0.43	0.81	0.085	0.135	0.119	0.425	0.771	0.08	0.135	0.109	0.419	0.739	0.074	0.135	0.098	0.414	0.695	0.068	0.135	0.088	0.409	0.639	0.061	0.135	0.077
	175	0.675	1.487	0.089	0.259	0.151	0.675	1.411	0.083	0.259	0.136	0.676	1.312	0.077	0.259	0.124	0.677	1.194	0.071	0.259	0.109	0.678	1.078	0.064	0.259	0.097
	250	0.366	1.869	0.054	0.354	0.125	0.347	1.79	0.054	0.358	0.083	0.333	1.679	0.049	0.358	0.082	0.326	1.533	0.049	0.358	0.082	0.32	1.397	0.045	0.358	0.081
	500	0.521	2.496	0.077	0.463	0.129	0.505	2.319	0.07	0.46	0.128	0.495	2.1	0.063	0.46	0.127	0.479	1.922	0.057	0.46	0.126	0.463	1.752	0.056	0.46	0.125
	Composite	0.456	0.89	0.084	0.15	0.123	0.451	0.846	0.079	0.15	0.112	0.446	0.806	0.073	0.15	0.101	0.442	0.754	0.067	0.15	0.09	0.437	0.691	0.061	0.15	0.079
Rubber Tired Dozers	175	0.66	1.396	0.075	0.264	0.189	0.674	1.33	0.075	0.273	0.187	0.67	1.191	0.037	0.273	0.186	0.665	1.017	0.037	0.273	0	0.661	0.899	0.037	0.273	0
	250	0.656	2.475	0.103	0.38	0.193	0.616	2.395	0.098	0.38	0.184	0.587	2.326	0.093	0.38	0.175	0.564	2.258	0.089	0.38	0.174	0.54	2.185	0.086	0.38	0.165
	500	1.503	3.271	0.132	0.479	0.246	1.363	3.131	0.124	0.479	0.229	1.249	3.014	0.12	0.479	0.222	1.148	2.917	0.116	0.479	0.216	1.047	2.814	0.111	0.479	0.209
	750	2.079	4.957	0.191	0.738	0.342	1.901	4.775	0.183	0.739	0.338	1.746	4.61	0.181	0.739	0.335	1.623	4.47	0.172	0.739	0.331	1.481	4.312	0.17	0.739	0.328
	9999	3.645	8.571	0.296	1.084	0.985	3.512	8.39	0.293	1.116	0.976	3.285	8.213	0.29	1.116	0.966	3.048	8.095	0.286	1.116	0.952	2.817	7.887	0.282	1.116	0
	Composite	1.209	3.037	0.123	0.453	0.232	1.106	2.919	0.117	0.452	0.219	1.024	2.817	0.112	0.452	0.211	0.952	2.728	0.108	0.452	0.204	0.878	2.633	0.104	0.453	0.194
Rubber Tired Loaders	25	0.06	0.134	0	0	0	0.089	0.163	0	0	0	0.088	0.147	0	0	0	0.088	0.131	0	0	0	0.087	0.13	0	0	0
	50	0.377	0.33	0.044	0.074	0.137	0.359	0.32	0.041	0.074	0.126	0.343	0.312	0.039	0.074	0.111	0.329	0.306	0.037	0.074	0.101	0.316	0.3	0.035	0.074	0.086
	120	0.412	0.775	0.083	0.127	0.116	0.407	0.738	0.078	0.127	0.106	0.402	0.707	0.072	0.127	0.098	0.397	0.665	0.066	0.127	0.085	0.392	0.612	0.06	0.127	0.075
	175	0.584	1.284	0.079	0.221	0.132	0.584	1.218	0.074	0.221	0.121	0.584	1.133	0.068	0.221	0.109	0.585	1.031	0.063	0.221	0.097	0.586	0.932	0.057	0.221	0.086
	250	0.319	1.658	0.05	0.309	0.101	0.308	1.584	0.047	0.309	0.094	0.297	1.481	0.044	0.309	0.086	0.29	1.358	0.041	0.309	0.081	0.285	1.236	0.039	0.309	0.076
	500	0.488	2.332	0.073	0.429	0.137	0.472	2.166	0.068	0.429	0.126	0.456	1.97	0.064	0.429	0.118	0.445	1.79	0.061	0.429	0.112	0.437	1.633	0.058	0.429	0.108
	750	0.989	4.965	0.15	0.904	0.3	0.958	4.634	0.143	0.905	0.247	0.929	4.234	0.137	0.905	0.244	0.909	3.845	0.126	0.905	0.242	0.895	3.489	0.124	0.905	0.239
	9999	1.862	7.542	0.191	1.098	0.477	1.651	7.217	0.169	1.131	0.472	1.399	6.807	0.186	1.131	0.466	1.336	6.452	0.138	1.131	0.461	1.279	6.21	0.137	1.131	0.457
	Composite	0.438	1.253	0.073	0.221	0.119	0.432	1.187	0.068	0.221	0.109	0.425	1.111	0.063	0.221	0.099	0.421	1.022	0.059	0.221	0.09	0.417	0.932	0.054	0.221	0.082
Scrapers	120	0.69	1.404	0.147	0.202	0.21	0.689	1.361	0.142	0.203	0.209	0.684	1.306	0.133	0.203	0.166	0.671	1.231	0.132	0.203	0.165	0.658	1.133	0.119	0.203	0.164
	175	0.857	2.053	0.126	0.307	0.219	0.854	1.98	0.122	0.307	0.208	0.85	1.867	0.117	0.307	0.193	0.845	1.728	0.111	0.307	0.179	0.842	1.597	0.105	0.307	0.164
	250	0.638	2.692	0.102	0.435	0.201	0.588	2.59	0.094	0.435	0.186	0.531	2.436	0.085	0.435	0.166	0.491	2.261	0.078	0.435	0.151	0.469	2.106	0.072	0.435	0.141
	500	1.166	3.768	0.142	0.582	0.27	1.027	3.57	0.132	0.582	0.248	0.889	3.301	0.119	0.582	0.223	0.787	3.048	0.109	0.582	0.203	0.727	2.826	0.103	0.582	0.192
	750	1.912	6.595	0.248	1.03	0.477	1.698	6.278	0.231	1.031	0.425	1.48	5.83	0.201	1.031	0.373	1.321	5.389	0.189	1.031	0.369	1.229	5.005	0.178	1.031	0.32
	Composite	1.001	3.203	0.133	0.496	0.249	0.909	3.051	0.124	0.496	0.23	0.816	2.839	0.114	0.496	0.207	0.748	2.625	0.105	0.496	0.19	0.708	2.435	0.099	0.496	0.178
Signal Boards	15	0.024	0.037	0.004	0.001	0.013	0.038	0.053	0.004	0.001	0.006	0.038	0.049	0.004	0.001	0.005	0.038	0.048	0.004	0.001	0.005	0.038	0.047	0.004	0.001	0.005
	50	0.415	0.39	0.049	0.073	0.244	0.412	0.387	0.048	0.094	0.242	0.385	0.385	0.048	0.094	0.24	0.382	0.382	0.048	0.094	0.239	0.379	0.379	0.047	0.094	0.237
	120	0.566	1.179	0.107	0.172	0.159	0.559	1.142	0.103	0.173	0.158	0.557	1.117	0.101	0.173	0.157	0.553	1.091	0.101	0.173	0.142	0.55	1.056	0.099	0.173	0.141
	175	0.865	2.076	0.114	0.319	0.21	0.861	2.009	0.109	0.322	0.208	0.857	1.949	0.108	0.322	0.184	0.851	1.892	0.105	0.322	0.183	0.85	1.829	0.102	0.322	0.181
	250	0.688	2.665	0.098	0.448	0.218	0.64	2.56	0.098	0.444	0.217	0.625	2.501	0.097	0.444	0.216	0.6	2.409	0.096	0.444	0.214	0.574	2.35	0.074	0.444	0.213
	Composite	0.086	0.183	0.013	0.024	0.03	0.097	0.193	0.013	0.024	0.023	0.097	0.185	0.013	0.024	0.021	0.096	0.18	0.013	0.024	0.02	0.096	0.176	0.013	0.024	0.02
Skid Steer Loaders	25	0.047	0.101	0.01	0.002	0.04	0.06	0.133	0.009	0.002	0.015	0.058	0.127	0.008	0.002	0.014	0.057	0.121	0.008	0.002	0.013	0.057	0.116	0.008	0.002	0.013
	50	0.216	0.241	0.026	0.061	0.071	0.204	0.234	0.024	0.061	0.059	0.191	0.228	0.022	0.061	0.048	0.178	0.223	0.02	0.061	0.035	0.168	0.219	0.018	0.061	0.025
	120	0.271	0.487	0.047	0.092	0.067	0.266	0.46	0.041	0.092	0.057	0.26	0.433	0.035	0.092	0.046	0.255	0.393	0.029	0.092	0.035	0.25	0.345	0.023	0.092	0.026
	Composite	0.222	0.31	0.032	0.067	0.068	0.213	0.299	0.029	0.067	0.055	0.204	0.287	0.025	0.067	0.045	0.194	0.27	0.022	0.067	0.034	0.186	0.252	0.019	0.067	0.025
Surfacing Equipment	50	0.159	0.143	0.016	0.032	0	0.158	0.142	0.016	0.031	0	0.157	0.141	0.016	0.031	0	0.156	0.14	0.016	0.031	0	0.155	0.139	0.015	0.031	0
	120	0.53	0.985	0.076	0.152	0	0.524	0.899	0	0.146	0	0.52	0.892	0	0.146	0	0.517	0.886	0	0.146	0	0.515	0.882	0	0.146	0
	175	0.505	1.212	0	0.202	0	0.5	1.1	0	0.195	0	0.495	1.089	0	0.195	0	0.493	0.985	0	0.195	0	0.588	0.98	0	0.195	0
	250	0.452	1.709	0.05	0.302	0	0.45	1.65	0.05	0.292	0	0.398	1.592	0.05	0.292	0	0.346	1.531	0.049	0.292	0	0.343	1.471	0	0.292	0
	500	1.014	2.602	0.101	0.403	0.189	0.925	2.495	0.094	0.401	0.188	0.851	2.391	0.081	0.401	0.186	0.789	2.313	0.08	0.401	0.185	0.741	2.229	0.08	0.401	0.122
	750	1.456	4.175	0.146	0.631	0	1.343	3.933	0.144	0.596	0	1.28	3.791	0.142	0.596	0	1.221	3.709	0.141	0.596	0	1.114	3.527	0.139	0.596	0
	Composite	0.778	1.988	0.077	0.312	0.105	0.72	1.899	0.07	0.307	0.104	0.67	1.827	0.062	0.307	0.104	0.628	1.77	0.062	0.307	0.103	0.596	1.706	0.058	0.308	0.068
Tractors/Loaders/Backhoes	25	0.079	0.138	0.013	0	0.05	0.085	0.164	0.012	0	0.033	0.075	0.156	0.012	0	0.017	0.072	0.15	0.012	0	0.016	0.07	0.145	0.011	0	0.016
	50	0.476	0.36	0.052	0.072	0.185	0.471	0.355	0.052	0.072	0.181	0.472	0.353	0.052	0.072	0.179	0.476	0.352	0.052	0.072	0.178	0.477	0.35	0.052	0.072	0.176
	120	0.408	0.849	0.087	0.112	0.127	0.404	0.824	0.086	0.112	0.123	0.403	0.807	0.085	0.112	0.12	0.403	0.79	0.085	0.112	0.117	0.402	0.768	0.084	0.112	0.114
	175	0.638	1.517	0.096	0.21	0.163	0.633	1.471	0.094	0.21	0.157	0.632	1.433	0.093	0.21	0.154	0.632	1.395	0.092	0.21	0.151	0.633	1.354	0.091	0.21	0.148
	250	0.648	2.441	0.1	0.349	0.249	0.618	2.324	0.099	0.361	0.247	0.565	2.285	0.098	0.361	0.246	0.536	2.217	0.097	0.361	0.244	0.533	2.155	0.073	0.361	0.242
	Composite	0.424	0.858	0.086	0.115	0.132	0.421	0.834	0.084	0.115	0.128	0.419	0.816	0.083	0.115	0.125	0.42	0.799	0.083	0.115	0.122	0.419	0.777	0.082	0.115	0.119
Trenchers	15	0.036	0.051	0.004	0	0.04	0.051	0.075	0.004	0	0	0.051	0.062	0.004	0	0	0.054	0.062	0.004	0	0	0.054	0.062	0.004	0	0
	25	0.11	0.242	0.026	0	0.076	0.143	0.319	0.023	0	0.038	0.138	0.299	0.022	0	0.037	0.137	0.289	0.022	0	0.037	0.136	0.283	0.022	0	0.037
	50	0.296	0.322	0.036	0.078	0.101	0.282	0.312	0.034	0.079	0.089	0.269	0.306	0.032	0.079	0.079	0.256	0.299	0.029	0.079	0.066	0.242	0.292	0.027	0.079	0.054
	120	0.416	0.771	0.074	0.14	0.109	0.41	0.737	0.068	0.14	0.097	0.405	0.705	0.062	0.14	0.085	0.398	0.656	0.055	0.14	0.073	0.392	0.592	0.048	0.14	0.06
	175	0.726	1.577	0.085	0.298	0.152	0.726	1.491	0.078	0.299	0.13	0.727	1.374	0.071	0.299	0.116	0.728	1.226	0.064	0.299	0.095	0.727	1.08	0.056	0.299	0.081

Sum of Ems Factor #/hr		Year	Pollutant																						
		2005					2006					2007					2008					2009				
Eq Name	Hp	CO	NOx	PM10	SOx	VOC	CO	NOx	PM10	SOx	VOC	CO	NOx	PM10	SOx	VOC	CO	NOx	PM10	SOx	VOC	CO	NOx	PM10	SOx	VOC
Trenchers	250	0.406	2.243	0.055	0.461	0.156	0.403	2.149	0.054	0.46	0.078	0.393	1.988	0.054	0.46	0.077	0.39	1.798	0.054	0.46	0.077	0.388	1.604	0.053	0.46	0.076
	500	0.565	2.783	0.073	0.565	0.122	0.549	2.57	0.072	0.564	0.121	0.539	2.319	0.066	0.564	0.12	0.536	2.089	0.065	0.564	0.119	0.532	1.898	0.065	0.564	0.118
	750	0.845	5.915	0	0.845	0	0.845	5.07	0	1.081	0	0.833	4.722	0	1.081	0	0.822	4.11	0	1.081	0	0.822	3.562	0	1.081	0
	Composite	0.381	0.652	0.059	0.127	0.108	0.373	0.625	0.054	0.127	0.094	0.365	0.596	0.05	0.127	0.083	0.357	0.556	0.045	0.127	0.071	0.348	0.51	0.04	0.127	0.058
Welders	15	0.043	0.079	0.007	0	0.016	0.041	0.077	0.007	0	0.015	0.04	0.074	0.007	0	0.015	0.039	0.072	0.006	0	0.015	0.038	0.069	0.006	0	0.015
	25	0.073	0.112	0.011	0	0.035	0.071	0.11	0.011	0	0.035	0.068	0.107	0.011	0	0.035	0.065	0.105	0.01	0	0.034	0.063	0.103	0.01	0	0.034
	50	0.321	0.291	0.037	0	0.123	0.319	0.288	0.036	0	0.12	0.316	0.285	0.036	0	0.117	0.314	0.282	0.035	0	0.114	0.312	0.279	0.035	0	0.111
	120	0.285	0.596	0.055	0	0.086	0.283	0.579	0.054	0	0.083	0.282	0.562	0.053	0	0.08	0.28	0.545	0.052	0	0.077	0.278	0.528	0.051	0	0.074
	175	0.571	1.349	0.063	0.001	0.143	0.572	1.307	0.063	0.001	0.139	0.572	1.266	0.063	0.001	0.135	0.572	1.225	0.062	0.001	0.131	0.572	1.184	0.062	0.001	0.127
	Composite	0.236	0.333	0.035	0	0.084	0.234	0.326	0.034	0	0.081	0.232	0.318	0.034	0	0.079	0.23	0.311	0.033	0	0.077	0.228	0.304	0.032	0	0.075