APPENDIX 3.1E

Construction Emissions and Impact Analysis

Appendix 3.1E

Construction Emissions and Impact Analysis

The original AFC Appendix 8.1E is now Amendment Appendix 3.1E. Significant changes have occurred with respect to site size and layout, and as such this appendix presents updated construction emissions data for the new facility site and configuration.

3.1E.1 Construction Phases

Construction of RCEC is expected to last approximately 24 months, with actual construction activity occurring for 20 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 18.3 acres in size and is essentially flat. 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 RCEC 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; 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 1-3 months of construction when site preparation occurs. The worst-case daily exhaust emissions are expected to occur near 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 20-month construction period.

3.1E.2 Available Mitigation Measures

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

- 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, II, and III) 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.

3.1E.3 Estimation of Emissions with Mitigation Measures

Table 3.1E-1 shows the estimated maximum daily and annual heavy equipment exhaust and fugitive dust emissions with recommended mitigation measures. Detailed emission calculations are included in Table 3.1E-3.

Table 3.1E-1 Summary of Construction Emissions

	PM10	PM2.5	NOx	CO	VOC	SOx
Daily Emissions of Fugitive Dust, lbs	24.6	3.93	NA	NA	NA	NA
Daily Onsite Exhaust Emissions, lbs	11.4	10.3	212.3	88.7	24.2	41.3
Daily Offsite Exhaust Emissions, lbs	0.69	0.64	14.79	96.48	10.45	0.09
Total Daily Emissions, lbs	**36.7**	**14.9**	**227.1**	**185.2**	**34.7**	**41.4**
Total Construction Period Emissions						
Period Emissions of Fugitive Dust, tons	2.87	0.49	NA	NA	NA	NA
Period Onsite Exhaust Emissions, tons	1.29	1.14	18.86	9.1	2.53	4.14
Period Offsite Exhaust Emissions, tons	0.18	0.17	3.79	25.0	2,72	0.023
Total Period Emissions, tons	**4.34**	**1.8**	**22.7**	**34.1**	**5.25**	**4.16**

3.1E.4 Analysis of Ambient Impacts from Facility Construction

Ambient air quality impacts from emissions during the construction of RCEC 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.

3.1E.4.1 Existing Ambient Levels

As with the modeling analysis of project operating impacts (Section 3.1), monitoring stations delineated in Section 3.1 were used to establish the ambient background levels for the construction impact modeling analysis. Table 3.1-13 showed the maximum concentrations of NO_x, SO_2, CO and PM_{10} recorded for the most recent 3-year period at those monitoring stations.

3.1E.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 3.1.7.

The emission sources for the construction site were grouped into two categories: exhaust emissions and dust emissions. The exhaust emissions were modeled as 28 point sources located at 50 meter intervals across the total area of the construction site with stack parameters of 10 foot stack height, 890°F stack temperature, 0.5 foot stack diameter, and volumetric flowrate of 2500 acfm. The dust emissions were modeled as a single area source that covered the total area of the construction site with an effective emission plume height of 0.5 meters. 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 Sections 3.1.7 and 3.1.8.

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 3.1E-1 and 3.1E-3 were used. For pollutants with annual average ambient standards, the annual onsite emission levels shown in Tables 3.1E-1 and 3.1E-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 Union City met station for 1990-1994.

3.1E.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 one-hour average was adjusted using the Ozone Limiting Method based on the worst-case 1-hour ozone concentration of 0.123 ppm. 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 3.1E-2. 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 3.1E-2, with the exception of 24-hour PM_{10} impacts for the state standard, construction impacts for all modeled pollutants are expected to be below the most stringent state and national standards. The state 24-hour PM_{10} standard is already exceeded in the absence of construction emissions for RCEC.

TABLE 3.1E-2 Modeled Maximum Construction Impacts

Pollutant	Averaging Time	Maximum Construction Impacts (µg/m³)	Background (µg/m³)	Total Impact (µg/m³)	State Standard (µg/m³)	Federal Standard (µg/m³)
NO_2[a]	1-hour	114.9	143	257.9	470	-
	Annual	5.3	32	37.3	-	100
SO_2	1-hour	22.6	102.2	124.8	650	-
	3-hour	19.3	49.4	68.7	-	1300
	24-hour	7.0	23.5	30.5	109	365
	Annual	1.6	8.0	9.6	-	80
CO	1-hour	50	3680	3730	23,000	40,000

	8-hour	35	2178	2213	10,000	10,000
PM_{10}	24-hour Annual[b]	55.3 5.8	51.7 18.1	107.0 23.9	50 30	150 -
$PM_{2.5}$	24-hour Annual[b]	11.8 1.5	39.9 9.4	51.7 10.9	- 12	65 15

Notes:
[a]Ozone limiting method applied for 1-hour average, using maximum background O_3 and NO_2 levels. ARM applied for annual average, using national default 0.75 ratio.
[b]Annual Arithmetic Mean.

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. RCEC 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 3.1E-3 Construction Emissions Calculations

Table 3.1E-4 BAAQMD Emfac Data

Table 3.1E-5 BAAQMD EMFAC Composite Emissions Factors

Table 3.1E-6 Construction Equipment Emissions Factors

Construction Emission Totals

Table 3.1E-3

Construction Activity	lbs/day NOx	CO	VOC	SOx	PM10	PM2.5	tons per const period NOx	CO	VOC	SOx	PM10	PM2.5	tons per year NOx	CO	VOC	SOx	PM10	PM2.5
Main Site																		
Construction Equipment	173.6	76.1	20.0	34.1	11.2	10.3	17.7	8.7	2.41	3.93	1.24	1.14	10.6	5.2	1.4	2.4	0.7	0.7
Construction Dust	0.000	0.000	0.000	0.000	16.46	3.45	0.000	0.000	0.000	0.000	1.44	0.30	0.0	0.0	0.0	0.0	0.9	0.2
Site Delivery	5.95	14.38	1.61	0.032	0.18	0.17	1.49	3.74	0.42	0.008	0.048	0.043	0.9	2.2	0.3	0.0	0.0	0.0
Worker Travel	8.84	82.1	8.84	0.057	0.51	0.47	2.30	21.30	2.30	0.015	0.131	0.122	1.4	12.8	1.4	0.0	0.1	0.1
Paved Roads	0.000	0.000	0.000	0.000	4.70	0.030	0.000	0.000	0.000	0.000	1.22	0.15	0.0	0.0	0.0	0.0	0.7	0.1
Laydown Area(s)	0.000	0.000	0.000	0.000	0.470	0.100	0.000	0.000	0.000	0.000	0.121	0.025	0.0	0.0	0.0	0.0	0.1	0.0
Unpaved Roads	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0
Wind Blown Dust	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0
Linears																		
Gas Line	12.900	4.200	1.400	2.400	1.220	0.100	0.580	0.190	0.060	0.110	0.060	0.010	0.3	0.1	0.0	0.1	0.0	0.0
Sewer Line	12.900	4.200	1.400	2.400	0.770	0.040	0.290	0.090	0.030	0.050	0.014	0.001	0.2	0.1	0.0	0.0	0.0	0.0
Water Line	12.900	4.200	1.400	2.400	0.770	0.040	0.290	0.090	0.030	0.050	0.014	0.001	0.2	0.1	0.0	0.0	0.0	0.0
Transmission Line		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0	0.0	0.0	0.0	0.0
TOTALS	**227.1**	**185.2**	**34.7**	**41.4**	**36.3**	**14.7**	**22.7**	**34.1**	**5.25**	**4.16**	**4.28**	**1.80**	**13.6**	**20.5**	**3.15**	**2.50**	**2.57**	**1.08**
				DPM =	13.00					**DPM =**	1.29					**DPM =**	0.8	

Total Const Months: 20
Total Const Years: 1.67

DPM is diesel particulate matter. DPM totals include only site and linear const equipment emissions.

CONSTRUCTION PHASE EMISSIONS

Equipment Exhaust

Project: Russell City Energy Center

Projected Construction Year(s): 2007-2009

Equip. Type	Avg # on Site	Avg. HP (a)	Fuel Type (b)	Avg.Load Factor % (c)	Load Adj HP	Avg. Daily Equip. Op. Hours (d)	Equipment Category Daily Hrs. (e)	Estimated Avg Days on Site (f)	Load Adjusted Construction Hourly HP/Hrs	Daily HP/Hrs	Period HP/HRs
Bore/Drill Rigs/Pile Drivers	2	209	D	75.0	157	6	12.00	180	314	1881	338580
Cement Mixers	4	11	D	56.0	6	8	32.00	120	25	197	23654
Industrial/Concrete Saws	2	56	D	73.0	41	5	10.00	30	82	409	12264
Cranes	12	194	D	43.0	83	6	72.00	150	1001	6006	900936
Crawler Tractors/Dozers	0	103	D	59.0	61	0	0.00	0	0	0	0
Crushing/Processing Eq.	0	127	D	78.0	99	0	0.00	0	0	0	0
Dump and Tender Trucks	0	23	D	38.0	9	0	0.00	0	0	0	0
Excavators	0	152	D	58.0	88	0	0.00	0	0	0	0
Forklifts/Aerial Lifts/Booms	1	83	D	50.5	42	6	6.00	520	42	251	130775
Generators/Compressors	16	50	D	74.0	37	8	128.00	420	592	4736	1989120
Graders	0	157	D	57.5	90	0	0.00	0	0	0	0
Off Highway Tractors	1	69	D	46.5	32	8	8.00	420	32	257	107806
Off Highway Trucks	1	489	D	41.0	200	6	6.00	120	200	1203	144353
Other Const. Eq.	2	161	D	62.0	100	6	12.00	120	200	1198	143741
Pavers	1	99	D	53.0	52	8	8.00	30	52	420	12593
Paving Eq./Surfacing Eq.	1	91	D	59.0	54	8	8.00	30	54	430	12886
Plate Compactors	0	8	D	43.0	3	0	0.00	0	0	0	0
Rollers/Compactors	2	99	D	57.5	57	8	16.00	270	114	911	245916
Rough Terrain Forklifts	10	93	D	47.5	44	6	60.00	420	442	2651	1113210
Rubber Tired Dozers	2	356	D	59.0	210	6	12.00	150	420	2520	378072
Rubber Tired Loaders	2	147	D	54.0	79	6	12.00	320	159	953	304819
Scrapers	3	267	D	66.0	176	6	18.00	90	529	3172	285476
Signal Boards/Light Sets	8	15	D	82.0	12	8	64.00	350	98	787	275520
Skid Steer Loaders	1	40	D	51.5	21	6	6.00	270	21	124	33372
Tractors/Loaders/Backhoes	16	79	D	46.5	37	6	96.00	120	588	3527	423187
Trenchers	1	60	D	69.5	42	6	6.00	180	42	250	45036
Welders	18	50	D	45.0	23	9	162.00	450	405	3645	1640250
Utility Trucks (gas or diesel)	see site delivery and support sheet calcs										

Fuel Use Rates: 0.05 gal/hp-hr

Ref: SCAQMD, PR XXI, Staff Report, 3-15-95

(a) Ref: South Coast AQMD-CEQA Handbook, Table A9-8-C.

(b) D=diesel, G=gasoline

(c) Ref: NTIS PB92-126960, EPA 460/3-91-02, EPA 21A-2001, and SCAQMD CEQA Manual, Table A9-8-D.

(d) Per construction engineering estimate.

(e) Estimated daily hours for this equipment/operation category.

(f) Total estimated days on site from construction schedule for this equipment category.

Estimated Project Equip Fuel Use Rates

	Gals	mGals
Hr:	270	0.270
Day:	1776	1.776
Period:	428078	428.078

EMISSIONS FACTORS (g)

Composite Emissions Factors (h)

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
Bore/Drill Rigs/Pile Drivers	209	0.002	0.9	0.0003	0.1	0.0053	2.4	0.0014	0.6	0.0002	0.1
Cement Mixers	11	0.0023	1.0	0.0005	0.2	0.0038	1.7	0	0.0	0.0003	0.1
Industrial/Concrete Saws	56	0.0049	2.2	0.0013	0.6	0.0084	3.8	0.0014	0.6	0.0008	0.4
Cranes	194	0.0012	0.5	0.0003	0.1	0.0033	1.5	0.0006	0.3	0.0002	0.1
Crawler Tractors/Dozers	103	0.0021	0.0	0.0005	0.2	0.0049	2.2	0.0008	0.4	0.0003	0.1
Crushing/Processing Eq.	127	0.0028	1.3	0.0007	0.3	0.0057	2.6	0.0009	0.4	0.0004	0.2
Dump and Tender Trucks	23	0.0018	0.8	0.001	0.5	0.0031	1.4	0.001	0.5	0.0001	0.0
Excavators	152	0.0018	0.8	0.0004	0.2	0.0043	2.0	0.0009	0.4	0.0002	0.1
Forklifts/Aerial Lifts/Booms	83	0.0012	0.5	0.0004	0.2	0.0021	1.0	0.001	0.5	0.0002	0.1
Generators/Compressors	50	0.0014	0.6	0.0004	0.2	0.0028	1.3	0.001	0.5	0.0002	0.1
Graders	157	0.0018	0.8	0.0004	0.2	0.0047	2.1	0.0009	0.4	0.0002	0.1
Off Highway Tractors	69	0.0021	1.0	0.0005	0.2	0.006	2.7	0.001	0.5	0.0003	0.1
Off Highway Trucks	489	0.0015	0.7	0.0004	0.2	0.0065	2.9	0.0012	0.5	0.0002	0.1
Other Const. Eq.	161	0.0038	1.7	0.0008	0.4	0.0094	4.3	0.0015	0.7	0.0004	0.2
Pavers	99	0.0023	1.0	0.0005	0.2	0.0043	2.0	0.0009	0.4	0.0003	0.1
Paving Eq./Surfacing Eq.	91	0.0033	1.5	0.0009	0.4	0.0073	3.3	0.0012	0.5	0.0005	0.2
Plate Compactors	8	0.0017	0.8	0.0006	0.3	0.0026	1.2	0.001	0.5	0.0001	0.0
Rollers/Compactors	99	0.0022	1.0	0.0005	0.2	0.0043	2.0	0.0009	0.4	0.0003	0.1
Rough Terrain Forklifts	93	0.002	0.9	0.0005	0.2	0.0037	1.7	0.0007	0.3	0.0003	0.1
Rubber Tired Dozers	356	0.0024	1.1	0.0005	0.2	0.0067	3.0	0.0011	0.5	0.0003	0.1
Rubber Tired Loaders	147	0.0016	0.7	0.0004	0.2	0.0042	1.9	0.0008	0.4	0.0002	0.1
Scrapers	267	0.0023	1.0	0.0006	0.3	0.0079	3.6	0.0014	0.6	0.0003	0.1
Signal Boards/Light Sets	15	0.0008	0.4	0.0002	0.1	0.0015	0.7	0.0002	0.1	0.0001	0.0
Skid Steer Loaders	40	0.0031	1.4	0.0007	0.3	0.0044	2.0	0.001	0.5	0.0004	0.2
Tractors/Loaders/Backhoes	79	0.0034	1.5	0.001	0.5	0.0066	3.0	0.0009	0.4	0.0007	0.3
Trenchers	60	0.0015	0.7	0.0004	0.2	0.0025	1.1	0.0005	0.2	0.0002	0.1
Welders	50	0.003	1.4	0.001	0.5	0.0041	1.9	0.001	0.5	0.0004	0.2

(g) SCAQMD off-road emissions factor database, website, October 2006.
(h) EFs are for inventory year 2008.

Construction Equipment Exhaust 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*
Bore/Drill Rigs/Pile Drivers	0.63	3.76	0.34	0.09	0.56	0.05	1.66	9.97	0.90	0.44	2.63	0.24	0.06	0.38	0.03
Cement Mixers	0.06	0.45	0.03	0.01	0.10	0.01	0.09	0.75	0.04	0.00	0.00	0.00	0.01	0.06	0.00
Industrial/Concrete Saws	0.40	2.00	0.03	0.11	0.53	0.01	0.69	3.43	0.05	0.11	0.57	0.01	0.07	0.33	0.00
Cranes	1.20	7.21	0.54	0.30	1.80	0.14	3.30	19.82	1.49	0.60	3.60	0.27	0.20	1.20	0.09
Crawler Tractors/Dozers	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
Crushing/Processing Eq.	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
Dump and Tender Trucks	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
Excavators	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
Forklifts/Aerial Lifts/Booms	0.05	0.30	0.08	0.02	0.10	0.03	0.09	0.53	0.14	0.04	0.25	0.07	0.01	0.05	0.01
Generators/Compressors	0.83	6.63	1.39	0.24	1.89	0.40	1.66	13.26	2.78	0.59	4.74	0.99	0.12	0.95	0.20
Graders	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
Off Highway Tractors	0.07	0.54	0.11	0.02	0.13	0.03	0.19	1.54	0.32	0.03	0.26	0.05	0.01	0.08	0.02
Off Highway Trucks	0.30	1.80	0.11	0.08	0.48	0.03	1.30	7.82	0.47	0.24	1.44	0.09	0.04	0.24	0.01
Other Const. Eq.	0.76	4.55	0.27	0.16	0.96	0.06	1.88	11.26	0.68	0.30	1.80	0.11	0.08	0.48	0.03
Pavers	0.12	0.97	0.01	0.03	0.21	0.00	0.23	1.80	0.03	0.05	0.38	0.01	0.02	0.13	0.00
Paving Eq./Surfacing Eq.	0.18	1.42	0.02	0.05	0.39	0.01	0.39	3.14	0.05	0.06	0.52	0.01	0.03	0.21	0.00
Plate Compactors	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
Rollers/Compactors	0.25	2.00	0.27	0.06	0.46	0.06	0.49	3.92	0.53	0.10	0.82	0.11	0.03	0.27	0.04
Rough Terrain Forklifts	0.88	5.30	1.11	0.22	1.33	0.28	1.63	9.81	2.06	0.31	1.86	0.39	0.13	0.80	0.17
Rubber Tired Dozers	1.01	6.05	0.45	0.21	1.26	0.09	2.81	16.89	1.27	0.46	2.77	0.21	0.13	0.76	0.06
Rubber Tired Loaders	0.25	1.52	0.24	0.06	0.38	0.06	0.67	4.00	0.64	0.13	0.76	0.12	0.03	0.19	0.03
Scrapers	1.22	7.30	0.33	0.32	1.90	0.09	4.18	25.06	1.13	0.74	4.44	0.20	0.16	0.95	0.04
Signal Boards/Light Sets	0.08	0.63	0.11	0.02	0.16	0.03	0.15	1.18	0.21	0.02	0.16	0.03	0.01	0.08	0.01
Skid Steer Loaders	0.06	0.38	0.05	0.01	0.09	0.01	0.09	0.54	0.07	0.02	0.12	0.02	0.01	0.05	0.01
Tractors/Loaders/Backhoes	2.00	11.99	0.72	0.59	3.53	0.21	3.88	23.28	1.40	0.53	3.17	0.19	0.41	2.47	0.15
Trenchers	0.06	0.38	0.03	0.02	0.10	0.01	0.10	0.63	0.06	0.02	0.13	0.01	0.01	0.05	0.00
Welders	1.22	10.94	2.46	0.41	3.65	0.82	1.66	14.94	3.36	0.41	3.65	0.82	0.16	1.46	0.33
		CO			VOC			**NOx**			SOx			**PM10**	
Totals	**11.6**	**76.1**	**8.7**	**3.0**	**20.0**	**2.4**	**27.1**	**173.6**	**17.7**	**5.2**	**34.1**	**3.9**	**1.7**	**11.2**	**1.2**
	lbs/hr	**lbs/day**	**tons***	lbs/hr	lbs/day	tons*	**lbs/hr**	**lbs/day**	**tons***	lbs/hr	lbs/day	tons*	**lbs/hr**	**lbs/day**	**tons***
													PM2.5 =	**10.3**	**1.14**

*tons = tons emitted during construction phase

CARB-CEIDARS, Summmary of Overall Size Fractions for PM Profiles, 9-26-02: PM2.5 = 92% of PM10 : Diesel Vehicle Exhaust

CONSTRUCTION PHASE-Main Project Site Fugitive Dust Emissions **MRI Level 2 Analysis**

Total Site Acreage:	18.3	Avg Acres Subject to Construction Activity/Month:	18.3			
Emission Factor:	0.017	tons/acre/month of activity PM10 Uncontrolled (MRI Level 2 Adjusted Analysis Factor)				
	0.311	tons per const month (uncontrolled) PM10				
	6.222	tons per const period (uncontrolled) PM10				
	0.933	**ton per const period Controlled PM10 =**	0.05	tons/month		
	0.196	ton per const period Controlled PM2.5 =	0.01	tons/month		
Activity Levels			3.59	lbs/day PM10 controlled		
Hrs/Day:	10		0.75	lbs/day PM2.5 controlled		
Days/Wk:	6					
Day/Month:	26	Cut and Fill Activity:	3	total months		
Worst Case Month:	3	Total Cut and Fill:	56700	cu.yds. Avg month		
Annual Const Hours:	3120		56.7	10^3 cu.yds. Avg month		
Total Construction Hrs:	5200	MRI Ef:	0.059	tons/10^3 cu.yds. uncontrolled		
			3.35	tons PM10 month uncontrolled		
Total Const Period:	20	months	Control Technique:	Watering (assumes moist subsurface soils) and speed control		
			Control Factor, %	95		
			Cut/Fill	**0.167**	**tons/month PM10 controlled =**	0.502 tons/const period
				0.035	tons/month PM2.5 controlled =	0.105 tons/const period
				12.87	lbs/day PM10 controlled	
				2.70	lbs/day PM2.5 controlled	

PM10 Control Techniques *		
Type	Used	Avg. % PM10 Reduction
Watering	Yes	65
Surface Sealant	No	0
Dust Suppressant	No	0
Speed Control	Yes	20
	% Control:	85

Release Factor: 0.15

* Control techniques are additive.
Per SCAQMD CEQA Manual, 11/93.

Months 1 - 3 will be worst case construction emissions months. After month 3, construction related dust emissions will be well below the max daily and max monthly values calculated above, probably on the order of less than 30% of the maximum values

Ref: MRI Report, South Coast AQMD Project No. 95040, March 1996, Level 2 Analysis Procedure.
MRI Report factor of 0.011 tons/acre/month is based on 168 hours per month of const activity. For a monthly activity rate of approx 260 hours, the adjusted factor would be 0.017 tons/acre/month.
SCAQMD CEQA Manual: watering twice daily yields 50% reduction, watering three times daily yields 65% reduction, Table 11-4, 11/93.
Typical watering schedule for RCEC activities is 3 times per day.
*** Although not all of the site area will disturbed on any one work day, due to the size of this site, the worst case assumption was made that at least 100% of the construction area would be disturbed over the entire construction period. Acreage does not include access roads.
CARB-CEIDARS, Statewide Summary of Overall Size Fractions for PM Profiles, 9-26-02: PM2.5 = 21% of PM10 : Construction Dust

CONSTRUCTION PHASE-Laydown Area Fugitive Dust Emissions **MRI Level 2 Analysis**

Total Site Acreage:	55	Laydown area acreage subject to vehicle movement activity:	5.5		
Emission Factor:	0.011	tons/acre/month of activity PM10 Uncontrolled (MRI Level 2 Adjusted Analysis Factor)			
	0.061	tons per const month (uncontrolled) PM10			
	1.210	tons per const period (uncontrolled) PM10			
	0.121	**ton per const period Controlled PM10 =**	0.01	tons/month	
	0.025	ton per const period Controlled PM2.5 =	0.00	tons/month	
Activity Levels			0.47	lbs/day PM10 controlled	
Hrs/Day:	10		0.10	lbs/day PM2.5 controlled	
Days/Wk:	6				
Day/Month:	26	Cut and Fill Activity:	0	total months	
Worst Case Month:	3	Total Cut and Fill:	0	cu.yds. Avg month	
Annual Const Hours:	3120		0	10^3 cu.yds. Avg month	
Total Construction Hrs:	5200	MRI Ef:	0.059	tons/10^3 cu.yds. uncontrolled	
			0.00	tons PM10 month uncontrolled	
Total Const Period:	20 months	Control Technique:	N/A		
		Control Factor, %	0		
		Cut/Fill	**0.000**	**tons/month PM10 controlled =**	0.000 tons/const period
			0.000	tons/month PM2.5 controlled =	0.000 tons/const period
			0.00	lbs/day PM10 controlled	
			0.00	lbs/day PM2.5 controlled	

PM10 Control Techniques *		
Type	Used	Avg. % PM10 Reduction
Watering	Yes	50
Surface Sealant	No	0
Dust Suppressant	No	0
Gravel Access Roads	Yes	40
	% Control:	90

Release Factor: 0.1

* Control techniques are additive.
Per SCAQMD CEQA Manual, 11/93.

Emissions from the laydown area will consist primarily of vehicle movement generated fugitives during the unloading and loading of project supplies to and from the laydown area. Only a small portion of the laydown area will experience vehicle movement on a daily basis.

Ref: MRI Report, South Coast AQMD Project No. 95040, March 1996, Level 2 Analysis Procedure.
MRI Report factor of 0.011 tons/acre/month (uncontrolled) is assumed for the laydown area.
The laydown area vehicle lanes will most likely be gravelled and water will be used to enhance dust control.
SCAQMD CEQA Manual: watering twice daily yields 50% reduction, watering three times daily yields 65% reduction, Table 11-4, 11/93.
Typical watering schedule for RCEC laydown area activities is 2 times per day.

CARB-CEIDARS, Summmary of Overall Size Fractions for PM Profiles, 9-26-02: PM2.5 = 21% of PM10 : Construction Dust

CONSTRUCTION PHASE - Truck Delivery and Site Support Vehicle Emissions

Avg # deliveries/day:	8.1				Emissions Factors (lbs/vmt)				
Avg Haul Distance (miles)	20	see note below	NOx	CO	VOC	SOx	PM10		
VMT/Day:	161.7		0.0276	0.005534	0.001345	0.0000419	0.0007055	Ref: BAAQMD Emfac 2002 Ver 2.2, 4-03	
Work days/yr:	312				Daily Emissions (lbs)			On-Road Heavy Duty Diesels (1965-2007)	
Total Const Work Days:	520		**NOx**	**CO**	**VOC**	**SOx**	**PM10**	**PM2.5**	
Total # of Deliveries:	4204		**4.463**	**0.895**	**0.217**	**0.007**	**0.114**	**0.105**	
				Tons per Const Period					
			1.160	0.233	0.057	0.002	0.030	0.027	

Site Support Vehicle Emissions

Total # of vehicles:	50	**NOx**	**CO**	**VOC**	**SOx**	**PM10**			**PM2.5**
# of Pickups (gas):	30	0.00196	0.01797	0.001852	0.0000108	0.0000882	lbs/vmt*	gasoline	
# of Pickups (diesel):	20	0.0000364	0.0000196	0.0000046	0.000033	0.0000026	lbs/vmt*	diesel	
Avg. pickup daily vmt:	25	**1.4700**	**13.4775**	**1.3890**	**0.0081**	**0.0662**	**lbs/day**	**gasoline**	**0.0615195**
Total Gas VMT:	750	**0.0182**	**0.0098**	**0.0023**	**0.0165**	**0.0013**	**lbs/day**	**diesel**	**0.0012**
Total Diesel VMT:	500								
		0.3822	3.5042	0.3611	0.0021	0.0172	**tons/period**	**gasoline**	0.0160
		0.0047	0.0025	0.0006	0.0043	0.0003	**tons/period**	**diesel**	0.0003

Avg haul distance: one way distance from site to Alameda port and rail area.
These trucks will not be dedicated to the site, so backhaul distances are not included.
Total deliveries for construction period = 4204, from construction schedule data.

CARB EMFAC 2002 Summaries
Ref: BAAQMD Emfac 2002 Ver 2.2, 4-03
On Road Vehicles (1965-2007)

CARB-CEIDARS, Summmary of Overall Size Fractions for PM Profiles, 9-26-02: PM2.5 = 92% of PM10 for Diesel Exhaust, and 93% for Gasoline Vehicles.

It should be noted that these emissions are not necessarily new emissions to the regional air shed. A significant portion of the truck services will be derived from the existing regional truck services vehicle pool, and as such these truck emissions would most likely be involved in deliveries in the area regardless of whether or not the proposed facility is constructed. As such, a major portion of the above estimated emissions would not be considered as additions to the air shed.

CONSTRUCTION PHASE - Unpaved Road Travel

Acres used for unpaved access roads:	0		Assumed roadway width (ft):	0		PM10 Control Techniques*		
Calculated length of unpaved road(s):	#DIV/0!	miles	Avg travel distance on unpaved		Type	Used	Avg. % PM10	
Average daily traffic on road segment:	0	vehicles per day	road (miles):	0			Reduction	
EF for PM10:	0	lbs/VMT			Watering	No	0	
Road or surface material silt content:	0	%			Surface Sealant	No	0	
	0	fraction			Dust Suppressant	No	0	
Average vehicle weight using road:	0	tons			Speed Control	No	0	
Days per year with > =0.01 in. rain:	0							
Avg surface material moisture content:	0	%				% Control:	0	
	0	fraction						
Adjusted VMT per day:	0				Release Factor:	1		

Int calc 1	0.00		Uncontrolled PM10 Emissions:	0.00	lbs/day	* Control techniques are additive.
Int calc 2	0.00		PM2.5 Emissions:	0.00	lbs/day	Per SCAQMD CEQA Manual, 11/93.
Int calc 3	1.00		**Controlled PM10 Emissions:**	**0.00**	**lbs/day**	
E final, lbs/VM	0.00	0.00	**PM2.5 Emissions:**	**0.00**	**lbs/day**	
	PM10	PM2.5	Total Construction Days:	0		
			Controlled PM10 Emissions:	**0.00**	**tons per construction period**	
			PM2.5 Emissions:	**0.00**	**tons per construction period**	

USEPA, AP-42, Section 13.2.2, draft dated 3-22-06.
Per SCAQMD CEQA Manual, watering 3 or more times per day yields 65% reduction.
There are no unpaved roads on site proposed for long term or permanent use. Construction fugitive emissions account for dust from equipment travel on site during the earthmoving and construction activities.

CONSTRUCTION PHASE - Worker Travel - Emissions

Max # of Workers/Day:	445	Month 11
Avg # of Workers/Day:	242	
Avg Occupancy/Vehicle:	1.15	
Round Trips/Day:	210	
Avg Roundtrip Distance:	30	miles
VMT/Day:	6313	
VMT/Year:	1969670	
VMT/Const Period:	3282783	
Total Const Days:	520	

Emissions Factors (lbs/VMT)

NOx	CO	VOC	SOx	PM10
0.0014	0.013	0.0014	0.000009	0.00008

Ref: BAAQMD Emfac 2002 Ver 2.2, 4-03
On Road Vehicles
LDP/LDT Weighted Avg Efs

Avg. Daily Emissions (lbs)

NOx	CO	VOC	SOx	PM10	PM2.5
8.838	**82.070**	**8.838**	**0.057**	**0.505**	**0.470**

Tons per Const Period

2.2979	**21.3381**	**2.2979**	**0.0148**	**0.1313**	**0.1221**

It should be noted that these emissions are not necessarily new emissions to the regional air shed. A significant portion of the workers will be derived from the existing work force pool in the urban regional area, and as such these workers would most likely be involved in projects in the area regardless of whether or not the proposed facility is constructed. As such, a major portion of the above estimated emissions would not be considered as additions to the air shed.

CONSTRUCTION PHASE - Paved Road Travel - Particulate Emissions Including Trackout Emissions

Paved Road Length (miles):	0.038	estimated roundtrip distance				
Daily # of Vehicles:	220					
Avg Vehicle Weight (tons):	5			PM10	PM2.5	
Total Unadjusted VMT/day	8.4			0.351	0.351	
Particle Size Multipliers	PM10	PM2.5		2.152	2.152	
lb/VMT	0.016	0.0024		0.012	0.001	lb/VMT
C factor, lb/VMT	0.00047	0.00036		**0.061**	**0.008**	**tons/month**
Road Sfc Silt Loading (g/m^2):	0.4			**1.222**	**0.153**	**tons/const period**
# of Active Trackout Points:	1			**4.70**	**0.03**	**lbs/day**
Added Trackout Miles:	PM10	PM2.5				
Trackout VMT/day:	1320	660				
Final Adjusted VMT/day	1328	668				
Final Adjusted VMT/month	34537	17377				
Control Applied to Trackout:	Sweeping and Cleaning (Water washing)					
Control Efficiency, %	70	0.7	Release Factor =		0.3	
Total Const Days:	520					

EPA, AP-42, Section 13.2.1, draft dated 3-22-06. Silt load factor from Table 13.2.1-3 for low ADT roads is 0.6.
Silt factor reduced to 0.4 due to extreme low use road data and controls proposed.
Main site access route is Depot Rd., with trackout affecting 100 ft from site access entrance.

LINEAR CONSTRUCTION ELEMENTS

Project: **RCEC**

Natural Gas Pipeline

Equip	Rating	Units	Load Factor	# Units	Hrs/day	# Days	Emissions Factors (lbs/hp-hr) NOx	CO	VOC	SOx	PM10	Calc 1	Emissions (lbs/Period) NOx	CO	VOC	SOx	PM10
Tractors	79	hp	0.465	1	6	90	0.0091	0.0023	0.001	0.0014	0.0004	19837	180.52	45.62	19.84	27.77	7.93
Loaders	147	hp	0.54	1	6	90	0.0042	0.0016	0.0004	0.0008	0.0002	42865	180.03	68.58	17.15	34.29	8.57
Backhoes	79	hp	0.465	2	8	90	0.0091	0.0023	0.001	0.0014	0.0004	52898	481.38	121.67	52.90	74.06	21.16
Forklifts	83	hp	0.505	1	6	90	0.0021	0.0012	0.0004	0.001	0.0002	22634	47.53	27.16	9.05	22.63	4.53
Excavators	152	hp	0.58	1	8	90	0.0043	0.0018	0.0004	0.0009	0.0002	63475	272.94	114.26	25.39	57.13	12.70
*		hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
*		hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
*		hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
*		hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
*		hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
*		hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
*		hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
Total													1162.40	377.29	124.33	215.88	54.89

Total Const Days: 90 Input 0.01 if no gas line construction required.

	NOx	CO	VOC	SOx	PM10
Total Construction Period Emissions (lbs):	1162.40	377.29	124.33	215.88	54.89
Total Construction Period Emissions (tons):	0.58	0.19	0.06	0.11	0.03
Avg lbs/day:	12.9	4.2	1.4	2.4	0.6

Fugitive Dust Emissions

Avg Activity Values	Process Rate	Units	PM10 EF	Control %	PM10 Emissions lbs/day
Sfc Area Impacted	1500	ft2/day	0.000025	65	0.013
Trenching	163	yd3/day	0.0018	0	0.293
BackFill	163	yd3/day	0.0018	0	0.293
Grading	0.05	VMT/day	0.2754	0	0.014
Unpaved Sfc Travel					
Water Trk	0.05	VMT/day	0.1522	65	0.003
Delivery Trk	0.05	VMT/day	0.1589	65	0.003

Construction Data:	
Length ft	5280
Width ft	5
Depth ft	5
Construction Days	90
Corridor Width ft	20

Total:	0.62	lbs/day PM10		
	0.13	lbs/day PM2.5		
	55.72	lbs PM10/const period =	0.028	tons PM10/const period
	11.70	lbs PM2.5/const period =	0.006	tons PM2.5/const period

LINEAR CONSTRUCTION ELEMENTS

Project: **RCEC**

Sewer Line

Equip	Rating	Units	Load Factor	# Units	Hrs/day	# Days	Emissions Factors (lbs/hp-hr) NOx	CO	VOC	SOx	PM10	Calc 1	Emissions (lbs/Period) NOx	CO	VOC	SOx	PM10
Tractors	79	hp	0.465	1	6	45	0.0091	0.0023	0.001	0.0014	0.0004	9918	90.26	22.81	9.92	13.89	3.97
Loaders	147	hp	0.54	1	6	45	0.0042	0.0016	0.0004	0.0008	0.0002	21433	90.02	34.29	8.57	17.15	4.29
Backhoes	79	hp	0.465	2	8	45	0.0091	0.0023	0.001	0.0014	0.0004	26449	240.69	60.83	26.45	37.03	10.58
Forklifts	83	hp	0.505	1	6	45	0.0021	0.0012	0.0004	0.001	0.0002	11317	23.77	13.58	4.53	11.32	2.26
Excavators	152	hp	0.58	1	8	45	0.0043	0.0018	0.0004	0.0009	0.0002	31738	136.47	57.13	12.70	28.56	6.35
*		hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
*		hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
*		hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
*		hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
*		hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
*		hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
*		hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
Total													581.20	188.65	62.16	107.94	27.44

Total Const Days: 45 Input 0.01 if no sewer line construction required.

	NOx	CO	VOC	SOx	PM10
Total Construction Period Emissions (lbs):	581.20	188.65	62.16	107.94	27.44
Total Construction Period Emissions (tons):	0.29	0.09	0.03	0.05	0.01
Avg lbs/day:	12.9	4.2	1.4	2.4	0.6

Fugitive Dust Emissions

Avg Activity Values	Process Rate	Units	PM10 EF	Control %	PM10 Emissions lbs/day
Sfc Area Impacted	500	ft2/day	0.000025	65	0.004
Trenching	40	yd3/day	0.0018	0	0.072
BackFill	40	yd3/day	0.0018	0	0.072
Grading	0.05	VMT/day	0.2754	0	0.014
Unpaved Sfc Travel					
Water Trk	0.05	VMT/day	0.1522	65	0.003
Delivery Trk	0.05	VMT/day	0.1589	65	0.003

Construction Data:	
Length ft	1000
Width ft	3
Depth ft	5
Construction Days	45
Corridor Width ft	20

Total:	0.17	lbs/day PM10		
	0.04	lbs/day PM2.5		
	7.54	lbs PM10/const period =	0.004	tons PM10/const period
	1.58	lbs PM2.5/const period =	0.001	tons PM2.5/const period

LINEAR CONSTRUCTION ELEMENTS

Project: **RCEC**

Water Line

Equip	Rating	Units	Load Factor	# Units	Hrs/day	# Days	Emissions Factors (lbs/hp-hr) NOx	CO	VOC	SOx	PM10	Calc 1	Emissions (lbs/Period) NOx	CO	VOC	SOx	PM10
Tractors	79	hp	0.465	1	6	45	0.0091	0.0023	0.001	0.0014	0.0004	9918	90.26	22.81	9.92	13.89	3.97
Loaders	147	hp	0.54	1	6	45	0.0042	0.0016	0.0004	0.0008	0.0002	21433	90.02	34.29	8.57	17.15	4.29
Backhoes	79	hp	0.465	2	8	45	0.0091	0.0023	0.001	0.0014	0.0004	26449	240.69	60.83	26.45	37.03	10.58
Forklifts	83	hp	0.505	1	6	45	0.0021	0.0012	0.0004	0.001	0.0002	11317	23.77	13.58	4.53	11.32	2.26
Excavators	152	hp	0.58	1	8	45	0.0043	0.0018	0.0004	0.0009	0.0002	31738	136.47	57.13	12.70	28.56	6.35
*		hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
*		hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
*		hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
*		hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
*		hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
*		hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
*		hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
Total													581.20	188.65	62.16	107.94	27.44

Total Const Days: 45 Input 0.01 if no water line construction required.

	NOx	CO	VOC	SOx	PM10
Total Construction Period Emissions (lbs):	581.20	188.65	62.16	107.94	27.44
Total Construction Period Emissions (tons):	0.29	0.09	0.03	0.05	0.01
Avg lbs/day:	12.9	4.2	1.4	2.4	0.6

Fugitive Dust Emissions

Avg Activity Values	Process Rate	Units	PM10 EF	Control %	PM10 Emissions lbs/day
Sfc Area Impacted	500	ft2/day	0.000025	65	0.004
Trenching	40	yd3/day	0.0018	0	0.072
BackFill	40	yd3/day	0.0018	0	0.072
Grading	0.05	VMT/day	0.2754	0	0.014
Unpaved Sfc Travel					
Water Trk	0.05	VMT/day	0.1522	65	0.003
Delivery Trk	0.05	VMT/day	0.1589	65	0.003
				Total:	0.17 lbs/day PM10
					0.04 lbs/day PM2.5

Construction Data:	
Length ft	1000
Width ft	3
Depth ft	5
Construction Days	45
Corridor Width ft	20

7.54 lbs PM10/const period = 0.004 tons PM10/const period

1.58 lbs PM2.5/const period = 0.001 tons PM2.5/const period

LINEAR CONSTRUCTION ELEMENTS

Project: **RCEC**

Transmission Line

Equip	Rating	Units	Load Factor	# Units	Hrs/day	# Days	Emissions Factors (lbs/hp-hr) NOx	CO	VOC	SOx	PM10	Calc 1	Emissions (lbs/Period) NOx	CO	VOC	SOx	PM10
*	0	hp	0	0	0	0	0.0091	0.0023	0.001	0.0014	0.0004	0	0.00	0.00	0.00	0.00	0.00
*	0	hp	0	0	0	0	0.0042	0.0016	0.0004	0.0008	0.0002	0	0.00	0.00	0.00	0.00	0.00
*	0	hp	0	0	0	0	0.0091	0.0023	0.001	0.0014	0.0004	0	0.00	0.00	0.00	0.00	0.00
*	0	hp	0	0	0	0	0.0021	0.0012	0.0004	0.001	0.0002	0	0.00	0.00	0.00	0.00	0.00
*	0	hp	0	0	0	0	0.0043	0.0018	0.0004	0.0009	0.0002	0	0.00	0.00	0.00	0.00	0.00
*	0	hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
*	0	hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
*	0	hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
*	0	hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
*	0	hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
*	0	hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
*	0	hp	0	0	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0.00	0.00
Total													0.00	0.00	0.00	0.00	0.00

Total Const Days: 0.01 Input 0.01 if no trans line construction required.

Total Construction Period Emissions (lbs):	0.00	0.00	0.00	0.00	0.00
Total Construction Period Emissions (tons):	0.00	0.00	0.00	0.00	0.00
Avg lbs/day:	0.0	0.0	0.0	0.0	0.0

Fugitive Dust Emissions

Avg Activity Values	Process Rate	Units	PM10 EF	Control %	PM10 Emissions lbs/day
Sfc Area Impacted	0	ft2/day	0.000025	65	0.000
Trenching	0	yd3/day	0.0018	0	0.000
BackFill	0	yd3/day	0.0018	0	0.000
Grading	0	VMT/day	0.2754	0	0.000
Unpaved Sfc Travel					
Water Trk	0	VMT/day	0.1522	65	0.000
Delivery Trk	0	VMT/day	0.1589	65	0.000

Construction Data:	
Length ft	0
Width ft	0
Depth ft	0
Construction Days	0
Corridor Width ft	0

Total:	0.00	lbs/day PM10
	0.00	lbs/day PM2.5
	0.00	lbs PM10/const period = 0.000 tons PM10/const period
	0.00	lbs PM2.5/const period = 0.000 tons PM2.5/const period

Title : San Francisco Air Basin Avg 2007 Annual Default Title
Version : Emfac2002 V2.2 Apr 23 2003
Run Date : 11/14/06 13:21:37
Scen Year: 2007 -- Model Years: 1965 to 2007
Season : Annual
Area : San Francisco Air Basin Average
I/M Stat : I and M program in effect
Emissions: Tons Per Day

TABLE 3.1E-4

	Light Duty Passenger Cars				Light Duty Trucks				Medium Duty Trucks				Heavy Duty Trucks: Gasoline Trucks			Heavy Duty Trucks: Diesel Trucks	Heavy Duty Trucks: Total HD Trucks	Urban Buses	Motor-cycles	All Vehicles
	Non-cat	Cat	Diesel	Total	Non-cat	Cat	Diesel	Total	Non-cat	Cat	Diesel	Total	Non-cat	Cat	Total					
Vehicles	51975.	3121760.	12592.	3186320.	29152.	1383690.	20509.	1433350.	5752.	441759.	25105.	472616.	6266.	59130.	65396.	75776.	141172.	8399.	72261.	5314120.
VMT/1000	571.	104927.	251.	105748.	499.	46144.	589.	47232.	93.	15767.	1188.	17048.	73.	1348.	1421.	7166.	8587.	1026.	547.	180188.
Trips	215605.	19655800.	70341.	19941700.	123628.	8700860.	126015.	8950500.	53600.	3984090.	248035.	4285730.	94967.	635924.	730891.	1230380.	1961270.	33596.	144507.	35317300.
Total Organic Gas Emissions																				
Run Exh	4.31	21.49	0.09	25.89	3.69	12.13	0.11	15.92	0.80	5.04	0.46	6.29	0.60	1.74	2.34	4.51	6.85	1.99	2.31	59.26
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.07	0.01	0.04	0.04	0.32	0.36	0.00	0.00	0.43
Start Ex	1.42	19.89	0.00	21.31	0.77	9.83	0.00	10.60	0.44	4.76	0.00	5.20	1.38	1.65	3.03	0.00	3.03	0.07	0.47	40.67
Total Ex	5.73	41.38	0.09	47.20	4.46	21.96	0.11	26.53	1.24	9.86	0.46	11.56	1.98	3.43	5.40	4.83	10.23	2.06	2.78	100.36
Diurnal	0.30	2.92	0.00	3.23	0.17	1.35	0.00	1.51	0.02	0.35	0.00	0.37	0.00	0.01	0.02	0.00	0.02	0.00	0.14	5.27
Hot Soak	0.67	2.54	0.00	3.21	0.39	1.21	0.00	1.59	0.07	0.40	0.00	0.47	0.05	0.06	0.11	0.00	0.11	0.01	0.09	5.47
Running	4.21	15.11	0.00	19.32	1.39	11.58	0.00	12.96	0.36	4.37	0.00	4.73	0.46	1.49	1.95	0.00	1.95	0.04	0.58	39.59
Resting	0.15	1.15	0.00	1.30	0.08	0.55	0.00	0.63	0.01	0.15	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.05	2.14
Total	11.05	63.11	0.09	74.25	6.49	36.63	0.11	43.23	1.69	15.13	0.46	17.29	2.49	4.99	7.48	4.83	12.31	2.11	3.64	152.83
Carbon Monoxide Emissions																				
Run Exh	48.25	406.25	0.24	454.75	42.63	259.87	0.46	302.96	12.62	78.50	1.42	92.54	14.24	29.53	43.77	18.16	61.93	14.66	26.39	953.24
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.38	0.01	0.41	0.03	0.21	0.24	1.66	1.90	0.00	0.00	2.30
Start Ex	7.19	200.04	0.00	207.23	4.18	112.56	0.00	116.74	2.62	48.14	0.00	50.77	9.81	26.24	36.05	0.00	36.05	0.93	1.57	413.29
Total Ex	55.44	606.30	0.24	661.98	46.81	372.43	0.46	419.70	15.26	127.03	1.43	143.72	24.08	55.98	80.06	19.82	99.88	15.59	27.96	1368.83
Oxides of Nitrogen Emissions																				
Run Exh	2.80	45.14	0.38	48.32	2.39	35.45	0.85	38.69	0.60	15.51	5.50	21.61	0.37	6.54	6.91	93.84	100.75	17.36	0.80	227.51
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.05	0.00	0.00	0.00	5.08	5.09	0.00	0.00	5.13
Start Ex	0.34	11.98	0.00	12.32	0.19	7.78	0.00	7.97	0.07	5.62	0.00	5.69	0.16	2.94	3.10	0.00	3.10	0.09	0.05	29.22
Total Ex	3.15	57.12	0.38	60.64	2.58	43.22	0.85	46.66	0.67	21.14	5.54	27.35	0.53	9.48	10.01	98.92	108.93	17.44	0.85	261.87
Carbon Dioxide Emissions (000)																				
Run Exh	0.33	45.50	0.10	45.93	0.29	24.53	0.23	25.04	0.07	12.41	0.62	13.09	0.05	1.00	1.05	15.31	16.36	2.30	0.07	102.80
Idle Exh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.02	0.00	0.01	0.01	0.26	0.27	0.00	0.00	0.28
Start Ex	0.05	1.60	0.00	1.65	0.03	0.87	0.00	0.89	0.01	0.41	0.00	0.42	0.02	0.03	0.05	0.00	0.05	0.00	0.01	3.02
Total Ex	0.38	47.10	0.10	47.58	0.32	25.39	0.23	25.94	0.08	12.83	0.62	13.53	0.08	1.03	1.10	15.57	16.67	2.30	0.08	106.10
PM10 Emissions																				
Run Exh	0.02	1.38	0.04	1.45	0.02	1.00	0.05	1.07	0.00	0.40	0.09	0.50	0.00	0.01	0.01	2.10	2.11	0.29	0.03	5.45
Idle Exh	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	0.10	0.10	0.00	0.00	0.10
Start Ex	0.00	0.14	0.00	0.14	0.00	0.10	0.00	0.10	0.00	0.04	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29
Total Ex	0.03	1.52	0.04	1.59	0.02	1.10	0.05	1.17	0.00	0.44	0.09	0.54	0.00	0.02	0.02	2.20	2.22	0.29	0.03	5.84
TireWear	0.01	0.93	0.00	0.93	0.00	0.41	0.01	0.42	0.00	0.15	0.01	0.16	0.00	0.02	0.02	0.22	0.24	0.01	0.00	1.76
BrakeWr	0.01	1.45	0.00	1.46	0.01	0.64	0.01	0.65	0.00	0.22	0.02	0.24	0.00	0.02	0.02	0.10	0.12	0.01	0.01	2.49
Total	0.04	3.90	0.05	3.99	0.03	2.15	0.06	2.24	0.01	0.81	0.12	0.94	0.00	0.05	0.06	2.52	2.58	0.32	0.04	10.09
Lead	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
SOx	0.00	0.46	0.00	0.47	0.00	0.25	0.00	0.26	0.00	0.13	0.01	0.13	0.00	0.01	0.01	0.15	0.16	0.02	0.00	1.04
Fuel Consumption (000 gallons)																				
Gasoline	49.77	4931.74	0.00	4981.51	41.58	2666.02	0.00	2707.60	10.89	1336.78	0.00	1347.68	12.34	115.27	127.61	0.00	127.61	33.77	13.83	9211.99
Diesel	0.00	0.00	9.04	9.04	0.00	0.00	20.32	20.32	0.00	0.00	55.89	55.89	0.00	0.00	0.00	1401.06	1401.06	179.43	0.00	1665.75

EMFAC Composite Emissions Factor Conversion

Table 3.1E-5

County: Bay Area Air Basin
Year: 2007
Model Years: 1965 - 2007

EMFAC Burden Output

	LDP	LDT(gas)	LDT(diesel)	MDT	HDGT	HDDT	Buses
Daily VMT/1000	105748	46643	589	17048	1421	7166	1026
Daily VMT	105748000	46643000	589000	17048000	1421000	7166000	1026000
TOG, tpd	74.25	43.12	0.11	17.29	7.48	4.83	2.11
CO, tpd	661.98	419.24	0.46	143.72	80.06	19.82	15.59
NOx, tpd	60.64	45.8	0.85	27.35	10.01	98.92	17.44
CO2, tpd	47.58	25.71	0.23	13.53	1.1	15.57	2.3
PM10, tpd	1.59	2.18	0.06	0.94	0.06	2.52	0.32
SOx, tpd	0.47	0.25	0	0.13	0.01	0.15	0.02

Composite Efs

	LDP	LDT(gas)	LDT(diesel)	MDT	HDGT	HDDT	Buses
	g/VMT	g/VMT	g/VMT	g/VMT	g/VMT	g/VMT	g/VMT
TOG	0.64	0.84	0.0021	0.92	4.78	0.61	1.87
CO	5.68	8.15	0.0089	7.65	51.11	2.51	13.78
NOx	0.52	0.89	0.0165	1.46	6.39	12.52	15.42
CO2	0.41	0.50	0.0045	0.72	0.70	1.97	2.03
PM10	0.01	0.04	0.0012	0.05	0.04	0.32	0.28
SOx	0.0040	0.0049	0.0000	0.0069	0.0064	0.0190	0.0177

Weighted Avg LDP/LDT

	g/VMT
TOG	0.699
CO	6.436
NOx	0.634
CO2	0.436
PM10	0.022
SOx	0.004

Calc 1	0.30607451
Calc 2	0.69392549

Table 3.1E-6 Equipment Emissions Factors

SCAQMD Data (website)	Year						2007				
	HP	CO	CO	Nox	NOx	PM10	PM10	SOx	SOx	VOC	VOC
		lbs/hp-hr	lbs/hr	lbs/hp-hr	lbs/hr	lbs/hp-hr	lbs/hr	lbs/hp-hr	lbs/hr	lbs/hp-hr	lbs/hr
Bore/Drill Rigs	15	0.0046	0.069	0.0046	0.069	0.0000	0	0.0000	0	0.0000	0
	25	0.0031	0.077	0.0062	0.155	0.0000	0	0.0000	0	0.0000	0
	50	0.0038	0.19	0.0053	0.263	0.0004	0.021	0.0015	0.075	0.0008	0.038
	120	0.0037	0.444	0.0058	0.698	0.0004	0.043	0.0014	0.167	0.0004	0.05
	175	0.0039	0.688	0.0058	1.023	0.0002	0.043	0.0017	0.294	0.0003	0.054
	250	0.0012	0.311	0.0053	1.332	0.0001	0.037	0.0016	0.393	0.0002	0.062
	500	0.0010	0.517	0.0035	1.77	0.0001	0.059	0.0011	0.563	0.0001	0.07
	750	0.0014	1.025	0.0048	3.607	0.0001	0.109	0.0015	1.145	0.0002	0.121
Composite	236	0.0020	0.476	0.0053	1.252	0.0002	0.048	0.0014	0.329	0.0003	0.067
Cement and Mortar Mixers	15	0.0027	0.04	0.0043	0.065	0.0003	0.005	0.0000	0	0.0007	0.011
	25	0.0046	0.114	0.0081	0.203	0.0005	0.013	0.0000	0	0.0000	0
Composite	20	0.0023	0.046	0.0038	0.076	0.0003	0.005	0.0000	0	0.0005	0.01
Concrete/Industrial Saws	25	0.0000	0	0.0056	0.141	0.0000	0	0.0000	0	0.0000	0
	50	0.0072	0.358	0.0065	0.323	0.0009	0.044	0.0015	0.077	0.0017	0.087
	120	0.0043	0.517	0.0087	1.039	0.0008	0.094	0.0013	0.161	0.0012	0.149
	175	0.0058	1.007	0.0115	2.014	0.0000	0	0.0016	0.282	0.0000	0
Composite	93	0.0049	0.451	0.0084	0.778	0.0008	0.071	0.0014	0.128	0.0013	0.119
Cranes	50	0.0056	0.282	0.0048	0.238	0.0006	0.03	0.0011	0.053	0.0020	0.101
	120	0.0029	0.353	0.0053	0.63	0.0006	0.067	0.0009	0.108	0.0007	0.088
	175	0.0026	0.454	0.0052	0.904	0.0003	0.057	0.0010	0.167	0.0005	0.09
	250	0.0010	0.241	0.0047	1.176	0.0001	0.037	0.0009	0.233	0.0003	0.073
	500	0.0007	0.369	0.0032	1.605	0.0001	0.055	0.0007	0.326	0.0002	0.102
	750	0.0008	0.616	0.0037	2.801	0.0001	0.093	0.0007	0.556	0.0002	0.169
Composite	308	0.0012	0.355	0.0033	1.023	0.0002	0.052	0.0006	0.196	0.0003	0.086
Crawler Tractors	50	0.0070	0.35	0.0056	0.28	0.0009	0.047	0.0011	0.053	0.0031	0.155
	120	0.0041	0.494	0.0083	0.99	0.0008	0.1	0.0012	0.142	0.0012	0.143
	175	0.0042	0.727	0.0094	1.652	0.0006	0.102	0.0014	0.251	0.0010	0.172
	250	0.0021	0.536	0.0085	2.121	0.0003	0.086	0.0014	0.345	0.0006	0.161
	500	0.0025	1.246	0.0059	2.965	0.0002	0.119	0.0009	0.469	0.0004	0.22
	750	0.0028	2.072	0.0072	5.41	0.0003	0.212	0.0011	0.857	0.0005	0.364
Composite	308	0.0021	0.631	0.0049	1.521	0.0003	0.1	0.0008	0.232	0.0005	0.161
Crushing/Proc. Equipment	50	0.0126	0.628	0.0100	0.5	0.0014	0.07	0.0021	0.105	0.0046	0.229
	120	0.0052	0.626	0.0105	1.255	0.0011	0.127	0.0015	0.179	0.0015	0.183
	175	0.0058	1.007	0.0131	2.289	0.0008	0.141	0.0020	0.348	0.0014	0.241
	250	0.0032	0.788	0.0125	3.123	0.0005	0.126	0.0021	0.515	0.0008	0.195
	500	0.0036	1.813	0.0086	4.286	0.0003	0.172	0.0014	0.678	0.0007	0.326
	750	0.0036	2.727	0.0092	6.909	0.0002	0.182	0.0014	1.053	0.0000	0
Composite	308	0.0028	0.854	0.0057	1.748	0.0004	0.126	0.0009	0.268	0.0007	0.221
Dumpers/Tenders	25	0.0018	0.044	0.0031	0.077	0.0000	0	0.0000	0	0.0000	0
Composite	25	0.0018	0.044	0.0031	0.077	0.0000	0	0.0000	0	0.0000	0
Excavators	25	0.0025	0.062	0.0058	0.146	0.0003	0.007	0.0000	0	0.0000	0
	50	0.0049	0.243	0.0048	0.241	0.0006	0.028	0.0012	0.059	0.0015	0.076
	120	0.0040	0.484	0.0070	0.839	0.0007	0.081	0.0013	0.159	0.0009	0.108
	175	0.0034	0.597	0.0064	1.125	0.0004	0.064	0.0013	0.233	0.0006	0.102
	250	0.0012	0.296	0.0060	1.491	0.0002	0.041	0.0013	0.329	0.0003	0.081
	500	0.0008	0.423	0.0036	1.802	0.0001	0.056	0.0008	0.423	0.0002	0.1
	750	0.0009	0.707	0.0042	3.144	0.0001	0.074	0.0010	0.721	0.0002	0.186
Composite	267	0.0018	0.472	0.0043	1.138	0.0002	0.06	0.0009	0.243	0.0004	0.097
Forklifts	50	0.0050	0.252	0.0035	0.173	0.0005	0.027	0.0000	0	0.0019	0.096
	120	0.0021	0.25	0.0039	0.468	0.0005	0.055	0.0000	0	0.0006	0.074
	175	0.0020	0.358	0.0044	0.766	0.0003	0.054	0.0000	0.001	0.0005	0.089
	250	0.0009	0.237	0.0039	0.981	0.0002	0.041	0.0000	0.001	0.0003	0.079
	500	0.0008	0.412	0.0025	1.239	0.0001	0.055	0.0000	0.001	0.0002	0.1
Composite	219	0.0012	0.259	0.0021	0.457	0.0002	0.05	0.0000	0	0.0004	0.079
Generator Sets	15	0.0022	0.033	0.0039	0.058	0.0005	0.007	0.0000	0	0.0010	0.015
	25	0.0020	0.049	0.0036	0.09	0.0005	0.013	0.0000	0	0.0013	0.033
	50	0.0061	0.306	0.0064	0.322	0.0007	0.036	0.0000	0	0.0022	0.108
	120	0.0043	0.52	0.0087	1.041	0.0007	0.089	0.0000	0.001	0.0012	0.14
	175	0.0043	0.758	0.0098	1.719	0.0005	0.091	0.0000	0.002	0.0009	0.164
	250	0.0024	0.604	0.0096	2.411	0.0003	0.083	0.0000	0.002	0.0007	0.167
	500	0.0023	1.163	0.0071	3.555	0.0002	0.123	0.0000	0.003	0.0005	0.238
	750	0.0025	1.879	0.0078	5.873	0.0003	0.201	0.0000	0.005	0.0005	0.395
Composite	236	0.0014	0.322	0.0028	0.656	0.0002	0.048	0.0000	0.001	0.0004	0.094
Graders	50	0.0062	0.309	0.0057	0.285	0.0005	0.025	0.0015	0.073	0.0025	0.124
	120	0.0042	0.508	0.0077	0.926	0.0008	0.092	0.0014	0.162	0.0010	0.125
	175	0.0038	0.672	0.0079	1.377	0.0005	0.082	0.0015	0.257	0.0008	0.134
	250	0.0015	0.364	0.0071	1.78	0.0002	0.054	0.0014	0.357	0.0004	0.107
	500	0.0009	0.473	0.0041	2.073	0.0001	0.068	0.0008	0.418	0.0002	0.124
	750	0.0013	0.941	0.0056	4.235	0.0000	0	0.0012	0.92	0.0000	0
Composite	308	0.0018	0.546	0.0047	1.442	0.0002	0.074	0.0009	0.276	0.0004	0.124
Off-Highway Tractors	120	0.0049	0.588	0.0114	1.373	0.0000	0	0.0000	0	0.0000	0
	175	0.0044	0.771	0.0100	1.751	0.0006	0.106	0.0015	0.27	0.0010	0.181
	250	0.0017	0.413	0.0066	1.64	0.0003	0.065	0.0011	0.27	0.0005	0.122
	750	0.0033	2.441	0.0087	6.532	0.0003	0.25	0.0014	1.051	0.0006	0.466
Composite	324	0.0021	0.695	0.0060	1.953	0.0003	0.095	0.0010	0.31	0.0005	0.169

Off-Highway Trucks		175	0.0042	0.74	0.0086	1.507	0.0006	0.1	0.0015	0.258	0.0009	0.164
		250	0.0015	0.387	0.0075	1.867	0.0003	0.063	0.0014	0.345	0.0005	0.122
		500	0.0012	0.609	0.0052	2.623	0.0002	0.095	0.0010	0.493	0.0004	0.178
		750	0.0013	0.976	0.0058	4.378	0.0002	0.155	0.0011	0.819	0.0004	0.295
	Composite	419	0.0015	0.641	0.0065	2.731	0.0002	0.096	0.0012	0.494	0.0004	0.187
Other Construction Equipment		15	0.0041	0.061	0.0057	0.086	0.0004	0.006	0.0001	0.002	0.0006	0.009
		25	0.0023	0.057	0.0052	0.129	0.0004	0.01	0.0000	0	0.0000	0
		50	0.0067	0.333	0.0061	0.303	0.0007	0.037	0.0013	0.066	0.0027	0.135
		120	0.0047	0.568	0.0095	1.142	0.0009	0.105	0.0015	0.175	0.0014	0.162
		175	0.0034	0.599	0.0078	1.363	0.0004	0.077	0.0013	0.22	0.0008	0.133
		500	0.0020	1.015	0.0055	2.768	0.0002	0.102	0.0009	0.46	0.0004	0.19
	Composite	148	0.0038	0.561	0.0094	1.38	0.0004	0.065	0.0015	0.223	0.0008	0.118
Pavers		25	0.0036	0.091	0.0084	0.211	0.0000	0	0.0000	0	0.0000	0
		50	0.0052	0.26	0.0054	0.269	0.0006	0.03	0.0013	0.067	0.0016	0.08
		120	0.0037	0.447	0.0066	0.789	0.0006	0.074	0.0013	0.15	0.0008	0.1
		175	0.0038	0.668	0.0074	1.298	0.0004	0.071	0.0015	0.266	0.0007	0.117
		250	0.0015	0.364	0.0074	1.84	0.0002	0.051	0.0016	0.401	0.0005	0.114
		500	0.0009	0.429	0.0037	1.864	0.0001	0.055	0.0009	0.425	0.0002	0.111
	Composite	187	0.0023	0.435	0.0043	0.802	0.0003	0.058	0.0009	0.165	0.0005	0.098
Paving Equipment		25	0.0023	0.057	0.0047	0.118	0.0004	0.009	0.0000	0	0.0006	0.014
		50	0.0057	0.284	0.0052	0.261	0.0007	0.033	0.0012	0.06	0.0022	0.11
		120	0.0032	0.385	0.0064	0.772	0.0006	0.072	0.0010	0.118	0.0009	0.106
		175	0.0033	0.57	0.0074	1.298	0.0004	0.074	0.0012	0.21	0.0007	0.128
		250	0.0015	0.364	0.0059	1.469	0.0002	0.055	0.0010	0.254	0.0004	0.106
	Composite	124	0.0033	0.411	0.0073	0.909	0.0005	0.066	0.0012	0.144	0.0009	0.107
Plate Compactors		15	0.0017	0.026	0.0026	0.039	0.0001	0.002	0.0000	0	0.0006	0.009
	Composite	15	0.0017	0.026	0.0026	0.039	0.0001	0.002	0.0000	0	0.0006	0.009
Rollers		15	0.0025	0.038	0.0036	0.054	0.0003	0.004	0.0001	0.001	0.0005	0.008
		25	0.0023	0.058	0.0050	0.125	0.0003	0.008	0.0001	0.002	0.0008	0.019
		50	0.0047	0.235	0.0050	0.248	0.0005	0.027	0.0012	0.062	0.0014	0.071
		120	0.0031	0.377	0.0056	0.667	0.0005	0.061	0.0011	0.128	0.0007	0.084
		175	0.0032	0.558	0.0062	1.085	0.0003	0.059	0.0013	0.224	0.0005	0.095
		250	0.0011	0.286	0.0057	1.436	0.0002	0.041	0.0013	0.318	0.0003	0.078
		500	0.0008	0.399	0.0035	1.741	0.0001	0.051	0.0008	0.396	0.0002	0.083
	Composite	162	0.0022	0.364	0.0043	0.697	0.0003	0.051	0.0009	0.139	0.0005	0.077
Rough Terrain Forklifts		50	0.0071	0.355	0.0067	0.336	0.0008	0.041	0.0016	0.081	0.0023	0.113
		120	0.0035	0.419	0.0062	0.739	0.0006	0.074	0.0011	0.135	0.0008	0.098
		175	0.0039	0.676	0.0075	1.312	0.0004	0.077	0.0015	0.259	0.0007	0.124
		250	0.0013	0.333	0.0067	1.679	0.0002	0.049	0.0014	0.358	0.0003	0.082
		500	0.0010	0.495	0.0042	2.1	0.0001	0.063	0.0009	0.46	0.0003	0.127
	Composite	219	0.0020	0.446	0.0037	0.806	0.0003	0.073	0.0007	0.15	0.0005	0.101
Rubber Tired Dozers		175	0.0038	0.67	0.0068	1.191	0.0002	0.037	0.0016	0.273	0.0011	0.186
		250	0.0023	0.587	0.0093	2.326	0.0004	0.093	0.0015	0.38	0.0007	0.175
		500	0.0025	1.249	0.0060	3.014	0.0002	0.12	0.0010	0.479	0.0004	0.222
		750	0.0023	1.746	0.0061	4.61	0.0002	0.181	0.0010	0.739	0.0004	0.335
	Composite	419	0.0024	1.024	0.0067	2.817	0.0003	0.112	0.0011	0.452	0.0005	0.211
Rubber Tired Loaders		25	0.0035	0.088	0.0059	0.147	0.0000	0	0.0000	0	0.0000	0
		50	0.0069	0.343	0.0062	0.312	0.0008	0.039	0.0015	0.074	0.0022	0.111
		120	0.0034	0.402	0.0059	0.707	0.0006	0.072	0.0011	0.127	0.0008	0.096
		175	0.0033	0.584	0.0065	1.133	0.0004	0.068	0.0013	0.221	0.0006	0.109
		250	0.0012	0.297	0.0059	1.481	0.0002	0.044	0.0012	0.309	0.0003	0.086
		500	0.0009	0.456	0.0039	1.97	0.0001	0.064	0.0009	0.429	0.0002	0.118
		750	0.0012	0.929	0.0056	4.234	0.0002	0.137	0.0012	0.905	0.0003	0.244
	Composite	267	0.0016	0.425	0.0042	1.111	0.0002	0.063	0.0008	0.221	0.0004	0.099
Scrapers		120	0.0057	0.684	0.0109	1.306	0.0011	0.133	0.0017	0.203	0.0014	0.166
		175	0.0049	0.85	0.0107	1.867	0.0007	0.117	0.0018	0.307	0.0011	0.193
		250	0.0021	0.531	0.0097	2.436	0.0003	0.085	0.0017	0.435	0.0007	0.166
		500	0.0018	0.889	0.0066	3.301	0.0002	0.119	0.0012	0.582	0.0004	0.223
		750	0.0020	1.48	0.0078	5.83	0.0003	0.201	0.0014	1.031	0.0005	0.373
	Composite	359	0.0023	0.816	0.0079	2.839	0.0003	0.114	0.0014	0.496	0.0006	0.207
Signal Boards		15	0.0025	0.038	0.0033	0.049	0.0003	0.004	0.0001	0.001	0.0003	0.005
		50	0.0077	0.385	0.0077	0.385	0.0010	0.048	0.0019	0.094	0.0048	0.24
		120	0.0046	0.557	0.0093	1.117	0.0008	0.101	0.0014	0.173	0.0013	0.157
		175	0.0049	0.857	0.0111	1.949	0.0006	0.108	0.0018	0.322	0.0011	0.184
		250	0.0025	0.625	0.0100	2.501	0.0004	0.097	0.0018	0.444	0.0009	0.216
	Composite	122	0.0008	0.097	0.0015	0.185	0.0001	0.013	0.0002	0.024	0.0002	0.021
Skid Steer Loaders		25	0.0023	0.058	0.0051	0.127	0.0003	0.008	0.0001	0.002	0.0006	0.014
		50	0.0038	0.191	0.0046	0.228	0.0004	0.022	0.0012	0.061	0.0010	0.048
		120	0.0022	0.26	0.0036	0.433	0.0003	0.035	0.0008	0.092	0.0004	0.046
	Composite	65	0.0031	0.204	0.0044	0.287	0.0004	0.025	0.0010	0.067	0.0007	0.045
Surfacing Equipment		50	0.0031	0.157	0.0028	0.141	0.0003	0.016	0.0006	0.031	0.0000	0
		120	0.0043	0.52	0.0074	0.892	0.0000	0	0.0012	0.146	0.0000	0
		175	0.0028	0.495	0.0062	1.089	0.0000	0	0.0011	0.195	0.0000	0
		250	0.0016	0.398	0.0064	1.592	0.0002	0.05	0.0012	0.292	0.0000	0
		500	0.0017	0.851	0.0048	2.391	0.0002	0.081	0.0008	0.401	0.0004	0.186
		750	0.0017	1.28	0.0051	3.791	0.0002	0.142	0.0008	0.596	0.0000	0
	Composite	308	0.0022	0.67	0.0059	1.827	0.0002	0.062	0.0010	0.307	0.0003	0.104

Tractors/Loaders/Backhoes		25	0.0030	0.075	0.0062	0.156	0.0005	0.012	0.0000	0	0.0007	0.017
		50	0.0094	0.472	0.0071	0.353	0.0010	0.052	0.0014	0.072	0.0036	0.179
		120	0.0034	0.403	0.0067	0.807	0.0007	0.085	0.0009	0.112	0.0010	0.12
		175	0.0036	0.632	0.0082	1.433	0.0005	0.093	0.0012	0.21	0.0009	0.154
		250	0.0023	0.565	0.0091	2.285	0.0004	0.098	0.0014	0.361	0.0010	0.246
	Composite	124	0.0034	0.419	0.0066	0.816	0.0007	0.083	0.0009	0.115	0.0010	0.125
Trenchers		15	0.0034	0.051	0.0041	0.062	0.0003	0.004	0.0000	0	0.0000	0
		25	0.0055	0.138	0.0120	0.299	0.0009	0.022	0.0000	0	0.0015	0.037
		50	0.0054	0.269	0.0061	0.306	0.0006	0.032	0.0016	0.079	0.0016	0.079
		120	0.0034	0.405	0.0059	0.705	0.0005	0.062	0.0012	0.14	0.0007	0.085
		175	0.0042	0.727	0.0079	1.374	0.0004	0.071	0.0017	0.299	0.0007	0.116
		250	0.0016	0.393	0.0080	1.988	0.0002	0.054	0.0018	0.46	0.0003	0.077
		500	0.0011	0.539	0.0046	2.319	0.0001	0.066	0.0011	0.564	0.0002	0.12
		750	0.0011	0.833	0.0063	4.722	0.0000	0	0.0014	1.081	0.0000	0
	Composite	236	0.0015	0.365	0.0025	0.596	0.0002	0.05	0.0005	0.127	0.0004	0.083
Welders		15	0.0027	0.04	0.0049	0.074	0.0005	0.007	0.0000	0	0.0010	0.015
		25	0.0027	0.068	0.0043	0.107	0.0004	0.011	0.0000	0	0.0014	0.035
		50	0.0063	0.316	0.0057	0.285	0.0007	0.036	0.0000	0	0.0023	0.117
		120	0.0024	0.282	0.0047	0.562	0.0004	0.053	0.0000	0	0.0007	0.08
		175	0.0033	0.572	0.0072	1.266	0.0004	0.063	0.0000	0.001	0.0008	0.135
	Composite	77	0.0030	0.232	0.0041	0.318	0.0004	0.034	0.0000	0	0.0010	0.079

Data obtained from Will Walters - Aspen Environmental-CEC Air Quality Consultant on Siting Issues