Appendix C.
Air Pollutant Emissions Calculations

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Emission Calculation Assumptions

Proposed Project General Assumptions

1) Construction work occurs 6 days a week excepting major holidays.

Offroad Equipment Emission Calculation Assumptions

1) Emission factors are the latest available from the SCAQMD website, where the nearest horsepower sized equipment given in the SCAQMD emission factor database are used with a ratio of actual assumed equipment horsepower to derive hourly emission factors.
2) Emission factors from each year assumed in the project schedule are used to calculate the annual emissions.
3) Equipment type, number, and usage estimates are used as estimated using equipment data and quantity estimates are from the PEA revised to create a consistent equipment list given certain variability between the segment construction elements.
4) The following vehicle types, which could be offroad vehicles are assumed to be onroad vehicles considering the project description, needs and location: water trucks and dump trucks.

Onroad Equipment Emission Calculations Assumptions

1) Emission factors are the latest available from the SCAQMD website, where the vehicles have been assigned three classes, passenger (i.e. employee vehicles and pickups), delivery (all nonpassenger vehicles smaller than Heavy-Heavy Duty), and heavy-heavy duty vehicles.
2) Emission factors from each year assumed in the project schedule are used to calculate the annual emissions.

3) Trip estimates are based on PEA estimates of crew size and onroad vehicle numbers and trips revised to create a consistent basis given certain variability between construction segment elements.

4) For simplification all onroad traffic for the project is assumed to occur within the jurisdiction of the specific project segment construction element.

Fugitive Dust Emission Calculations Assumptions

1) Unpaved road travel is minimized to the extent feasible and shall be no more than one-half mile per trip for equipment that must access the working sites. Construction employee traffic does not use unpaved roads, parking will be on paved roads/lots.
2) Unpaved road emission factors are calculated using the most current version of USEPA AP-42 Section 13.2.1 and use the following assumptions: 1) Silt content is assumed to be 6% on average (SCAQMD level for sand and gravel plant roads and the site is in a stream bed); and 2) average vehicle weight based on VMT estimate for unpaved roads
3) Paved road emission factors are calculated using the most current version of USEPA AP-42 Section 13.2.1 and use the following assumptions: 1) Silt loading is average for 5000-10000 ADT road; 2) average vehicle weight is calculated on VMT average basis.
4) Earthmoving emission factors are calculated using the recent version of USEPA AP-42 Section 11.9 for Dozing and Grading, and Section 13.2.4 for soil handling (drop emissions).
5) Specific assumptions related to the calculations, such as silt content or silt loading, are noted in the calculation sheets.

Helicopter Emission Calculations Assumptions

1) The type of helicopters and number of helicopter trips for tower helicopter construction are based on estimates provided by SCE.

Emission Estimate Limitations

1) The SCE project schedule has errors and inconsistencies that were corrected to the extent possible.

2) The actual project construction schedule would have greater variability and activity overlap in each segment or subsegment as problems such as weather or other factors delay work and work delays are later compensated for and as foundation/tower/stringing/restoration crews work sequentially down each T-Line Segment.
3) The equipment data provided by SCE was inconsistent between segments. Some consistency was attempted given differences in Segment needs such as more road construction through the ANF than in the LA basin.
4) The annual emissions estimate for each air basin and for the ANF are estimated based on a certain progression and direction of activities in those construction elements that cross borders.
5) There are likely unknown project construction requirements, such as upgrading certain paved roads within the ANF, that are not currently included in the construction assumptions.

6) The helicopter emission factors come from a old source and use engines that do not match the helicopter engines being used, which may cause an overestimation of these emissions depending on the accuracy of the helicopter trip estimate. Unlike large fixed wing aircraft engines helicopter engines do not require emission testing by the ICAO so no new emission factors are readily available.

TRTP Alternative 2 Project Construction Emission Totals
All Jurisdictions

2009 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.374	2.824	2.637	0.005	0.058	0.054
Offroad Vehicles/Equipment	0.671	2.060	3.947	0.004	0.260	0.239
Helicopter	0.000	0.000	0.000	0.000	0.000	0.000
Fugitive Dust	---	---	---	---	6.704	1.377
Totals	**1.05**	**4.88**	**6.58**	**0.01**	**7.02**	**1.67**

2010 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	5.610	42.917	36.276	0.084	0.880	0.810
Offroad Vehicles/Equipment	11.372	38.644	75.145	0.079	4.586	4.219
Helicopter	1.701	8.184	9.613	0.080	0.531	0.488
Fugitive Dust	---	---	---	---	111.807	26.372
Totals	**18.68**	**89.75**	**121.03**	**0.24**	**117.80**	**31.89**

2011 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	3.587	27.464	19.139	0.052	0.531	0.488
Offroad Vehicles/Equipment	6.769	24.092	43.803	0.047	2.779	2.557
Helicopter	1.437	5.629	7.756	0.065	0.427	0.393
Fugitive Dust	---	---	---	---	57.955	11.882
Totals	**11.79**	**57.19**	**70.70**	**0.16**	**61.69**	**15.32**

2012 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	1.967	14.666	10.675	0.032	0.310	0.285
Offroad Vehicles/Equipment	3.178	11.903	20.641	0.023	1.301	1.197
Helicopter	2.660	9.806	11.734	0.098	0.647	0.595
Fugitive Dust	---	---	---	---	36.721	7.848
Totals	**7.80**	**36.38**	**43.05**	**0.15**	**38.98**	**9.92**

2013 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.108	0.841	0.396	0.002	0.015	0.013
Offroad Vehicles/Equipment	0.145	0.597	1.015	0.001	0.058	0.053
Helicopter	0.005	0.011	0.022	0.000	0.001	0.001
Fugitive Dust	---	---	---	---	1.852	0.357
Totals	**0.26**	**1.45**	**1.43**	**0.00**	**1.93**	**0.42**

TRTP Alternative 2 Project Construction Emission Totals
SCAQMD Jurisdiction

Worst-Case Day	Emissions (lbs/day)					
(Year 2010)	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	26.51	202.71	169.31	0.39	4.11	3.78
Offroad Vehicles/Equipment	25.54	86.57	165.52	0.17	10.25	9.43
Helicopter	275.95	1,004.12	1,092.23	9.14	60.30	55.47
Fugitive Dust	---	---	---	---	494.30	115.44
Totals	**328.01**	**1,293.40**	**1,427.06**	**9.70**	**568.96**	**184.13**

2009 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.103	0.774	0.710	0.001	0.016	0.014
Offroad Vehicles/Equipment	0.161	0.500	0.772	0.001	0.063	0.058
Helicopter	0.000	0.000	0.000	0.000	0.000	0.000
Fugitive Dust	---	---	---	---	2.010	0.420
Totals	**0.26**	**1.27**	**1.48**	**0.00**	**2.09**	**0.49**

2010 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	1.904	14.222	13.742	0.030	0.322	0.296
Offroad Vehicles/Equipment	4.326	14.971	28.303	0.029	1.772	1.630
Helicopter	1.565	7.879	8.990	0.075	0.497	0.457
Fugitive Dust	---	---	---	---	33.552	7.899
Totals	**7.80**	**37.07**	**51.03**	**0.13**	**36.14**	**10.28**

2011 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	2.579	19.664	14.068	0.038	0.387	0.356
Offroad Vehicles/Equipment	4.988	17.428	31.043	0.033	2.022	1.860
Helicopter	1.294	5.310	7.104	0.059	0.391	0.360
Fugitive Dust	---	---	---	---	39.376	8.107
Totals	**8.86**	**42.40**	**52.22**	**0.13**	**42.18**	**10.68**

2012 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	1.232	9.154	6.815	0.021	0.197	0.181
Offroad Vehicles/Equipment	1.868	7.067	12.109	0.014	0.779	0.717
Helicopter	1.158	4.010	5.135	0.043	0.282	0.260
Fugitive Dust	---	---	---	---	22.809	4.838
Totals	**4.26**	**20.23**	**24.06**	**0.08**	**24.07**	**6.00**

2013 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.001	0.008	0.011	0.000	0.000	0.000
Offroad Vehicles/Equipment	0.002	0.007	0.009	0.000	0.001	0.001
Helicopter	0.000	0.000	0.000	0.000	0.000	0.000
Fugitive Dust	---	---	---	---	0.083	0.017
Totals	**0.00**	**0.01**	**0.02**	**0.00**	**0.08**	**0.02**

TRTP Alternative 2 Project Construction Emission Totals
AVAQMD Jurisdiction

Worst-Case Day	Emissions (lbs/day)					
(Year 2012)	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	14.25	107.13	73.25	0.23	2.17	2.00
Offroad Vehicles/Equipment	31.87	114.81	197.89	0.22	12.37	11.38
Helicopter	357.11	1,271.53	1,379.43	11.54	76.13	0.00
Fugitive Dust	---	---	---	---	271.90	53.29
Totals	**403.23**	**1,493.47**	**1,650.56**	**11.99**	**362.57**	**66.67**

2009 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.220	1.662	1.583	0.003	0.035	0.032
Offroad Vehicles/Equipment	0.447	1.365	2.902	0.003	0.172	0.158
Helicopter	0.000	0.000	0.000	0.000	0.000	0.000
Fugitive Dust	---	---	---	---	4.025	0.812
Totals	**0.67**	**3.03**	**4.48**	**0.01**	**4.23**	**1.00**

2010 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	1.807	13.731	12.134	0.028	0.291	0.268
Offroad Vehicles/Equipment	4.037	13.711	26.686	0.029	1.623	1.493
Helicopter	0.044	0.098	0.199	0.002	0.011	0.010
Fugitive Dust	---	---	---	---	44.333	10.589
Totals	**5.89**	**27.54**	**39.02**	**0.06**	**46.26**	**12.36**

2011 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.719	5.475	3.923	0.011	0.108	0.099
Offroad Vehicles/Equipment	1.284	4.877	9.421	0.010	0.557	0.513
Helicopter	0.110	0.246	0.503	0.004	0.027	0.025
Fugitive Dust	---	---	---	---	15.025	3.075
Totals	**2.11**	**10.60**	**13.85**	**0.03**	**15.72**	**3.71**

2012 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.735	5.513	3.860	0.012	0.114	0.104
Offroad Vehicles/Equipment	1.310	4.836	8.532	0.010	0.522	0.480
Helicopter	1.503	5.796	6.599	0.055	0.364	0.335
Fugitive Dust	---	---	---	---	13.911	3.010
Totals	**3.55**	**16.14**	**18.99**	**0.08**	**14.91**	**3.93**

2013 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.107	0.833	0.386	0.002	0.014	0.013
Offroad Vehicles/Equipment	0.143	0.590	1.006	0.001	0.057	0.053
Helicopter	0.005	0.011	0.022	0.000	0.001	0.001
Fugitive Dust	---	---	---	---	1.768	0.340
Totals	**0.26**	**1.43**	**1.41**	**0.00**	**1.84**	**0.41**

TRTP Alternative 2 Project Construction Emission Totals
KCAPCD Jurisdiction

Worst-Case Day	Emissions (lbs/day)					
(Year 2010)	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	31.15	246.26	159.66	0.40	4.17	3.84
Offroad Vehicles/Equipment	41.22	136.98	254.81	0.25	16.39	15.08
Helicopter	2.10	4.69	9.58	0.08	0.52	0.48
Fugitive Dust	---	---	---	---	445.04	88.32
Totals	**74.47**	**387.93**	**424.06**	**0.74**	**466.13**	**107.72**

2009 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.051	0.388	0.344	0.001	0.008	0.007
Offroad Vehicles/Equipment	0.063	0.194	0.273	0.000	0.025	0.023
Helicopter	0.000	0.000	0.000	0.000	0.000	0.000
Fugitive Dust	---	---	---	---	0.668	0.145
Totals	**0.11**	**0.58**	**0.62**	**0.00**	**0.70**	**0.17**

2010 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	1.899	14.964	10.400	0.026	0.268	0.246
Offroad Vehicles/Equipment	3.009	9.961	20.156	0.021	1.192	1.096
Helicopter	0.093	0.207	0.424	0.004	0.023	0.021
Fugitive Dust	---	---	---	---	33.922	7.883
Totals	**5.00**	**25.13**	**30.98**	**0.05**	**35.40**	**9.25**

2011 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.290	2.325	1.148	0.004	0.036	0.033
Offroad Vehicles/Equipment	0.497	1.786	3.338	0.004	0.200	0.184
Helicopter	0.032	0.073	0.149	0.001	0.008	0.007
Fugitive Dust	---	---	---	---	3.555	0.699
Totals	**0.82**	**4.18**	**4.63**	**0.01**	**3.80**	**0.92**

2012 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.000	0.000	0.000	0.000	0.000	0.000
Offroad Vehicles/Equipment	0.000	0.000	0.000	0.000	0.000	0.000
Helicopter	0.000	0.000	0.000	0.000	0.000	0.000
Fugitive Dust	---	---	---	---	0.000	0.000
Totals	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2013 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.000	0.000	0.000	0.000	0.000	0.000
Offroad Vehicles/Equipment	0.000	0.000	0.000	0.000	0.000	0.000
Helicopter	0.000	0.000	0.000	0.000	0.000	0.000
Fugitive Dust	---	---	---	---	0.000	0.000
Totals	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Major Elements																		
# Days in Full Month (6 days/week)																		
Onsite Construction Elements Begin in 2009							**Employee Vehicle**				**Delivery Truck**				**Heavy Heavy Duty Truck**			
Segment 4	**Crew Size**	**Total Days**	**Start Date**	**End Date**			**# of vehicle**	**Paved**	**Unpaved**	**Total VMT/day**	**# of vehicle**	**Paved**	**Unpaved**	**Total VMT/day**	**# of vehicle**	**Paved**	**Unpaved**	**Total VMT/day**
Construction of Marshalling Yards	6	**192**	**6-Mar-09**	**20-Oct-09**			6	60	0.10	360.60	3	60	0.10	180.30	1	60	0.10	60.10
Marshalling Yards, -5 & +5 other elements	4	**250**	**31-Mar-10**	**27-Jan-11**			4	60	0.10	240.40	1	60	0.10	60.10	1	210	0.10	210.10
Road Maintenance	2	**235**	**12-Apr-10**	**21-Jan-11**			2	60	0.10	120.20	1	60	2.94	62.94	0	60	2.94	0.00
500 kV T/L Antelope-Whirlwind																		
Road Construction (-5)	8	**39**	**6-Apr-10**	**20-May-10**			8	60	0.10	480.80	2	60	1.41	122.81	3	60	1.41	184.22
Foundation Construction	24	**53**	**20-May-10**	**22-Jul-10**			24	60	0.10	1442.40	8	60	1.41	491.26	7	60	1.41	429.85
Tower Construction	48	**135**	**25-Jun-10**	**4-Dec-10**			48	60	0.10	2884.80	14	60	1.41	859.70	3	60	1.41	184.22
String Cable	40	**54**	**5-Nov-10**	**11-Jan-11**			40	60	0.10	2404.00	15	60	1.41	921.10	6	60	1.41	368.44
Restoration/Guard Poles +3	7	**16**	**23-Dec-10**	**14-Jan-11**			7	60	0.10	420.70	3	60	1.41	184.22	3	60	1.41	184.22
IT/Communications -Antelope to Whirlwind	6	**36**	**2-Feb-11**	**16-Mar-11**			6	60	0.10	360.60	1	60	1.41	61.41	0	60	1.41	0.00
230 kV T/L Drycreek-Whirlwind																		
Road Construction	7	**38**	**20-May-10**	**5-Jul-10**			7	60	0.10	420.70	2	60	4.58	129.15	3	60	4.58	193.73
Foundation Construction	24	**55**	**26-Aug-10**	**29-Oct-10**			24	60	0.10	1442.40	8	60	4.58	516.61	7	60	4.58	452.04
Tower Construction	48	**71**	**1-Oct-10**	**27-Dec-10**			48	60	0.10	2884.80	14	60	4.58	904.07	3	60	4.58	193.73
String Cable	40	**35**	**4-Dec-10**	**18-Jan-11**			40	60	0.10	2404.00	15	60	4.58	968.65	6	60	4.58	387.46
Restoration/Guard Poles	7	**4**	**18-Jan-11**	**21-Jan-11**			7	60	0.10	420.70	3	60	4.58	193.73	3	60	4.58	193.73
IT/Communications - Drycreek to Whirlwind	6	**36**	**16-Feb-11**	**30-Mar-11**			6	60	0.10	360.60	1	60	4.58	64.58	0	60	4.58	0.00
Path 26 Loop																		
Road Construction	7	**39**	**6-Apr-10**	**20-May-10**			7	60	0.10	420.70	2	60	1.41	122.81	3	60	1.41	184.22
Foundation Construction	24	**30**	**23-Jul-10**	**26-Aug-10**			24	60	0.10	1442.40	8	60	1.41	491.26	7	60	1.41	429.85
Tower Construction	48	**19**	**26-Aug-10**	**17-Sep-10**			48	60	0.10	2884.80	14	60	1.41	859.70	3	60	1.41	184.22
String Cable	40	**13**	**17-Sep-10**	**1-Oct-10**			40	60	0.10	2404.00	15	60	1.41	921.10	6	60	1.41	368.44
Restoration/Guard Poles	7	**2**	**30-Sep-10**	**1-Oct-10**			7	60	0.10	420.70	3	60	1.41	184.22	3	60	1.41	184.22
IT/Communications	6	**37**	**19-Aug-10**	**1-Oct-10**			6	60	0.10	360.60	1	60	1.41	61.41	0	60	1.41	0.00
66 kV Relocate at Antelope																		
Construction - Relocate 66 kV at Antelope	6	**142**	**17-Nov-09**	**6-May-10**			6	60	0.10	360.60	2	40	0.10	80.20	2	40	0.10	80.20
							Employee Vehicle				**Delivery Truck**				**Heavy Heavy Duty Truck**			
Segment 5	**Crew Size**	**Total Days**	**Start Date**	**End Date**			**# of vehicle**	**Paved**	**Unpaved**	**Total VMT/day**	**# of vehicle**	**Paved**	**Unpaved**	**Total VMT/day**	**# of vehicle**	**Paved**	**Unpaved**	**Total VMT/day**
Construction of Marshalling Yards	6	**308**	**11-Jul-09**	**16-Jul-10**			6	40	0.10	240.60	3	40	1.61	124.84	1	40	1.61	41.61
Marshalling Yards	4	**497**	**10-Nov-09**	**2-Jul-11**			4	40	0.10	160.40	1	40	1.61	41.61	1	190	1.61	191.61
Road Maintenance	2	**364**	**13-Apr-10**	**24-Jun-11**			2	40	0.10	80.20	1	40	1.61	41.61	1	40	1.61	41.61
230 kV Removal T/L Antelope-Vincent																		
Wreckout - Antelope-Mesa	26	**7**	**6-Dec-11**	**13-Dec-11**			26	40	0.10	1042.60	12	40	1.61	499.38	10	40	1.61	416.15
Wreckout - Antelope-Vincent	26	**7**	**6-Dec-11**	**13-Dec-11**			26	40	0.10	1042.60	12	40	1.61	499.38	10	40	1.61	416.15
500 kV T/L Antelope-Vincent (#2 - 3a, b, &c)																		
Road Construction	8	**39**	**6-Apr-10**	**20-May-10**			8	40	0.10	320.80	2	40	1.61	83.23	3	40	1.61	124.84
Foundation Construction	24	**58**	**11-Sep-10**	**20-Nov-10**			24	40	0.10	962.40	8	40	1.61	332.92	7	40	1.61	291.30
Tower Construction	48	**141**	**23-Oct-10**	**13-Apr-11**			48	40	0.10	1924.80	14	40	1.61	582.61	3	40	1.61	124.84
String Cable	40	**72**	**16-Mar-11**	**23-Jun-11**			40	40	0.10	1604.00	15	40	1.61	624.22	6	40	1.61	249.69
Restoration/Guard Poles	7	**18**	**7-Jun-11**	**27-Jun-11**			7	40	0.10	280.70	3	40	1.61	124.84	3	40	1.61	124.84
Remove 18-mi 230kV T/L Antelope-Mesa	26	**96**	**20-May-10**	**11-Sep-10**			26	40	0.10	1042.60	12	40	1.61	499.38	10	40	1.61	416.15
Remove 18-mi 230kV T/L Antelope-Vincent	26	**96**	**20-May-10**	**11-Sep-10**			26	40	0.10	1042.60	12	40	1.61	499.38	10	40	1.61	416.15
IT/Communications	6	**72**	**23-Feb-11**	**17-May-11**			6	40	0.10	240.60	1	40	1.61	41.61	0	40	1.61	0.00
500 kV T/L Antelope-Vincent (#1)																		
Reconfigure 500kV T/L Antelope-Vincent	6	**12**	**16-Jan-12**	**30-Jan-12**			6	40	0.10	240.60	2	40	1.61	83.23	1	40	1.61	41.61
Test/Energize	3	**3**	**30-Jan-12**	**1-Feb-12**			3	40	0.10	120.30	0	40	1.61	0.00	0	40	1.61	0.00
Shoe Fly - Sagebrush Vincent	6	**24**	**17-Nov-09**	**15-Dec-09**			6	40	0.10	240.60	2	40	1.61	83.23	2	40	1.61	83.23
Construction - Sagebrush Vincent	6	**47**	**16-Dec-09**	**11-Feb-10**			6	40	0.10	240.60	2	40	1.61	83.23	2	40	1.61	83.23
Cutover of Sagebrush Vincent	6	**19**	**1-Apr-10**	**22-Apr-10**			6	40	0.10	240.60	2	40	1.61	83.23	2	40	1.61	83.23
Relocate Sagebrush - Antelope																		
Shoe Fly - Sagebrush Antelope	6	**24**	**17-Nov-09**	**15-Dec-09**			6	40	0.10	240.60	2	40	1.61	83.23	2	40	1.61	83.23
Construction - Sagebrush Antelope	6	**70**	**16-Dec-09**	**11-Mar-10**			6	40	0.10	240.60	2	40	1.61	83.23	2	40	1.61	83.23
Cutover of Sagebrush Antelope	6	**18**	**12-Mar-10**	**1-Apr-10**			6	40	0.10	240.60	2	40	1.61	83.23	2	40	1.61	83.23

							Employee Vehicle				Delivery Truck				Heavy Heavy Duty Truck			
Segment 6	**Crew Size**	**Total Days**	**Start Date**	**End Date**			**# of vehicle**	**Paved**	**Unpaved**	**Total VMT/day**	**# of vehicle**	**Paved**	**Unpaved**	**Total VMT/day**	**# of vehicle**	**Paved**	**Unpaved**	**Total VMT/day**
Construction of Marshalling/Heli Yards	6	**468**	**13-Jun-09**	**30-Dec-10**			6	60	0.10	360.60	3	60	0.10	180.30	1	60	0.10	60.10
Marshalling Yards	4	**667**	**31-Mar-10**	**11-Jun-12**			4	60	0.10	240.40	1	60	0.10	60.10	1	130	0.10	130.10
Road Maintenance	2	**533**	**5-Jan-10**	**5-Jun-12**			2	60	0.10	120.20	1	60	5.68	65.68	1	60	5.68	65.68
230 kV Removal Ant-Mesa																		
Wreckout - Antelope-Mesa	26	**133**	**6-Apr-10**	**22-Sep-10**			26	60	0.10	1562.60	12	60	5.68	788.13	10	60	1.08	610.83
500 kV T/L Vincent-Duarte																		
Road Construction	12	**139**	**1-Jul-10**	**15-Dec-10**			12	60	0.10	721.20	4	60	5.68	262.71	7	60	5.68	459.74
Foundation Construction	24	**104**	**23-Sep-10**	**29-Jan-11**			24	60	0.10	1442.40	8	60	5.68	525.42	7	60	5.68	459.74
Tower Construction	48	**238**	**10-Dec-10**	**22-Sep-11**			48	60	0.10	2884.80	14	60	5.68	919.48	3	60	5.68	197.03
String Cable	40	**99**	**13-Jul-11**	**23-Nov-11**			40	60	0.10	2404.00	15	60	5.68	985.16	6	60	5.68	394.06
Restoration/Guard Poles	7	**27**	**26-Oct-11**	**28-Nov-11**			7	60	0.10	420.70	5	60	5.68	328.39	5	60	5.68	328.39
IT/Communications	6	**65**	**31-Jan-11**	**16-Apr-11**			6	60	0.10	360.60	1	60	5.68	65.68	0	60	5.68	0.00
230 kV Removal Rio Hondo-Vincent																		
Wreckout - Antelope-Mesa	26	**17**	**12-Jan-12**	**9-Feb-12**			26	60	0.10	1562.60	12	60	1.08	732.99	10	60	1.08	610.83
500 kV T/L Vincent-Mira Loma																		
Foundation Construction	24	**24**	**9-Feb-12**	**8-Mar-12**			24	60	0.10	1442.40	8	60	1.08	488.66	7	60	1.08	427.58
Tower Construction	28	**73**	**23-Feb-12**	**17-May-12**			28	60	0.10	1682.80	14	60	1.08	855.16	3	60	1.08	183.25
String Cable	40	**25**	**3-May-12**	**1-Jun-12**			40	60	0.10	2404.00	15	60	1.08	916.24	6	60	1.08	366.50
Restoration/Guard Poles	7	**5**	**31-May-12**	**5-Jun-12**			7	60	0.10	420.70	5	60	1.08	305.41	5	60	1.08	305.41
							Employee Vehicle				**Delivery Truck**				**Heavy Heavy Duty Truck**			
Segment 7	**Crew Size**	**Total Days**	**Start Date**	**End Date**			**# of vehicle**	**Paved**	**Unpaved**	**Total VMT/day**	**# of vehicle**	**Paved**	**Unpaved**	**Total VMT/day**	**# of vehicle**	**Paved**	**Unpaved**	**Total VMT/day**
Construction of Marshalling Yards	6	**95**	**4-Jun-10**	**24-Sep-10**			6	40	0.10	240.60	3	40	0.10	120.30	1	40	0.10	40.10
Marshalling Yards	4	**649**	**24-Jun-10**	**14-Aug-12**			4	40	0.10	160.40	1	40	0.10	40.10	1	70	0.10	70.10
230 kV Removal Ant-Mesa																		
Wreckout - Antelope-Mesa	26	**94**	**30-Jun-10**	**20-Oct-10**			26	40	0.10	1042.60	12	40	0.87	490.45	10	40	0.87	408.71
500 kV Vincent-Rio Hondo																		
Road Construction	3	**39**	**14-Sep-10**	**28-Oct-10**			3	40	0.10	120.30	1	40	1.07	41.07	3	40	1.07	123.20
Foundation Construction	24	**30**	**28-Oct-10**	**3-Dec-10**			24	40	0.10	962.40	8	40	1.07	328.55	7	40	1.07	287.48
Tower Construction	48	**13**	**3-Dec-10**	**17-Dec-10**			48	40	0.10	1924.80	14	40	1.07	574.95	3	40	1.07	123.20
Restoration/Guard Poles	7	**2**	**18-Dec-10**	**19-Dec-10**			7	40	0.10	280.70	3	40	1.07	123.20	3	40	1.07	123.20
IT/Communications	6	**69**	**30-Sep-10**	**24-Dec-10**			6	40	0.10	240.60	1	40	1.07	41.07	0	40	1.07	0.00
500 kV Duarte-Mesa																		
Foundation Construction	24	**100**	**3-Dec-10**	**4-Apr-11**			24	40	0.10	962.40	8	40	0.79	326.33	7	40	0.79	285.54
Tower Construction	48	**376**	**10-Feb-11**	**17-May-12**			48	40	0.10	1924.80	14	40	0.79	571.08	3	40	0.79	122.38
String Cable	40	**156**	**2-Feb-12**	**4-Aug-12**			40	40	0.10	1604.00	15	40	0.87	613.06	6	40	0.87	245.22
Restoration/Guard Poles	7	**16**	**21-Jul-12**	**8-Aug-12**			7	40	0.10	280.70	3	40	0.79	122.38	3	40	0.79	122.38
IT/Communications	6	**73**	**10-May-12**	**4-Aug-12**			6	40	0.10	240.60	1	40	0.79	40.79	0	40	0.79	0.00
66 kV North of Rio Hondo																		
Construction	6	**146**	**6-Apr-10**	**25-Sep-10**			6	40	0.10	240.60	2	40	0.10	80.20	2	40	0.10	80.20
Removal	6	**47**	**29-Sep-10**	**24-Nov-10**			6	40	0.10	240.60	2	40	0.10	80.20	2	40	0.10	80.20
66 kV Rio Hondo-SG River																		
Construction	6	**142**	**3-Oct-10**	**26-Mar-11**			6	40	0.10	240.60	2	40	0.10	80.20	2	40	0.10	80.20
Removal	6	**49**	**26-Mar-11**	**21-May-11**			6	40	0.10	240.60	2	40	0.10	80.20	2	40	0.10	80.20
66 kV SG River to Mesa																		
Construction	6	**150**	**26-Mar-11**	**20-Sep-11**			6	40	0.10	240.60	2	40	0.10	80.20	2	40	0.10	80.20
Removal	6	**47**	**20-Sep-11**	**15-Nov-11**			6	40	0.10	240.60	2	40	0.10	80.20	2	40	0.10	80.20
66 kV Underground																		
Construction	12	**7**	**26-Sep-10**	**2-Oct-10**			12	40	0.10	481.20	2	40	0.10	80.20	2	40	0.10	80.20

							Employee Vehicle				Delivery Truck				Heavy Heavy Duty Truck			
Segment 8	**Crew Size**	**Total Days**	**Start Date**	**End Date**			**# of vehicle**	**Paved**	**Unpaved**	**Total VMT/day**	**# of vehicle**	**Paved**	**Unpaved**	**Total VMT/day**	**# of vehicle**	**Paved**	**Unpaved**	**Total VMT/day**
Construction of Marshalling Yards	6	**188**	**9-Sep-09**	**23-Apr-10**			6	40	0.10	240.60	3	40	0.10	120.30	1	40	0.10	40.10
Marshalling Yards	4	**631**	**31-Mar-10**	**28-Apr-12**			4	40	0.10	160.40	1	40	0.10	40.10	1	90	0.10	90.10
Road Maintenance	2	**616**	**12-Apr-10**	**23-Apr-12**			2	40	0.10	80.20	1	40	0.48	40.48	1	40	0.48	40.48
230kV Removal																		
Remove 230 kV Rose Hills	26	**7**	**2-Aug-10**	**9-Aug-10**			26	40	0.10	1042.60	12	40	1.25	494.94	10	40	1.25	412.45
Remove 230 kV at Fullerton Rd	26	**6**	**27-Aug-10**	**2-Sep-10**			26	40	0.10	1042.60	12	40	0.45	485.36	10	40	0.45	404.47
Remove 230 kV Chino-Mesa (8A)	26	**96**	**17-Apr-10**	**9-Aug-10**			26	40	0.10	1042.60	12	40	0.62	487.48	10	40	0.62	406.23
Remove 230 kV on North ROW (8B)	26	**48**	**6-Apr-10**	**1-Jun-10**			26	40	0.10	1042.60	12	40	0.27	483.19	10	40	0.27	402.66
Remove 230 kV Chino-Mira Loma (8A)	26	**25**	**24-Aug-10**	**22-Sep-10**			26	40	0.10	1042.60	12	40	0.28	483.37	10	40	0.28	402.81
220 kV Rose Hills																		
Road Construction	3	**39**	**6-Apr-10**	**20-May-10**			3	40	0.10	120.30	1	40	1.25	41.25	3	40	1.25	123.74
Foundation Construction	24	**37**	**20-May-10**	**2-Jul-10**			24	40	0.10	962.40	8	40	1.25	329.96	7	40	1.25	288.72
Tower Construction	48	**24**	**18-Jun-10**	**16-Jul-10**			48	40	0.10	1924.80	14	40	1.25	577.43	3	40	1.25	123.74
String Cable	40	**13**	**16-Jul-10**	**30-Jul-10**			40	40	0.10	1604.00	15	40	1.25	618.68	6	40	1.25	247.47
Restoration/Guard Poles	7	**2**	**29-Jul-10**	**30-Jul-10**			7	40	0.10	280.70	3	40	1.25	123.74	3	40	1.25	123.74
Test/Energize	3	**3**	**30-Jul-10**	**2-Aug-10**			3	40	0.10	120.30	0	40	1.25	0.00	0	40	1.25	0.00
230 kV Fullerton Road																		
Road Construction	3	**39**	**6-Apr-10**	**20-May-10**			3	40	0.10	120.30	1	40	0.45	40.45	3	40	0.45	121.34
Foundation Construction	24	**37**	**20-May-10**	**2-Jul-10**			24	40	0.10	962.40	8	40	0.45	323.58	7	40	0.45	283.13
Tower Construction	48	**29**	**18-Jun-10**	**16-Jul-10**			48	40	0.10	1924.80	14	40	0.45	566.26	3	40	0.45	121.34
String Cable	40	**12**	**23-Jul-10**	**5-Aug-10**			40	40	0.10	1604.00	15	40	0.45	606.70	6	40	0.45	242.68
Restoration/Guard Poles	7	**1**	**5-Aug-10**	**5-Aug-10**			7	40	0.10	280.70	3	40	0.45	121.34	3	40	0.45	121.34
Test/Energize	3	**12**	**6-Aug-10**	**19-Aug-10**			3	40	0.10	120.30	0	40	0.45	0.00	0	40	0.45	0.00
230 kV Chino-Mira Loma (8B)																		
Road Construction	3	**32**	**22-Dec-09**	**29-Jan-10**			3	40	0.10	120.30	1	40	0.27	40.27	3	40	0.27	120.80
Foundation Construction	24	**61**	**29-Jan-10**	**10-Apr-10**			24	40	0.10	962.40	8	40	0.27	322.13	7	40	0.27	281.86
Tower Construction	48	**80**	**18-Mar-10**	**19-Jun-10**			48	40	0.10	1924.80	14	40	0.27	563.72	3	40	0.27	120.80
String Cable	40	**41**	**2-Jun-10**	**20-Jul-10**			40	40	0.10	1604.00	15	40	0.27	603.99	6	40	0.27	241.60
Restoration/Guard Poles	7	**7**	**16-Jul-10**	**23-Jul-10**			7	40	0.10	280.70	3	40	0.27	120.80	3	40	0.27	120.80
Test/Energize	3	**7**	**17-Aug-10**	**24-Aug-10**			3	40	0.10	120.30	0	40	0.27	0.00	0	40	0.27	0.00
500 kV Mesa to Chino (8A)																		
Road Construction	3	**13**	**23-Jun-10**	**6-Aug-10**			3	40	0.10	120.30	1	40	0.62	40.62	3	40	0.62	121.87
Foundation Construction	24	**175**	**9-Aug-10**	**25-Mar-11**			24	40	0.10	962.40	8	40	0.62	324.98	7	40	0.62	284.36
Tower Construction	48	**290**	**30-Dec-10**	**13-Dec-11**			48	40	0.10	1924.80	14	40	0.62	568.72	3	40	0.62	121.87
String Cable	40	**285**	**13-May-11**	**19-Apr-12**			40	40	0.10	1604.00	15	40	0.62	609.35	6	40	0.62	243.74
Restoration/Guard Poles	7	**27**	**23-Mar-12**	**23-Apr-12**			7	40	0.10	280.70	3	40	0.62	121.87	3	40	0.62	121.87
500 kV Chino to Mira Loma (8A/8C)																		
Road Construction	3	**38**	**26-Jun-10**	**10-Aug-10**			3	40	0.10	120.30	1	40	0.28	40.28	3	40	0.28	120.84
Foundation Construction	24	**71**	**22-Sep-10**	**16-Dec-10**			24	40	0.10	962.40	8	40	0.28	322.25	7	40	0.28	281.96
Tower Construction	48	**94**	**24-Nov-10**	**19-Mar-11**			48	40	0.10	1924.80	14	40	0.28	563.93	3	40	0.28	120.84
String Cable	40	**48**	**28-Feb-11**	**23-Apr-11**			40	40	0.10	1604.00	15	40	0.28	604.21	6	40	0.28	241.68
Restoration/Guard Poles	7	**6**	**21-Apr-11**	**27-Apr-11**			7	40	0.10	280.70	3	40	0.28	120.84	3	40	0.28	120.84
Connect Chino-Mira Loma 500 kV	6	**72**	**16-Feb-12**	**10-May-12**			6	40	0.10	240.60	2	40	0.28	80.56	1	40	0.28	40.28
66 kV Construction/Removal																		
Construction Chino	6	**83**	**6-Apr-10**	**13-Jul-10**			6	40	0.00	240.00	2	40	0.00	80.00	2	40	0.00	80.00
Construction Mesa	6	**25**	**11-Jul-10**	**4-Aug-10**			6	40	0.00	240.00	2	40	0.00	80.00	2	40	0.00	80.00
Construction Mira Loma	6	**25**	**7-Jul-10**	**4-Aug-10**			6	40	0.00	240.00	2	40	0.00	80.00	2	40	0.00	80.00
Removal	6	**48**	**14-Jul-10**	**8-Sep-10**			6	40	0.00	240.00	2	40	0.00	80.00	2	40	0.00	80.00
66 kV Underground																		
Construction	12	**43**	**27-May-10**	**16-Jul-10**			12	40	0.10	481.20	2	40	0.10	80.20	2	40	0.10	80.20

Segment 9	Crew Size	Total Days	Start Date	End Date			Employee Vehicle # of vehicle	Paved	Unpaved	Total VMT/day	Delivery Truck # of vehicle	Paved	Unpaved	Total VMT/day	Heavy Heavy Duty Truck # of vehicle	Paved	Unpaved	Total VMT/day
Whirlwind Substation																		
Grading Element	15	**71**	**22-Jan-10**	**15-Apr-10**			15	80	0.25	1203.75	2	60	0.25	120.5	3	60	0.25	180.75
Civil Element	25	**107**	**16-Apr-10**	**20-Aug-10**			25	80	0.25	2006.25	6	60	0.25	361.5	4	100	0.25	401
Electrical Element	25	**199**	**21-Aug-10**	**20-Aug-11**			25	80	0.10	2002.5	6	60	0.1	360.6	0	60	0.1	0
Transformer Assembly*	6	**161**	**4 different durations**				6	80	0.10	480.6	2	60	0.1	120.2	0	60	0.1	0
Testing	4	**48**	**21-Apr-11**	**16-Jun-11**			4	80	0.10	320.4	0	60	0.1	0	0	60	0.1	0
Antelope Substation																		
Grading Element	8	**71**	**17-Nov-09**	**11-Feb-10**			8	60	0.10	480.8	2	50	0.1	100.2	3	50	0.1	150.3
Civil Element	15	**160**	**12-Feb-10**	**20-Aug-10**			15	60	0.10	901.5	5	50	0.1	250.5	3	133	0.1	399.3
Electrical Element*	25	**204**	**2 different durations**				25	60	0.10	1502.5	5	50	0.1	250.5	0	50	0.1	0
Transformer Element*	6	**236**	**4 different durations**				6	60	0.00	360	2	50	0.1	100.2	0	50	0.1	0
Testing*	4	**145**	**2 different durations**				4	60	0.00	240	0	50	0.1	0	0	50	0.1	0
Construct SVC Antelope	6	**74**	**7-Dec-10**	**8-Mar-12**			6	60	0.00	360	2	50	0.1	100.2	0	50	0.1	0
Vincent Substation																		
Electrical Element	25	**59**	**9-Jan-12**	**19-Mar-12**			25	60	0.10	1502.5	5	40	0.1	200.5	1	165	0.1	165.1
Transformer Element*	6	**261**	**3 different durations**				6	60	0.10	360.6	2	40	0.1	80.2	1	165	0.1	165.1
Testing*	4	**107**	**2 different durations**				4	60	0.10	240.4	0	40	0.1	0	0	40	0.1	0
Construct SVC Vincent	6	**297**	**1-Aug-12**	**24-Jul-13**			6	60	0.10	360.6	2	40	0.1	80.2	0	40	0.1	0
Reconductor Line Riser on Existing Rio Hon	6	**12**	**10-Jul-09**	**23-Jul-09**			6	60	0.10	360.6	2	40	0.1	80.2	1	165	0.1	165.1
Gould Substation																		
Transformer Element*	6	**59**	**2 different durations**				6	40	0.00	240	2	40	0	80	1	80	0	80
Testing	4	**6**	**26-Nov-11**	**2-Dec-11**			4	40	0.00	160	0	40	0	0	0	40	0	0
Mira Loma Substation																		
Transformer Element	6	**54**	**2 different durations**				6	40	0.00	240	2	40	0	80	1	120	0	120
Chino Substation																		
Transformer Element	6	**53**	**11-May-10**	**13-Jul-10**			6	40	0.00	240	2	40	0	80	1	105	0	105

4/Jan/11 ~ 28/Feb/11
16/Feb/11 ~ 30/Mar/11
2/Mar/11 ~ 30/Mar/11
21/Mar/11 ~ 25/May/11

7/May/10 ~ 13/Nov/10
9/Feb/12 ~ 4/Apr/12

20/Dec/10 ~ 15/Feb/11
20/Dec/10 ~ 16/Mar/11
13/Nov/10 ~ 9/Feb/11
1/Mar/11 ~ 26/Apr/11

23/Jun/11 ~ 19/Aug/11
5/Apr/12 ~ 27/Jul/12

20/Nov/12 ~ 7/Jun/13
9/Oct/10 ~ 5/Jan/11
9/DEc/11 ~ 9/Jan/12

20/Sep/10 ~ 25/Sep/10
24/Jul/13 ~ 14/Nov/13

28/Oct/11 ~ 24/Nov/11
22/Jun/11 ~ 3/Aug/11

20/Jul/10 ~ 17/Aug/10
2/Jun/12 ~ 4/Aug/12

							Employee Vehicle				Delivery Truck				Heavy Heavy Duty Truck			
Segment 10	**Crew Size**	**Total Days**	**Start Date**	**End Date**			**# of vehicle**	**Paved**	**Unpaved**	**Total VMT/day**	**# of vehicle**	**Paved**	**Unpaved**	**Total VMT/day**	**# of vehicle**	**Paved**	**Unpaved**	**Total VMT/day**
Marshalling Yards	4	**245**	**31-Mar-10**	**21-Jan-11**			4	80	0.10	320.40	1	60	3.14	63.14	1	220	3.14	223.14
Road Maintenance	2	**230**	**12-Apr-10**	**14-Jan-11**			2	80	0.10	160.20	1	60	3.14	63.14	1	60	3.14	63.14
500 kV Whirlwind to Windhub																		
Road Construction	10	**39**	**6-Apr-10**	**20-May-10**			10	80	0.10	801.00	2	60	3.14	126.27	3	60	3.14	189.41
Foundation Construction	24	**53**	**20-May-10**	**22-Jul-10**			24	80	0.10	1922.40	8	60	3.14	505.10	7	60	3.14	441.96
Tower Construction	48	**135**	**25-Jun-10**	**4-Dec-10**			48	80	0.10	3844.80	14	60	3.14	883.92	3	60	3.14	189.41
String Cable	40	**59**	**30-Oct-10**	**11-Jan-11**			40	80	0.10	3204.00	15	60	3.14	947.06	6	60	3.14	378.82
Restoration/Guard Poles	7	**17**	**23-Dec-10**	**14-Jan-11**			7	80	0.10	560.70	3	60	3.14	189.41	3	60	3.14	189.41
IT/Communications	6	**68**	**16-Oct-10**	**11-Jan-11**			6	80	0.10	480.60	1	60	3.14	63.14	0	60	3.14	0.00
							Employee Vehicle				**Delivery Truck**				**Heavy Heavy Duty Truck**			
Segment 11	**Crew Size**	**Total Days**	**Start Date**	**End Date**			**# of vehicle**	**Paved**	**Unpaved**	**Total VMT/day**	**# of vehicle**	**Paved**	**Unpaved**	**Total VMT/day**	**# of vehicle**	**Paved**	**Unpaved**	**Total VMT/day**
Construction of Marshalling/Heli Yards	6	**264**	**2 different durations**				6	60	0.10	360.60	3	60	3.17	189.52	1	60	3.17	63.17
Marshalling Yards	4	**428**	**18-Apr-11**	**18-Jan-13**			4	60	0.10	240.40	1	60	0.10	60.10	1	130	0.10	130.10
Road Maintenance	2	**320**	**22-Dec-11**	**12-Jan-13**			2	60	0.10	120.20	1	60	4.22	64.22	1	60	4.22	64.22
Removal 230 kV Eagle-Pardee																		
Wreckout	26	**59**	**23-Dec-11**	**5-Mar-12**			26	60	0.10	1562.60	12	60	4.22	770.66	10	60	4.22	642.22
500 kV 2nd Circuit Vincent-Gould																		
Road Construction	12	**98**	**3-Nov-11**	**2-Mar-12**			12	60	0.10	721.20	4	60	4.22	256.89	7	60	4.22	449.55
Foundation Construction	24	**49**	**5-Mar-12**	**30-Apr-12**			24	60	0.10	1442.40	8	60	4.22	513.77	7	60	4.22	449.55
Tower Construction	48	**136**	**30-Apr-12**	**9-Oct-12**			48	60	0.10	2884.80	14	60	4.22	899.10	3	60	4.22	192.67
String Cable	40	**57**	**1-Nov-12**	**9-Jan-13**			40	60	0.10	2404.00	15	60	4.22	963.33	6	60	4.22	385.33
Restoration/Guard Poles	7	**19**	**20-Dec-12**	**12-Jan-13**			7	60	0.10	420.70	5	60	4.22	321.11	5	60	4.22	321.11
IT/Communications	6	**72**	**13-Oct-12**	**9-Jan-13**			6	60	0.10	360.60	1	60	4.22	64.22	0	60	4.22	0.00
230 kV Mesa-Gould																		
String Cable	40	**54**	**8-Aug-12**	**11-Oct-12**			40	60	0.10	2404.00	15	60	0.55	908.29	6	60	0.55	363.32
IT/Communications	6	**72**	**18-Jul-12**	**11-Oct-12**			6	60	0.10	360.60	1	60	0.55	60.55	0	60	0.55	0.00
Test/Energize	3	**7**	**11-Oct-12**	**18-Oct-12**			3	60	0.10	180.30	0	60	0.55	0.00	0	60	0.55	0.00
230 kV Pardee-Vincent																		
Road Construction	6	**2**	**22-Apr-11**	**23-Apr-11**			6	60	0.10	360.60	4	60	0.48	241.92	7	60	0.48	423.37
Foundation Construction	24	**6**	**25-Apr-11**	**30-Apr-11**			24	60	0.10	1442.40	8	60	0.48	483.85	7	60	0.48	423.37
Tower Construction	48	**6**	**7-Jun-11**	**13-Jun-11**			48	60	0.10	2884.80	14	60	0.48	846.73	3	60	0.48	181.44
String Cable	40	**7**	**13-Jun-11**	**20-Jun-11**			40	60	0.10	2404.00	15	60	0.48	907.22	6	60	0.48	362.89
Restoration/Guard Poles	7	**1**	**20-Jun-11**	**20-Jun-11**			7	60	0.10	420.70	5	60	0.48	302.41	5	60	0.48	302.41
Test/Energize	3	**7**	**19-Mar-12**	**26-Mar-12**			3	60	0.10	180.30	0	60	0.48	0.00	0	60	0.48	0.00
230 kV Eagle Rock-Gould																		
Road Construction	6	**2**	**23-Apr-11**	**8-Jun-11**			6	60	0.10	360.60	4	60	0.25	240.99	7	60	0.25	421.73
Foundation Construction	24	**7**	**8-Jun-11**	**15-Jun-11**			24	60	0.10	1442.40	8	60	0.25	481.98	7	60	0.25	421.73
Tower Construction	48	**7**	**21-Jul-11**	**28-Jul-11**			48	60	0.10	2884.80	14	60	0.25	843.47	3	60	0.25	180.74
String Cable	40	**7**	**29-Jul-11**	**5-Aug-11**			40	60	0.10	2404.00	15	60	0.25	903.72	6	60	0.25	361.49
Restoration/Guard Poles	7	**1**	**6-Aug-11**	**6-Aug-11**			7	60	0.10	420.70	5	60	0.25	301.24	5	60	0.25	301.24

Onroad Emission Calculations

ONROAD EMISSIONS: SCAQMD EMISSION FACTORS FOR 2009

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

Passenger Vehicles	
lb/mile	
CO	0.010849
NOx	0.001138
ROG	0.001179
SOx	0.000009
PM10	0.000081

Delivery Trucks	
lb/mile	
CO	0.01454
NOx	0.021501
ROG	0.002295
SOx	0.000033
PM10	0.000400

Heavy-Heavy Duty	
lb/mile	
CO	0.004738
NOx	0.029455
ROG	0.001042
SOx	4.61E-05
PM10	0.000559

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

Passenger Vehicles	
lb/mile	
CO	0.009954
Nox	0.001038
ROG	0.001087
Sox	0.000009
PM10	0.000081

Delivery Trucks	
lb/mile	
CO	0.013168
Nox	0.019339
ROG	0.002141
Sox	0.000033
PM10	0.000374

Heavy-Heavy Duty	
lb/mile	
CO	0.004335
NOx	0.025802
ROG	0.000948
SOx	4.61E-05
PM10	0.000507

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

Passenger Vehicles	
lb/mile	
CO	0.009268
Nox	0.000952
ROG	0.001015
Sox	0.000009
PM10	0.000083

Delivery Trucks	
lb/mile	
CO	0.012065
Nox	0.01704
ROG	0.002031
Sox	0.000033
PM10	0.000357

Heavy-Heavy Duty	
lb/mile	
CO	0.004069
NOx	0.022117
ROG	0.000888
SOx	4.61E-05
PM10	0.000475

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

Passenger Vehicles	
lb/mile	
CO	0.008512
Nox	0.000868
ROG	0.000941
Sox	0.000009
PM10	0.000083

Delivery Trucks	
lb/mile	
CO	0.010982
Nox	0.01529
ROG	0.001909
Sox	0.000034
PM10	0.000337

Heavy-Heavy Duty	
lb/mile	
CO	0.003783
NOx	0.01938
ROG	0.000813
SOx	4.63E-05
PM10	0.000438

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

Passenger Vehicles	
lb/mile	
CO	0.007818
Nox	0.000791
ROG	0.000874
Sox	0.000009
PM10	0.000083

Delivery Trucks	
lb/mile	
CO	0.010047
Nox	0.013737
ROG	0.001803
Sox	0.000034
PM10	0.000318

Heavy-Heavy Duty	
lb/mile	
CO	0.003551
NOx	0.017054
ROG	0.000749
SOx	4.66E-05
PM10	0.000408

Offroad Equipment Emission

SCAQMD Offroad Emission Factors

Note: SCAQMD emission factors are linearly interpolated as necessary for the specific hp size of the assumed equipment

	HP	2009 SCAQMD Emission Factor lbs/hour					2010 SCAQMD Emission Factor lbs/hour				
		ROG	CO	NOX	SOX	PM	ROG	CO	NOX	SOX	PM
14 ton Crane	180	0.1284	0.5009	1.0117	0.0009	0.0557	0.1213	0.4785	0.9507	0.0009	0.0534
50 ton crane	200	0.1317	0.5424	1.1189	0.0010	0.0532	0.1222	0.4408	1.0325	0.0010	0.0516
980 Loader	318	0.1768	0.5461	1.8155	0.0019	0.0672	0.1678	0.5145	1.7078	0.0019	0.0633
Backhoe	85	0.1193	0.3673	0.4618	0.0005	0.0446	0.1083	0.3586	0.4389	0.0005	0.0414
Backhoe w/ Bucket; backhoe w/ concrete hammer	85	0.1193	0.3673	0.4618	0.0005	0.0446	0.1083	0.3586	0.4389	0.0005	0.0414
Compactor	80	0.1322	0.3671	0.4932	0.0005	0.0464	0.1240	0.3601	0.4737	0.0005	0.0442
Compressor, Air	75	0.1165	0.3048	0.3786	0.0004	0.0378	0.1110	0.3005	0.3668	0.0004	0.0365
Crane, Hydraulic, 150 Ton (150 ton crane)	350	0.1553	0.5061	1.5371	0.0015	0.0591	0.1474	0.4728	1.4512	0.0015	0.0556
Crane, Hydraulic, Rough Terrain 35 ton	155	0.1244	0.4490	0.8777	0.0008	0.0589	0.1177	0.4459	0.8298	0.0008	0.0562
Crane, Hydraulic, 150/300 Ton	450	0.1793	0.6458	1.7637	0.0017	0.0681	0.1706	0.5992	1.6652	0.0017	0.0642
Crawler, track type, drill dig, Pheumatic D8	305	0.2347	0.7557	2.2327	0.0020	0.0903	0.2241	0.7105	2.1160	0.0020	0.0854
Crawler, Track Type, w/ blade (D6 Type)	185	0.2055	0.7445	1.6267	0.0014	0.0888	0.1956	0.7350	1.5409	0.0014	0.0846
Crawler, Track Type, w/ blade (D8 type)	305	0.2347	0.7557	2.2327	0.0020	0.0903	0.2241	0.7105	2.1160	0.0020	0.0854
Crawler, Track Type, Sagging (D8 type)	305	0.2347	0.7557	2.2327	0.0020	0.0903	0.2241	0.7105	2.1160	0.0020	0.0854
Ditch Digger	75	0.1808	0.4617	0.5754	0.0005	0.0559	0.1720	0.4534	0.5571	0.0005	0.0538
Drill Rig	250	0.0999	0.3479	1.3113	0.0021	0.0395	0.0957	0.3460	1.1847	0.0021	0.0384
Driller	305	0.1114	0.3944	1.4291	0.0023	0.0446	0.1074	0.3924	1.2992	0.0023	0.0435
Excavator Cat 320	138	0.1534	0.5814	0.9977	0.0010	0.0796	0.1420	0.5771	0.9299	0.0010	0.0742
Excavator, Grade - All	165	0.1556	0.6472	1.1448	0.0012	0.0729	0.1453	0.6450	1.0645	0.0012	0.0684
Forklift	75	0.0723	0.2046	0.2348	0.0003	0.0248	0.0643	0.1973	0.2233	0.0003	0.0227
Forklift, 5 ton	75	0.0723	0.2046	0.2348	0.0003	0.0248	0.0643	0.1973	0.2233	0.0003	0.0227
Forklift, 10 ton	85	0.0709	0.2097	0.2661	0.0003	0.0275	0.0634	0.2033	0.2514	0.0003	0.0252
Generator Concrete Batch Plant	50	0.1182	0.2970	0.3115	0.0004	0.0296	0.1117	0.2904	0.3070	0.0004	0.0284
Grader	285	0.1912	0.5601	1.9514	0.0020	0.0726	0.1815	0.5297	1.8365	0.0020	0.0683
Loader, Front End w/ Bucket	145	0.1416	0.5240	0.9747	0.0009	0.0699	0.1329	0.5203	0.9175	0.0009	0.0662
Manlifts	75	0.0723	0.2046	0.2348	0.0003	0.0248	0.0643	0.1973	0.2233	0.0003	0.0227
Motor, Auxilary Power	5	0.0060	0.0246	0.0399	0.0001	0.0024	0.0057	0.0242	0.0385	0.0001	0.0023
Motor Grader	140	0.1730	0.6218	1.1482	0.0011	0.0871	0.1622	0.6168	1.0818	0.0011	0.0825
Puller, Wire Puller 1 Drum	310	0.1489	0.6170	1.5047	0.0017	0.0635	0.1391	0.5970	1.4037	0.0017	0.0599
Tension Machine, Conductor or Static	135	0.1391	0.5595	0.9629	0.0010	0.0731	0.1279	0.5550	0.8997	0.0010	0.0686
Tractors	85	0.1193	0.3673	0.4618	0.0005	0.0446	0.1083	0.3586	0.4389	0.0005	0.0414
Water Pump	100	0.1494	0.4701	0.7904	0.0008	0.0651	0.1412	0.4648	0.7577	0.0008	0.0627

	HP	2011 SCAQMD Emission Factor lbs/hour					2012 SCAQMD Emission Factor lbs/hour				
		ROG	CO	NOX	SOX	PM	ROG	CO	NOX	SOX	PM
14 ton Crane	180	0.1150	0.4752	0.8960	0.0009	0.0509	0.1089	0.4722	0.8423	0.0009	0.0473
50 ton crane	200	0.1156	0.4330	0.9692	0.0010	0.0486	0.1093	0.4260	0.9077	0.0010	0.0449
980 Loader	318	0.1586	0.4870	1.5801	0.0019	0.0575	0.1502	0.4631	1.4605	0.0019	0.0521
10,000 lb Rough Terrain Fork Lift	80	0.1311	0.4200	0.4951	0.0006	0.0475	0.1196	0.4104	0.4728	0.0006	0.0440
20,000 lb. rough terrain forklift	160	0.1427	0.6498	1.0628	0.0012	0.0691	0.1333	0.6476	0.9901	0.0012	0.0634
Backhoe	85	0.0980	0.3505	0.4179	0.0005	0.0383	0.0883	0.3431	0.3970	0.0005	0.0349
Backhoe w/ Bucket; backhoe w/ concrete hammer	85	0.0980	0.3505	0.4179	0.0005	0.0383	0.0883	0.3431	0.3970	0.0005	0.0349
Compactor	80	0.1161	0.3533	0.4553	0.0005	0.0421	0.1083	0.3467	0.4367	0.0005	0.0397
Compressor, Air	75	0.1044	0.2947	0.3538	0.0004	0.0350	0.0967	0.2875	0.3390	0.0004	0.0329
Crane, Hydraulic, 150 Ton (150 ton crane)	350	0.1393	0.4421	1.3511	0.0015	0.0508	0.1316	0.4138	1.2558	0.0015	0.0461
Crane, Hydraulic, Rough Terrain 35 ton	155	0.1112	0.4431	0.7838	0.0008	0.0535	0.1050	0.4406	0.7381	0.0008	0.0499
Crane, Hydraulic, 150/300 Ton	450	0.1615	0.5565	1.5499	0.0017	0.0587	0.1529	0.5173	1.4404	0.0017	0.0534
Crawler, track type, drill dig, Pheumatic D8	305	0.2133	0.6694	1.9821	0.0020	0.0789	0.2031	0.6323	1.8555	0.0020	0.0728
Crawler, Track Type, w/ blade (D6 Type)	185	0.1862	0.7264	1.4567	0.0014	0.0806	0.1771	0.7189	1.3752	0.0014	0.0752
Crawler, Track Type, w/ blade (D8 type)	305	0.2133	0.6694	1.9821	0.0020	0.0789	0.2031	0.6323	1.8555	0.0020	0.0728
Crawler, Track Type, Sagging (D8 type)	305	0.2133	0.6694	1.9821	0.0020	0.0789	0.2031	0.6323	1.8555	0.0020	0.0728
Ditch Digger	75	0.1633	0.4453	0.5397	0.0005	0.0517	0.1548	0.4374	0.5222	0.0005	0.0493
Drill Rig	250	0.0892	0.3445	1.0129	0.0021	0.0323	0.0838	0.3435	0.8722	0.0021	0.0268
Drill Rig	350	0.1102	0.4284	1.2042	0.0025	0.0402	0.1044	0.4271	1.0494	0.0025	0.0336
Driller	305	0.1008	0.3906	1.1181	0.0023	0.0366	0.0951	0.3895	0.9697	0.0023	0.0305
Excavator Cat 320	138	0.1316	0.5732	0.8673	0.0010	0.0693	0.1217	0.5697	0.8057	0.0010	0.0628
Excavator, Grade - All	165	0.1359	0.6430	0.9906	0.0012	0.0644	0.1269	0.6413	0.9192	0.0012	0.0585
Forklift	75	0.0572	0.1917	0.2134	0.0003	0.0208	0.0505	0.1866	0.2034	0.0003	0.0187
Forklift, 5 ton	75	0.0572	0.1917	0.2134	0.0003	0.0208	0.0505	0.1866	0.2034	0.0003	0.0187
Forklift, 10 ton	85	0.0566	0.1984	0.2384	0.0003	0.0231	0.0501	0.1939	0.2252	0.0003	0.0207
Generator Concrete Batch Plant	50	0.1043	0.2826	0.3020	0.0004	0.0270	0.0959	0.2734	0.2966	0.0004	0.0255
Grader	285	0.1718	0.5036	1.7014	0.0020	0.0622	0.1627	0.4806	1.5743	0.0020	0.0564
Loader, Front End w/ Bucket	145	0.1246	0.5171	0.8635	0.0009	0.0627	0.1166	0.5142	0.8100	0.0009	0.0579
Manlifts	75	0.0572	0.1917	0.2134	0.0003	0.0208	0.0505	0.1866	0.2034	0.0003	0.0187
Motor, Auxilary Power	5	0.0055	0.0237	0.0370	0.0001	0.0022	0.0052	0.0233	0.0354	0.0001	0.0020
Motor Grader	140	0.1521	0.6125	1.0195	0.0011	0.0781	0.1423	0.6085	0.9571	0.0011	0.0721
Puller, Wire Puller 1 Drum	310	0.1298	0.5804	1.2927	0.0017	0.0553	0.1220	0.5692	1.1912	0.0017	0.0500
Tension Machine, Conductor or Static	135	0.1176	0.5510	0.8413	0.0010	0.0645	0.1078	0.5473	0.7829	0.0010	0.0588
Tractors	85	0.0980	0.3505	0.4179	0.0005	0.0383	0.0883	0.3431	0.3970	0.0005	0.0349
Water Pump	100	0.1323	0.4588	0.7229	0.0008	0.0600	0.1223	0.4520	0.6836	0.0008	0.0563

	HP	2013 SCAQMD Emission Factor lbs/hour				
		ROG	CO	NOX	SOX	PM
14 ton Crane	180	0.1032	0.4696	0.7914	0.0009	0.0439
50 ton crane	200	0.1034	0.4197	0.8495	0.0010	0.0414
980 Loader	318	0.1424	0.4422	1.3494	0.0019	0.0470
10,000 lb Rough Terrain Fork Lift	80	0.1084	0.4013	0.4464	0.0006	0.0399
20,000 lb. rough terrain forklift	160	0.1244	0.6457	0.9233	0.0012	0.0575
Backhoe	85	0.0794	0.3364	0.3729	0.0005	0.0311
Backhoe w/ Bucket; backhoe w/ concrete hammer	85	0.0794	0.3364	0.3729	0.0005	0.0311
Compactor	80	0.1008	0.3405	0.4156	0.0005	0.0368
Compressor, Air	75	0.0886	0.2798	0.3210	0.0004	0.0304
Crane, Hydraulic, 150 Ton (150 ton crane)	350	0.1245	0.3886	1.1661	0.0015	0.0418
Crane, Hydraulic, Rough Terrain 35 ton	155	0.0990	0.4383	0.6947	0.0008	0.0462
Crane, Hydraulic, 150/300 Ton	450	0.1449	0.4823	1.3374	0.0017	0.0485
Crawler, track type, drill dig, Pheumatic D8	305	0.1935	0.5991	1.7363	0.0020	0.0669
Crawler, Track Type, w/ blade (D6 Type)	185	0.1686	0.7122	1.2984	0.0014	0.0700
Crawler, Track Type, w/ blade (D8 type)	305	0.1935	0.5991	1.7363	0.0020	0.0669
Crawler, Track Type, Sagging (D8 type)	305	0.1935	0.5991	1.7363	0.0020	0.0669
Ditch Digger	75	0.1464	0.4297	0.5014	0.0005	0.0466
Drill Rig	250	0.0795	0.3429	0.7632	0.0021	0.0221
Drill Rig	350	0.0995	0.4264	0.9266	0.0025	0.0277
Driller	305	0.0905	0.3888	0.8531	0.0023	0.0252
Excavator Cat 320	138	0.1126	0.5665	0.7492	0.0010	0.0562
Excavator, Grade - All	165	0.1186	0.6397	0.8542	0.0012	0.0526
Forklift	75	0.0443	0.1821	0.1916	0.0003	0.0164
Forklift, 5 ton	75	0.0443	0.1821	0.1916	0.0003	0.0164
Forklift, 10 ton	85	0.0442	0.1900	0.2110	0.0003	0.0181
Generator Concrete Batch Plant	50	0.0872	0.2639	0.2847	0.0004	0.0234
Grader	285	0.1543	0.4605	1.4556	0.0020	0.0510
Loader, Front End w/ Bucket	145	0.1092	0.5116	0.7600	0.0009	0.0530
Manlifts	75	0.0443	0.1821	0.1916	0.0003	0.0164
Motor, Auxilary Power	5	0.0050	0.0228	0.0339	0.0001	0.0019
Motor Grader	140	0.1331	0.6050	0.8989	0.0011	0.0660
Puller, Wire Puller 1 Drum	310	0.1150	0.5608	1.0991	0.0017	0.0449
Tension Machine, Conductor or Static	135	0.0987	0.5439	0.7294	0.0010	0.0527
Tractors	85	0.0794	0.3364	0.3729	0.0005	0.0311
Water Pump	100	0.1121	0.4450	0.6427	0.0008	0.0519

Helicopter Emission Factor Derivation

Approach/Climbout (i.e. Working)

Equiv. Engs	Engine HP	Number	Emissions lbs/hour				
			HC	CO	NOx	SOx	PM
T53-L-11D	1100	1	0.20	2.04	5.00	0.04	0.27
T58-GE-5 (2)	1500	2	1.40	9.92	12.79	0.11	0.71

Note: SOx increased to assume 30 ppm sulfur Jet A fuel Sulfur Content

Idle	Engine HP	Number	Emissions lbs/hour				
			HC	CO	NOx	SOx	PM
T53-L-11D	1100	1	9.00	4.21	0.20	0.01	0.01
T58-GE-5 (2)	1500	2	25.86	45.12	0.40	0.02	0.03

Source: FAEED database
FAEED - FAA Aircraft Engine Emission Database

Relating Factors to Potential Construction/Operating Helicopters

Approach/Climbout	Engine HP	Number	Emissions lbs/hour				
			HC	CO	NOx	SOx	PM
Hughes 500	420	1	0.08	0.78	1.91	0.02	0.10
Eurocopter	847	1	0.15	1.57	3.85	0.03	0.21
Skyking	1400	2	2.61	18.52	23.87	0.20	1.32
Skycrane	4500	2	8.40	59.52	76.74	0.64	4.25

Idle	Engine HP	Number	Emissions lbs/hour				
			HC	CO	NOx	SOx	PM
Hughes 500	420	1	3.44	1.61	0.08	0.00	0.01
Eurocopter	847	1	6.93	3.24	0.15	0.01	0.01
Skyking	1400	2	48.28	84.23	0.75	0.03	0.05
Skycrane	4500	2	155.19	270.73	2.40	0.10	0.16

Proposed Project - Onroad Emissions Summary

2009	VMT	Emissions lbs -2009				
Vehicle Type	Total	VOC	CO	NOx	SOx	PM
Passenger	304,656	359.19	3,305.21	346.70	2.74	24.60
Delivery	139,824	320.90	2,033.04	3,006.36	4.61	55.91
Heavy-Heavy Duty	65,186	67.95	308.82	1,920.05	3.01	36.44

2010	VMT	Emissions lbs -2010				
Vehicle Type	Total	VOC	CO	NOx	SOx	PM
Passenger	5,717,873	6,213.98	56,902.86	5,933.54	51.46	463.29
Delivery	1,788,831	3,829.20	23,548.44	34,579.86	59.03	668.11
Heavy-Heavy Duty	1,241,853	1,177.30	5,382.61	32,038.00	57.22	629.36

2011	VMT	Emissions lbs -2011				
Vehicle Type	Total	VOC	CO	NOx	SOx	PM
Passenger	4,016,709	4,076.96	37,226.86	3,823.91	36.15	332.99
Delivery	1,272,423	2,584.29	15,351.78	21,682.09	41.99	454.70
Heavy-Heavy Duty	577,482	512.70	2,349.56	12,772.24	26.62	274.10

2012	VMT	Emissions lbs -2012				
Vehicle Type	Total	VOC	CO	NOx	SOx	PM
Passenger	2,276,811	2,142.48	19,380.21	1,976.27	20.49	189.20
Delivery	771,660	1,473.10	8,474.37	11,798.68	26.24	259.98
Heavy-Heavy Duty	390,817	317.74	1,478.28	7,574.16	18.08	171.14

2013	VMT	Emissions lbs -2013				
Vehicle Type	Total	VOC	CO	NOx	SOx	PM
Passenger	163,232	142.66	1,276.14	129.12	1.47	13.60
Delivery	37,276	67.21	374.51	512.06	1.27	11.87
Heavy-Heavy Duty	8,887	6.66	31.56	151.57	0.41	3.63

Total	VMT	Emissions lbs				
Vehicle Type	Total	VOC	CO	NOx	SOx	PM
Passenger	12,479,280	12,935.27	118,091.29	12,209.53	112.31	1,023.69
Delivery	4,010,014	8,274.70	49,782.15	71,579.05	133.14	1,450.56
Heavy-Heavy Duty	2,284,226	2,082.35	9,550.84	54,456.03	105.34	1,114.67

Proposed Project Onroad Emissions - KCAPCD

		VMT	Emissions lbs -2009				
2009	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	40,995	48.33	444.75	46.65	0.37	3.31
	Delivery	20,497	47.04	298.03	440.71	0.68	8.20
	Heavy-Heavy Duty	6,832	7.12	32.37	201.25	0.32	3.82
	Totals	68,324	102.50	775.15	688.61	1.36	15.33

		VMT	Emissions lbs -2010				
2010	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	2,154,316	2,341.74	21,444.06	2,236.18	19.39	174.54
	Delivery	540,856	1,157.97	7,122.00	10,459.62	17.85	202.04
	Heavy-Heavy Duty	314,084	297.78	1,361.42	8,103.97	14.47	159.19
	Totals	3,009,256	3,797.49	29,927.48	20,799.77	51.71	535.76

		VMT	Emissions lbs -2011				
2011	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	381,298	387.02	3,533.87	363.00	3.43	31.61
	Delivery	85,097	172.83	1,026.69	1,450.05	2.81	30.41
	Heavy-Heavy Duty	21,814	19.37	88.75	482.46	1.01	10.35
	Totals	488,208	579.22	4,649.31	2,295.50	7.25	72.37

Proposed Project Onroad Emissions - SCAQMD

		VMT	Emissions lbs -2009				
2009	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	80,554	94.97	873.93	91.67	0.72	6.50
	Delivery	41,575	95.41	604.50	893.90	1.37	16.62
	Heavy-Heavy Duty	14,717	15.34	69.72	433.50	0.68	8.23
	Totals	136,846	205.73	1,548.15	1,419.07	2.78	31.35

		VMT	Emissions lbs -2010				
2010	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	1,765,884	1,918.17	17,564.76	1,831.38	15.89	143.11
	Delivery	662,760	1,418.28	8,720.34	12,802.77	21.87	247.47
	Heavy-Heavy Duty	498,163	472.23	2,159.03	12,849.41	22.95	252.44
	Totals	2,926,807	3,808.68	28,444.13	27,483.55	60.72	643.02

		VMT	Emissions lbs -2011				
2011	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	2,845,577	2,888.26	26,372.81	2,708.99	25.61	235.90
	Delivery	926,950	1,882.64	11,183.65	15,795.23	30.59	331.24
	Heavy-Heavy Duty	435,523	386.67	1,771.98	9,632.51	20.08	206.72
	Totals	4,208,050	5,157.56	39,328.44	28,136.72	76.28	773.87

		VMT	Emissions lbs -2012				
2012	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	1,407,854	1,324.79	11,983.66	1,222.02	12.67	116.99
	Delivery	487,923	931.45	5,358.37	7,460.34	16.59	164.38
	Heavy-Heavy Duty	255,283	207.55	965.62	4,947.46	11.81	111.79
	Totals	2,151,060	2,463.79	18,307.64	13,629.82	41.07	393.16

		VMT	Emissions lbs -2013				
2013	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	867	0.76	6.77	0.69	0.01	0.07
	Delivery	661	1.19	6.64	9.09	0.02	0.21
	Heavy-Heavy Duty	661	0.50	2.35	11.28	0.03	0.27
	Totals	2,189	2.45	15.77	21.05	0.06	0.55

Proposed Project Onroad Emissions - AVAQMD

		VMT	Emissions lbs -2009				
2009	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	183,107	215.88	1,986.53	208.38	1.65	14.79
	Delivery	77,752	178.44	1,130.51	1,671.75	2.57	31.09
	Heavy-Heavy Duty	43,636	45.48	206.73	1,285.30	2.01	24.39
	Totals	304,496	439.81	3,323.78	3,165.43	6.23	70.27

		VMT	Emissions lbs -2010				
2010	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	1,797,673	1,954.07	17,894.04	1,865.98	16.18	145.65
	Delivery	585,215	1,252.94	7,706.11	11,317.47	19.31	218.61
	Heavy-Heavy Duty	429,605	407.30	1,862.16	11,084.63	19.79	217.73
	Totals	2,812,494	3,614.31	27,462.30	24,268.08	55.29	581.99

		VMT	Emissions lbs -2011				
2011	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	789,834	801.68	7,320.18	751.92	7.11	65.48
	Delivery	260,376	528.82	3,141.44	4,436.82	8.59	93.04
	Heavy-Heavy Duty	120,146	106.67	488.83	2,657.28	5.54	57.03
	Totals	1,170,356	1,437.17	10,950.45	7,846.01	21.24	215.55

		VMT	Emissions lbs -2012				
2012	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	868,956	817.69	7,396.56	754.25	7.82	72.21
	Delivery	283,737	541.65	3,116.00	4,338.34	9.65	95.59
	Heavy-Heavy Duty	135,535	110.19	512.66	2,626.70	6.27	59.35
	Totals	1,288,228	1,469.53	11,025.22	7,719.30	23.74	227.15

		VMT	Emissions lbs -2013				
2013	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	162,365	141.91	1,269.37	128.43	1.46	13.53
	Delivery	36,614	66.02	367.86	502.97	1.24	11.66
	Heavy-Heavy Duty	8,226	6.16	29.21	140.29	0.38	3.36
	Totals	207,206	214.08	1,666.45	771.69	3.09	28.54

Summary - Offroad Equipment Emissions Calculation by Segment

	Total Annual Emissions (lbs)					
Segment	Year	ROG	CO	NOx	SOx	PM
4	2009	246.32	760.26	1,184.21	1.31	95.78
	2010	3,765.91	12,699.25	24,558.90	24.61	1,522.82
	2011	218.29	858.04	1,567.12	1.83	95.14
5	2009	268.43	836.66	1,413.55	1.66	104.56
	2010	2,933.73	10,044.88	18,228.80	18.87	1,199.53
	2011	1,277.45	5,064.40	10,195.76	11.11	580.74
6	2009	186.02	569.20	801.77	0.80	72.48
	2010	3,288.00	11,515.51	22,036.28	22.35	1,355.56
	2011	2,686.59	9,338.49	16,168.14	17.06	1,092.24
	2012	1,013.80	3,718.19	6,221.48	7.00	409.25
7	2010	1,512.33	5,227.19	9,665.58	10.82	616.49
	2011	2,793.21	9,491.96	16,495.05	18.37	1,095.01
	2012	1,510.22	5,596.30	9,560.17	10.81	621.63
8	2009	146.19	462.09	786.19	0.76	58.24
	2010	5,034.00	17,329.69	32,644.59	33.39	2,061.59
	2011	4,371.26	15,240.52	27,092.70	28.61	1,780.91
	2012	481.75	1,939.81	3,415.36	3.89	214.25
9	2009	319.12	952.31	2,949.85	3.00	119.81
	2010	4,083.23	13,320.89	29,871.27	35.30	1,553.70
	2011	1,362.45	4,931.75	9,520.44	10.41	544.85
	2012	598.81	2,227.47	4,235.50	4.90	230.89
	2013	233.95	953.16	1,649.06	2.02	91.51
10	2010	2,095.47	7,046.98	13,143.66	13.03	850.01
	2011	73.51	281.10	489.96	0.52	33.37
11	2009	176.00	538.53	758.56	0.76	68.58
	2010	31.22	102.92	140.93	0.15	12.47
	2011	755.12	2,976.81	6,076.51	6.59	335.75
	2012	2,751.22	10,323.41	17,849.62	20.20	1,125.45
	2013	55.96	240.56	381.89	0.46	24.65

Summary - Offroad Equipment Emissions Calculation by Segment

	Total Annual Emissions (ton)					
Segment	Year	ROG	CO	NOx	SOx	PM
4	2009	0.12	0.38	0.59	0.00	0.05
	2010	1.88	6.35	12.28	0.01	0.76
	2011	0.11	0.43	0.78	0.00	0.05
5	2009	0.13	0.42	0.71	0.00	0.05
	2010	1.47	5.02	9.11	0.01	0.60
	2011	0.64	2.53	5.10	0.01	0.29
6	2009	0.09	0.28	0.40	0.00	0.04
	2010	1.64	5.76	11.02	0.01	0.68
	2011	1.34	4.67	8.08	0.01	0.55
	2012	0.51	1.86	3.11	0.00	0.20
7	2010	0.76	2.61	4.83	0.01	0.31
	2011	1.40	4.75	8.25	0.01	0.55
	2012	0.76	2.80	4.78	0.01	0.31
8	2009	0.07	0.23	0.39	0.00	0.03
	2010	2.52	8.66	16.32	0.02	1.03
	2011	2.19	7.62	13.55	0.01	0.89
	2012	0.24	0.97	1.71	0.00	0.11
9	2009	0.16	0.48	1.47	0.00	0.06
	2010	2.04	6.66	14.94	0.02	0.78
	2011	0.68	2.47	4.76	0.01	0.27
	2012	0.30	1.11	2.12	0.00	0.12
	2013	0.12	0.48	0.82	0.00	0.05
10	2010	1.05	3.52	6.57	0.01	0.43
	2011	0.04	0.14	0.24	0.00	0.02
11	2009	0.09	0.27	0.38	0.00	0.03
	2010	0.02	0.05	0.07	0.00	0.01
	2011	0.38	1.49	3.04	0.00	0.17
	2012	1.38	5.16	8.92	0.01	0.56
	2013	0.03	0.12	0.19	0.00	0.01

Summary - Offroad Equipment Emissions Calculation by Jurisdiction

Jurisdiction	Segment	Year	Total Annual Emissions (lbs)				
			ROG	CO	NOx	SOx	PM
KCAPCD	4	2009	126.63	387.48	545.80	0.55	49.34
		2010	2,145.02	7,213.55	13,926.40	13.76	866.41
		2011	97.88	374.20	659.82	0.71	44.33
	9	2010	1,777.59	5,661.15	13,241.82	15.57	666.84
		2011	823.17	2,917.07	5,527.11	6.01	321.64
	10	2010	2,095.47	7,046.98	13,143.66	13.03	850.01
		2011	73.51	281.10	489.96	0.52	33.37
SCAQMD	6	2010	1,922.58	6,759.72	13,080.76	13.30	792.75
		2011	1,933.20	6,704.36	11,584.56	12.24	783.12
		2012	186.39	750.63	1,144.81	1.27	81.69
	7	2010	1,512.33	5,227.19	9,665.58	10.82	616.49
		2011	2,793.21	9,491.96	16,495.05	18.37	1,095.01
		2012	1,510.22	5,596.30	9,560.17	10.81	621.63
	8	2009	146.19	462.09	786.19	0.76	58.24
		2010	5,034.00	17,329.69	32,644.59	33.39	2,061.59
		2011	4,371.26	15,240.52	27,092.70	28.61	1,780.91
		2012	481.75	1,939.81	3,415.36	3.89	214.25
	9	2010	174.52	597.27	1,175.45	1.19	69.49
		2011	122.37	442.30	837.25	0.90	49.08
		2012	55.62	213.16	386.65	0.44	22.12
	11	2009	176.00	538.53	758.56	0.76	68.58
		2010	8.80	29.01	39.72	0.04	3.51
		2011	755.12	2,976.81	6,076.51	6.59	335.75
		2012	1,502.76	5,633.21	9,710.74	10.98	618.11
		2013	3.01	13.43	18.65	0.02	1.41
AVAQMD	4	2009	119.69	372.78	638.42	0.76	46.44
		2010	1,620.89	5,485.70	10,632.50	10.85	656.40
		2011	120.41	483.84	907.30	1.13	50.81
	5	2009	268.43	836.66	1,413.55	1.66	104.56
		2010	2,933.73	10,044.88	18,228.80	18.87	1,199.53
		2011	1,277.45	5,064.40	10,195.76	11.11	580.74
	6	2009	186.02	569.20	801.77	0.80	72.48
		2010	1,365.42	4,755.79	8,955.52	9.05	562.81
		2011	753.39	2,634.13	4,583.58	4.82	309.12
		2012	827.41	2,967.56	5,076.67	5.73	327.56
	9	2009	319.12	952.31	2,949.85	3.00	119.81
		2010	2,131.12	7,062.48	15,454.00	18.54	817.37
		2011	416.90	1,572.38	3,156.08	3.49	174.13
		2012	543.19	2,014.31	3,848.85	4.46	208.77
		2013	233.95	953.16	1,649.06	2.02	91.51
	11	2010	22.42	73.92	101.21	0.11	8.95
		2012	1,248.46	4,690.19	8,138.88	9.22	507.34
		2013	52.95	227.13	363.24	0.44	23.25

Jurisdiction	Segment	Year	Total Annual Emissions (ton)				
			ROG	CO	NOx	SOx	PM
KCAPCD	4	2009	0.06	0.19	0.27	0.00	0.02
		2010	1.07	3.61	6.96	0.01	0.43
		2011	0.05	0.19	0.33	0.00	0.02
	9	2010	0.89	2.83	6.62	0.01	0.33
		2011	0.41	1.46	2.76	0.00	0.16
	10	2010	1.05	3.52	6.57	0.01	0.43
		2011	0.04	0.14	0.24	0.00	0.02
SCAQMD	6	2010	0.96	3.38	6.54	0.01	0.40
		2011	0.97	3.35	5.79	0.01	0.39
		2012	0.09	0.38	0.57	0.00	0.04
	7	2010	0.76	2.61	4.83	0.01	0.31
		2011	1.40	4.75	8.25	0.01	0.55
		2012	0.76	2.80	4.78	0.01	0.31
	8	2009	0.07	0.23	0.39	0.00	0.03
		2010	2.52	8.66	16.32	0.02	1.03
		2011	2.19	7.62	13.55	0.01	0.89
		2012	0.24	0.97	1.71	0.00	0.11
	9	2010	0.09	0.30	0.59	0.00	0.03
		2011	0.06	0.22	0.42	0.00	0.02
		2012	0.03	0.11	0.19	0.00	0.01
	11	2009	0.09	0.27	0.38	0.00	0.03
		2010	0.00	0.01	0.02	0.00	0.00
		2011	0.38	1.49	3.04	0.00	0.17
		2012	0.75	2.82	4.86	0.01	0.31
		2013	0.00	0.01	0.01	0.00	0.00
AVAQMD	4	2009	0.06	0.19	0.32	0.00	0.02
		2010	0.81	2.74	5.32	0.01	0.33
		2011	0.06	0.24	0.45	0.00	0.03
	5	2009	0.13	0.42	0.71	0.00	0.05
		2010	1.47	5.02	9.11	0.01	0.60
		2011	0.64	2.53	5.10	0.01	0.29
	6	2009	0.09	0.28	0.40	0.00	0.04
		2010	0.68	2.38	4.48	0.00	0.28
		2011	0.38	1.32	2.29	0.00	0.15
		2012	0.41	1.48	2.54	0.00	0.16
	9	2009	0.16	0.48	1.47	0.00	0.06
		2010	1.07	3.53	7.73	0.01	0.41
		2011	0.21	0.79	1.58	0.00	0.09
		2012	0.27	1.01	1.92	0.00	0.10
		2013	0.12	0.48	0.82	0.00	0.05
	11	2010	0.01	0.04	0.05	0.00	0.00
		2012	0.62	2.35	4.07	0.00	0.25
		2013	0.03	0.11	0.18	0.00	0.01

Total Annual Emission for different jurisductions (lbs)

Jurisdiction	Segment	Total Annual Emissions (lbs)				
		ROG	CO	NOx	SOx	PM
KCAPCD	2009	126.63	387.48	545.80	0.55	49.34
	2010	6,018.09	19,921.68	40,311.88	42.35	2,383.26
	2011	994.57	3,572.36	6,676.89	7.24	399.34
SCAQMD	2009	322.18	1,000.62	1,544.75	1.52	126.82
	2010	8,652.22	29,942.88	56,606.09	58.75	3,543.83
	2011	9,975.17	34,855.94	62,086.07	66.71	4,043.87
	2012	3,736.73	14,133.11	24,217.73	27.40	1,557.81
	2013	3.01	13.43	18.65	0.02	1.41
AVAQMD	2009	893.26	2,730.96	5,803.58	6.23	343.29
	2010	8,073.58	27,422.76	53,372.03	57.42	3,245.06
	2011	2,568.15	9,754.76	18,842.72	20.55	1,114.80
	2012	2,619.06	9,672.07	17,064.40	19.41	1,043.66
	2013	286.90	1,180.29	2,012.30	2.46	114.76

Total Annual Emission for different jurisductions (ton)

Jurisdiction	Segment	Total Annual Emissions (ton)				
		ROG	CO	NOx	SOx	PM
KCAPCD	2009	0.06	0.19	0.27	0.00	0.02
	2010	3.01	9.96	20.16	0.02	1.19
	2011	0.50	1.79	3.34	0.00	0.20
SCAQMD	2009	0.16	0.50	0.77	0.00	0.06
	2010	4.33	14.97	28.30	0.03	1.77
	2011	4.99	17.43	31.04	0.03	2.02
	2012	1.87	7.07	12.11	0.01	0.78
	2013	0.00	0.01	0.01	0.00	0.00
AVAQMD	2009	0.45	1.37	2.90	0.00	0.17
	2010	4.04	13.71	26.69	0.03	1.62
	2011	1.28	4.88	9.42	0.01	0.56
	2012	1.31	4.84	8.53	0.01	0.52
	2013	0.14	0.59	1.01	0.00	0.06

Summary - Offroad Equipment Emissions Calculation by Substation

Substation	Total Annual Emissions (lbs)					
	Year	ROG	CO	NOx	SOx	PM
Antelope	2009	319.12	952.31	2,949.85	3.00	119.81
	2010	1,981.21	6,549.44	14,444.32	17.51	757.68
	2011	371.27	1,341.89	2,540.14	2.74	148.91
	2012	206.84	762.78	1,470.10	1.71	79.04
Whirlwind	2010	1,777.59	5,661.15	13,241.82	15.57	666.84
	2011	823.17	2,917.07	5,527.11	6.01	321.64
Vincent	2010	149.91	513.04	1,009.68	1.03	59.69
	2011	45.63	230.49	615.94	0.75	25.21
	2012	336.36	1,251.54	2,378.75	2.75	129.73
	2013	233.95	953.16	1,649.06	2.02	91.51
Mira Loma	2010	55.94	191.43	376.75	0.38	22.27
	2012	55.62	213.16	386.65	0.44	22.12
Chino	2010	118.58	405.84	798.70	0.81	47.22
Gould	2011	122.37	442.30	837.25	0.90	49.08

Substation	Total Annual Emissions (ton)					
	Year	ROG	CO	NOx	SOx	PM
Antelope	2009	0.160	0.476	1.475	0.001	0.060
	2010	0.991	3.275	7.222	0.009	0.379
	2011	0.186	0.671	1.270	0.001	0.074
	2012	0.103	0.381	0.735	0.001	0.040
Whirlwind	2010	0.889	2.831	6.621	0.008	0.333
	2011	0.412	1.459	2.764	0.003	0.161
Vincent	2010	0.075	0.257	0.505	0.001	0.030
	2011	0.023	0.115	0.308	0.000	0.013
	2012	0.168	0.626	1.189	0.001	0.065
	2013	0.117	0.477	0.825	0.001	0.046
Mira Loma	2010	0.028	0.096	0.188	0.000	0.011
	2012	0.028	0.107	0.193	0.000	0.011
Chino	2010	0.059	0.203	0.399	0.000	0.024
Gould	2011	0.061	0.221	0.419	0.000	0.025

Offroad Equipment Emissions Calculation

Segement 4

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2009	Construction of Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	47.77	172.41	337.04	0.30	22.62
		Forklift, 5 ton	83.24	235.75	270.51	0.29	28.51
		Forklift, 10 ton	81.69	241.53	306.58	0.32	31.73
		Motor, Auxilary Power	1.16	4.72	7.66	0.01	0.47
	Construction - 66kV (or other subtransmission lines)	Drill Rig	14.79	51.49	194.07	0.31	5.85
	Segment 4 - Relocate at Antelope	Backhoe	17.66	54.36	68.35	0.07	6.59
	2009 Total Emission		**246.32**	**760.26**	**1,184.21**	**1.31**	**95.78**

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2010	Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	67.36	255.29	475.07	0.45	32.15
		Forklift, 5 ton	73.62	225.96	255.66	0.29	25.97
		Forklift, 10 ton	72.56	232.82	287.84	0.32	28.91
	Road Maintenance	Motor Grader	71.05	270.15	473.85	0.47	36.13
		Crawler, Track Type, w/ blade (D6 Type)	85.67	321.93	674.90	0.63	37.07
	Roads & Landing Work	Crawler, Track Type, w/ blade (D8 type)	233.96	741.72	2,209.06	2.11	89.15
		Crawler, Track Type, w/ blade (D6 Type)	204.20	767.33	1,608.66	1.49	88.35
		Motor Grader	94.08	357.74	627.47	0.62	47.84
		Backhoe w/ Bucket; backhoe w/ concrete hammer	37.69	124.79	152.74	0.17	14.39
	Install Foundations	Crawler, Track Type, w/ blade (D6 Type)	80.98	304.29	637.92	0.59	35.04
		Excavator, Grade - All	80.20	356.01	587.58	0.66	37.77
		Crawler, track type, drill dig, Pheumatic D8	247.41	784.35	2,336.02	2.23	94.27
		Backhoe w/ Bucket; backhoe w/ concrete hammer	119.58	395.88	484.56	0.55	45.65
		Motor, Auxilary Power	3.17	13.35	21.24	0.03	1.27
	Steel (Hauling, Shake-out, Light Assembly, Heavy Assembly, Erection)	Crane, Hydraulic, 150/300 Ton	307.02	1,078.65	2,997.44	3.00	115.55
		Crane, Hydraulic, Rough Terrain 35 ton	635.35	2,407.94	4,481.01	4.26	303.27
		Compressor, Air	936.55	2,535.56	3,095.00	3.22	307.78
		Motor, Auxilary Power	5.17	21.77	34.62	0.05	2.06
	Conductor & OHGW Installation	Backhoe w/ Bucket; backhoe w/ concrete hammer	26.00	86.06	105.34	0.12	9.92
		Crane, Hydraulic, Rough Terrain 35 ton	84.71	321.06	597.47	0.57	40.44
		Crawler, Track Type, w/ blade (D8 type)	35.86	113.67	338.55	0.32	13.66
		Crawler, Track Type, Sagging (D8 type)	71.71	227.35	677.11	0.65	27.33
		Motor, Auxilary Power	3.68	15.48	24.62	0.03	1.47
		Tension machine, conductor	61.39	266.41	431.87	0.49	32.95
		Tension machine, static	20.46	88.80	143.96	0.16	10.98
	Restoration & Guard Poles	Backhoe	4.33	14.34	17.56	0.02	1.65
		Motor Grader	10.38	39.47	69.24	0.07	5.28
	Construction - 66kV (or other subtransmission lines)	Drill Rig	26.78	96.89	331.70	0.59	10.76
	Segment 4 - Relocate at Antelope	Backhoe	30.33	100.40	122.89	0.14	11.58
	Wreckout - 66kV (or other subtransmission lines)	Puller, Wire Puller 1 Drum	19.48	83.58	196.52	0.24	8.39
	Segment 4 - Relocate at Antelope	Backhoe	15.16	50.20	61.45	0.07	5.79
	2010 Total Emission		**3,765.91**	**12,699.25**	**24,558.90**	**24.61**	**1,522.82**

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2011	Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	5.84	23.26	41.15	0.04	2.81
		Forklift, 5 ton	6.01	20.13	22.41	0.03	2.18
		Forklift, 10 ton	5.94	20.83	25.04	0.03	2.42
	Road Maintenance	Motor Grader	4.87	19.60	32.62	0.03	2.50
		Crawler, Track Type, w/ blade (D6 Type)	5.96	23.25	46.62	0.05	2.58
	Conductor & OHGW Installation	Backhoe w/ Bucket; backhoe w/ concrete hammer	6.47	23.13	27.58	0.03	2.53
		Crane, Hydraulic, Rough Terrain 35 ton	22.02	87.74	155.20	0.16	10.60
		Crawler, Track Type, w/ blade (D8 type)	9.39	29.45	87.21	0.09	3.47
		Crawler, Track Type, Sagging (D8 type)	18.77	58.91	174.43	0.18	6.95
		Motor, Auxilary Power	0.97	4.18	6.51	0.01	0.38
		Tension machine, conductor	15.52	72.73	111.05	0.13	8.52
		Tension machine, static	5.17	24.24	37.02	0.04	2.84
	Restoration & Guard Poles	Backhoe	6.86	24.54	29.25	0.03	2.68
		Motor Grader	17.03	68.60	114.18	0.12	8.74
	Wreckout - 66kV (or other subtransmission lines)	Puller, Wire Puller 1 Drum	49.85	222.86	496.40	0.67	21.22
	Segment 4 - Relocate at Antelope	Backhoe	37.63	134.60	160.47	0.19	14.73
	2011 Total Emission		**218.29**	**858.04**	**1,567.12**	**1.83**	**95.14**

Offroad Equipment Emissions Calculation

Segment 5

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2009	Construction of Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	35.83	129.31	252.78	0.23	16.96
		Forklift, 5 ton	62.43	176.81	202.89	0.22	21.39
		Forklift, 10 ton	61.27	181.15	229.94	0.24	23.80
		Motor, Auxilary Power	0.87	3.54	5.74	0.01	0.35
	Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	13.06	47.14	92.16	0.08	6.18
		Forklift, 5 ton	15.17	42.97	49.31	0.05	5.20
		Forklift, 10 ton	14.89	44.03	55.89	0.06	5.78
	Construction - 66kV (or other subtransmission lines)	Drill Rig	29.58	102.97	388.14	0.63	11.70
	Segment 5 - Sagebrush/Ant. & Sage	Backhoe	35.32	108.73	136.70	0.15	13.19
	2009 Total Emission		**268.43**	**836.66**	**1,413.55**	**1.66**	**104.56**

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2010	Construction of Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	38.59	146.26	272.18	0.26	18.42
		Forklift, 5 ton	63.27	194.19	219.71	0.25	22.32
		Forklift, 10 ton	62.36	200.08	247.36	0.27	24.84
		Motor, Auxilary Power	0.94	3.97	6.31	0.01	0.38
	Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	88.83	336.67	626.51	0.60	42.40
		Forklift, 5 ton	97.09	297.99	337.16	0.38	34.25
		Forklift, 10 ton	95.69	307.03	379.59	0.42	38.12
	Road Maintenance	Motor Grader	70.72	268.92	471.68	0.47	35.96
		Crawler, Track Type, w/ blade (D6 Type)	85.28	320.46	671.82	0.62	36.90
	Roads & Landing Work	Crawler, Track Type, w/ blade (D8 type)	78.66	249.37	742.70	0.71	29.97
		Crawler, Track Type, w/ blade (D6 Type)	68.65	257.98	540.84	0.50	29.70
		Motor Grader	31.63	120.27	210.96	0.21	16.08
		Backhoe w/ Bucket; backhoe w/ concrete hammer	12.67	41.95	51.35	0.06	4.84
	Install Foundations	Crawler, Track Type, w/ blade (D6 Type)	34.03	127.89	268.11	0.25	14.73
		Excavator, Grade - All	33.71	149.63	246.95	0.28	15.88
		Crawler, track type, drill dig, Pheumatic D8	103.98	329.66	981.81	0.94	39.62
		Backhoe w/ Bucket; backhoe w/ concrete hammer	50.26	166.38	203.65	0.23	19.19
		Motor, Auxilary Power	1.33	5.61	8.92	0.01	0.53
	Steel (Hauling, Shake-out, Light Assembly, Heavy Assembly, Erection)	Crane, Hydraulic, 150/300 Ton	76.41	268.46	746.03	0.75	28.76
		Crane, Hydraulic, Rough Terrain 35 ton	158.13	599.31	1,115.27	1.06	75.48
		Compressor, Air	233.10	631.07	770.31	0.80	76.60
		Motor, Auxilary Power	1.29	5.42	8.62	0.01	0.51
	Wreck-Out (conductors, structures, & Foundations)	Tension Machine	147.33	639.39	1,036.49	1.17	79.08
		Crawler, Track Type, w/ blade (D8 type)	344.22	1,091.27	3,250.12	3.10	131.16
		Backhoe w/ Bucket; backhoe w/ concrete hammer	665.49	2,203.13	2,696.67	3.07	254.06
		Crane, Hydraulic, Rough Terrain 35 ton	180.72	684.92	1,274.60	1.21	86.26
		Motor, Auxilary Power	6.62	27.86	44.32	0.06	2.64
	Construction - 66kV (or other subtransmission lines)	Drill Rig	30.99	112.12	383.83	0.69	12.45
	Segment 5 - Sagebrush/Ant. & Sagebrush Vincent	Backhoe	35.09	116.18	142.21	0.16	13.40
	Wreckout - 66kV (or other subtransmission lines)	Puller, Wire Puller 1 Drum	20.59	88.36	207.75	0.26	8.87
	Segment 5 - Sagebrush/Ant. & Sagebrush Vincent	Backhoe	16.03	53.07	64.96	0.07	6.12
	2010 Total Emission		**2,933.73**	**10,044.88**	**18,228.80**	**18.87**	**1,199.53**

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2011	Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	42.54	169.50	299.82	0.30	20.47
		Forklift, 5 ton	43.78	146.64	163.24	0.19	15.88
		Forklift, 10 ton	43.31	151.76	182.41	0.21	17.66
	Road Maintenance	Motor Grader	44.41	178.84	297.68	0.31	22.79
		Crawler, Track Type, w/ blade (D6 Type)	54.36	212.12	425.36	0.42	23.53
	Steel (Hauling, Shake-out, Light Assembly, Heavy Assembly, Erection)	Crane, Hydraulic, 150/300 Ton	109.80	441.87	722.70	0.83	46.95
		Crane, Hydraulic, Rough Terrain 35 ton	226.89	856.71	1,010.02	1.15	96.82
		Compressor, Air	332.91	1,409.07	4,306.48	4.67	161.81
		Motor, Auxilary Power	1.86	65.17	72.55	0.09	7.06
	Conductor & OHGW Installation	Backhoe w/ Bucket; backhoe w/ concrete hammer	21.17	75.71	90.26	0.11	8.28
		Crane, Hydraulic, Rough Terrain 35 ton	72.07	287.15	507.92	0.51	34.67
		Crawler, Track Type, w/ blade (D8 type)	30.72	96.39	285.42	0.29	11.37
		Crawler, Track Type, Sagging (D8 type)	61.43	192.78	570.85	0.58	22.74
		Motor, Auxilary Power	3.16	13.68	21.31	0.03	1.25
		Tension machine, conductor	50.79	238.02	363.42	0.44	27.87
		Tension machine, static	16.93	79.34	121.14	0.15	9.29
	Wreck-Out (Conductors, Structures & Foundations)	Tension Machine	9.88	46.28	70.67	0.09	5.42
	(Antelope-Mesa & Antelope-Vincent)	Crawler, Track Type, w/ blade (D8 type)	23.89	74.97	222.00	0.23	8.84
		Backhoe w/ Bucket; backhoe w/ concrete hammer	43.90	157.03	187.21	0.22	17.18
		Crane, Hydraulic, Rough Terrain 35 ton	12.46	49.63	87.79	0.09	5.99
		Motor, Auxilary Power	0.46	1.99	3.11	0.00	0.18
	Restoration & Guard Poles	Backhoe	8.82	31.55	37.61	0.04	3.45
		Motor Grader	21.90	88.19	146.80	0.15	11.24
	2011 Total Emission		**1,277.45**	**5,064.40**	**10,195.76**	**11.11**	**580.74**

Offroad Equipment Emissions Calculation

Segment 6

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2009	Construction of Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	41.55	149.96	293.15	0.26	19.67
		Forklift, 5 ton	72.40	205.05	235.29	0.25	24.80
		Forklift, 10 ton	71.06	210.08	266.66	0.28	27.60
		Motor, Auxilary Power	1.01	4.11	6.66	0.01	0.41
	2009 Total Emission		**186.02**	**569.20**	**801.77**	**0.80**	**72.48**

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2010	Construction of Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	70.83	268.44	499.55	0.48	33.81
		Forklift, 5 ton	116.12	356.41	403.25	0.46	40.96
		Forklift, 10 ton	114.45	367.22	454.00	0.50	45.59
		Motor, Auxilary Power	1.73	7.28	11.58	0.02	0.69
	Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	67.36	255.29	475.07	0.45	32.15
		Forklift, 5 ton	73.62	225.96	255.66	0.29	25.97
		Forklift, 10 ton	72.56	232.82	287.84	0.32	28.91
	Road Maintenance	Motor Grader	40.55	154.20	270.46	0.27	20.62
		Crawler, Track Type, w/ blade (D6 Type)	48.90	183.75	385.22	0.36	21.16
	Roads & Landing Work	Crawler, Track Type, w/ blade (D8 type)	498.40	1,580.07	4,705.90	4.49	189.91
		Crawler, Track Type, w/ blade (D6 Type)	217.50	817.31	1,713.44	1.59	94.11
		Backhoe w/ Bucket; backhoe w/ concrete hammer	90.34	299.06	366.05	0.42	34.49
		Excavator, Grade - All	323.14	1,434.38	2,367.36	2.65	152.19
		Motor Grader	112.73	428.67	751.88	0.74	57.33
	Install Foundations	Crawler, Track Type, w/ blade (D6 Type)	47.53	178.60	374.43	0.35	20.56
		Excavator, Grade - All	47.08	208.97	344.89	0.39	22.17
		Crawler, track type, drill dig, Pheumatic D8	145.22	460.38	1,371.14	1.31	55.33
		Generator, Concrete Batch Plant	54.28	141.15	149.20	0.19	13.80
		Backhoe w/ Bucket; backhoe w/ concrete hammer	70.19	232.36	284.41	0.32	26.80
		Motor, Auxilary Power	1.86	7.84	12.46	0.02	0.74
	Steel (Hauling, Shake-out, Light Assembly, Heavy Assembly, Erection)	Crane, Hydraulic, 150/300 Ton	23.20	81.50	226.47	0.23	8.73
		Crane, Hydraulic, Rough Terrain 35 ton	48.00	181.93	338.57	0.32	22.91
		Compressor, Air	70.76	191.58	233.84	0.24	23.25
		Motor, Auxilary Power	0.39	1.64	2.62	0.00	0.16
	Wreck-Out (conductors, structures, & Foundations)	Tension Machine, Conductor or Static	102.06	442.91	717.99	0.81	54.78
		Crawler, Track Type, w/ blade (D8 type)	238.44	755.93	2,251.38	2.15	90.86
		Backhoe w/ Bucket; backhoe w/ concrete hammer	460.99	1,526.13	1,868.00	2.13	175.99
		Crane, Hydraulic, Rough Terrain 35 ton	125.19	474.45	882.92	0.84	59.76
		Motor, Auxilary Power	4.59	19.30	30.70	0.04	1.83
	2010 Total Emission		**3,288.00**	**11,515.51**	**22,036.28**	**22.35**	**1,355.56**

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2011	Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	84.25	335.67	593.75	0.60	40.53
		Forklift, 5 ton	86.71	290.40	323.27	0.38	31.44
		Forklift, 10 ton	85.78	300.55	361.25	0.42	34.97
	Road Maintenance	Motor Grader	84.56	340.53	566.82	0.59	43.40
		Crawler, Track Type, w/ blade (D6 Type)	103.51	403.91	809.94	0.80	44.81
	Install Foundations	Crawler, Track Type, w/ blade (D6 Type)	12.85	50.12	100.51	0.10	5.56
		Crawler, track type, drill dig, Pheumatic D8	39.25	123.17	364.71	0.37	14.53
		Generator, Concrete Batch Plant	14.39	39.00	41.68	0.05	3.73
		Backhoe w/ Bucket; backhoe w/ concrete hammer	18.03	64.49	76.89	0.09	7.06
		Motor, Auxilary Power	0.50	2.18	3.40	0.00	0.20
		Excavator, Grade - All	12.50	59.16	91.14	0.11	5.93
	Steel (Hauling, Shake-out, Light Assembly, Heavy Assembly, Erection)	Crane, Hydraulic, 150/300 Ton	285.48	983.90	2,740.21	2.95	103.80
		Crane, Hydraulic, Rough Terrain 35 ton	589.91	2,350.37	4,157.44	4.19	283.82
		Compressor, Air	865.58	2,442.71	2,932.36	3.16	289.75
		Motor, Auxilary Power	4.85	20.99	32.70	0.05	1.92
	Conductor & OHGW Installation	Backhoe w/ Bucket; backhoe w/ concrete hammer	29.10	104.10	124.11	0.15	11.39
		Crane, Hydraulic, Rough Terrain 35 ton	99.10	394.83	698.39	0.70	47.68
		Crawler, Track Type, w/ blade (D8 type)	42.24	132.54	392.46	0.40	15.63
		Crawler, Track Type, Sagging (D8 type)	84.47	265.07	784.92	0.80	31.26
		Motor, Auxilary Power	4.34	18.81	29.30	0.04	1.72
		Tension machine, conductor	69.84	327.28	499.70	0.60	38.32
		Tension machine, static	23.28	109.09	166.57	0.20	12.77
	Restoration & Guard Poles	Backhoe	13.23	47.32	56.41	0.07	5.18
		Motor Grader	32.85	132.29	220.20	0.23	16.86
	2011 Total Emission		**2,686.59**	**9,338.49**	**16,168.14**	**17.06**	**1,092.24**

Offroad Equipment Emissions Calculation

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2012	Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	35.43	148.71	249.11	0.27	16.84
		Forklift, 5 ton	34.08	125.93	137.29	0.17	12.60
		Forklift, 10 ton	33.84	130.88	152.03	0.19	13.95
	Road Maintenance	Motor Grader	37.00	158.22	248.85	0.28	18.75
		Crawler, Track Type, w/ blade (D6 Type)	46.05	186.90	357.54	0.37	19.55
	Install Foundations	Crawler, Track Type, w/ blade (D6 Type)	12.75	51.76	99.01	0.10	5.42
		Crawler, track type, drill dig, Pheumatic D8	39.00	121.40	356.26	0.39	13.98
		Generator, Concrete Batch Plant	13.81	39.37	42.71	0.06	3.67
		Backhoe w/ Bucket; backhoe w/ concrete hammer	16.95	65.87	76.23	0.10	6.71
		Motor, Auxilary Power	0.50	2.23	3.40	0.01	0.20
		Excavator, Grade - All	12.18	61.56	88.25	0.11	5.61
	Steel (Hauling, Shake-out, Light Assembly, Heavy Assembly, Erection)	Crane, Hydraulic, 150/300 Ton	89.27	302.13	841.20	0.97	31.21
		Crane, Hydraulic, Rough Terrain 35 ton	183.91	771.95	1,293.15	1.38	87.43
		Compressor, Air	264.83	786.98	927.89	1.05	90.15
		Motor, Auxilary Power	1.53	6.80	10.34	0.02	0.60
	Conductor & OHGW Installation	Backhoe w/ Bucket; backhoe w/ concrete hammer	6.62	25.73	29.78	0.04	2.62
		Crane, Hydraulic, Rough Terrain 35 ton	23.62	99.14	166.07	0.18	11.23
		Crawler, Track Type, w/ blade (D8 type)	10.16	31.61	92.78	0.10	3.64
		Crawler, Track Type, Sagging (D8 type)	20.31	63.23	185.55	0.20	7.28
		Motor, Auxilary Power	1.04	4.65	7.09	0.01	0.41
		Tension machine, conductor	16.17	82.09	117.43	0.15	8.82
		Tension machine, static	5.39	27.36	39.14	0.05	2.94
	Wreck-Out (conductors, structures, & Foundations)	Tension Machine, Conductor or Static	10.99	55.82	79.85	0.10	6.00
		Crawler, Track Type, w/ blade (D8 type)	27.62	85.99	252.35	0.27	9.90
		Backhoe w/ Bucket; backhoe w/ concrete hammer	48.04	186.64	215.98	0.27	19.01
		Crane, Hydraulic, Rough Terrain 35 ton	14.28	59.92	100.38	0.11	6.79
		Motor, Auxilary Power	0.53	2.37	3.61	0.01	0.21
	Restoration & Guard Poles	Backhoe	2.21	8.58	9.93	0.01	0.87
		Motor Grader	5.69	24.34	38.28	0.04	2.88
	2012 Total Emission		**1,013.80**	**3,718.19**	**6,221.48**	**7.00**	**409.25**

Offroad Equipment Emissions Calculation

Segment 7

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2010	Construction of Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	22.35	84.72	157.67	0.15	10.67
		Forklift, 5 ton	36.65	112.49	127.27	0.14	12.93
		Forklift, 10 ton	36.12	115.90	143.29	0.16	14.39
		Motor, Auxilary Power	0.55	2.30	3.65	0.01	0.22
	Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	46.18	175.02	325.70	0.31	22.04
		Forklift, 5 ton	50.47	154.92	175.28	0.20	17.80
		Forklift, 10 ton	49.75	159.62	197.34	0.22	19.82
	Roads & Landing Work	Crawler, Track Type, w/ blade (D6 Type)	22.88	85.99	180.28	0.17	9.90
		Excavator, Grade - All	17.00	75.46	124.54	0.14	8.01
		Motor Grader	18.98	72.16	126.58	0.12	9.65
	Install Foundations	Crawler, Track Type, w/ blade (D6 Type)	31.10	116.86	245.00	0.23	13.46
		Excavator, Grade - All	30.80	136.73	225.67	0.25	14.51
		Crawler, track type, drill dig, Pheumatic D8	95.02	301.24	897.17	0.86	36.21
		Backhoe w/ Bucket; backhoe w/ concrete hammer	45.93	152.04	186.10	0.21	17.53
		Motor, Auxilary Power	1.22	5.13	8.16	0.01	0.49
	Steel (Hauling, Shake-out, Light Assembly, Heavy Assembly, Erection)	Crane, Hydraulic, 150/300 Ton	17.74	62.32	173.19	0.17	6.68
		Crane, Hydraulic, Rough Terrain 35 ton	36.71	139.13	258.90	0.25	17.52
		Compressor, Air	54.11	146.50	178.82	0.19	17.78
		Motor, Auxilary Power	0.30	1.26	2.00	0.00	0.12
	Restoration & Guard Poles	Backhoe	1.08	3.59	4.39	0.00	0.41
		Motor Grader	2.60	9.87	17.31	0.02	1.32
	Wreck-Out (conductors, structures, & Foundations)	Tension Machine, Conductor or Static	72.13	313.03	507.45	0.57	38.71
		Crawler, Track Type, w/ blade (D8 type)	168.52	534.27	1,591.20	1.52	64.22
		Backhoe w/ Bucket; backhoe w/ concrete hammer	325.81	1,078.62	1,320.24	1.50	124.39
		Crane, Hydraulic, Rough Terrain 35 ton	88.48	335.33	624.02	0.59	42.23
		Motor, Auxilary Power	3.24	13.64	21.70	0.03	1.29
	Construction - 66kV (or other subtransmission lines)	Drill Rig	83.41	301.75	1,033.02	1.85	33.50
		Backhoe	94.45	312.68	382.73	0.44	36.06
	Wreckout - 66kV (or other subtransmission lines)	Puller, Wire Puller 1 Drum	26.16	112.24	263.90	0.33	11.26
		Backhoe	20.36	67.41	82.52	0.09	7.77
	66 kV Underground Construction						
	Trenching	Excavator Cat 320	3.41	13.85	22.32	0.02	1.78
		Forklift - 10 ton	0.76	2.44	3.02	0.00	0.30
		Backhoe	1.30	4.30	5.27	0.01	0.50
		Water Pumps - 100 hp	1.69	5.58	9.09	0.01	0.75
		Loader, Front End w/ Bucket	1.59	6.24	11.01	0.01	0.79
	Vault Construction	Excavator Cat 320	0.00	0.00	0.00	0.00	0.00
		Water Pumps - 100 hp	0.00	0.00	0.00	0.00	0.00
		Forklift, 10 ton	0.00	0.00	0.00	0.00	0.00
		Loader, Front End w/ Bucket	0.00	0.00	0.00	0.00	0.00
	End Structures	Drill Rig	1.53	5.54	18.95	0.03	0.61
		Loader, Front End w/ Bucket	1.06	4.16	7.34	0.01	0.53
		Backhoe	0.87	2.87	3.51	0.00	0.33
	2010 Total Emission		**1,512.33**	**5,227.19**	**9,665.58**	**10.82**	**616.49**

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2011	Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	84.25	335.67	593.75	0.60	40.53
		Forklift, 5 ton	86.71	290.40	323.27	0.38	31.44
		Forklift, 10 ton	85.78	300.55	361.25	0.42	34.97
	Install Foundations	Crawler, Track Type, w/ blade (D6 Type)	43.00	167.81	336.50	0.33	18.62
		Crawler, track type, drill dig, Pheumatic D8	131.40	412.34	1,220.98	1.24	48.63
		Backhoe w/ Bucket; backhoe w/ concrete hammer	60.36	215.91	257.42	0.31	23.62
		Motor, Auxilary Power	1.69	7.31	11.39	0.02	0.67
		Excavator, Grade - All	41.85	198.04	305.10	0.37	19.85
	Steel (Hauling, Shake-out, Light Assembly, Heavy Assembly, Erection)	Crane, Hydraulic, 150/300 Ton	342.32	1,179.80	3,285.78	3.53	124.46
		Crane, Hydraulic, Rough Terrain 35 ton	707.36	2,818.31	4,985.16	5.02	340.33
		Compressor, Air	1,037.91	2,929.04	3,516.17	3.79	347.44
		Motor, Auxilary Power	5.81	25.17	39.21	0.06	2.30
	Construction - 66kV (or other subtransmission lines)	Drill Rig	78.53	303.15	891.31	1.86	28.41
	Segment 7 - Rio Hondo/SG River & S	Backhoe	86.23	308.45	367.74	0.44	33.75
	2011 Total Emission		**2,793.21**	**9,491.96**	**16,495.05**	**18.37**	**1,095.01**

Offroad Equipment Emissions Calculation

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2012	Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	49.60	208.19	348.75	0.37	23.58
		Forklift, 5 ton	47.71	176.30	192.20	0.24	17.64
		Forklift, 10 ton	47.38	183.23	212.84	0.26	19.53
	Steel (Hauling, Shake-out, Light Assembly, Heavy Assembly, Erection)	Crane, Hydraulic, 150/300 Ton	135.73	459.40	1,279.09	1.48	47.46
		Crane, Hydraulic, Rough Terrain 35 ton	279.65	1,173.79	1,966.29	2.10	132.94
		Compressor, Air	402.69	1,196.65	1,410.90	1.59	137.08
		Motor, Auxilary Power	2.32	10.33	15.73	0.02	0.91
	Conductor & OHGW Installation	Backhoe w/ Bucket; backhoe w/ concrete hammer	41.32	160.57	185.81	0.23	16.35
		Crane, Hydraulic, Rough Terrain 35 ton	147.38	618.62	1,036.29	1.11	70.06
		Crawler, Track Type, w/ blade (D8 type)	63.37	197.27	578.93	0.63	22.71
		Crawler, Track Type, Sagging (D8 type)	126.75	394.55	1,157.86	1.26	45.42
		Motor, Auxilary Power	6.52	29.04	44.21	0.07	2.55
		Tension machine, conductor	100.89	512.26	732.75	0.95	55.03
		Tension machine, static	33.63	170.75	244.25	0.32	18.34
	Restoration & Guard Poles	Backhoe	7.06	27.45	31.76	0.04	2.79
		Motor Grader	18.21	77.89	122.51	0.14	9.23
	2012 Total Emission		**1,510.22**	**5,596.30**	**9,560.17**	**10.81**	**621.63**

Offroad Equipment Emissions Calculation

Segment 8

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2009	Construction of Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	23.39	84.41	165.01	0.15	11.07
		Forklift, 5 ton	40.75	115.42	132.44	0.14	13.96
		Forklift, 10 ton	40.00	118.25	150.10	0.16	15.54
		Motor, Auxilary Power	0.57	2.31	3.75	0.00	0.23
	Roads & Landing Work	Crawler, Track Type, w/ blade (D8 type)	16.90	54.41	160.76	0.15	6.50
		Crawler, Track Type, w/ blade (D6 Type)	14.80	53.61	117.12	0.10	6.39
		Motor Grader	6.92	24.87	45.93	0.04	3.48
		Backhoe w/ Bucket; backhoe w/ concrete hammer	2.86	8.82	11.08	0.01	1.07
	2009 Total Emission		**146.19**	**462.09**	**786.19**	**0.76**	**58.24**

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2010	Construction of Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	22.12	83.83	156.01	0.15	10.56
		Forklift, 5 ton	36.26	111.30	125.93	0.14	12.79
		Forklift, 10 ton	35.74	114.68	141.78	0.16	14.24
		Motor, Auxilary Power	0.54	2.27	3.62	0.00	0.22
	Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	67.36	255.29	475.07	0.45	32.15
		Forklift, 5 ton	73.62	225.96	255.66	0.29	25.97
		Forklift, 10 ton	72.56	232.82	287.84	0.32	28.91
	Road Maintenance	Motor Grader	71.05	270.15	473.85	0.47	36.13
		Crawler, Track Type, w/ blade (D6 Type)	85.67	321.93	674.90	0.63	37.07
	Roads & Landing Work	Crawler, Track Type, w/ blade (D6 Type)	89.78	337.36	707.26	0.66	38.84
		Motor Grader	74.45	283.11	496.56	0.49	37.86
		Excavator, Grade - All	66.69	296.03	488.59	0.55	31.41
	Install Foundations	Crawler, Track Type, w/ blade (D6 Type)	183.08	687.95	1,442.25	1.34	79.21
		Excavator, Grade - All	181.33	804.90	1,328.45	1.49	85.40
		Crawler, track type, drill dig, Pheumatic D8	559.36	1,773.32	5,281.44	5.04	213.14
		Backhoe w/ Bucket; backhoe w/ concrete hammer	270.36	895.02	1,095.52	1.25	103.21
		Motor, Auxilary Power	7.17	30.19	48.01	0.07	2.86
	Steel (Hauling, Shake-out, Light Assembly, Heavy Assembly, Erection)	Crane, Hydraulic, 150/300 Ton	223.78	786.21	2,184.80	2.19	84.22
		Crane, Hydraulic, Rough Terrain 35 ton	463.10	1,755.12	3,266.16	3.11	221.05
		Compressor, Air	682.64	1,848.14	2,255.91	2.35	224.34
		Motor, Auxilary Power	3.77	15.87	25.24	0.03	1.50
	Conductor & OHGW Installation	Backhoe w/ Bucket; backhoe w/ concrete hammer	21.45	71.00	86.90	0.10	8.19
		Crane, Hydraulic, Rough Terrain 35 ton	69.89	264.87	492.91	0.47	33.36
		Crawler, Track Type, w/ blade (D8 type)	29.58	93.78	279.31	0.27	11.27
		Crawler, Track Type, Sagging (D8 type)	59.16	187.56	558.61	0.53	22.54
		Motor, Auxilary Power	3.03	12.77	20.31	0.03	1.21
		Tension machine, conductor	50.65	219.79	356.29	0.40	27.18
		Tension machine, static	16.88	73.26	118.76	0.13	9.06
	Restoration & Guard Poles	Backhoe	5.42	17.93	21.95	0.02	2.07
		Motor Grader	12.98	49.34	86.55	0.09	6.60
	Wreck-Out (conductors, structures, & Foundations)	Tension Machine, Conductor or Static	139.66	606.09	982.51	1.11	74.96
		Crawler, Track Type, w/ blade (D8 type)	326.29	1,034.44	3,080.84	2.94	124.33
		Backhoe w/ Bucket; backhoe w/ concrete hammer	630.83	2,088.39	2,556.21	2.91	240.83
		Crane, Hydraulic, Rough Terrain 35 ton	171.31	649.25	1,208.21	1.15	81.77
		Motor, Auxilary Power	6.28	26.41	42.01	0.06	2.50
	Construction - 66kV (or other subtransmission lines)	Drill Rig	34.43	124.57	426.47	0.76	13.83
		Backhoe	38.99	129.09	158.01	0.18	14.89
	Wreckout - 66kV (or other subtransmission lines)	Puller, Wire Puller 1 Drum	26.71	114.62	269.51	0.33	11.50
		Backhoe	20.80	68.85	84.27	0.10	7.94
	66 kV Underground Construction						
	Trenching	Excavator Cat 320	30.68	124.65	200.85	0.21	16.03
		Forklift - 10 ton	6.84	21.96	27.15	0.03	2.73
		Backhoe	11.70	38.73	47.40	0.05	4.47
		Water Pumps - 100 hp	15.25	50.20	81.83	0.08	6.77
		Loader, Front End w/ Bucket	14.35	56.20	99.09	0.10	7.15
	Vault Construction	Excavator Cat 320	5.11	20.77	33.48	0.04	2.67
		Water Pumps - 100 hp	5.08	16.73	27.28	0.03	2.26
		Forklift, 10 ton	0.76	2.44	3.02	0.00	0.30
		Loader, Front End w/ Bucket	0.80	3.12	5.51	0.01	0.40
	End Structures	Drill Rig	3.83	13.84	47.39	0.08	1.54
		Loader, Front End w/ Bucket	2.66	10.41	18.35	0.02	1.32
		Backhoe	2.17	7.17	8.78	0.01	0.83
	2010 Total Emission		**5,034.00**	**17,329.69**	**32,644.59**	**33.39**	**2,061.59**

Offroad Equipment Emissions Calculation

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2011	Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	84.25	335.67	593.75	0.60	40.53
		Forklift, 5 ton	86.71	290.40	323.27	0.38	31.44
		Forklift, 10 ton	85.78	300.55	361.25	0.42	34.97
	Road Maintenance	Motor Grader	92.16	371.15	617.79	0.65	47.30
		Crawler, Track Type, w/ blade (D6 Type)	112.81	440.23	882.77	0.87	48.83
	Install Foundations	Crawler, Track Type, w/ blade (D6 Type)	38.54	150.37	301.54	0.30	16.68
		Crawler, track type, drill dig, Pheumatic D8	117.75	369.50	1,094.12	1.11	43.58
		Backhoe w/ Bucket; backhoe w/ concrete hammer	54.09	193.48	230.67	0.28	21.17
		Motor, Auxilary Power	1.51	6.55	10.21	0.01	0.60
		Excavator, Grade - All	37.50	177.47	273.41	0.33	17.79
	Steel (Hauling, Shake-out, Light Assembly, Heavy Assembly, Erection)	Crane, Hydraulic, 150/300 Ton	456.00	1,571.58	4,376.90	4.71	165.79
		Crane, Hydraulic, Rough Terrain 35 ton	942.25	3,754.21	6,640.61	6.69	453.34
		Compressor, Air	1,382.58	3,901.70	4,683.81	5.05	462.81
		Motor, Auxilary Power	7.74	33.53	52.24	0.07	3.06
	Conductor & OHGW Installation	Backhoe w/ Bucket; backhoe w/ concrete hammer	71.14	254.47	303.39	0.36	27.84
		Crane, Hydraulic, Rough Terrain 35 ton	242.24	965.14	1,707.18	1.72	116.55
		Crawler, Track Type, w/ blade (D8 type)	103.24	323.98	959.34	0.98	38.21
		Crawler, Track Type, Sagging (D8 type)	206.48	647.96	1,918.68	1.95	76.42
		Motor, Auxilary Power	10.62	45.97	71.62	0.10	4.20
		Tension machine, conductor	170.73	800.02	1,221.50	1.48	93.67
		Tension machine, static	56.91	266.67	407.17	0.49	31.22
	Restoration & Guard Poles	Backhoe	2.94	10.52	12.54	0.01	1.15
		Motor Grader	7.30	29.40	48.93	0.05	3.75
	2011 Total Emission		**4,371.26**	**15,240.52**	**27,092.70**	**28.61**	**1,780.91**

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2012	Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	25.98	109.05	182.68	0.20	12.35
		Forklift, 5 ton	24.99	92.35	100.68	0.13	9.24
		Forklift, 10 ton	24.82	95.98	111.49	0.14	10.23
	Road Maintenance	Motor Grader	26.75	114.40	179.93	0.20	13.56
		Crawler, Track Type, w/ blade (D6 Type)	33.30	135.15	258.53	0.27	14.14
	Conductor & OHGW Installation	Backhoe w/ Bucket; backhoe w/ concrete hammer	24.11	93.66	108.39	0.14	9.54
		Crane, Hydraulic, Rough Terrain 35 ton	85.97	360.86	604.50	0.65	40.87
		Crawler, Track Type, w/ blade (D8 type)	36.97	115.08	337.71	0.37	13.25
		Crawler, Track Type, Sagging (D8 type)	73.94	230.15	675.42	0.73	26.50
		Motor, Auxilary Power	3.80	16.94	25.79	0.04	1.49
		Tension machine, conductor	58.85	298.82	427.44	0.56	32.10
		Tension machine, static	19.62	99.61	142.48	0.19	10.70
	Restoration & Guard Poles	Backhoe	11.92	46.32	53.60	0.07	4.72
		Motor Grader	30.74	131.44	206.73	0.23	15.57
	2012 Total Emission		**481.75**	**1,939.81**	**3,415.36**	**3.89**	**214.25**

Offroad Equipment Emissions Calculation

Segment 9

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2009	Grading Element						
	Segment 9 - Antelope Substation	980 Loader	157.02	484.94	1,612.15	1.65	59.70
		Compactor	48.92	135.82	182.48	0.18	17.16
		Grader	113.18	331.55	1,155.22	1.17	42.95
	2009 Total Emission		**319.12**	**952.31**	**2,949.85**	**3.00**	**119.81**

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2010	Grading Element						
	Segment 9 - Whirlwind Substation	980 Loader	285.96	876.72	2,910.05	3.16	107.82
		Grader	206.21	601.71	2,086.29	2.25	77.55
		Compactor	105.67	306.77	403.62	0.42	37.65
	Segment 9 - Antelope Substation	980 Loader	136.94	419.84	1,393.54	1.51	51.63
		Grader	98.75	288.14	999.07	1.08	37.14
		Compactor	42.17	122.42	161.07	0.17	15.03
	Civil Element						
	Segment 9 - Whirlwind Substation	14 ton Crane	51.92	204.81	406.88	0.40	22.85
		Driller	183.79	671.71	2,224.25	3.98	74.43
		Ditch Digger	220.85	582.22	715.31	0.70	69.02
		Forklift	27.52	84.46	95.57	0.11	9.71
		Tractors	139.08	460.42	563.56	0.64	53.10
	Segment 9 - Antelope Substation	14 ton Crane	77.63	306.25	608.42	0.59	34.17
		Driller	274.83	1,004.42	3,325.98	5.95	111.30
		Ditch Digger	165.12	435.31	534.81	0.52	51.60
		Forklift	41.15	126.30	142.90	0.16	14.52
		Tractors	207.97	688.48	842.71	0.96	79.39
	Electrical Element						
	Segment 9 - Whirlwind Substation	14 ton Crane	157.21	620.17	1,232.05	1.20	69.19
		Crane, Hydraulic, 150 Ton (150 ton crane)	191.07	612.76	1,880.80	1.90	72.04
		Forklift	41.66	127.88	144.69	0.16	14.70
		Manlifts	166.66	511.52	578.76	0.66	58.79
	Segment 9 - Antelope Substation	14 ton Crane	228.53	901.54	1,791.04	1.75	100.58
		Crane, Hydraulic, 150 Ton (150 ton crane)	277.75	890.77	2,734.13	2.76	104.73
		Forklift	60.57	185.90	210.33	0.24	21.37
		Manlifts	242.27	743.60	841.34	0.95	85.46
	Transformer Assembly and Processing Element						
	Segment 9 - Antelope Substation	50 ton crane	83.55	301.48	706.25	0.70	35.27
		Forklift	21.99	67.49	76.36	0.09	7.76
		Manlifts	21.99	67.49	76.36	0.09	7.76
	Segment 9 - Vincent Substation	50 ton crane	98.21	354.37	830.16	0.82	41.45
		Forklift	25.85	79.33	89.76	0.10	9.12
		Manlifts	25.85	79.33	89.76	0.10	9.12
	Segment 9 - Mira Loma Substation	50 ton crane	36.65	132.23	309.76	0.31	15.47
		Forklift	9.64	29.60	33.49	0.04	3.40
		Manlifts	9.64	29.60	33.49	0.04	3.40
	Segment 9 - Chino Substation	50 ton crane	77.69	280.33	656.69	0.65	32.79
		Forklift	20.45	62.76	71.00	0.08	7.21
		Manlifts	20.45	62.76	71.00	0.08	7.21
	2010 Total Emission		**4,083.23**	**13,320.89**	**29,871.27**	**35.30**	**1,553.70**

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2011	Electrical Element						
	Segment 9 - Whirlwind Substation	14 ton Crane	125.60	518.92	978.39	1.01	55.55
		Crane, Hydraulic, 150 Ton (150 ton crane)	152.09	482.73	1,475.35	1.60	55.43
		Forklift	31.25	104.66	116.51	0.14	11.33
		Manlifts	125.00	418.64	466.03	0.55	45.33
	Transformer Assembly and Processing Element						
	Segment 9 - Whirlwind Substation	50 ton crane	223.36	836.62	1,872.45	1.98	93.84
		Forklift	55.29	185.17	206.13	0.24	20.05
		Manlifts	110.58	370.34	412.25	0.49	40.10
	Segment 9 - Antelope Substation	50 ton crane	248.33	930.15	2,081.80	2.20	104.33
		Forklift	61.47	205.87	229.17	0.27	22.29
		Manlifts	61.47	205.87	229.17	0.27	22.29
	Segment 9 - Vincent Substation	50 ton crane	30.52	128.58	417.13	0.49	15.18
		Forklift	7.56	25.30	28.17	0.03	2.74
		Manlifts	7.56	76.61	170.64	0.23	7.29
	Segment 9 - Gould Substation	50 ton crane	81.85	306.59	686.18	0.72	34.39
		Forklift	20.26	67.86	75.54	0.09	7.35
		Manlifts	20.26	67.86	75.54	0.09	7.35
	2011 Total Emission		**1,362.45**	**4,931.75**	**9,520.44**	**10.41**	**544.85**

Offroad Equipment Emissions Calculation

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2012	Electrical Element						
	Segment 9 - Antelope Substation	14 ton Crane	61.45	266.34	475.04	0.52	26.70
		Crane, Hydraulic, 150 Ton (150 ton crane)	74.21	233.39	708.28	0.83	26.02
		Forklift	14.24	52.61	57.36	0.07	5.26
		Manlifts	56.95	210.44	229.42	0.29	21.05
	Segment 9 - Vincent Substation	14 ton Crane	77.13	334.34	596.33	0.66	33.52
		Crane, Hydraulic, 150 Ton (150 ton crane)	93.16	292.98	889.12	1.04	32.67
		Forklift	17.87	66.04	72.00	0.09	6.61
		Manlifts	71.48	264.17	288.00	0.36	26.43
	Transformer Assembly and Processing Element						
	Segment 9 - Vincent Substation	50 ton crane	52.48	204.46	435.69	0.49	21.56
		Forklift	12.12	44.78	48.81	0.06	4.48
		Manlifts	12.12	44.78	48.81	0.06	4.48
	Segment 9 - Mira Loma Substation	50 ton crane	38.05	148.23	315.87	0.36	15.63
		Forklift	8.78	32.46	35.39	0.04	3.25
		Manlifts	8.78	32.46	35.39	0.04	3.25
	2012 Total Emission		**598.81**	**2,227.47**	**4,235.50**	**4.90**	**230.89**

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2013	Transformer Assembly & Processing Element						
	Segment 9 - Vincent Substation	50 ton crane	163.84	664.75	1,345.60	1.62	65.54
		Forklift	35.05	144.21	151.73	0.20	12.99
		Manlifts	35.05	144.21	151.73	0.20	12.99
	2013 Total Emission		**233.95**	**953.16**	**1,649.06**	**2.02**	**91.51**

Offroad Equipment Emissions Calculation

Segment 10

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2010	Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	67.36	255.29	475.07	0.45	32.15
		Forklift, 5 ton	73.62	225.96	255.66	0.29	25.97
		Forklift, 10 ton	72.56	232.82	287.84	0.32	28.91
	Road Maintenance	Motor Grader	71.05	270.15	473.85	0.47	36.13
		Crawler, Track Type, w/ blade (D6 Type)	85.67	321.93	674.90	0.63	37.07
	Roads & Landing Work	Crawler, Track Type, w/ blade (D8 type)	78.66	249.37	742.70	0.71	29.97
		Crawler, Track Type, w/ blade (D6 Type)	68.65	257.98	540.84	0.50	29.70
		Motor Grader	31.63	120.27	210.96	0.21	16.08
		Backhoe w/ Bucket; backhoe w/ concrete hammer	12.67	41.95	51.35	0.06	4.84
	Install Foundations	Crawler, Track Type, w/ blade (D6 Type)	31.10	116.86	245.00	0.23	13.46
		Excavator, Grade - All	30.80	136.73	225.67	0.25	14.51
		Crawler, track type, drill dig, Pheumatic D8	95.02	301.24	897.17	0.86	36.21
		Backhoe w/ Bucket; backhoe w/ concrete hammer	45.93	152.04	186.10	0.21	17.53
		Motor, Auxilary Power	1.22	5.13	8.16	0.01	0.49
	Steel (Hauling, Shake-out, Light Assembly, Heavy Assembly, Erection)	Crane, Hydraulic, 150/300 Ton	184.21	647.19	1,798.46	1.80	69.33
		Crane, Hydraulic, Rough Terrain 35 ton	381.21	1,444.76	2,688.61	2.56	181.96
		Compressor, Air	561.93	1,521.34	1,857.00	1.93	184.67
		Motor, Auxilary Power	3.10	13.06	20.77	0.03	1.24
	Conductor & OHGW Installation	Backhoe w/ Bucket; backhoe w/ concrete hammer	16.25	53.79	65.84	0.07	6.20
		Crane, Hydraulic, Rough Terrain 35 ton	52.95	200.66	373.42	0.36	25.27
		Crawler, Track Type, w/ blade (D8 type)	22.41	71.05	211.60	0.20	8.54
		Crawler, Track Type, Sagging (D8 type)	44.82	142.09	423.19	0.40	17.08
		Motor, Auxilary Power	2.30	9.67	15.39	0.02	0.92
		Tension machine, conductor	38.37	166.51	269.92	0.31	20.59
		Tension machine, static	12.79	55.50	89.97	0.10	6.86
	Restoration & Guard Poles	Backhoe	2.71	8.96	10.97	0.01	1.03
		Motor Grader	6.49	24.67	43.27	0.04	3.30
	2010 Total Emission		**2,095.47**	**7,046.98**	**13,143.66**	**13.03**	**850.01**

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2011	Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	4.45	17.73	31.35	0.03	2.14
		Forklift, 5 ton	4.58	15.33	17.07	0.02	1.66
		Forklift, 10 ton	4.53	15.87	19.08	0.02	1.85
	Road Maintenance	Motor Grader	3.35	13.47	22.43	0.02	1.72
		Crawler, Track Type, w/ blade (D6 Type)	4.10	15.98	32.05	0.03	1.77
	Conductor & OHGW Installation	Backhoe w/ Bucket; backhoe w/ concrete hammer	2.65	9.46	11.28	0.01	1.04
		Crane, Hydraulic, Rough Terrain 35 ton	9.01	35.89	63.49	0.06	4.33
		Crawler, Track Type, w/ blade (D8 type)	3.84	12.05	35.68	0.04	1.42
		Crawler, Track Type, Sagging (D8 type)	7.68	24.10	71.36	0.07	2.84
		Motor, Auxilary Power	0.39	1.71	2.66	0.00	0.16
		Tension machine, conductor	6.35	29.75	45.43	0.05	3.48
		Tension machine, static	2.12	9.92	15.14	0.02	1.16
	Restoration & Guard Poles	Backhoe	5.88	21.03	25.07	0.03	2.30
		Motor Grader	14.60	58.80	97.87	0.10	7.49
	2011 Total Emission		**73.51**	**281.10**	**489.96**	**0.52**	**33.37**

Offroad Equipment Emissions Calculation

Segment 11

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2009	Construction of Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	39.31	141.88	277.36	0.25	18.61
		Forklift, 5 ton	68.50	194.00	222.61	0.24	23.47
		Forklift, 10 ton	67.23	198.76	252.29	0.26	26.11
		Motor, Auxilary Power	0.95	3.89	6.30	0.01	0.38
	2009 Total Emission		**176.00**	**538.53**	**758.56**	**0.76**	**68.58**

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2010	Construction of Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	7.29	27.65	51.45	0.05	3.48
		Forklift, 5 ton	11.96	36.71	41.53	0.05	4.22
		Forklift, 10 ton	11.79	37.82	46.76	0.05	4.70
		Motor, Auxilary Power	0.18	0.75	1.19	0.00	0.07
	2010 Total Emission		**31.22**	**102.92**	**140.93**	**0.15**	**12.47**

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2011	Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	30.59	121.86	215.55	0.22	14.72
		Forklift, 5 ton	31.48	105.43	117.36	0.14	11.42
		Forklift, 10 ton	31.14	109.11	131.15	0.15	12.69
	Road Maintenance	Motor Grader	2.13	8.57	14.27	0.01	1.09
		Crawler, Track Type, w/ blade (D6 Type)	2.61	10.17	20.39	0.02	1.13
	Roads & Landing Work (Road Work)	Crawler, Track Type, w/ blade (D8 type)	163.82	514.08	1,522.26	1.55	60.63
	(Upgrade Existing Road, Construct New Roads and Landing Work)	Crawler, Track Type, w/ blade (D6 Type)	71.49	278.96	559.38	0.55	30.94
		Backhoe w/ Bucket; backhoe w/ concrete hammer	28.22	100.95	120.35	0.14	11.04
		Excavator, Grade - All	104.36	493.82	760.78	0.91	49.49
		Motor Grader	36.50	146.99	244.67	0.26	18.73
	Install Foundations	Crawler, Track Type, w/ blade (D6 Type)	7.26	28.33	56.81	0.06	3.14
		Crawler, track type, drill dig, Pheumatic D8	22.18	69.62	206.14	0.21	8.21
		Generator, Concrete Batch Plant	8.14	22.04	23.56	0.03	2.11
		Backhoe w/ Bucket; backhoe w/ concrete hammer	10.19	36.45	43.46	0.05	3.99
		Motor, Auxilary Power	0.29	1.23	1.92	0.00	0.11
		Excavator, Grade - All	7.07	33.44	51.51	0.06	3.35
	Steel (Hauling, Shake-out, Light Assembly, Heavy Assembly, Erection)	Crane, Hydraulic, 150/300 Ton	16.79	44.55	125.24	0.26	4.18
		Crane, Hydraulic, Rough Terrain 35 ton	34.70	138.95	168.38	0.17	16.12
		Compressor, Air	50.92	326.32	966.28	0.98	38.49
		Motor, Auxilary Power	0.29	30.18	67.22	0.09	2.87
	Conductor & OHGW Installation	Backhoe w/ Bucket; backhoe w/ concrete hammer	3.82	13.67	16.30	0.02	1.50
		Crane, Hydraulic, Rough Terrain 35 ton	13.01	51.85	91.71	0.09	6.26
		Crawler, Track Type, w/ blade (D8 type)	5.55	17.40	51.53	0.05	2.05
		Crawler, Track Type, Sagging (D8 type)	11.09	34.81	103.07	0.10	4.11
		Motor, Auxilary Power	0.57	2.47	3.85	0.01	0.23
		Tension machine, conductor	9.17	42.98	65.62	0.08	5.03
		Tension machine, static	3.06	14.33	21.87	0.03	1.68
	Wreck-Out (Conductors, Structures & Foundations)	Tension Machine	4.94	23.14	35.33	0.04	2.71
		Crawler, Track Type, w/ blade (D8 type)	11.95	37.49	111.00	0.11	4.42
		Backhoe w/ Bucket; backhoe w/ concrete hammer	21.95	78.51	93.61	0.11	8.59
		Crane, Hydraulic, Rough Terrain 35 ton	6.23	24.82	43.89	0.04	3.00
		Motor, Auxilary Power	0.23	1.00	1.55	0.00	0.09
	Restoration & Guard Poles	Backhoe	0.98	3.51	4.18	0.00	0.38
		Motor Grader	2.43	9.80	16.31	0.02	1.25
	2011 Total Emission		**755.12**	**2,976.81**	**6,076.51**	**6.59**	**335.75**

Offroad Equipment Emissions Calculation

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2012	Construction of Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	15.75	66.09	110.71	0.12	7.49
		Forklift, 5 ton	22.72	83.95	91.52	0.11	8.40
		Forklift, 10 ton	22.56	87.25	101.35	0.13	9.30
		Motor, Auxilary Power	0.39	1.75	2.66	0.00	0.15
	Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	79.52	333.76	559.11	0.60	37.80
		Forklift, 5 ton	76.48	282.64	308.13	0.38	28.28
		Forklift, 10 ton	75.95	293.75	341.22	0.42	31.32
	Road Maintenance	Motor Grader	86.23	368.76	580.00	0.65	43.70
		Crawler, Track Type, w/ blade (D6 Type)	107.32	435.63	833.34	0.87	45.58
	Construct New Roads & Landing Work (500kV 2nd Circuit Vincent-Gould)	Crawler, Track Type, w/ blade (D8 type)	162.50	505.83	1,484.43	1.61	58.23
		Crawler, Track Type, w/ blade (D6 Type)	70.84	287.54	550.06	0.57	30.08
		Backhoe w/ Bucket; backhoe w/ concrete hammer	26.49	102.93	119.11	0.15	10.48
		Excavator, Grade - All	101.54	513.01	735.38	0.95	46.79
		Motor Grader	35.57	152.13	239.28	0.27	18.03
	Install Foundations	Crawler, Track Type, w/ blade (D6 Type)	26.03	105.67	202.15	0.21	11.06
		Crawler, track type, drill dig, Pheumatic D8	79.62	247.86	727.37	0.79	28.53
		Generator, Concrete Batch Plant	28.19	80.39	87.20	0.12	7.49
		Backhoe w/ Bucket; backhoe w/ concrete hammer	34.61	134.49	155.64	0.20	13.69
		Motor, Auxilary Power	1.02	4.56	6.94	0.01	0.40
		Excavator, Grade - All	24.88	125.69	180.17	0.23	11.46
	Steel (Hauling, Shake-out, Light Assembly, Heavy Assembly, Erection)	Crane, Hydraulic, 150/300 Ton	166.30	562.87	1,567.17	1.81	58.15
		Crane, Hydraulic, Rough Terrain 35 ton	342.64	1,438.16	2,409.15	2.58	162.88
		Compressor, Air	493.38	1,466.16	1,728.67	1.95	167.96
		Motor, Auxilary Power	2.84	12.66	19.27	0.03	1.11
	Conductor & OHGW Installation	Backhoe w/ Bucket; backhoe w/ concrete hammer	27.28	106.02	122.68	0.15	10.80
		Crane, Hydraulic, Rough Terrain 35 ton	97.31	408.45	684.22	0.73	46.26
		Crawler, Track Type, w/ blade (D8 type)	41.84	130.25	382.24	0.42	15.00
		Crawler, Track Type, Sagging (D8 type)	83.69	260.50	764.48	0.83	29.99
		Motor, Auxilary Power	4.30	19.18	29.19	0.04	1.68
		Tension machine, conductor	66.61	338.23	483.80	0.63	36.33
		Tension machine, static	22.20	112.74	161.27	0.21	12.11
	Wreck-Out (conductors, structures, & Foundations)	Tension Machine, Conductor or Static	33.63	170.75	244.25	0.32	18.34
		Crawler, Track Type, w/ blade (D8 type)	84.50	263.03	771.91	0.84	30.28
		Backhoe w/ Bucket; backhoe w/ concrete hammer	146.93	570.91	660.66	0.83	58.13
		Crane, Hydraulic, Rough Terrain 35 ton	43.67	183.29	307.05	0.33	20.76
		Motor, Auxilary Power	1.63	7.26	11.05	0.02	0.64
	Restoration & Guard Poles	Backhoe	3.97	15.44	17.87	0.02	1.57
		Motor Grader	10.25	43.81	68.91	0.08	5.19
	2012 Total Emission		**2,751.22**	**10,323.41**	**17,849.62**	**20.20**	**1,125.45**

			Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM
2013	Marshalling Yards	Crane, Hydraulic, Rough Terrain 35 ton	3.71	16.44	26.05	0.03	1.73
		Forklift, 5 ton	3.32	13.66	14.37	0.02	1.23
		Forklift, 10 ton	3.31	14.25	15.82	0.02	1.36
	Road Maintenance	Motor Grader	2.66	12.10	17.98	0.02	1.32
		Crawler, Track Type, w/ blade (D6 Type)	3.37	14.24	25.97	0.03	1.40
	Conductor & OHGW Installation	Backhoe w/ Bucket; backhoe w/ concrete hammer	1.91	8.07	8.95	0.01	0.75
		Crane, Hydraulic, Rough Terrain 35 ton	7.13	31.56	50.02	0.06	3.33
		Crawler, Track Type, w/ blade (D8 type)	3.10	9.59	27.78	0.03	1.07
		Crawler, Track Type, Sagging (D8 type)	6.19	19.17	55.56	0.06	2.14
		Motor, Auxilary Power	0.32	1.46	2.17	0.00	0.12
		Tension machine, conductor	4.74	26.11	35.01	0.05	2.53
		Tension machine, static	1.58	8.70	11.67	0.02	0.84
	Restoration & Guard Poles	Backhoe	3.97	16.82	18.65	0.02	1.55
		Motor Grader	10.65	48.40	71.91	0.09	5.28
	2013 Total Emission		**55.96**	**240.56**	**381.89**	**0.46**	**24.65**

Segment 9

2009

		Annual Emissions lbs				
		ROG	CO	NOX	SOX	PM
Grading Element						
Segment 9 - Antelope Substation	980 Loader	157.02	484.94	1,612.15	1.65	59.70
	Compactor	48.92	135.82	182.48	0.18	17.16
	Grader	113.18	331.55	1,155.22	1.17	42.95
2009 Total Emission		**319.12**	**952.31**	**2,949.85**	**3.00**	**119.81**

2010

		Annual Emissions lbs				
		ROG	CO	NOX	SOX	PM
Grading Element						
Segment 9 - Whirlwind Substation	980 Loader	285.96	876.72	2,910.05	3.16	107.82
	Grader	206.21	601.71	2,086.29	2.25	77.55
	Compactor	105.67	306.77	403.62	0.42	37.65
Segment 9 - Antelope Substation	980 Loader	136.94	419.84	1,393.54	1.51	51.63
	Grader	98.75	288.14	999.07	1.08	37.14
	Compactor	42.17	122.42	161.07	0.17	15.03
Civil Element						
Segment 9 - Whirlwind Substation	14 ton Crane	51.92	204.81	406.88	0.40	22.85
	Driller	183.79	671.71	2,224.25	3.98	74.43
	Ditch Digger	220.85	582.22	715.31	0.70	69.02
	Forklift	27.52	84.46	95.57	0.11	9.71
	Tractors	139.08	460.42	563.56	0.64	53.10
Segment 9 - Antelope Substation	14 ton Crane	77.63	306.25	608.42	0.59	34.17
	Driller	274.83	1,004.42	3,325.98	5.95	111.30
	Ditch Digger	165.12	435.31	534.81	0.52	51.60
	Forklift	41.15	126.30	142.90	0.16	14.52
	Tractors	207.97	688.48	842.71	0.96	79.39
Electrical Element						
Segment 9 - Whirlwind Substation	14 ton Crane	157.21	620.17	1,232.05	1.20	69.19
	Crane, Hydraulic, 150 Ton (150 ton cr	191.07	612.76	1,880.80	1.90	72.04
	Forklift	41.66	127.88	144.69	0.16	14.70
	Manlifts	166.66	511.52	578.76	0.66	58.79
Segment 9 - Antelope Substation	14 ton Crane	228.53	901.54	1,791.04	1.75	100.58
	Crane, Hydraulic, 150 Ton (150 ton cr	277.75	890.77	2,734.13	2.76	104.73
	Forklift	60.57	185.90	210.33	0.24	21.37
	Manlifts	242.27	743.60	841.34	0.95	85.46
Transformer Assembly and Processing Element						
Segment 9 - Antelope Substation	50 ton crane	83.55	301.48	706.25	0.70	35.27
	Forklift	21.99	67.49	76.36	0.09	7.76
	Manlifts	21.99	67.49	76.36	0.09	7.76
Segment 9 - Vincent Substation	50 ton crane	98.21	354.37	830.16	0.82	41.45
	Forklift	25.85	79.33	89.76	0.10	9.12
	Manlifts	25.85	79.33	89.76	0.10	9.12
Segment 9 - Mira Loma Substation	50 ton crane	36.65	132.23	309.76	0.31	15.47
	Forklift	9.64	29.60	33.49	0.04	3.40
	Manlifts	9.64	29.60	33.49	0.04	3.40
Segment 9 - Chino Substation	50 ton crane	77.69	280.33	656.69	0.65	32.79
	Forklift	20.45	62.76	71.00	0.08	7.21
	Manlifts	20.45	62.76	71.00	0.08	7.21
2010 Total Emission		**4,083.23**	**13,320.89**	**29,871.27**	**35.30**	**1,553.70**

2011

		Annual Emissions lbs				
		ROG	CO	NOX	SOX	PM
Electrical Element						
Segment 9 - Whirlwind Substation	14 ton Crane	125.60	518.92	978.39	1.01	55.55
	Crane, Hydraulic, 150 Ton (150 ton cr	152.09	482.73	1,475.35	1.60	55.43
	Forklift	31.25	104.66	116.51	0.14	11.33
	Manlifts	125.00	418.64	466.03	0.55	45.33
Transformer Assembly and Processing Element						
Segment 9 - Whirlwind Substation	50 ton crane	223.36	836.62	1,872.45	1.98	93.84
	Forklift	55.29	185.17	206.13	0.24	20.05
	Manlifts	110.58	370.34	412.25	0.49	40.10
Segment 9 - Antelope Substation	50 ton crane	248.33	930.15	2,081.80	2.20	104.33
	Forklift	61.47	205.87	229.17	0.27	22.29
	Manlifts	61.47	205.87	229.17	0.27	22.29
Segment 9 - Vincent Substation	50 ton crane	30.52	128.58	417.13	0.49	15.18
	Forklift	7.56	25.30	28.17	0.03	2.74
	Manlifts	7.56	76.61	170.64	0.23	7.29
Segment 9 - Gould Substation	50 ton crane	81.85	306.59	686.18	0.72	34.39
	Forklift	20.26	67.86	75.54	0.09	7.35
	Manlifts	20.26	67.86	75.54	0.09	7.35
2011 Total Emission		**1,362.45**	**4,931.75**	**9,520.44**	**10.41**	**544.85**

2012

		Annual Emissions lbs				
		ROG	CO	NOX	SOX	PM
Electrical Element						
Segment 9 - Antelope Substation	14 ton Crane	61.45	266.34	475.04	0.52	26.70
	Crane, Hydraulic, 150 Ton (150 ton cr	74.21	233.39	708.28	0.83	26.02
	Forklift	14.24	52.61	57.36	0.07	5.26
	Manlifts	56.95	210.44	229.42	0.29	21.05
Segment 9 - Vincent Substation	14 ton Crane	77.13	334.34	596.33	0.66	33.52
	Crane, Hydraulic, 150 Ton (150 ton cr	93.16	292.98	889.12	1.04	32.67
	Forklift	17.87	66.04	72.00	0.09	6.61
	Manlifts	71.48	264.17	288.00	0.36	26.43
Transformer Assembly and Processing Element						
Segment 9 - Vincent Substation	50 ton crane	52.48	204.46	435.69	0.49	21.56
	Forklift	12.12	44.78	48.81	0.06	4.48
	Manlifts	12.12	44.78	48.81	0.06	4.48
Segment 9 - Mira Loma Substation	50 ton crane	38.05	148.23	315.87	0.36	15.63
	Forklift	8.78	32.46	35.39	0.04	3.25
	Manlifts	8.78	32.46	35.39	0.04	3.25
2012 Total Emission		**598.81**	**2,227.47**	**4,235.50**	**4.90**	**230.89**

2013

		Annual Emissions lbs				
		ROG	CO	NOX	SOX	PM
Transformer Assembly & Processing Element						
Segment 9 - Vincent Substation	50 ton crane	163.84	664.75	1,345.60	1.62	65.54
	Forklift	35.05	144.21	151.73	0.20	12.99
	Manlifts	35.05	144.21	151.73	0.20	12.99
2013 Total Emission		**233.95**	**953.16**	**1,649.06**	**2.02**	**91.51**

TRTP Alternative 2 Project Construction Emission Totals
All Jurisdictions - ANF Total

2009 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.105	0.793	0.717	0.001	0.016	0.015
Offroad Vehicles/Equipment	0.128	0.391	0.550	0.001	0.050	0.046
Helicopter	0.000	0.000	0.000	0.000	0.000	0.000
Fugitive Dust	---	---	---	---	2.512	0.511
Totals	**0.23**	**1.18**	**1.27**	**0.00**	**2.58**	**0.57**

2010 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.609	4.438	4.908	0.010	0.111	0.102
Offroad Vehicles/Equipment	1.314	4.613	8.864	0.009	0.542	0.498
Helicopter	1.495	7.724	8.674	0.072	0.479	0.441
Fugitive Dust	---	---	---	---	22.690	5.298
Totals	**3.42**	**16.78**	**22.45**	**0.09**	**23.82**	**6.34**

2011 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.941	7.109	5.398	0.014	0.146	0.134
Offroad Vehicles/Equipment	1.466	5.166	9.078	0.010	0.601	0.553
Helicopter	1.053	4.770	6.000	0.050	0.331	0.305
Fugitive Dust	---	---	---	---	25.426	5.213
Totals	**3.46**	**17.05**	**20.48**	**0.07**	**26.50**	**6.21**

2012 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.759	5.572	4.538	0.013	0.128	0.118
Offroad Vehicles/Equipment	1.350	5.033	8.598	0.010	0.550	0.506
Helicopter	2.355	9.121	10.335	0.086	0.571	0.525
Fugitive Dust	---	---	---	---	25.919	5.641
Totals	**4.46**	**19.73**	**23.47**	**0.11**	**27.17**	**6.79**

2013 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.007	0.047	0.052	0.000	0.001	0.001
Offroad Vehicles/Equipment	0.008	0.033	0.049	0.000	0.003	0.003
Helicopter	0.001	0.002	0.003	0.000	0.000	0.000
Fugitive Dust	---	---	---	---	0.000	0.000
Totals	**0.02**	**0.08**	**0.10**	**0.00**	**0.01**	**0.00**

TRTP Alternative 2 Project Construction Emission Totals
ANF - SCAQMD Jurisdiction

2009 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.058	0.436	0.397	0.001	0.009	0.008
Offroad Vehicles/Equipment	0.070	0.213	0.300	0.000	0.027	0.025
Helicopter	0.000	0.000	0.000	0.000	0.000	0.000
Fugitive Dust	---	---	---	---	1.592	0.314
Totals	**0.13**	**0.65**	**0.70**	**0.00**	**1.63**	**0.35**

2010 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.452	3.291	3.608	0.008	0.082	0.075
Offroad Vehicles/Equipment	0.979	3.439	6.656	0.007	0.403	0.371
Helicopter	1.495	7.724	8.674	0.072	0.479	0.441
Fugitive Dust	---	---	---	---	14.306	3.352
Totals	**2.93**	**14.45**	**18.94**	**0.09**	**15.27**	**4.24**

2011 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.737	5.566	4.265	0.011	0.115	0.106
Offroad Vehicles/Equipment	1.176	4.152	7.326	0.008	0.482	0.443
Helicopter	1.033	4.724	5.906	0.049	0.326	0.300
Fugitive Dust	---	---	---	---	20.925	4.341
Totals	**2.95**	**14.44**	**17.50**	**0.07**	**21.85**	**5.19**

2012 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.384	2.832	2.273	0.007	0.064	0.059
Offroad Vehicles/Equipment	0.645	2.409	4.039	0.005	0.264	0.243
Helicopter	0.871	3.368	3.823	0.032	0.211	0.194
Fugitive Dust	---	---	---	---	15.412	3.340
Totals	**1.90**	**8.61**	**10.13**	**0.04**	**15.95**	**3.84**

2013 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.004	0.025	0.033	0.000	0.001	0.001
Offroad Vehicles/Equipment	0.005	0.021	0.030	0.000	0.002	0.002
Helicopter	0.000	0.000	0.000	0.000	0.000	0.000
Fugitive Dust	---	---	---	---	0.000	0.000
Totals	**0.01**	**0.05**	**0.06**	**0.00**	**0.00**	**0.00**

TRTP Alternative 2 Project Construction Emission Totals
ANF - AVAQMD Jurisdiction

2009 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.047	0.358	0.320	0.001	0.007	0.007
Offroad Vehicles/Equipment	0.058	0.178	0.250	0.000	0.023	0.021
Helicopter	0.000	0.000	0.000	0.000	0.000	0.000
Fugitive Dust	---	---	---	---	0.920	0.197
Totals	**0.11**	**0.54**	**0.57**	**0.00**	**0.95**	**0.22**

2010 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.158	1.147	1.299	0.003	0.029	0.027
Offroad Vehicles/Equipment	0.336	1.174	2.208	0.002	0.138	0.127
Helicopter	0.000	0.000	0.000	0.000	0.000	0.000
Fugitive Dust	---	---	---	---	8.385	1.946
Totals	**0.49**	**2.32**	**3.51**	**0.01**	**8.55**	**2.10**

2011 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.204	1.544	1.134	0.003	0.031	0.028
Offroad Vehicles/Equipment	0.290	1.015	1.753	0.002	0.119	0.110
Helicopter	0.021	0.046	0.094	0.001	0.005	0.005
Fugitive Dust	---	---	---	---	4.501	0.873
Totals	**0.51**	**2.60**	**2.98**	**0.01**	**4.66**	**1.02**

2012 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.375	2.741	2.265	0.007	0.063	0.058
Offroad Vehicles/Equipment	0.705	2.624	4.559	0.005	0.286	0.263
Helicopter	1.484	5.753	6.512	0.054	0.360	0.331
Fugitive Dust	---	---	---	---	10.507	2.301
Totals	**2.56**	**11.12**	**13.34**	**0.07**	**11.22**	**2.95**

2013 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.003	0.022	0.019	0.000	0.001	0.001
Offroad Vehicles/Equipment	0.003	0.012	0.020	0.000	0.001	0.001
Helicopter	0.001	0.002	0.003	0.000	0.000	0.000
Fugitive Dust	---	---	---	---	0.000	0.000
Totals	**0.01**	**0.04**	**0.04**	**0.00**	**0.00**	**0.00**

Helicopter Emission Calculations

Helicopter Construction
Assumptions:
1) Hughes 500 size helicopters are used during conductor installation for the proposed project, and two Hughes helicopters are in operation during line stringing for 2.5 hours/day each.
2) Use of Eurocopter, Skyking, and Skycrane helicopters for helicopter tower site construction and wreckout are based on estimates provided by SCE.
3) Idle time is 10% of working time for Hughes 500, Eurocopter, and Skyking helicopters and negligible for the Skycrane.
4) Assumes helicopters stay within 3000 feet of the ground.

Segment 6

Wreck Out	Eurocopter		Skyking		Skycrane	
	Suspension	Dead-End	Suspension	Dead-End	Suspension	Dead-End
Site Preparation						
Personnel to Site	6	6	0	0	0	0
Brush Clearing	16	16	0	0	0	0
Temporary Heli Pad Construction	6	6	0	0	0	0
Soil Borings	0	0	0.5	0.5	0	0
Incidental	12	12	0	0	0	0
Conductor Removal						
Personnel to Site	4	4	0	0	0	0
Insulators &Hardware & Travelers	8	12	0	0	0	0
Unclip Conductor & OHGW	4	0	0	0	0	0
Break Tension/Sock Thru	0	4	0	0	0	0
Remove Jumper Loops & OHGW	0	4	0	0	0	0
Incidental	4	4	0	0	0	0
Excavate Foundation						
Personnel to Site	4	4	0	0	0	0
Tools & Equipment to Site	2	2	0	0	0	0
Equipment (Air Compressor)	0	0	2	2	0	0
Footing Steel Removal	0	0	4	4	0	0
Incidental	0	0	0	0	0	0
Suspension Tower Removal						
Personnal to Site	4	4	0	0	0	0
Tools & Equipment to Site	4	4	0	0	0	0
Tower Components	0	0	4	6	0	6
Incidental	4	4	0	0	0	0
Total Number of Trips per Tower Site	78	86	11	13	0	6

Construction	Eurocopter		Skyking		Skycrane	
	Suspension	Dead-End	Suspension	Dead-End	Suspension	Dead-End
Foundations, Conventional Piers						
Personnel to Site	16	32	0	0	0	0
Tools to Site	6	12	0	0	0	0
Equipment (Air Compressor)	0	0	2	2	0	0
Spoil Removal	0	0	28	132	0	0
Rebar to Site	0	0	8	8	0	0
Stubs & Material to Site	8	8	0	0	0	0
Concrete to Site	0	0	28	120	0	0
Strip and Cleanup Site	8	8	0	0	0	0
Incidental	12	24	0	0	0	0
Tower Erection						
Personnel to Site	8	8	0	0	0	0
Tools to Site	4	4	0	0	0	0
Tower Components	0	0	0	0	16	24
Incidental	4	4	0	0	0	0
Conductor & OHGW Installation						
Personnel to Site	4	12	0	0	0	0
Install Insulators, Hardware & Travelers	8	24	0	0	0	0
Clip-in or Dead-end Conductor	4	12	0	0	0	0
Space Conductor	6	0	0	0	0	0
Install Jumper Loops	0	6	0	0	0	0
Incidental	8	24	0	0	0	0
Site Restoration						
Personnel to Site	2	2	0	0	0	0
Remove Temporary Heli Pad	6	6	0	0	0	0
Cleanup Site & Restoration	8	8	0	0	0	0
Total Number of Trips per Tower Site	112	194	66	262	16	24

Assumptions in time period

	Min	Hour
to helicopter pod	5	0.08
from helicopter pod	5	0.08
load/trip	10	0.17

Total Required Time for Each Helicopter Round Trip

Helicopter Type	Working Hour/Round Trip	Idle Hour/Round Trip
Hughes 500		
Eurocopter	0.33	0.033
Skyking	0.33	0.033
Skycrane	0.33	0.000

Stringing Helicopter - Hughes 500

Hughes 500 Total Emissions (ton)

		HC	CO	NOx	SOx	PM
Segment 4	2010	0.084	0.188	0.383	0.003	0.021
	2011	0.023	0.052	0.105	0.001	0.006
Segment 5	2011	0.075	0.169	0.345	0.003	0.019
Segment 6	2011	0.104	0.232	0.474	0.004	0.026
	2012	0.026	0.059	0.120	0.001	0.007
Segment 7	2012	0.163	0.366	0.748	0.006	0.041
Segment 8	2010	0.069	0.155	0.316	0.003	0.017
	2011	0.254	0.568	1.160	0.010	0.063
	2012	0.095	0.214	0.436	0.004	0.024
Segment 9		0.000	0.000	0.000	0.000	0.000
Segment 10	2010	0.052	0.117	0.240	0.002	0.013
	2011	0.009	0.021	0.043	0.000	0.002
Segment 11	2011	0.008	0.019	0.038	0.000	0.002
	2012	0.061	0.137	0.280	0.002	0.015
	2013	0.005	0.011	0.022	0.000	0.001

Totals	HC	CO	NOx	SOx	PM
Segment 4	0.11	0.24	0.49	0.00	0.03
Segment 5	0.08	0.17	0.35	0.00	0.02
Segment 6	0.13	0.29	0.59	0.00	0.03
Segment 7	0.16	0.37	0.75	0.01	0.04
Segment 8	0.42	0.94	1.91	0.02	0.10
Segment 9	0.00	0.00	0.00	0.00	0.00
Segment 10	0.06	0.14	0.28	0.00	0.02
Segment 11	0.07	0.17	0.34	0.00	0.02
Total	1.03	2.31	4.71	0.04	0.26

Totals	HC	CO	NOx	SOx	PM
2010	0.21	0.46	0.94	0.01	0.05
2011	0.47	1.06	2.17	0.02	0.12
2012	0.35	0.78	1.58	0.01	0.09
2013	0.00	0.01	0.02	0.00	0.00
Total	1.03	2.31	4.71	0.04	0.26

Proposed Project

Helicopter Trip Emissions for SCE's Proposed Project (Segment 6)

Summary of Total Number of Helicopter Trips

	220 kV Construction	500 kV Construction
Eurocopter	1326	1904
Skyking	187	1122
Skycrane	0	272

220 kV	Suspension	1513
	Dead End	0
500 kV	Suspension	3298
	Dead End	0

230kV Wreckout - Total Emissions (lbs)

Helicopter Type	Year	HC	CO	NOx	SOx	PM
Eurocopter	2010	373.50	836.78	1,708.60	14.17	92.97
(personnel)	2011					
Skyking	2010	463.78	1,679.28	1,492.84	12.56	82.76
(foundation)	2011					
Skycrane	2010	0.00	0.00	0.00	0.00	0.00
(tower)	2011					

500kV Construction - Total Emissions (lbs)

Helicopter Type	Year	HC	CO	NOx	SOx	PM
Eurocopter	2010	189.29	424.07	865.90	7.18	47.12
(personnel)	2011	347.02	777.46	1,587.48	13.16	86.38
Skyking	2010	1,964.26	7,112.25	6,322.62	53.18	350.51
(foundation)	2011	818.44	2,963.44	2,634.43	22.16	146.04
Skycrane	2010	0.00	5,396.60	6,957.76	57.83	385.47
(tower)	2011	761.31	5,396.60	6,957.76	57.83	385.47

Total Emissions (lbs)

Helicopter Type	Year	HC	CO	NOx	SOx	PM
Eurocopter	2010	562.79	1,260.85	2,574.49	21.34	140.09
(personnel)	2011	347.02	777.46	1,587.48	13.16	86.38
Skyking	2010	2,428.04	8,791.53	7,815.46	65.73	433.26
(foundation)	2011	818.44	2,963.44	2,634.43	22.16	146.04
Skycrane	2010	0.00	5,396.60	6,957.76	57.83	385.47
(tower)	2011	761.31	5,396.60	6,957.76	57.83	385.47

Total Emissions (ton)

Helicopter Type	Year	HC	CO	NOx	SOx	PM
Eurocopter	2010	0.28	0.63	1.29	0.01	0.07
(personnel)	2011	0.17	0.39	0.79	0.01	0.04
Skyking	2010	1.21	4.40	3.91	0.03	0.22
(foundation)	2011	0.41	1.48	1.32	0.01	0.07
Skycrane	2010	0.00	2.70	3.48	0.03	0.19
(tower)	2011	0.38	2.70	3.48	0.03	0.19

Total Emissions (ton)

Helicopter Type	HC	CO	NOx	SOx	PM
Eurocopter	0.45	1.02	2.08	0.02	0.11
Skyking	1.62	5.88	5.22	0.04	0.29
Skycrane	0.38	2.70	3.48	0.03	0.19

Helicopter Trip Emissions for SCE's Proposed Project (Segment 11)

Summary of Total Number of Helicopter Trips

	220 kV Construction	500 kV Construction
Eurocopter	1248	1792
Skyking	176	1056
Skycrane	0	256

220 kV	Suspension	1424
	Dead End	0
500 kV	Suspension	3104
	Dead End	0

230kV Wreckout - Total Emissions (lbs)

Helicopter Type	Year	HC	CO	NOx	SOx	PM
Eurocopter	2011	0.00	0.00	0.00	0.00	0.00
	2012	351.53	787.56	1,608.09	13.33	87.50
Skyking	2011	0.00	0.00	0.00	0.00	0.00
	2012	436.50	1,580.50	1,405.03	11.82	77.89
Skycrane	2011	0.00	0.00	0.00	0.00	0.00
	2012	0.00	0.00	0.00	0.00	0.00

500kV Construction - Total Emissions (lbs)

Helicopter Type	Year	HC	CO	NOx	SOx	PM
Eurocopter	2012	504.76	1,130.85	2,309.06	19.14	125.64
Skyking	2012	2,619.01	9,483.00	8,430.16	70.90	467.34
Skycrane	2012	716.52	5,079.15	6,548.48	54.43	362.80

Total Emissions (lbs)

Helicopter Type	Year	HC	CO	NOx	SOx	PM
Eurocopter	2011	0.00	0.00	0.00	0.00	0.00
	2012	856.29	1,918.41	3,917.15	32.48	213.15
Skyking	2011	0.00	0.00	0.00	0.00	0.00
	2012	3,055.51	11,063.49	9,835.19	82.72	545.23
Skycrane	2011	0.00	0.00	0.00	0.00	0.00
	2012	716.52	5,079.15	6,548.48	54.43	362.80

Total Emissions (ton)

Helicopter Type	Year	HC	CO	NOx	SOx	PM
Eurocopter	2011	0.00	0.00	0.00	0.00	0.00
	2012	0.43	0.96	1.96	0.02	0.11
Skyking	2011	0.00	0.00	0.00	0.00	0.00
	2012	1.53	5.53	4.92	0.04	0.27
Skycrane	2011	0.00	0.00	0.00	0.00	0.00
	2012	0.36	2.54	3.27	0.03	0.18

Total Helipcopter Emissions - Proposed Project

Helicopter Type	Year	HC	CO	NOx	SOx	PM
Hughes 500	2010	0.205	0.460	0.939	0.008	0.051
	2011	0.473	1.061	2.166	0.018	0.118
	2012	0.346	0.776	1.584	0.013	0.086
	2013	0.005	0.011	0.022	0.000	0.001
Eurocopter	2010	0.28	0.63	1.29	0.01	0.07
	2011	0.17	0.39	0.79	0.01	0.04
	2012	0.43	0.96	1.96	0.02	0.11
Skyking	2010	1.21	4.40	3.91	0.03	0.22
	2011	0.41	1.48	1.32	0.01	0.07
	2012	1.53	5.53	4.92	0.04	0.27
Skycrane	2010	0.00	2.70	3.48	0.03	0.19
	2011	0.38	2.70	3.48	0.03	0.19
	2012	0.36	2.54	3.27	0.03	0.18

Total Emissions (ton)

Year	HC	CO	NOx	SOx	PM
2010	1.701	8.184	9.613	0.080	0.531
2011	1.437	5.629	7.756	0.065	0.427
2012	2.660	9.806	11.734	0.098	0.647
2013	0.005	0.011	0.022	0.000	0.001

Total Emissions (ton)

Helicopter Type	HC	CO	NOx	SOx	PM
Hughes 500	1.03	2.31	4.71	0.04	0.26
Eurocopter	0.88	1.98	4.04	0.03	0.22
Skyking	3.15	11.41	10.14	0.09	0.56
Skycrane	0.74	7.94	10.23	0.09	0.57
Totals	5.80	23.63	29.12	0.24	1.61

Proposed Project By Jurisdiction

Hughes 500 - 500 kV 2nd Circuit Vincent-Gould Construction (ton)

KCAPCD

	Year	HC	CO	NOx	SOx	PM
Segment 4	2010	0.040	0.090	0.184	0.002	0.010
	2011	0.023	0.052	0.105	0.001	0.006
Segment 10	2010	0.052	0.117	0.240	0.002	0.013
	2011	0.009	0.021	0.043	0.000	0.002

Totals	Year	HC	CO	NOx	SOx	PM
	2010	0.093	0.207	0.424	0.004	0.023
	2011	0.032	0.073	0.149	0.001	0.008

SCAQMD

	Year	HC	CO	NOx	SOx	PM
Segment 6	2011	0.069	0.155	0.316	0.003	0.017
	2012	0.000	0.000	0.000	0.000	0.000
Segment 7	2012	0.163	0.366	0.748	0.006	0.041
Segment 8	2010	0.069	0.155	0.316	0.003	0.017
	2011	0.254	0.568	1.160	0.010	0.063
	2012	0.095	0.214	0.436	0.004	0.024
Segment 11	2011	0.008	0.019	0.038	0.000	0.002
	2012	0.046	0.104	0.212	0.002	0.012

Totals	Year	HC	CO	NOx	SOx	PM
	2010	0.069	0.155	0.316	0.003	0.017
	2011	0.331	0.742	1.514	0.013	0.082
	2012	0.305	0.683	1.395	0.012	0.076

AVAQMD

	Year	HC	CO	NOx	SOx	PM
Segment 4	2010	0.044	0.098	0.199	0.002	0.011
Segment 5	2011	0.075	0.169	0.345	0.003	0.019
Segment 6	2011	0.035	0.077	0.158	0.001	0.009
	2012	0.026	0.059	0.120	0.001	0.007
Segment 11	2012	0.015	0.034	0.069	0.001	0.004
	2013	0.005	0.011	0.022	0.000	0.001

Totals	Year	HC	CO	NOx	SOx	PM
	2010	0.044	0.098	0.199	0.002	0.011
	2011	0.110	0.246	0.503	0.004	0.027
	2012	0.041	0.092	0.188	0.002	0.010
	2013	0.005	0.011	0.022	0.000	0.001

Helicopter Trip Emissions for SCE's Proposed Project (Segment 6)

SCAQMD

		Helicopter Type	Year	HC	CO	NOx	SOx	PM
Segment 6	Wreckout	Eurocopter	2010	373.50	836.78	1,708.60	14.17	92.97
			2011	0.00	0.00	0.00	0.00	0.00
		Skyking	2010	463.78	1,679.28	1,492.84	12.56	82.76
			2011	0.00	0.00	0.00	0.00	0.00
		Skycrane	2010	0.00	0.00	0.00	0.00	0.00
			2011	0.00	0.00	0.00	0.00	0.00
Segment 6	Construction	Eurocopter	2010	189.29	424.07	865.90	7.18	47.12
			2011	347.02	777.46	1,587.48	13.16	86.38
		Skyking	2010	1,964.26	7,112.25	6,322.62	53.18	350.51
			2011	818.44	2,963.44	2,634.43	22.16	146.04
		Skycrane	2010	0.00	5,396.60	6,957.76	57.83	385.47
			2011	761.31	5,396.60	6,957.76	57.83	385.47
Segment 6 Totals (ton)			2010	1.50	7.72	8.67	0.07	0.48
			2011	0.96	4.57	5.59	0.05	0.31

Helicopter Trip Emissions for SCE's Proposed Project (Segment 11)

SCAQMD

		Helicopter Type	Year	HC	CO	NOx	SOx	PM
Segment 11	Wreckout	Eurocopter	2012	129.51	290.15	592.46	4.91	32.24
		Skyking	2012	160.82	582.29	517.64	4.35	28.70
		Skycrane	2012	0.00	0.00	0.00	0.00	0.00
Segment 11	Construction	Eurocopter	2012	185.97	416.63	850.70	7.05	46.29
		Skyking	2012	964.90	3,493.74	3,105.85	26.12	172.18
		Skycrane	2012	263.98	1,871.27	2,412.60	20.05	133.66
Segment 11 Totals (ton)			2012	0.85	3.33	3.74	0.03	0.21

AVAQMD

		Helicopter Type	Year	HC	CO	NOx	SOx	PM
Segment 11	Wreckout	Eurocopter	2012	222.02	497.40	1,015.64	8.42	55.26
		Skyking	2012	275.69	998.21	887.39	7.46	49.19
		Skycrane	2012	0.00	0.00	0.00	0.00	0.00
Segment 11	Construction	Eurocopter	2012	318.80	714.22	1,458.35	12.09	79.35
		Skyking	2012	1,654.11	5,989.26	5,324.31	44.78	295.16
		Skycrane	2012	452.54	3,207.89	4,135.88	34.38	229.13
Segment 11 Totals (ton)			2012	1.46	5.70	6.41	0.05	0.35

Total Helicopter Trip Emissions for SCE's Proposed Project by Jurisdiction (tons)

KCAPCD

Year	HC	CO	NOx	SOx	PM
2010	0.093	0.207	0.424	0.004	0.023
2011	0.032	0.073	0.149	0.001	0.008

SCAQMD

Year	HC	HC	HC	HC	HC
2010	1.565	7.879	8.990	0.075	0.497
2011	1.294	5.310	7.104	0.059	0.391
2012	1.158	4.010	5.135	0.043	0.282

AVAQMD

Year	HC	HC	HC	HC	HC
2010	0.044	0.098	0.199	0.002	0.011
2011	0.110	0.246	0.503	0.004	0.027
2012	1.503	5.796	6.599	0.055	0.364
2013	0.005	0.011	0.022	0.000	0.001

Fugitive Dust Emissions - Segment 4

Fugitive Dust Emission Totals	2009		2010		2011	
	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
Dozer	0.00	0.00	4.43	1.94	0.07	0.03
Grading	0.00	0.00	0.45	0.03	0.06	0.00
Soil Handling	0.00	0.00	0.39	0.12	0.00	0.00
Paved Road Dust	0.77	0.18	9.79	2.23	0.71	0.16
Unpaved Road Dust	0.05	0.01	6.99	1.07	0.64	0.10
Disturbed Area Dust	0.51	0.11	4.00	0.82	1.64	0.33
Totals	1.34	0.29	26.04	6.21	3.12	0.63

Fugitive Dust Emission Totals	2012		2013	
	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
Dozer	0.00	0.00	0.00	0.00
Grading	0.00	0.00	0.00	0.00
Soil Handling	0.00	0.00	0.00	0.00
Paved Road Dust	0.00	0.00	0.00	0.00
Unpaved Road Dust	0.00	0.00	0.00	0.00
Disturbed Area Dust	0.00	0.00	0.00	0.00
Totals	0.00	0.00	0.00	0.00

Percent each Jurisdiction		KCAPCD	AVAQMD	SCAQMD
	2009	50.00%	50.00%	0.00%
	2010	55.00%	45.00%	0.00%
	2011	65.00%	35.00%	0.00%
	2012	0.00%	0.00%	0.00%
	2013	0.00%	0.00%	0.00%
Emissions per Jurisdiction				
PM10	2009	0.67	0.67	0.00
	2010	14.32	11.72	0.00
	2011	2.03	1.09	0.00
	2012	0.00	0.00	0.00
	2013	0.00	0.00	0.00
PM2.5	2009	0.14	0.14	0.00
	2010	3.41	2.79	0.00
	2011	0.41	0.22	0.00
	2012	0.00	0.00	0.00
	2013	0.00	0.00	0.00

Fugitive Dust Emissions - Segment 5

Fugitive Dust Emission Totals	2009		2010		2011	
	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
Dozer	0.00	0.00	2.72	1.19	0.52	0.23
Grading	0.00	0.00	0.42	0.03	0.18	0.01
Soil Handling	0.00	0.00	0.11	0.04	0.11	0.04
Paved Road Dust	0.90	0.21	8.36	1.98	3.26	0.75
Unpaved Road Dust	0.53	0.08	4.92	0.75	2.22	0.34
Disturbed Area Dust	0.27	0.06	1.91	0.39	1.54	0.32
Totals	1.71	0.35	18.44	4.38	7.84	1.68

Fugitive Dust Emission Totals	2012		2013	
	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
Dozer	0.00	0.00	0.00	0.00
Grading	0.00	0.00	0.00	0.00
Soil Handling	0.00	0.00	0.00	0.00
Paved Road Dust	0.02	0.01	0.00	0.00
Unpaved Road Dust	0.02	0.00	0.00	0.00
Disturbed Area Dust	0.00	0.00	0.00	0.00
Totals	0.04	0.01	0.00	0.00

Percent each Jurisdiction		KCAPCD	AVAQMD	SCAQMD
	2009	0.00%	100.00%	0.00%
	2010	0.00%	100.00%	0.00%
	2011	0.00%	100.00%	0.00%
	2012	0.00%	100.00%	0.00%
	2013	0.00%	100.00%	0.00%
Emissions per Jurisdiction				
PM10	2009	0.00	1.71	0.00
	2010	0.00	18.44	0.00
	2011	0.00	7.84	0.00
	2012	0.00	0.04	0.00
	2013	0.00	0.00	0.00
PM2.5	2009	0.00	0.35	0.00
	2010	0.00	4.38	0.00
	2011	0.00	1.68	0.00
	2012	0.00	0.01	0.00
	2013	0.00	0.00	0.00

Fugitive Dust Emissions - Segment 6

Fugitive Dust Emission Totals	2009		2010		2011	
	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
Dozer	0.00	0.00	3.04	1.45	0.51	0.24
Grading	0.00	0.00	0.39	0.03	0.32	0.02
Soil Handling	0.00	0.00	0.21	0.07	0.21	0.07
Paved Road Dust	0.56	0.13	10.38	2.46	7.46	1.68
Unpaved Road Dust	0.03	0.00	7.73	1.19	9.81	1.50
Disturbed Area Dust	0.64	0.13	2.24	0.46	3.12	0.64
Totals	1.23	0.26	23.98	5.64	21.43	4.15

Fugitive Dust Emission Totals	2012		2013	
	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
Dozer	0.44	0.21	0.00	0.00
Grading	0.12	0.01	0.00	0.00
Soil Handling	0.00	0.00	0.00	0.00
Paved Road Dust	3.35	0.78	0.00	0.00
Unpaved Road Dust	1.16	0.18	0.00	0.00
Disturbed Area Dust	0.79	0.16	0.00	0.00
Totals	5.86	1.34	0.00	0.00

Percent each Jurisdiction		KCAPCD	AVAQMD	SCAQMD
	2009	0.00%	100.00%	0.00%
	2010	0.00%	42.00%	58.00%
	2011	0.00%	28.00%	72.00%
	2012	0.00%	70.00%	30.00%
	2013	0.00%	0.00%	0.00%
Emissions per Jurisdiction				
PM10	2009	0.00	1.23	0.00
	2010	0.00	10.07	13.91
	2011	0.00	6.00	15.43
	2012	0.00	4.10	1.76
	2013	0.00	0.00	0.00
PM2.5	2009	0.00	0.26	0.00
	2010	0.00	2.37	3.27
	2011	0.00	1.16	2.99
	2012	0.00	0.93	0.40
	2013	0.00	0.00	0.00

Fugitive Dust Emissions - Segment 7

Fugitive Dust Emission Totals	2009		2010		2011	
	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
Dozer	0.00	0.00	0.64	0.30	0.14	0.07
Grading	0.00	0.00	0.05	0.00	0.00	0.00
Soil Handling	0.00	0.00	0.02	0.01	0.02	0.01
Paved Road Dust	0.00	0.00	1.89	0.41	2.11	0.40
Unpaved Road Dust	0.00	0.00	0.98	0.15	1.34	0.21
Disturbed Area Dust	0.00	0.00	1.48	0.30	1.94	0.40
Totals	0.00	0.00	5.07	1.18	5.56	1.08

Fugitive Dust Emission Totals	2012		2013	
	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
Dozer	0.19	0.09	0.00	0.00
Grading	0.05	0.00	0.00	0.00
Soil Handling	0.00	0.00	0.00	0.00
Paved Road Dust	1.48	0.28	0.00	0.00
Unpaved Road Dust	1.25	0.19	0.00	0.00
Disturbed Area Dust	0.18	0.04	0.00	0.00
Totals	3.15	0.60	0.00	0.00

Percent each Jurisdiction	KCAPCD	AVAQMD	SCAQMD
2009	0.00%	0.00%	100.00%
2010	0.00%	0.00%	100.00%
2011	0.00%	0.00%	100.00%
2012	0.00%	0.00%	100.00%
2013	0.00%	0.00%	100.00%

Emissions per Jurisdiction				
PM10	2009	0.00	0.00	0.00
	2010	0.00	0.00	5.07
	2011	0.00	0.00	5.56
	2012	0.00	0.00	3.15
	2013	0.00	0.00	0.00
PM2.5	2009	0.00	0.00	0.00
	2010	0.00	0.00	1.18
	2011	0.00	0.00	1.08
	2012	0.00	0.00	0.60
	2013	0.00	0.00	0.00

Fugitive Dust Emissions - Segment 8

Fugitive Dust Emission Totals	2009		2010		2011	
	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
Dozer	0.09	0.04	2.12	1.01	0.80	0.38
Grading	0.02	0.00	0.40	0.03	0.27	0.02
Soil Handling	0.00	0.00	0.19	0.06	0.19	0.06
Paved Road Dust	0.11	0.02	5.25	1.11	3.53	0.67
Unpaved Road Dust	0.02	0.00	2.25	0.34	2.13	0.33
Disturbed Area Dust	0.15	0.03	3.88	0.79	5.84	1.20
Totals	0.39	0.10	14.09	3.35	12.77	2.66

Fugitive Dust Emission Totals	2012		2013	
	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
Dozer	0.23	0.11	0.00	0.00
Grading	0.17	0.01	0.00	0.00
Soil Handling	0.04	0.01	0.00	0.00
Paved Road Dust	0.84	0.17	0.00	0.00
Unpaved Road Dust	0.43	0.07	0.00	0.00
Disturbed Area Dust	2.24	0.46	0.00	0.00
Totals	3.95	0.83	0.00	0.00

Percent each Jurisdiction		KCAPCD	AVAQMD	SCAQMD
	2009	0.00%	0.00%	100.00%
	2010	0.00%	0.00%	100.00%
	2011	0.00%	0.00%	100.00%
	2012	0.00%	0.00%	100.00%
	2013	0.00%	0.00%	100.00%
Emissions per Jurisdiction				
PM10	2009	0.00	0.00	0.39
	2010	0.00	0.00	14.09
	2011	0.00	0.00	12.77
	2012	0.00	0.00	3.95
	2013	0.00	0.00	0.00
PM2.5	2009	0.00	0.00	0.10
	2010	0.00	0.00	3.35
	2011	0.00	0.00	2.66
	2012	0.00	0.00	0.83
	2013	0.00	0.00	0.00

Fugitive Dust Emissions - Segment 9

Fugitive Dust Emission Totals	2009		2010		2011	
	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
Dozer	0.00	0.00	3.06	1.34	0.00	0.00
Grading	0.24	0.02	0.69	0.05	0.00	0.00
Soil Handling	0.00	0.00	0.07	0.02	0.00	0.00
Paved Road Dust	0.10	0.02	1.83	0.31	0.30	0.02
Unpaved Road Dust	0.01	0.00	0.52	0.08	0.08	0.01
Disturbed Area Dust	0.06	0.01	1.67	0.34	0.00	0.00
Totals	0.42	0.05	7.85	2.14	0.39	0.03

Fugitive Dust Emission Totals	2012		2013	
	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
Dozer	0.00	0.00	0.00	0.00
Grading	0.00	0.00	0.00	0.00
Soil Handling	0.00	0.00	0.00	0.00
Paved Road Dust	0.17	0.01	0.09	0.00
Unpaved Road Dust	0.07	0.01	0.05	0.01
Disturbed Area Dust	0.24	0.05	0.33	0.07
Totals	0.49	0.07	0.47	0.08

Percent each Jurisdiction		KCAPCD	AVAQMD	SCAQMD
	2009	0.00%	100.00%	0.00%
	2010	60.00%	39.00%	1.00%
	2011	75.00%	23.00%	2.00%
	2012	0.00%	98.00%	2.00%
	2013	0.00%	100.00%	0.00%
Emissions per Jurisdiction				
PM10	2009	0.00	0.42	0.00
	2010	4.71	3.06	0.08
	2011	0.29	0.09	0.01
	2012	0.00	0.48	0.01
	2013	0.00	0.47	0.00
PM2.5	2009	0.00	0.05	0.00
	2010	1.28	0.83	0.02
	2011	0.02	0.01	0.00
	2012	0.00	0.07	0.00
	2013	0.00	0.08	0.00

Fugitive Dust Emissions - Segment 10

Fugitive Dust Emission Totals	2009		2010		2011	
	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
Dozer	0.00	0.00	1.34	0.58	0.11	0.05
Grading	0.00	0.00	0.28	0.02	0.05	0.00
Soil Handling	0.00	0.00	0.26	0.08	0.00	0.00
Paved Road Dust	0.00	0.00	6.19	1.39	0.42	0.10
Unpaved Road Dust	0.00	0.00	5.56	0.85	0.35	0.05
Disturbed Area Dust	0.00	0.00	1.27	0.26	0.30	0.06
Totals	0.00	0.00	14.89	3.19	1.23	0.26

Fugitive Dust Emission Totals	2012		2013	
	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
Dozer	0.00	0.00	0.00	0.00
Grading	0.00	0.00	0.00	0.00
Soil Handling	0.00	0.00	0.00	0.00
Paved Road Dust	0.00	0.00	0.00	0.00
Unpaved Road Dust	0.00	0.00	0.00	0.00
Disturbed Area Dust	0.00	0.00	0.00	0.00
Totals	0.00	0.00	0.00	0.00

Percent each Jurisdiction		KCAPCD	AVAQMD	SCAQMD
	2009	100.00%	0.00%	0.00%
	2010	100.00%	0.00%	0.00%
	2011	100.00%	0.00%	0.00%
	2012	100.00%	0.00%	0.00%
	2013	100.00%	0.00%	0.00%
Emissions per Jurisdiction				
PM10	2009	0.00	0.00	0.00
	2010	14.89	0.00	0.00
	2011	1.23	0.00	0.00
	2012	0.00	0.00	0.00
	2013	0.00	0.00	0.00
PM2.5	2009	0.00	0.00	0.00
	2010	3.19	0.00	0.00
	2011	0.26	0.00	0.00
	2012	0.00	0.00	0.00
	2013	0.00	0.00	0.00

Fugitive Dust Emissions - Segment 11

Fugitive Dust Emission Totals	2009		2010		2011	
	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
Dozer	0.00	0.00	0.00	0.00	0.80	0.38
Grading	0.00	0.00	0.00	0.00	0.11	0.01
Soil Handling	0.00	0.00	0.00	0.00	0.02	0.01
Paved Road Dust	0.53	0.12	0.10	0.02	2.38	0.56
Unpaved Road Dust	0.49	0.07	0.10	0.01	0.97	0.15
Disturbed Area Dust	0.61	0.12	1.24	0.25	1.33	0.27
Totals	1.62	0.32	1.44	0.29	5.61	1.38

Fugitive Dust Emission Totals	2012		2013	
	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
Dozer	1.60	0.76	0.02	0.01
Grading	0.38	0.03	0.04	0.00
Soil Handling	0.16	0.05	0.00	0.00
Paved Road Dust	9.35	2.15	0.39	0.09
Unpaved Road Dust	7.61	1.17	0.33	0.05
Disturbed Area Dust	4.12	0.84	0.61	0.12
Totals	23.22	5.00	1.39	0.28

Percent each Jurisdiction		KCAPCD	AVAQMD	SCAQMD
	2009	0.00%	0.00%	100.00%
	2010	0.00%	72.00%	28.00%
	2011	0.00%	0.00%	100.00%
	2012	0.00%	40.00%	60.00%
	2013	0.00%	94.00%	6.00%
Emissions per Jurisdiction				
PM10	2009	0.00	0.00	1.62
	2010	0.00	1.04	0.40
	2011	0.00	0.00	5.61
	2012	0.00	9.29	13.93
	2013	0.00	1.30	0.08
PM2.5	2009	0.00	0.00	0.32
	2010	0.00	0.21	0.08
	2011	0.00	0.00	1.38
	2012	0.00	2.00	3.00
	2013	0.00	0.26	0.02

Fugitive Dust Emissions - Segment 4

Emission Categories
1) Earthmoving
2) Road Dust Paved/Unpaved
3) Disturbed Area Windblown Emissions

1) Earthmoving

Emission Types
A) Dozing
B) Grading
C) Material Loading/Handling
D) Disturbed Area Windblown Emissions

A) Dozing (AP-42 Section 11.9 for overburden)

$E = k \times (s)^{1.5} / (M)^{1.4}$ For PM10 and $k \times 5.7 \times (s)^{1.2} / (M)^{1.3}$ for PM2.5
E = lb/hr
k = Scaling Constant (0.75 for PM10 and 0.105 for PM2.5)
s = Silt Content (assumed to be 16% - SCAQMD Handbook for Farm Roads)
M = Moisture Content = 10% (assumes watering when necessary for mitigation)

PM10 Emission Factor
1.910914419 lb/hr

PM2.5 Emission Factor
0.835618668 lb/hr

Total Dozer Use

	Hrs/year
2009	0
2010	4636
2011	76
2012	0
2013	0

Dozer Emissions

Tons/year	PM10	PM2.5
2009	0.00	0.00
2010	4.43	1.94
2011	0.07	0.03
2012	0.00	0.00
2013	0.00	0.00

Fugitive Dust Emissions - Segment 4

B) Grading

$E = k \times 0.051 \times (S)^{2.0}$ for PM10 and $k \times 0.040 \times (S)^{2.5}$ for PM2.5
E = lb/VMT
k = Scaling Constant (0.60 for PM10 and 0.031 for PM2.5)
S = Mean Vehicle Speed assumed to be 3 mph
Assumes VMT = 3 x hours in use

PM10 Emission Factor
0.2754 lb/VMT

PM2.5 Emission Factor
0.019329687 lb/VMT

Annual Grader VMT

	Hrs/year	VMT/year
2009	0	0
2010	1082	3246
2011	144	432
2012	0	0
2013	0	0

Grading Emissions

Lbs/Day	PM10	PM2.5
2009	13.22	0.93
2010	26.44	1.86
2011	9.91	0.70
2012	23.96	1.68
2013		

Tons/year	PM10	PM2.5
2009	0.00	0.00
2010	0.45	0.03
2011	0.06	0.00
2012	0.00	0.00
2013	0.00	0.00

C) Material Loading/Handling (AP-42, p. 13.2.4-3)

$E = (k)(0.0032)[(U/5)^{1.3}]/[(M/2)^{1.4}]$
E = lb/ton
k = Particle Size Constant (0.35 for PM10 and 0.11 for PM2.5)
U = average wind speed = 25 MPH worst day, 8 MPH avg daytime (engineering assumption)
M = moisture content = 10% (mitigated)
Four separate drops are assumed

2009	0	Annual tons
2010	675,000	Annual tons
2011	0	Annual tons
2012	0	Annual tons
2013	0	Annual tons

Emission Factors and Emissions
Emission Factors

PM10 Daily	PM2.5 Daily	PM10 Annual	PM2.5 Annual
0.00103	0.00032	0.00029	0.00009

Emissions lbs/day

PM10	PM2.5
1.03	0.32

Emissions tons/year

	PM10	PM2.5
2009	0.00	0.00
2010	0.39	0.12
2011	0.00	0.00
2012	0.00	0.00
2013	0.00	0.00

Fugitive Dust Emissions - Segment 4

2) Road Dust
Emission Types
A) Paved Road Dust
B) Unpaved Road Dust

A) Paved Road Dust

E = [k x (sL/2)0.65 x (W/3)1.5 -C] x (1-P/4N)
E = lb/VMT
k = Constant (0.016 for PM10 and 0.0040 for PM2.5)
sL = Silt Loading (assumed to be 0.2 g/m2 - assumes 500 to 5,000 ADT profile of Table 13.2.1-3 average for all traffic)
W = Average weight of vehicles in tons (calculated below)
C = Correction for exhaust, break wear, tire wear (0.00047 lb/VMT for PM10, 0.00036 lb/VMT for PM2.5)
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Passenger Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Average Weight = 40.0 Tons

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Paved VMT	Average Weight (Tons)
2009	82,440	37,520	14,480	134,440	6.7
2010	1,225,500	380,100	206,070	1,811,670	6.4
2011	91,560	28,860	14,850	135,270	6.4
2012	0	0	0	0	0.0
2013	0	0	0	0	0.0

Emission Factors and Emissions
Emission Factors

PM10 Daily	PM2.5 Daily
0.0793	0.0196

Emissions lbs/day

PM10	PM2.5
792.66	195.74

	PM10 Annual	PM2.5 Annual
2009	0.0115	0.0026
2010	0.0108	0.0025
2011	0.0106	0.0024
2012	0.0000	0.0000
2013	0.0000	0.0000

Emissions tons/year

	PM10	PM2.5
2009	0.77	0.18
2010	9.79	2.23
2011	0.71	0.16
2012	0.00	0.00
2013	0.00	0.00

Fugitive Dust Emissions - Segment 4

B) Unpaved Road Dust

$E = (k)[(s/12)^{0.9}][(W/3)^{0.45}][(365-P)/365]$ (for industrial sites)

k = constant = 1.5 lb/VMT for PM10 and 0.23 lb/VMT for PM2.5
s = Silt Content (assumed to be 16% - SCAQMD Handbook for Farm Roads)
W = avg. vehicle weight = calculated below
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Personal/Professionals/inspection Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Average Weight = 40.5 Tons

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Paved VMT	Average Weight (Tons)
2009	137	65	27	229	7.0
2010	2,043	14,606	6,227	22,875	13.5
2011	153	1,444	532	2,129	13.1
2012	0	0	0	0	0.0
2013	0	0	0	0	0.0

Uncontrolled Emission Factors and Emissions

Emission Factors (lb/VMT)		Emissions lbs/day	
PM10 Daily	PM2.5 Daily	PM10	PM2.5
6.27	0.96	62688.27	9612.20

	PM10 Annual	PM2.5 Annual
2009	2.84	0.44
2010	3.82	0.59
2011	3.77	0.58
2012	0.00	0.00
2013	0.00	0.00

Emissions tons/year

	PM10	PM2.5
2009	0.32	0.05
2010	43.66	6.70
2011	4.01	0.62
2012	0.00	0.00
2013	0.00	0.00

Controlled Emissions (assumes 84% efficiency with use of soil binder)

Emissions lbs/day

PM10	PM2.5
10030.12	1537.95

Emission Control 84%

Emissions tons/year

	PM10	PM2.5
2009	0.05	0.01
2010	6.99	1.07
2011	0.64	0.10
2012	0.00	0.00
2013	0.00	0.00

3) Disturbed Area Windblown Emissions

Assumptions
Emission Factor is 0.38 tons/disturbed acres/year of Total Suspended Particulate (AP-42 Section 11.9)
PM10 and PM2.5 fractions of TSP are 0.489 and 0.102 respectively per CEIDARS factors from SCAQMD CEQA Website
There are permanent and temporary disturbed acres that make up the total acre-years of disturbed area for each Segment
Disturbed areas are controlled by dust suppressants 84% control
Restoration of disturbed acres creates no net emission increase of permanently disturbed acres

Disturbed Acres (acre-years)	
2009	17
2010	132
2011	54
2012	0
2013	0

Emissions (tons/year)	
PM10	PM2.5
0.5147328	0.1054272
3.9967488	0.8186112
1.6350336	0.3348864
0	0
0	0

Fugitive Dust Emissions - Segment 5

Emission Categories
1) Earthmoving
2) Road Dust Paved/Unpaved

1) Earthmoving

Emission Types
A) Dozing
B) Grading
C) Material Loading/Handling

A) Dozing (AP-42 Section 11.9 for overburden)

$E = k \times (s)^{1.5} / (M)^{1.4}$ For PM10 and $k \times 5.7 \times (s)^{1.2} / (M)^{1.3}$ for PM2.5
E = lb/hr
k = Scaling Constant (0.75 for PM10 and 0.105 for PM2.5)
s = Silt Content (assumed to be 16% - SCAQMD Handbook for Farm Roads)
M = Moisture Content = 10% (assumes watering when necessary for mitigation)

PM10 Emission Factor
1.910914419 lb/hr

PM2.5 Emission Factor
0.835618668 lb/hr

Total Dozer Use

	Hrs/year
2009	0
2010	2848
2011	548
2012	0
2013	0

Dozer Emissions

Tons/year	PM10	PM2.5
2009	0.00	0.00
2010	2.72	1.19
2011	0.52	0.23
2012	0.00	0.00
2013	0.00	0.00

Fugitive Dust Emissions - Segment 5

B) Grading

$E = k \times 0.051 \times (S)^{2.0}$ for PM10 and $k \times 0.040 \times (S)^{2.5}$ for PM2.5
E = lb/VMT
k = Scaling Constant (0.60 for PM10 and 0.031 for PM2.5)
S = Mean Vehicle Speed assumed to be 3 mph
Assumes VMT = 3 x hours in use

PM10 Emission Factor
0.2754 lb/VMT

PM2.5 Emission Factor
0.019329687 lb/VMT

Annual Grader VMT

	Hrs/year	VMT/year
2009	0	0
2010	1016	3048
2011	436	1308
2012	0	0
2013	0	0

Grading Emissions

Lbs/Day	PM10	PM2.5
2009	13.22	0.93
2010	26.44	1.86
2011	9.91	0.70
2012	23.96	1.68

Tons/year	PM10	PM2.5
2009	0.00	0.00
2010	0.42	0.03
2011	0.18	0.01
2012	0.00	0.00
2013	0.00	0.00

C) Material Loading/Handling (AP-42, p. 13.2.4-3)

$E = (k)(0.0032)[(U/5)^{1.3}]/[(M/2)^{1.4}]$
E = lb/ton
k = Particle Size Constant (0.35 for PM10 and 0.11 for PM2.5)
U = average wind speed = 25 MPH worst day, 8 MPH avg daytime (engineering assumption)
M = moisture content = 10% (mitigated)
Three separate drops are assumed

2009	0	Annual tons
2010	195,085	Annual tons
2011	195,085	Annual tons
2012	0	Annual tons
2013	0	Annual tons

Emission Factors and Emissions
Emission Factors

PM10 Daily	PM2.5 Daily	PM10 Annual	PM2.5 Annual
0.00103	0.00032	0.00029	0.00009

Emissions lbs/day

PM10	PM2.5
1.03	0.32

Emissions tons/year

	PM10	PM2.5
2009	0.00	0.00
2010	0.11	0.04
2011	0.11	0.04
2012	0.00	0.00
2013	0.00	0.00

Fugitive Dust Emissions - Segment 5

2) Road Dust
Emission Types
A) Paved Road Dust
B) Unpaved Road Dust

A) Paved Road Dust

E = [k x (sL/2)0.65 x (W/3)1.5 -C] x (1-P/4N)
E = lb/VMT
k = Constant (0.016 for PM10 and 0.0040 for PM2.5)
sL = Silt Loading (assumed to be 0.2 g/m2 - assumes 500 to 5,000 ADT profile of Table 13.2.1-3 average for all traffic)
W = Average weight of vehicles in tons (calculated below)
C = Correction for exhaust, break wear, tire wear (0.00047 lb/VMT for PM10, 0.00036 lb/VMT for PM2.5)
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Passenger Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Average Weight = 40.0 Tons

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Paved VMT	Average Weight (Tons)
2009	59,040	24,880	19,660	103,580	8.8
2010	511,200	195,920	187,340	894,460	9.2
2011	351,440	114,520	70,150	536,110	6.9
2012	3,240	960	480	4,680	6.1
2013	0	0	0	0	0.0

Emission Factors and Emissions
Emission Factors

PM10 Daily	PM2.5 Daily
0.0793	0.0196

Emissions lbs/day

PM10	PM2.5
792.66	195.74

	PM10 Annual	PM2.5 Annual
2009	0.0174	0.0041
2010	0.0187	0.0044
2011	0.0121	0.0028
2012	0.0099	0.0022
2013	0.0000	0.0000

Emissions tons/year

	PM10	PM2.5
2009	0.90	0.21
2010	8.36	1.98
2011	3.26	0.75
2012	0.02	0.01
2013	0.00	0.00

Fugitive Dust Emissions - Segment 5

B) Unpaved Road Dust

$E = (k)[(s/12)^{0.9}][(W/3)^{0.45}][(365-P)/365]$ (for industrial sites)

k = constant = 1.5 lb/VMT for PM10 and 0.23 lb/VMT for PM2.5
s = Silt Content (assumed to be 16% - SCAQMD Handbook for Farm Roads)
W = avg. vehicle weight = calculated below
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Personal/Professionals/inspection Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Average Weight = 40.5 Tons

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Paved VMT	Average Weight (Tons)
2009	148	1,004	539	1,691	14.5
2010	1,278	7,909	5,734	14,921	15.9
2011	879	4,623	1,905	7,407	12.9
2012	8	39	19	66	13.7
2013	0	0	0	0	0.0

Uncontrolled Emission Factors and Emissions

Emission Factors (lb/VMT)		Emissions lbs/day	
PM10 Daily	PM2.5 Daily	PM10	PM2.5
6.27	0.96	62688.27	9612.20

	PM10 Annual	PM2.5 Annual
2009	3.95	0.61
2010	4.12	0.63
2011	3.75	0.58
2012	3.85	0.59
2013	0.00	0.00

Emissions tons/year

	PM10	PM2.5
2009	3.34	0.51
2010	30.74	4.71
2011	13.90	2.13
2012	0.13	0.02
2013	0.00	0.00

Controlled Emissions (assumes 84% efficiency with use of soil binder)

Emissions lbs/day		Emission Control
PM10	PM2.5	84%
10030.12	1537.95	

Emissions tons/year

	PM10	PM2.5
2009	0.53	0.08
2010	4.92	0.75
2011	2.22	0.34
2012	0.02	0.00
2013	0.00	0.00

3) Disturbed Area Windblown Emissions

Assumptions
Emission Factor is 0.38 tons/disturbed acres/year of Total Suspended Particulate (AP-42 Section 11.9)
PM10 and PM2.5 fractions of TSP are 0.489 and 0.102 respectively per CEIDARS factors from SCAQMD CEQA Website
There are permanent and temporary disturbed acres that make up the total acre-years of disturbed area for each Segment
Disturbed areas are controlled by dust suppressants 84% control

	Disturbed Acres (acre-years)	Emissions (tons/year)	
		PM10	PM2.5
2009	9	0.2725056	0.0558144
2010	63	1.9075392	0.3907008
2011	51	1.5441984	0.3162816
2012	0	0	0
2013	0	0	0

Fugitive Dust Emissions - Segment 6

Emission Categories
1) Earthmoving
2) Road Dust Paved/Unpaved

1) Earthmoving

Emission Types
A) Dozing
B) Grading
C) Material Loading/Handling

A) Dozing (AP-42 Section 11.9 for overburden)

$E = k \times (s)^{1.5} / (M)^{1.4}$ For PM10 and $k \times 5.7 \times (s)^{1.2} / (M)^{1.3}$ for PM2.5
E = lb/hr
k = Scaling Constant (0.75 for PM10 and 0.105 for PM2.5)
s = Silt Content (assumed to be 12% - SCAQMD Handbook for Mountain Roads)
M = Moisture Content = 10% (assumes watering when necessary for mitigation)

PM10 Emission Factor
1.241175323 lb/hr

PM2.5 Emission Factor
0.591672862 lb/hr

Total Dozer Use

	Hrs/year
2009	0
2010	4893
2011	823
2012	710
2013	0

Dozer Emissions

Tons/year	PM10	PM2.5
2009	0.00	0.00
2010	3.04	1.45
2011	0.51	0.24
2012	0.44	0.21
2013	0.00	0.00

Fugitive Dust Emissions - Segment 6

B) Grading

$E = k \times 0.051 \times (S)^{2.0}$ for PM10 and $k \times 0.040 \times (S)^{2.5}$ for PM2.5
E = lb/VMT
k = Scaling Constant (0.60 for PM10 and 0.031 for PM2.5)
S = Mean Vehicle Speed assumed to be 3 mph
Assumes VMT = 3 x hours in use

PM10 Emission Factor
0.2754 lb/VMT

PM2.5 Emission Factor
0.019329687 lb/VMT

Annual Grader VMT

	Hrs/year	VMT/year
2009	0	0
2010	945	2835
2011	772	2316
2012	300	900
2013	0	0

Grading Emissions

Lbs/Day	PM10	PM2.5
2009	13.22	0.93
2010	26.44	1.86
2011	9.91	0.70
2012	23.96	1.68

Tons/year	PM10	PM2.5
2009	0.00	0.00
2010	0.39	0.03
2011	0.32	0.02
2012	0.12	0.01
2013	0.00	0.00

C) Material Loading/Handling (AP-42, p. 13.2.4-3)

$E = (k)(0.0032)[(U/5)^{1.3}]/[(M/2)^{1.4}]$
E = lb/ton
k = Particle Size Constant (0.35 for PM10 and 0.11 for PM2.5)
U = average wind speed = 25 MPH worst day, 8 MPH avg daytime (engineering assumption)
M = moisture content = 10% (mitigated)
Three separate drops are assumed

2009	0	Annual tons
2010	362,689	Annual tons
2011	362,689	Annual tons
2012	0	Annual tons
2013	0	Annual tons

Emission Factors and Emissions
Emission Factors

PM10 Daily	PM2.5 Daily	PM10 Annual	PM2.5 Annual
0.00103	0.00032	0.00029	0.00009

Emissions lbs/day

PM10	PM2.5
1.03	0.32

Emissions tons/year

	PM10	PM2.5
2009	0.00	0.00
2010	0.21	0.07
2011	0.21	0.07
2012	0.00	0.00
2013	0.00	0.00

Fugitive Dust Emissions - Segment 6

2) Road Dust
Emission Types
A) Paved Road Dust
B) Unpaved Road Dust

A) Paved Road Dust

E = [k x (sL/2)0.65 x (W/3)1.5 -C] x (1-P/4N)
E = lb/VMT
k = Constant (0.016 for PM10 and 0.0040 for PM2.5)
sL = Silt Loading (assumed to be 0.2 g/m2 - assumes 500 to 5,000 ADT profile of Table 13.2.1-3 average for all traffic)
W = Average weight of vehicles in tons (calculated below)
C = Correction for exhaust, break wear, tire wear (0.00047 lb/VMT for PM10, 0.00036 lb/VMT for PM2.5)
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Passenger Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Average Weight = 40.0 Tons

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Paved VMT	Average Weight (Tons)
2009	60,120	30,060	10,020	100,200	6.6
2010	651,480	257,700	230,590	1,139,770	9.0
2011	1,048,020	332,640	149,250	1,529,910	6.0
2012	293,820	124,980	69,270	488,070	7.5
2013	0	0	0	0	0.0

Emission Factors and Emissions
Emission Factors

PM10 Daily	PM2.5 Daily
0.0793	0.0196

Emissions lbs/day

PM10	PM2.5
792.66	195.74

	PM10 Annual	PM2.5 Annual
2009	0.0112	0.0026
2010	0.0182	0.0043
2011	0.0098	0.0022
2012	0.0137	0.0032
2013	0.0000	0.0000

Emissions tons/year

	PM10	PM2.5
2009	0.56	0.13
2010	10.38	2.46
2011	7.46	1.68
2012	3.35	0.78
2013	0.00	0.00

Fugitive Dust Emissions - Segment 6

B) Unpaved Road Dust

$E = (k)[(s/12)^{0.9}][(W/3)^{0.45}][(365-P)/365]$ (for industrial sites)

k = constant = 1.5 lb/VMT for PM10 and 0.23 lb/VMT for PM2.5
s = Silt Content (assumed to be 12% - SCAQMD Handbook for Mountain Roads)
W = avg. vehicle weight = calculated below
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Personal/Professionals/inspection Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Average Weight = 40.5 Tons

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Paved VMT	Average Weight (Tons)
2009	100	50	17	167	6.6
2010	1,086	18,070	11,235	30,392	15.9
2011	1,747	29,785	10,425	41,957	13.2
2012	490	2,720	1,544	4,754	14.5
2013	0	0	0	0	0.0

Uncontrolled Emission Factors and Emissions

Emission Factors (lb/VMT)		Emissions lbs/day	
PM10 Daily	PM2.5 Daily	PM10	PM2.5
2.59	0.40	25930.71	3976.04

	PM10 Annual	PM2.5 Annual
2009	2.14	0.33
2010	3.18	0.49
2011	2.92	0.45
2012	3.05	0.47
2013	0.00	0.00

Emissions tons/year

	PM10	PM2.5
2009	0.18	0.03
2010	48.30	7.41
2011	61.33	9.40
2012	7.25	1.11
2013	0.00	0.00

Controlled Emissions (assumes 84% efficiency with use of soil binder)

Emissions lbs/day		Emission Control
PM10	PM2.5	84%
4148.91	636.17	

Emissions tons/year

	PM10	PM2.5
2009	0.03	0.00
2010	7.73	1.19
2011	9.81	1.50
2012	1.16	0.18
2013	0.00	0.00

3) Disturbed Area Windblown Emissions

Assumptions
Emission Factor is 0.38 tons/disturbed acres/year of Total Suspended Particulate (AP-42 Section 11.9)
PM10 and PM2.5 fractions of TSP are 0.489 and 0.102 respectively per CEIDARS factors from SCAQMD CEQA Website
There are permanent and temporary disturbed acres that make up the total acre-years of disturbed area for each Segment
Disturbed areas are controlled by dust suppressants 84% control

	Disturbed Acres (acre-years)	Emissions (tons/year)	
		PM10	PM2.5
2009	21	0.6358464	0.1302336
2010	74	2.2406016	0.4589184
2011	103	3.1186752	0.6387648
2012	26	0.7872384	0.1612416
2013	0	0	0

Fugitive Dust Emissions - Segment 7

Emission Categories
1) Earthmoving
2) Road Dust Paved/Unpaved

1) Earthmoving

Emission Types
A) Dozing
B) Grading
C) Material Loading/Handling

A) Dozing (AP-42 Section 11.9 for overburden)

$E = k \times (s)^{1.5} / (M)^{1.4}$ For PM10 and $k \times 5.7 \times (s)^{1.2} / (M)^{1.3}$ for PM2.5
E = lb/hr
k = Scaling Constant (0.75 for PM10 and 0.105 for PM2.5)
s = Silt Content (assumed to be 12% - SCAQMD Handbook for Mountain Roads)
M = Moisture Content = 10% (assumes watering when necessary for mitigation)

PM10 Emission Factor
1.241175323 lb/hr

PM2.5 Emission Factor
0.591672862 lb/hr

Total Dozer Use

	Hrs/year
2009	0
2010	1028
2011	231
2012	312
2013	0

Dozer Emissions

Tons/year	PM10	PM2.5
2009	0.00	0.00
2010	0.64	0.30
2011	0.14	0.07
2012	0.19	0.09
2013	0.00	0.00

Fugitive Dust Emissions - Segment 7

B) Grading

$E = k \times 0.051 \times (S)^{2.0}$ for PM10 and $k \times 0.040 \times (S)^{2.5}$ for PM2.5
E = lb/VMT
k = Scaling Constant (0.60 for PM10 and 0.031 for PM2.5)
S = Mean Vehicle Speed assumed to be 3 mph
Assumes VMT = 3 x hours in use

PM10 Emission Factor
0.2754 lb/VMT

PM2.5 Emission Factor
0.019329687 lb/VMT

Annual Grader VMT

	Hrs/year	VMT/year
2009	0	0
2010	133	399
2011	0	0
2012	128	384
2013	0	0

Grading Emissions

Lbs/Day	PM10	PM2.5
2009	13.22	0.93
2010	26.44	1.86
2011	9.91	0.70
2012	23.96	1.68

Tons/year	PM10	PM2.5
2009	0.00	0.00
2010	0.05	0.00
2011	0.00	0.00
2012	0.05	0.00
2013	0.00	0.00

C) Material Loading/Handling (AP-42, p. 13.2.4-3)

$E = (k)(0.0032)[(U/5)^{1.3}]/[(M/2)^{1.4}]$
E = lb/ton
k = Particle Size Constant (0.35 for PM10 and 0.11 for PM2.5)
U = average wind speed = 25 MPH worst day, 8 MPH avg daytime (engineering assumption)
M = moisture content = 10% (mitigated)
Three separate drops are assumed

2009	0	Annual tons
2010	33,723	Annual tons
2011	33,723	Annual tons
2012	0	Annual tons
2013	0	Annual tons

Emission Factors and Emissions
Emission Factors

PM10 Daily	PM2.5 Daily	PM10 Annual	PM2.5 Annual
0.00103	0.00032	0.00029	0.00009

Emissions lbs/day

PM10	PM2.5
1.03	0.32

Emissions tons/year

	PM10	PM2.5
2009	0.00	0.00
2010	0.02	0.01
2011	0.02	0.01
2012	0.00	0.00
2013	0.00	0.00

Fugitive Dust Emissions - Segment 7

2) Road Dust
Emission Types
A) Paved Road Dust
B) Unpaved Road Dust

A) Paved Road Dust

E = [k x (sL/2)0.65 x (W/3)1.5 -C] x (1-P/4N)
E = lb/VMT
k = Constant (0.016 for PM10 and 0.0040 for PM2.5)
sL = Silt Loading (assumed to be 0.06 g/m2 - assumes 5,000 to 10,000 ADT profile of Table 13.2.1-3 average for all traffic)
W = Average weight of vehicles in tons (calculated below)
C = Correction for exhaust, break wear, tire wear (0.00047 lb/VMT for PM10, 0.00036 lb/VMT for PM2.5)
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Passenger Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Average Weight = 40.0 Tons

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Paved VMT	Average Weight (Tons)
2009	0	0	0	0	0.0
2010	310,280	113,360	95,470	519,110	8.5
2011	707,040	210,440	99,850	1,017,330	6.0
2012	514,960	168,160	65,910	749,030	5.8
2013	0	0	0	0	0.0

Emission Factors and Emissions
Emission Factors

PM10 Daily	PM2.5 Daily
0.0793	0.0196

Emissions lbs/day

PM10	PM2.5
792.66	195.74

	PM10 Annual	PM2.5 Annual
2009	0.0000	0.0000
2010	0.0073	0.0016
2011	0.0041	0.0008
2012	0.0039	0.0007
2013	0.0000	0.0000

Emissions tons/year

	PM10	PM2.5
2009	0.00	0.00
2010	1.89	0.41
2011	2.11	0.40
2012	1.48	0.28
2013	0.00	0.00

Fugitive Dust Emissions - Segment 7

B) Unpaved Road Dust

$E = (k)[(s/12)^{0.9}][(W/3)^{0.45}][(365-P)/365]$ (for industrial sites)

k = constant = 1.5 lb/VMT for PM10 and 0.23 lb/VMT for PM2.5
s = Silt Content (assumed to be 12% - SCAQMD Handbook for Mountain Roads)
W = avg. vehicle weight = calculated below
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Personal/Professionals/inspection Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Average Weight = 40.5 Tons

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Paved VMT	Average Weight (Tons)
2009	0	0	0	0	0.0
2010	776	1,799	1,423	3,997	14.7
2011	1,768	3,518	1,150	6,435	10.3
2012	1,287	3,382	1,135	5,805	11.0
2013	0	0	0	0	0.0

Uncontrolled Emission Factors and Emissions

Emission Factors (lb/VMT)		Emissions lbs/day	
PM10 Daily	PM2.5 Daily	PM10	PM2.5
2.59	0.40	25930.71	3976.04

	PM10 Annual	PM2.5 Annual
2009	0.00	0.00
2010	3.06	0.47
2011	2.61	0.40
2012	2.69	0.41
2013	0.00	0.00

Emissions tons/year

	PM10	PM2.5
2009	0.00	0.00
2010	6.12	0.94
2011	8.40	1.29
2012	7.80	1.20
2013	0.00	0.00

Controlled Emissions (assumes 84% efficiency with use of soil binder)

Emissions lbs/day		Emission Control
PM10	PM2.5	84%
4148.91	636.17	

Emissions tons/year

	PM10	PM2.5
2009	0.00	0.00
2010	0.98	0.15
2011	1.34	0.21
2012	1.25	0.19
2013	0.00	0.00

3) Disturbed Area Windblown Emissions

Assumptions
Emission Factor is 0.38 tons/disturbed acres/year of Total Suspended Particulate (AP-42 Section 11.9)
PM10 and PM2.5 fractions of TSP are 0.489 and 0.102 respectively per CEIDARS factors from SCAQMD CEQA Website
There are permanent and temporary disturbed acres that make up the total acre-years of disturbed area for each Segment
Disturbed areas are controlled by dust suppressants 84% control

	Disturbed Acres (acre-years)	Emissions (tons/year)	
		PM10	PM2.5
2009	0	0	0
2010	49	1.4836416	0.3038784
2011	64	1.9378176	0.3969024
2012	6	0.1816704	0.0372096
2013	0	0	0

Fugitive Dust Emissions - Segment 8

Emission Categories
1) Earthmoving
2) Road Dust Paved/Unpaved

1) Earthmoving

Emission Types
A) Dozing
B) Grading
C) Material Loading/Handling

A) Dozing (AP-42 Section 11.9 for overburden)

$E = k \times (s)^{1.5} / (M)^{1.4}$ For PM10 and $k \times 5.7 \times (s)^{1.2} / (M)^{1.3}$ for PM2.5
E = lb/hr
k = Scaling Constant (0.75 for PM10 and 0.105 for PM2.5)
s = Silt Content (assumed to be 12% - SCAQMD Handbook for Mountain Roads)
M = Moisture Content = 10% (assumes watering when necessary for mitigation)

PM10 Emission Factor
1.241175323 lb/hr

PM2.5 Emission Factor
0.591672862 lb/hr

Total Dozer Use

	Hrs/year
2009	144
2010	3421
2011	1297
2012	370
2013	0

Dozer Emissions

Tons/year	PM10	PM2.5
2009	0.09	0.04
2010	2.12	1.01
2011	0.80	0.38
2012	0.23	0.11
2013	0.00	0.00

Fugitive Dust Emissions - Segment 8

B) Grading

$E = k \times 0.051 \times (S)^{2.0}$ for PM10 and $k \times 0.040 \times (S)^{2.5}$ for PM2.5
E = lb/VMT
k = Scaling Constant (0.60 for PM10 and 0.031 for PM2.5)
S = Mean Vehicle Speed assumed to be 3 mph
Assumes VMT = 3 x hours in use

PM10 Emission Factor
0.2754 lb/VMT

PM2.5 Emission Factor
0.019329687 lb/VMT

Annual Grader VMT

	Hrs/year	VMT/year
2009	40	120
2010	977	2931
2011	654	1962
2012	404	1212
2013	0	0

Grading Emissions

Lbs/Day	PM10	PM2.5
2009	13.22	0.93
2010	26.44	1.86
2011	9.91	0.70
2012	23.96	1.68

Tons/year	PM10	PM2.5
2009	0.02	0.00
2010	0.40	0.03
2011	0.27	0.02
2012	0.17	0.01
2013	0.00	0.00

C) Material Loading/Handling (AP-42, p. 13.2.4-3)

$E = (k)(0.0032)[(U/5)^{1.3}]/[(M/2)^{1.4}]$
E = lb/ton
k = Particle Size Constant (0.35 for PM10 and 0.11 for PM2.5)
U = average wind speed = 25 MPH worst day, 8 MPH avg daytime (engineering assumption)
M = moisture content = 10% (mitigated)
Three separate drops are assumed

2009	0	Annual tons
2010	325,637	Annual tons
2011	325,637	Annual tons
2012	72,364	Annual tons
2013	0	Annual tons

Emission Factors and Emissions
Emission Factors

PM10 Daily	PM2.5 Daily	PM10 Annual	PM2.5 Annual
0.00103	0.00032	0.00029	0.00009

Emissions lbs/day

PM10	PM2.5
1.03	0.32

Emissions tons/year

	PM10	PM2.5
2009	0.00	0.00
2010	0.19	0.06
2011	0.19	0.06
2012	0.04	0.01
2013	0.00	0.00

Fugitive Dust Emissions - Segment 8

2) Road Dust
Emission Types
A) Paved Road Dust
B) Unpaved Road Dust

A) Paved Road Dust

E = [k x (sL/2)0.65 x (W/3)1.5 -C] x (1-P/4N)
E = lb/VMT
k = Constant (0.016 for PM10 and 0.0040 for PM2.5)
sL = Silt Loading (assumed to be 0.06 g/m2 - assumes 5,000 to 10,000 ADT profile of Table 13.2.1-3 average for all traffic)
W = Average weight of vehicles in tons (calculated below)
C = Correction for exhaust, break wear, tire wear (0.00047 lb/VMT for PM10, 0.00036 lb/VMT for PM2.5)
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Passenger Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Average Weight = 40.0 Tons

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Paved VMT	Average Weight (Tons)
2009	23,520	11,600	4,720	39,840	7.1
2010	1,063,560	369,640	262,850	1,696,050	7.6
2011	1,205,600	389,920	159,870	1,755,390	5.9
2012	193,800	71,320	40,630	305,750	7.1
2013	0	0	0	0	0.0

Emission Factors and Emissions

Emission Factors

PM10 Daily	PM2.5 Daily
0.0793	0.0196

Emissions lbs/day

PM10	PM2.5
792.66	195.74

	PM10 Annual	PM2.5 Annual
2009	0.0054	0.0011
2010	0.0062	0.0013
2011	0.0040	0.0008
2012	0.0055	0.0011
2013	0.0000	0.0000

Emissions tons/year

	PM10	PM2.5
2009	0.11	0.02
2010	5.25	1.11
2011	3.53	0.67
2012	0.84	0.17
2013	0.00	0.00

Fugitive Dust Emissions - Segment 8

B) Unpaved Road Dust

$E = (k)[(s/12)^{0.9}][(W/3)^{0.45}][(365-P)/365]$ (for industrial sites)

k = constant = 1.5 lb/VMT for PM10 and 0.23 lb/VMT for PM2.5
s = Silt Content (assumed to be 12% - SCAQMD Handbook for Mountain Roads)
W = avg. vehicle weight = calculated below
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Personal/Professionals/inspection Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Average Weight = 40.5 Tons

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Paved VMT	Average Weight (Tons)
2009	59	30	16	105	7.9
2010	2,576	4,192	2,911	9,679	13.0
2011	3,014	5,312	1,882	10,207	10.3
2012	485	996	466	1,947	11.8
2013	0	0	0	0	0.0

Uncontrolled Emission Factors and Emissions

Emission Factors (lb/VMT)		Emissions lbs/day	
PM10 Daily	PM2.5 Daily	PM10	PM2.5
2.59	0.40	25930.71	3976.04

	PM10 Annual	PM2.5 Annual
2009	2.33	0.36
2010	2.90	0.45
2011	2.61	0.40
2012	2.77	0.43
2013	0.00	0.00

Emissions tons/year

	PM10	PM2.5
2009	0.12	0.02
2010	14.05	2.15
2011	13.33	2.04
2012	2.70	0.41
2013	0.00	0.00

Controlled Emissions (assumes 84% efficiency with use of soil binder)

Emissions lbs/day

PM10	PM2.5
4148.91	636.17

Emission Control 84%

Emissions tons/year

	PM10	PM2.5
2009	0.02	0.00
2010	2.25	0.34
2011	2.13	0.33
2012	0.43	0.07
2013	0.00	0.00

3) Disturbed Area Windblown Emissions

Assumptions
Emission Factor is 0.38 tons/disturbed acres/year of Total Suspended Particulate (AP-42 Section 11.9)
PM10 and PM2.5 fractions of TSP are 0.489 and 0.102 respectively per CEIDARS factors from SCAQMD CEQA Website
There are permanent and temporary disturbed acres that make up the total acre-years of disturbed area for each Segment
Disturbed areas are controlled by dust suppressants 84% control

Disturbed Acres (acre-years)	
2009	5
2010	128
2011	193
2012	74
2013	0

Emissions (tons/year)	
PM10	PM2.5
0.151392	0.031008
3.8756352	0.7938048
5.8437312	1.1969088
2.2406016	0.4589184
0	0

Fugitive Dust Emissions - Segment 9

Emission Categories
1) Earthmoving
2) Road Dust Paved/Unpaved

1) Earthmoving

Emission Types
A) Dozing
B) Grading
C) Material Loading/Handling

A) Dozing (AP-42 Section 11.9 for overburden)

$E = k \times (s)^{1.5} / (M)^{1.4}$ For PM10 and $k \times 5.7 \times (s)^{1.2} / (M)^{1.3}$ for PM2.5
E = lb/hr
k = Scaling Constant (0.75 for PM10 and 0.105 for PM2.5)
s = Silt Content (assumed to be 16% - SCAQMD Handbook for Farm Roads)
M = Moisture Content = 10% (assumes watering when necessary for mitigation)

PM10 Emission Factor
1.910914419 lb/hr

PM2.5 Emission Factor
0.835618668 lb/hr

Total Dozer Use

	Hrs/year
2009	0
2010	3204
2011	0
2012	0
2013	0

Dozer Emissions

Tons/year	PM10	PM2.5
2009	0.00	0.00
2010	3.06	1.34
2011	0.00	0.00
2012	0.00	0.00
2013	0.00	0.00

Fugitive Dust Emissions - Segment 9

B) Grading

$E = k \times 0.051 \times (S)^{2.0}$ for PM10 and $k \times 0.040 \times (S)^{2.5}$ for PM2.5
E = lb/VMT
k = Scaling Constant (0.60 for PM10 and 0.031 for PM2.5)
S = Mean Vehicle Speed assumed to be 3 mph
Assumes VMT = 3 x hours in use

PM10 Emission Factor
0.2754 lb/VMT

PM2.5 Emission Factor
0.019329687 lb/VMT

Annual Grader VMT

	Hrs/year	VMT/year
2009	592	1776
2010	1680	5040
2011	0	0
2012	0	0
2013	0	0

Grading Emissions

Lbs/Day	PM10	PM2.5
2009	13.22	0.93
2010	26.44	1.86
2011	9.91	0.70
2012	23.96	1.68

Tons/year	PM10	PM2.5
2009	0.24	0.02
2010	0.69	0.05
2011	0.00	0.00
2012	0.00	0.00
2013	0.00	0.00

C) Material Loading/Handling (AP-42, p. 13.2.4-3)

$E = (k)(0.0032)[(U/5)^{1.3}]/[(M/2)^{1.4}]$
E = lb/ton
k = Particle Size Constant (0.35 for PM10 and 0.11 for PM2.5)
U = average wind speed = 25 MPH worst day, 8 MPH avg daytime (engineering assumption)
M = moisture content = 10% (mitigated)
Three separate drops are assumed

2009	0	Annual tons
2010	121,950	Annual tons
2011	2,750	Annual tons
2012	0	Annual tons
2013	0	Annual tons

Emission Factors and Emissions
Emission Factors

PM10 Daily	PM2.5 Daily	PM10 Annual	PM2.5 Annual
0.00103	0.00032	0.00029	0.00009

Emissions lbs/day

PM10	PM2.5
1.03	0.32

Emissions tons/year

	PM10	PM2.5
2009	0.00	0.00
2010	0.07	0.02
2011	0.00	0.00
2012	0.00	0.00
2013	0.00	0.00

Fugitive Dust Emissions - Segment 9

2) Road Dust
Emission Types
A) Paved Road Dust
B) Unpaved Road Dust

A) Paved Road Dust

E = [k x (sL/2)0.65 x (W/3)1.5 -C] x (1-P/4N)
E = lb/VMT
k = Constant (0.016 for PM10 and 0.0040 for PM2.5)
sL = Silt Loading (assumed to be 0.06 g/m2 - assumes 5,000 to 10,000 ADT profile of Table 13.2.1-3 average for all traffic)
W = Average weight of vehicles in tons (calculated below)
C = Correction for exhaust, break wear, tire wear (0.00047 lb/VMT for PM10, 0.00036 lb/VMT for PM2.5)
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Passenger Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Average Weight = 40.0 Tons

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Paved VMT	Average Weight (Tons)
2009	22,080	4,660	5,715	32,455	7.8
2010	983,020	187,870	88,630	1,259,520	4.9
2011	393,320	81,860	1,625	476,805	3.1
2012	248,760	39,150	2,250	290,160	3.0
2013	131,880	24,240	0	156,120	2.9

Emission Factors and Emissions
Emission Factors

PM10 Daily	PM2.5 Daily
0.0793	0.0196

Emissions lbs/day

PM10	PM2.5
792.66	195.74

	PM10 Annual	PM2.5 Annual
2009	0.0064	0.0014
2010	0.0029	0.0005
2011	0.0013	0.0001
2012	0.0012	0.0001
2013	0.0011	0.0000

Emissions tons/year

	PM10	PM2.5
2009	0.10	0.02
2010	1.83	0.31
2011	0.30	0.02
2012	0.17	0.01
2013	0.09	0.00

Fugitive Dust Emissions - Segment 9

B) Unpaved Road Dust

$E = (k)[(s/12)^{0.9}][(W/3)^{0.45}][(365-P)/365]$ (for industrial sites)

k = constant = 1.5 lb/VMT for PM10 and 0.23 lb/VMT for PM2.5
s = Silt Content (assumed to be 16% - SCAQMD Handbook for Farm Roads)
W = avg. vehicle weight = calculated below
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Personal/Professionals/inspection Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Average Weight = 40.5 Tons

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Paved VMT	Average Weight (Tons)
2009	37	10	11	58	8.4
2010	1,907	455	219	2,581	5.4
2011	357	138	1	495	3.7
2012	365	86	1	452	3.2
2013	220	61	0	280	3.3

Uncontrolled Emission Factors and Emissions

Emission Factors (lb/VMT)		Emissions lbs/day	
PM10 Daily	PM2.5 Daily	PM10	PM2.5
2.59	0.40	25930.71	3976.04

	PM10 Annual	PM2.5 Annual
2009	3.10	0.47
2010	2.54	0.39
2011	2.14	0.33
2012	2.00	0.31
2013	2.03	0.31

Emissions tons/year

	PM10	PM2.5
2009	0.09	0.01
2010	3.28	0.50
2011	0.53	0.08
2012	0.45	0.07
2013	0.28	0.04

Controlled Emissions (assumes 84% efficiency with use of soil binder)

Emissions lbs/day

PM10	PM2.5
4148.91	636.17

Emission Control
84%

Emissions tons/year

	PM10	PM2.5
2009	0.01	0.00
2010	0.52	0.08
2011	0.08	0.01
2012	0.07	0.01
2013	0.05	0.01

3) Disturbed Area Windblown Emissions

Assumptions
Emission Factor is 0.38 tons/disturbed acres/year of Total Suspended Particulate (AP-42 Section 11.9)
PM10 and PM2.5 fractions of TSP are 0.489 and 0.102 respectively per CEIDARS factors from SCAQMD CEQA Website
There are permanent and temporary disturbed acres that make up the total acre-years of disturbed area for each Segment
Disturbed areas are controlled by dust suppressants 84% control

	Disturbed Acres (acre-years)	Emissions (tons/year)	
		PM10	PM2.5
2009	2	0.0605568	0.0124032
2010	55	1.665312	0.341088
2011	0	0	0
2012	8	0.2422272	0.0496128
2013	11	0.3330624	0.0682176

Fugitive Dust Emissions - Segment 10

Emission Categories
1) Earthmoving
2) Road Dust Paved/Unpaved

1) Earthmoving

Emission Types
A) Dozing
B) Grading
C) Material Loading/Handling

A) Dozing (AP-42 Section 11.9 for overburden)

$E = k \times (s)^{1.5} / (M)^{1.4}$ For PM10 and $k \times 5.7 \times (s)^{1.2} / (M)^{1.3}$ for PM2.5
E = lb/hr
k = Scaling Constant (0.75 for PM10 and 0.105 for PM2.5)
s = Silt Content (assumed to be 16% - SCAQMD Handbook for Farm Roads)
M = Moisture Content = 10% (assumes watering when necessary for mitigation)

PM10 Emission Factor
1.910914419 lb/hr

PM2.5 Emission Factor
0.835618668 lb/hr

Total Dozer Use

	Hrs/year
2009	0
2010	1399
2011	118
2012	0
2013	0

Dozer Emissions

Tons/year	PM10	PM2.5
2009	0.00	0.00
2010	1.34	0.58
2011	0.11	0.05
2012	0.00	0.00
2013	0.00	0.00

Fugitive Dust Emissions - Segment 10

B) Grading

$E = k \times 0.051 \times (S)^{2.0}$ for PM10 and $k \times 0.040 \times (S)^{2.5}$ for PM2.5
E = lb/VMT
k = Scaling Constant (0.60 for PM10 and 0.031 for PM2.5)
S = Mean Vehicle Speed assumed to be 3 mph
Assumes VMT = 3 x hours in use

PM10 Emission Factor
0.2754 lb/VMT

PM2.5 Emission Factor
0.019329687 lb/VMT

Annual Grader VMT

	Hrs/year	VMT/year
2009	0	0
2010	673	2019
2011	118	354
2012	0	0
2013	0	0

Grading Emissions

Lbs/Day	PM10	PM2.5
2009	13.22	0.93
2010	26.44	1.86
2011	9.91	0.70
2012	23.96	1.68

Tons/year	PM10	PM2.5
2009	0.00	0.00
2010	0.28	0.02
2011	0.05	0.00
2012	0.00	0.00
2013	0.00	0.00

C) Material Loading/Handling (AP-42, p. 13.2.4-3)

$E = (k)(0.0032)[(U/5)^{1.3}]/[(M/2)^{1.4}]$
E = lb/ton
k = Particle Size Constant (0.35 for PM10 and 0.11 for PM2.5)
U = average wind speed = 25 MPH worst day, 8 MPH avg daytime (engineering assumption)
M = moisture content = 10% (mitigated)
Three separate drops are assumed

2009	0	Annual tons
2010	448,800	Annual tons
2011	0	Annual tons
2012	0	Annual tons
2013	0	Annual tons

Emission Factors and Emissions
Emission Factors

PM10 Daily	PM2.5 Daily	PM10 Annual	PM2.5 Annual
0.00103	0.00032	0.00029	0.00009

Emissions lbs/day

PM10	PM2.5
1.03	0.32

Emissions tons/year

	PM10	PM2.5
2009	0.00	0.00
2010	0.26	0.08
2011	0.00	0.00
2012	0.00	0.00
2013	0.00	0.00

Fugitive Dust Emissions - Segment 10

2) Road Dust
Emission Types
A) Paved Road Dust
B) Unpaved Road Dust

A) Paved Road Dust

E = [k x (sL/2)0.65 x (W/3)1.5 -C] x (1-P/4N)
E = lb/VMT
k = Constant (0.016 for PM10 and 0.0040 for PM2.5)
sL = Silt Loading (assumed to be 0.2 g/m2 - assumes 500 to 5,000 ADT profile of Table 13.2.1-3 average for all traffic)
W = Average weight of vehicles in tons (calculated below)
C = Correction for exhaust, break wear, tire wear (0.00047 lb/VMT for PM10, 0.00036 lb/VMT for PM2.5)
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Passenger Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Average Weight = 40.0 Tons

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Paved VMT	Average Weight (Tons)
2009	0	0	0	0	0.0
2010	950,800	219,840	136,000	1,306,640	5.9
2011	46,720	12,420	9,580	68,720	7.0
2012	0	0	0	0	0.0
2013	0	0	0	0	0.0

Emission Factors and Emissions
Emission Factors

PM10 Daily	PM2.5 Daily
0.0793	0.0196

Emissions lbs/day

PM10	PM2.5
792.66	195.74

	PM10 Annual	PM2.5 Annual
2009	0.0000	0.0000
2010	0.0095	0.0021
2011	0.0123	0.0028
2012	0.0000	0.0000
2013	0.0000	0.0000

Emissions tons/year

	PM10	PM2.5
2009	0.00	0.00
2010	6.19	1.39
2011	0.42	0.10
2012	0.00	0.00
2013	0.00	0.00

Fugitive Dust Emissions - Segment 10

B) Unpaved Road Dust

$E = (k)[(s/12)^{0.9}][(W/3)^{0.45}][(365-P)/365]$ (for industrial sites)

k = constant = 1.5 lb/VMT for PM10 and 0.23 lb/VMT for PM2.5
s = Silt Content (assumed to be 16% - SCAQMD Handbook for Farm Roads)
W = avg. vehicle weight = calculated below
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Personal/Professionals/inspection Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Average Weight = 40.5 Tons

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Paved VMT	Average Weight (Tons)
2009	0	0	0	0	0.0
2010	1,189	11,495	5,195	17,879	14.0
2011	58	649	367	1,075	15.2
2012	0	0	0	0	0.0
2013	0	0	0	0	0.0

Uncontrolled Emission Factors and Emissions

Emission Factors (lb/VMT)		Emissions lbs/day	
PM10 Daily	PM2.5 Daily	PM10	PM2.5
2.59	0.40	25930.71	3976.04

	PM10 Annual	PM2.5 Annual
2009	0.00	0.00
2010	3.89	0.60
2011	4.03	0.62
2012	0.00	0.00
2013	0.00	0.00

Emissions tons/year

	PM10	PM2.5
2009	0.00	0.00
2010	34.74	5.33
2011	2.17	0.33
2012	0.00	0.00
2013	0.00	0.00

Controlled Emissions (assumes 84% efficiency with use of soil binder)

Emissions lbs/day

PM10	PM2.5
4148.91	636.17

Emission Control 84%

Emissions tons/year

	PM10	PM2.5
2009	0.00	0.00
2010	5.56	0.85
2011	0.35	0.05
2012	0.00	0.00
2013	0.00	0.00

3) Disturbed Area Windblown Emissions

Assumptions
Emission Factor is 0.38 tons/disturbed acres/year of Total Suspended Particulate (AP-42 Section 11.9)
PM10 and PM2.5 fractions of TSP are 0.489 and 0.102 respectively per CEIDARS factors from SCAQMD CEQA Website
There are permanent and temporary disturbed acres that make up the total acre-years of disturbed area for each Segment
Disturbed areas are controlled by dust suppressants 84% control

Disturbed Acres (acre-years)	
2009	0
2010	42
2011	10
2012	0
2013	0

Emissions (tons/year)	
PM10	PM2.5
0	0
1.2716928	0.2604672
0.302784	0.062016
0	0
0	0

Fugitive Dust Emissions - Segment 11

Emission Categories
1) Earthmoving
2) Road Dust Paved/Unpaved

1) Earthmoving

Emission Types
A) Dozing
B) Grading
C) Material Loading/Handling

A) Dozing (AP-42 Section 11.9 for overburden)

$E = k \times (s)^{1.5} / (M)^{1.4}$ For PM10 and $k \times 5.7 \times (s)^{1.2} / (M)^{1.3}$ for PM2.5
E = lb/hr
k = Scaling Constant (0.75 for PM10 and 0.105 for PM2.5)
s = Silt Content (assumed to be 12% - SCAQMD Handbook for Mountain Roads)
M = Moisture Content = 10% (assumes watering when necessary for mitigation)

PM10 Emission Factor
1.241175323 lb/hr

PM2.5 Emission Factor
0.591672862 lb/hr

Total Dozer Use

	Hrs/year
2009	0
2010	0
2011	1287
2012	2575
2013	36

Dozer Emissions

Tons/year	PM10	PM2.5
2009	0.00	0.00
2010	0.00	0.00
2011	0.80	0.38
2012	1.60	0.76
2013	0.02	0.01

Fugitive Dust Emissions - Segment 11

B) Grading

$E = k \times 0.051 \times (S)^{2.0}$ for PM10 and $k \times 0.040 \times (S)^{2.5}$ for PM2.5
E = lb/VMT
k = Scaling Constant (0.60 for PM10 and 0.031 for PM2.5)
S = Mean Vehicle Speed assumed to be 3 mph
Assumes VMT = 3 x hours in use

PM10 Emission Factor
0.2754 lb/VMT

PM2.5 Emission Factor
0.019329687 lb/VMT

Annual Grader VMT

	Hrs/year	VMT/year
2009	0	0
2010	0	0
2011	270	810
2012	928	2784
2013	100	300

Grading Emissions

Lbs/Day	PM10	PM2.5
2009	13.22	0.93
2010	26.44	1.86
2011	9.91	0.70
2012	23.96	1.68

Tons/year	PM10	PM2.5
2009	0.00	0.00
2010	0.00	0.00
2011	0.11	0.01
2012	0.38	0.03
2013	0.04	0.00

C) Material Loading/Handling (AP-42, p. 13.2.4-3)

$E = (k)(0.0032)[(U/5)^{1.3}]/[(M/2)^{1.4}]$
E = lb/ton
k = Particle Size Constant (0.35 for PM10 and 0.11 for PM2.5)
U = average wind speed = 25 MPH worst day, 8 MPH avg daytime (engineering assumption)
M = moisture content = 10% (mitigated)
Three separate drops are assumed

2009	0	Annual tons
2010	0	Annual tons
2011	31,750	Annual tons
2012	284,134	Annual tons
2013	0	Annual tons

Emission Factors and Emissions
Emission Factors

PM10 Daily	PM2.5 Daily	PM10 Annual	PM2.5 Annual
0.00103	0.00032	0.00029	0.00009

Emissions lbs/day

PM10	PM2.5
1.03	0.32

Emissions tons/year

	PM10	PM2.5
2009	0.00	0.00
2010	0.00	0.00
2011	0.02	0.01
2012	0.16	0.05
2013	0.00	0.00

Fugitive Dust Emissions - Segment 11

2) Road Dust
Emission Types
A) Paved Road Dust
B) Unpaved Road Dust

A) Paved Road Dust

E = [k x (sL/2)0.65 x (W/3)1.5 -C] x (1-P/4N)
E = lb/VMT
k = Constant (0.016 for PM10 and 0.0040 for PM2.5)
sL = Silt Loading (assumed to be 0.2 g/m2 - assumes 500 to 5,000 ADT profile of Table 13.2.1-3 average for all traffic)
W = Average weight of vehicles in tons (calculated below)
C = Correction for exhaust, break wear, tire wear (0.00047 lb/VMT for PM10, 0.00036 lb/VMT for PM2.5)
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Passenger Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Average Weight = 40.0 Tons

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Paved VMT	Average Weight (Tons)
2009	56,880	28,440	9,480	94,800	6.6
2010	11,160	5,580	1,860	18,600	6.6
2011	164,760	54,900	54,200	273,860	8.7
2012	1,017,900	340,620	199,110	1,557,630	6.9
2013	31,080	12,180	8,430	51,690	8.0

Emission Factors and Emissions

Emission Factors

PM10 Daily	PM2.5 Daily
0.0793	0.0196

Emissions lbs/day

PM10	PM2.5
792.66	195.74

	PM10 Annual	PM2.5 Annual
2009	0.0112	0.0026
2010	0.0112	0.0026
2011	0.0174	0.0041
2012	0.0120	0.0028
2013	0.0151	0.0035

Emissions tons/year

	PM10	PM2.5
2009	0.53	0.12
2010	0.10	0.02
2011	2.38	0.56
2012	9.35	2.15
2013	0.39	0.09

Fugitive Dust Emissions - Segment 11

B) Unpaved Road Dust

$E = (k)[(s/12)^{0.9}][(W/3)^{0.45}][(365-P)/365]$ (for industrial sites)

k = constant = 1.5 lb/VMT for PM10 and 0.23 lb/VMT for PM2.5
s = Silt Content (assumed to be 12% - SCAQMD Handbook for Mountain Roads)
W = avg. vehicle weight = calculated below
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Personal/Professionals/inspection Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Average Weight = 40.5 Tons

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Paved VMT	Average Weight (Tons)
2009	95	1,505	502	2,101	13.0
2010	19	295	98	412	13.0
2011	275	1,393	1,845	3,513	19.1
2012	1,697	19,246	10,001	30,944	14.8
2013	52	795	457	1,304	15.5

Uncontrolled Emission Factors and Emissions

Emission Factors (lb/VMT)		Emissions lbs/day	
PM10 Daily	PM2.5 Daily	PM10	PM2.5
2.59	0.40	25930.71	3976.04

	PM10 Annual	PM2.5 Annual
2009	2.90	0.44
2010	2.90	0.44
2011	3.45	0.53
2012	3.07	0.47
2013	3.14	0.48

Emissions tons/year

	PM10	PM2.5
2009	3.05	0.47
2010	0.60	0.09
2011	6.06	0.93
2012	47.57	7.29
2013	2.05	0.31

Controlled Emissions (assumes 84% efficiency with use of soil binder)

Emissions lbs/day

PM10	PM2.5
4148.91	636.17

Emission Control 84%

Emissions tons/year

	PM10	PM2.5
2009	0.49	0.07
2010	0.10	0.01
2011	0.97	0.15
2012	7.61	1.17
2013	0.33	0.05

3) Disturbed Area Windblown Emissions

Assumptions
Emission Factor is 0.38 tons/disturbed acres/year of Total Suspended Particulate (AP-42 Section 11.9)
PM10 and PM2.5 fractions of TSP are 0.489 and 0.102 respectively per CEIDARS factors from SCAQMD CEQA Website
There are permanent and temporary disturbed acres that make up the total acre-years of disturbed area for each Segment
Disturbed areas are controlled by dust suppressants 84% control

Disturbed Acres (acre-years)	
2009	20
2010	41
2011	44
2012	136
2013	20

Emissions (tons/year)	
PM10	PM2.5
0.605568	0.124032
1.2414144	0.2542656
1.3322496	0.2728704
4.1178624	0.8434176
0.605568	0.124032

Fugitive Dust Emissions - AVAQMD Maximum Daily

Emission Categories
1) Earthmoving
2) Road Dust Paved/Unpaved

1) Earthmoving

Emission Types
A) Dozing
B) Grading
C) Material Loading/Handling

A) Dozing (AP-42 Section 11.9 for overburden)

$E = k \times (s)^{1.5} / (M)^{1.4}$ For PM10 and $k \times 5.7 \times (s)^{1.2} / (M)^{1.3}$ for PM2.5
E = lb/hr
k = Scaling Constant (0.75 for PM10 and 0.105 for PM2.5)
s = Silt Content (assumed to be 16% - SCAQMD Handbook for Farm Roads)
M = Moisture Content = 10% (assumes watering when necessary for mitigation)

PM10 Emission Factor
1.910914419 lb/hr

PM2.5 Emission Factor
0.835618668 lb/hr

Maximum Daily Dozer Use

	Hrs/day
Apr-12	4

Dozer Emissions

Lbs/Day	PM10	PM2.5
Apr-12	7.64	3.34

B) Grading

$E = k \times 0.051 \times (S)^{2.0}$ for PM10 and $k \times 0.040 \times (S)^{2.5}$ for PM2.5
E = lb/VMT
k = Scaling Constant (0.60 for PM10 and 0.031 for PM2.5)
S = Mean Vehicle Speed assumed to be 3 mph
Assumes VMT = 3 x hours in use

PM10 Emission Factor
0.2754 lb/VMT

PM2.5 Emission Factor
0.019329687 lb/VMT

Maximum Daily Grader VMT

	Hrs/day	VMT/day
Apr-12	4	12

Grading Emissions

Lbs/Day	PM10	PM2.5
Apr-12	3.30	0.23

C) Material Loading/Handling (AP-42, p. 13.2.4-3)

$E = (k)(0.0032)[(U/5)^{1.3}]/[(M/2)^{1.4}]$
E = lb/ton
k = Particle Size Constant (0.35 for PM10 and 0.11 for PM2.5)
U = average wind speed = 26.5 MPH worst day, 6.4 MPH avg from Norco Met File
M = moisture content = 10% (mitigated)
Three separate drops are assumed

Max Daily 54 Maximum daily tons

Emission Factors and Emissions

Emission Factors		Emissions lbs/day	
PM10 Daily	PM2.5 Daily	PM10	PM2.5
0.00103	0.00032	0.06	0.02

2) Road Dust

Emission Types
A) Paved Road Dust
B) Unpaved Road Dust

A) Paved Road Dust

E = [k x (sL/2)0.65 x (W/3)1.5 -C] x (1-P/4N)
E = lb/VMT
k = Constant (0.016 for PM10 and 0.0040 for PM2.5)
sL = Silt Loading (assumed to be 0.2 g/m2 - assumes 500 to 5,000 ADT profile of Table 13.2.1-3 average for all traffic)
W = Average weight of vehicles in tons (calculated below)
C = Correction for exhaust, break wear, tire wear (0.00047 lb/VMT for PM10, 0.00036 lb/VMT for PM2.5)
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Passenger Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Worst Case Day VMT

8460	Passenger Vehicles
2650	Delivery/Work Vehicles
1160	Heavy-Heavy Duty Vehicles
12270	Total Paved VMT

Average Weight = 5.9 Tons

Emission Factors and Emissions

Emission Factors	
PM10 Daily	PM2.5 Daily
0.0095	0.0021

Emissions lbs/day	
PM10	PM2.5
116.78	26.22

B) Unpaved Road Dust

$E = (k)[(s/12)^{0.9}][(W/3)^{0.45}][(365-P)/365]$ (for industrial sites)

k = constant = 1.5 lb/VMT for PM10 and 0.23 lb/VMT for PM2.5
s = Silt Content (assumed to be 16% - SCAQMD Handbook for Farm Roads)
W = avg. vehicle weight = calculated below
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Personal/Professionals/inspection Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Worst Case Day VMT

14	Passenger Vehicles
119	Delivery/Work Vehicles
56	Heavy-Heavy Duty Vehicles
188	Total Unpaved VMT

Average Weight = 14.1 Tons

Uncontrolled Emission Factors and Emissions

Emission Factors (lb/VMT)		Emissions lbs/day	
PM10 Daily	PM2.5 Daily	PM10	PM2.5
3.90	0.60	732.79	112.36

Controlled Emissions (assumes 84% efficiency with use of soil binder)

Emissions lbs/day	
PM10	PM2.5
117.25	17.98

Emission Control
84%

3) Disturbed Area Windblown Emissions

Assumption

Average day in 2012 for Segments 6 and 11

PM10	PM2.5
27	6

Fugitive Dust Emission Totals Maximum Day

	PM10 lb/day	PM2.5 lb/day
Dozer	7.64	3.34
Grading	3.30	0.23
Soil Handling	0.06	0.02
Paved Road Dust	116.78	26.22
Unpaved Road Dust	117.25	17.98
Wind Blown Dust	26.88	5.50
Totals	271.90	53.29

Fugitive Dust Emissions - KCAPCD Maximum Daily

Emission Categories
1) Earthmoving
2) Road Dust Paved/Unpaved

1) Earthmoving

Emission Types
A) Dozing
B) Grading
C) Material Loading/Handling

A) Dozing (AP-42 Section 11.9 for overburden)

$E = k \times (s)^{1.5} / (M)^{1.4}$ For PM10 and $k \times 5.7 \times (s)^{1.2} / (M)^{1.3}$ for PM2.5
E = lb/hr
k = Scaling Constant (0.75 for PM10 and 0.105 for PM2.5)
s = Silt Content (assumed to be 16% - SCAQMD Handbook for Farm Roads)
M = Moisture Content = 10% (assumes watering when necessary for mitigation)

PM10 Emission Factor
1.910914419 lb/hr

PM2.5 Emission Factor
0.835618668 lb/hr

Maximum Daily Dozer Use

	Hrs/day
Oct-10	12

Dozer Emissions

Lbs/Day	PM10	PM2.5
Oct-10	22.93	10.03

B) Grading

$E = k \times 0.051 \times (S)^{2.0}$ for PM10 and $k \times 0.040 \times (S)^{2.5}$ for PM2.5
E = lb/VMT
k = Scaling Constant (0.60 for PM10 and 0.031 for PM2.5)
S = Mean Vehicle Speed assumed to be 3 mph
Assumes VMT = 3 x hours in use

PM10 Emission Factor
0.2754 lb/VMT

PM2.5 Emission Factor
0.019329687 lb/VMT

Maximum Daily Grader VMT

	Hrs/day	VMT/day
Oct-10	4	12

Grading Emissions

Lbs/Day	PM10	PM2.5
Oct-10	3.30	0.23

C) Material Loading/Handling (AP-42, p. 13.2.4-3)

$E = (k)(0.0032)[(U/5)^{1.3}]/[(M/2)^{1.4}]$
E = lb/ton
k = Particle Size Constant (0.35 for PM10 and 0.11 for PM2.5)
U = average wind speed = 26.5 MPH worst day, 6.4 MPH avg from Norco Met File
M = moisture content = 10% (mitigated)
Three separate drops are assumed

Max Daily 54 Maximum daily tons

Emission Factors and Emissions

Emission Factors		Emissions lbs/day	
PM10 Daily	PM2.5 Daily	PM10	PM2.5
0.00103	0.00032	0.06	0.02

2) Road Dust

Emission Types
A) Paved Road Dust
B) Unpaved Road Dust

A) Paved Road Dust

E = [k x (sL/2)0.65 x (W/3)1.5 -C] x (1-P/4N)
E = lb/VMT
k = Constant (0.016 for PM10 and 0.0040 for PM2.5)
sL = Silt Loading (assumed to be 0.2 g/m2 - assumes 500 to 5,000 ADT profile of Table 13.2.1-3 average for all traffic)
W = Average weight of vehicles in tons (calculated below)
C = Correction for exhaust, break wear, tire wear (0.00047 lb/VMT for PM10, 0.00036 lb/VMT for PM2.5)
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Passenger Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Worst Case Day VMT

17560	Passenger Vehicles
4560	Delivery/Work Vehicles
1810	Heavy-Heavy Duty Vehicles
23930	Total Paved VMT

Average Weight = 5.3 Tons

Emission Factors and Emissions

Emission Factors	
PM10 Daily	PM2.5 Daily
0.0078	0.0017

Emissions lbs/day	
PM10	PM2.5
187.82	41.15

B) Unpaved Road Dust

$E = (k)[(s/12)^{0.9}][(W/3)^{0.45}][(365-P)/365]$ (for industrial sites)

k = constant = 1.5 lb/VMT for PM10 and 0.23 lb/VMT for PM2.5
s = Silt Content (assumed to be 16% - SCAQMD Handbook for Farm Roads)
W = avg. vehicle weight = calculated below
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Personal/Professionals/inspection Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Worst Case Day VMT

25	Passenger Vehicles
224	Delivery/Work Vehicles
85	Heavy-Heavy Duty Vehicles
334	Total Unpaved VMT

Average Weight = 13.2 Tons

Uncontrolled Emission Factors and Emissions

Emission Factors (lb/VMT)		Emissions lbs/day	
PM10 Daily	PM2.5 Daily	PM10	PM2.5
3.78	0.58	1262.86	193.64

Controlled Emissions (assumes 84% efficiency with use of soil binder)

Controlled Emissions lbs/day	
PM10	PM2.5
202.06	30.98

Emission Control
84%

3) Disturbed Area Windblown Emissions

Assumption

Average day in 2010 for Segments 4 and 10

PM10	PM2.5
29	6

Fugitive Dust Emission Totals Maximum Day

	PM10 lb/day	PM2.5 lb/day
Dozer	22.93	10.03
Grading	3.30	0.23
Soil Handling	0.06	0.02
Paved Road Dust	187.82	41.15
Unpaved Road Dust	202.06	30.98
Wind Blown Dust	28.87	5.91
Totals	445.04	88.32

Fugitive Dust Emissions - SCAQMD Maximum Daily

Emission Categories
1) Earthmoving
2) Road Dust Paved/Unpaved

1) Earthmoving

Emission Types
A) Dozing
B) Grading
C) Material Loading/Handling

A) Dozing (AP-42 Section 11.9 for overburden)

$E = k \times (s)^{1.5} / (M)^{1.4}$ For PM10 and $k \times 5.7 \times (s)^{1.2} / (M)^{1.3}$ for PM2.5
E = lb/hr
k = Scaling Constant (0.75 for PM10 and 0.105 for PM2.5)
s = Silt Content (assumed to be 12% - SCAQMD Handbook for Mountain Roads)
M = Moisture Content = 10% (assumes watering when necessary for mitigation)

PM10 Emission Factor
1.241175323 lb/hr

PM2.5 Emission Factor
0.591672862 lb/hr

Maximum Daily Dozer Use

	Hrs/day
2009	40

Dozer Emissions

Lbs/Day	PM10	PM2.5
2009	76.44	33.42

B) Grading

$E = k \times 0.051 \times (S)^{2.0}$ for PM10 and $k \times 0.040 \times (S)^{2.5}$ for PM2.5
E = lb/VMT
k = Scaling Constant (0.60 for PM10 and 0.031 for PM2.5)
S = Mean Vehicle Speed assumed to be 3 mph
Assumes VMT = 3 x hours in use

PM10 Emission Factor
0.2754 lb/VMT

PM2.5 Emission Factor
0.019329687 lb/VMT

Maximum Daily Grader VMT

	Hrs/day	VMT/day
2009	9	27

Grading Emissions

Lbs/Day	PM10	PM2.5
2009	7.44	0.52

C) Material Loading/Handling (AP-42, p. 13.2.4-3)

$E = (k)(0.0032)[(U/5)^{1.3}]/[(M/2)^{1.4}]$
E = lb/ton
k = Particle Size Constant (0.35 for PM10 and 0.11 for PM2.5)
U = average wind speed = 26.5 MPH worst day, 6.4 MPH avg from Norco Met File
M = moisture content = 10% (mitigated)
Three separate drops are assumed

Max Daily 216 Maximum daily tons

Emission Factors and Emissions

Emission Factors		Emissions lbs/day	
PM10 Daily	PM2.5 Daily	PM10	PM2.5
0.00103	0.00032	0.22	0.07

2) Road Dust

Emission Types
A) Paved Road Dust
B) Unpaved Road Dust

A) Paved Road Dust

E = [k x (sL/2)0.65 x (W/3)1.5 -C] x (1-P/4N)
E = lb/VMT
k = Constant (0.016 for PM10 and 0.0040 for PM2.5)
sL = Silt Loading (assumed to be 0.2 g/m2 - assumes 500 to 5,000 ADT profile of Table 13.2.1-3 average for all traffic)
W = Average weight of vehicles in tons (calculated below)
C = Correction for exhaust, break wear, tire wear (0.00047 lb/VMT for PM10, 0.00036 lb/VMT for PM2.5)
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Passenger Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Worst Case Day VMT

13360	Passenger Vehicles
4180	Delivery/Work Vehicles
2630	Heavy-Heavy Duty Vehicles
20170	Total Paved VMT

Average Weight = 6.9 Tons

Emission Factors and Emissions

Emission Factors	
PM10 Daily	PM2.5 Daily
0.0120	0.0028

Emissions lbs/day	
PM10	PM2.5
242.22	55.66

B) Unpaved Road Dust

$E = (k)[(s/12)^{0.9}][(W/3)^{0.45}][(365-P)/365]$ (for industrial sites)

k = constant = 1.5 lb/VMT for PM10 and 0.23 lb/VMT for PM2.5
s = Silt Content (assumed to be 12% - SCAQMD Handbook for Mountain Roads)
W = avg. vehicle weight = calculated below
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Personal/Professionals/inspection Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Worst Case Day VMT

29	Passenger Vehicles
188	Delivery/Work Vehicles
119	Heavy-Heavy Duty Vehicles
335.8649512	Total Unpaved VMT

Average Weight = 15.3 Tons

Uncontrolled Emission Factors and Emissions

Emission Factors (lb/VMT)		Emissions lbs/day	
PM10 Daily	PM2.5 Daily	PM10	PM2.5
3.13	0.48	1049.92	160.99

Controlled Emissions (assumes 84% efficiency with use of soil binder)

Emissions lbs/day	
PM10	PM2.5
167.99	25.76

Emission Control
84%

3) Disturbed Area Windblown Emissions

Assumption

Average day in 2010 for Segments 6, 7, 8, and 11

PM10	PM2.5
49	10

Fugitive Dust Emission Totals Maximum Day

	PM10 lb/day	PM2.5 lb/day
Dozer	76.44	33.42
Grading	7.44	0.52
Soil Handling	0.22	0.07
Paved Road Dust	242.22	55.66
Unpaved Road Dust	167.99	25.76

Totals	494.30	115.44

LST Daily Emissions Estimate

Assumptions:
1) Three Worst-Case Construction Types - 1) Construction of Marshalling Yards, 2) Tower Construction, and 3) Substation Construction
2) Localized emissions include the on-site emissions only, so are comprised of the offroad equipment and their associated Fugitive Dust activities and onroad emissions and the unpaved road dust within 0.1 miles (0.05 miles each way).

Marshalling Yards - 2009 Emission Factor Basis

Offroad Emissions

	HP	Number	SCAQMD Emission Factor lbs/hour ROG	CO	NOX	SOX	PM	Hours/day	Daily Emissions lbs ROG	CO	NOX	SOX	PM
Crane, Hydraulic, Rough Terrain 35 ton	155	1	0.1244	0.4490	0.8777	0.0008	0.0589	2	0.25	0.90	1.76	0.00	0.12
Forklift, 5 ton	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.43	1.23	1.41	0.00	0.15
Forklift, 10 ton	85	1	0.0709	0.2097	0.2661	0.0003	0.0275	6	0.43	1.26	1.60	0.00	0.17
Motor, Auxilary Power	5	1	0.0060	0.0246	0.0399	0.0001	0.0024	1	0.01	0.02	0.04	0.00	0.00
									1.11	3.41	4.80	0.00	0.43

Onroad Emissions

Vehicle Type	Emissions Factor lb/mile VOC	CO	NOx	SOx	PM	VMT Total	Daily Emissions lbs VOC	CO	NOx	SOx	PM
Passenger	0.0012	0.0108	0.0011	0.0000	0.0001	0.6	0.00	0.01	0.00	0.00	0.00
Delivery	0.0023	0.0145	0.0215	0.0000	0.0004	0.3	0.00	0.00	0.01	0.00	0.00
Heavy-Heavy Duty	0.0010	0.0047	0.0295	0.0000	0.0006	0.1	0.00	0.00	0.00	0.00	0.00
						Totals	0.00	0.01	0.01	0.00	0.00

Fugitive Dust Emissions

	PM10 lb/mile	PM2.5 lbs/mile
Unpaved Road Efs	0.50	0.08
	PM10 lbs/day	PM2.5 lbs/day
(based on SCAQMD worst case day)	0.50	0.08

Total Miles
1.0

No dozing/grading or soil movement

Local Daily Emission Totals		VOC	CO	NOx	SOx	PM10	PM2.5
Marshalling Yard Construction	Offroad	1.11	3.41	4.80	0.00	0.43	0.40
	Onroad	0.00	0.01	0.01	0.00	0.00	0.00
	Fugitive Dust	--	--	--	--	0.50	0.08
Total		1.12	3.42	4.81	0.00	0.93	0.48

LST Daily Emissions Estimate

Tower Construction - 2010 Tower Steel

Offroad Emissions

	HP	Number	SCAQMD Emission Factor lbs/hour ROG	CO	NOX	SOX	PM
Crane, Hydraulic, 150/300 Ton	450	1	0.1706	0.5992	1.6652	0.0017	0.0642
Crane, Hydraulic, Rough Terrain 35 ton	155	3	0.1177	0.4459	0.8298	0.0008	0.0562
Compressor, Air	75	5	0.1110	0.3005	0.3668	0.0004	0.0365
Motor, Auxilary Power	5	2	0.0057	0.0242	0.0385	0.0001	0.0023

	Daily Emissions lbs				
Hours/day	ROG	CO	NOX	SOX	PM
8	1.36	4.79	13.32	0.01	0.51
8	2.82	10.70	19.92	0.02	1.35
7.5	4.16	11.27	13.76	0.01	1.37
2	0.02	0.10	0.15	0.00	0.01
	8.37	26.86	47.15	0.05	3.24

Onroad Emissions

	Emissions Factor lb/mile				
Vehicle Type	VOC	CO	NOx	SOx	PM
Passenger	0.0011	0.0100	0.0010	0.0000	0.0001
Delivery	0.0021	0.0132	0.0193	0.0000	0.0004
Heavy-Heavy Duty	0.0009	0.0043	0.0258	0.0000	0.0005

VMT	Daily Emissions lbs				
Total	VOC	CO	NOx	SOx	PM
4.8	0.01	0.05	0.00	0.00	0.00
1.4	0.00	0.02	0.03	0.00	0.00
0.3	0.00	0.00	0.01	0.00	0.00
Totals	0.01	0.07	0.04	0.00	0.00

Fugitive Dust Emissions

	PM10	PM2.5
	lb/mile	lbs/mile
Unpaved Road Efs	0.50	0.08
	PM10	PM2.5
(based on SCAQMD worst case day)	lbs/day	lbs/day
	3.25	0.50

No dozing/grading or soil movement

Total Miles
6.5

Local Daily Emission Totals		VOC	CO	NOx	SOx	PM10	PM2.5
Tower Construction	Offroad	8.37	26.86	47.15	0.05	3.24	2.98
	Onroad	0.01	0.07	0.04	0.00	0.00	0.00
	Fugitive Dust	--	--	--	--	3.25	0.50
Total		8.38	26.93	47.19	0.05	6.49	3.48

LST Daily Emissions Estimate

Substation Construction - Transformer Element in SCAQMD Jurisdiction - 2011

Offroad Emissions

			SCAQMD Emission Factor lbs/hour				
	HP	Number	ROG	CO	NOX	SOX	PM
50 ton crane	200	2	0.1156	0.4330	0.9692	0.0010	0.0486
Forklift	75	1	0.0572	0.1917	0.2134	0.0003	0.0208
Manlifts	75	1	0.0572	0.1917	0.2134	0.0003	0.0208

	Daily Emissions lbs				
Hours/day	ROG	CO	NOX	SOX	PM
6	1.39	5.20	11.63	0.01	0.58
6	0.34	1.15	1.28	0.00	0.12
6	0.34	1.15	1.28	0.00	0.12
	2.07	7.50	14.19	0.02	0.83

Onroad Emissions

	Emissions Factor lb/mile				
Vehicle Type	VOC	CO	NOx	SOx	PM
Passenger	0.0010	0.0093	0.0010	0.0000	0.0001
Delivery	0.0020	0.0121	0.0170	0.0000	0.0004
Heavy-Heavy Duty	0.0009	0.0041	0.0221	0.0000	0.0005

VMT	Daily Emissions lbs				
Total	VOC	CO	NOx	SOx	PM
4.8	0.00	0.04	0.00	0.00	0.00
1.4	0.00	0.02	0.02	0.00	0.00
0.3	0.00	0.00	0.01	0.00	0.00
Totals	0.01	0.06	0.04	0.00	0.00

Fugitive Dust Emissions

Negligible at existing SCAQMD paved substation sites

Local Daily Emission Totals		VOC	CO	NOx	SOx	PM10	PM2.5
Substation Construction	Offroad	2.07	7.50	14.19	0.02	0.83	0.77
	Onroad	0.01	0.06	0.04	0.00	0.00	0.00
	Fugitive Dust	--	--	--	--	0.00	0.00
Total		2.08	7.56	14.23	0.02	0.83	0.77

Alternative 2. - Operating Emissions

Daily Emissions (lbs)

AVAQMD		VOC	CO	NOx	SOx	PM10	PM2.5
Road Construction	Offroad	4.16	15.84	32.93	0.04	1.66	1.52
	Onroad	0.52	3.79	3.53	0.01	0.10	0.10
	Fugitive Dust	--	--	--	--	55.00	18.70
Helicopter - Hughes 500		1.68	3.76	7.67	0.06	0.42	0.38
Total		6.36	23.38	44.12	0.11	57.17	20.71

SCAQMD		VOC	CO	NOx	SOx	PM10	PM2.5
Road Construction	Offroad	4.16	15.84	32.93	0.04	1.66	1.52
	Onroad	0.80	5.78	5.55	0.02	0.16	0.15
	Fugitive Dust	--	--	--	--	58.27	17.08
Helicopter - Hughes 500		1.68	3.76	7.67	0.06	0.42	0.38
Total		6.64	25.37	46.14	0.12	60.50	19.14

KCAPCD		VOC	CO	NOx	SOx	PM10	PM2.5
Road Construction	Offroad	4.16	15.84	32.93	0.04	1.66	1.52
	Onroad	0.93	6.95	5.47	0.02	0.17	0.16
	Fugitive Dust	--	--	--	--	65.22	20.60
Helicopter - Hughes 500		1.68	3.76	7.67	0.06	0.42	0.38
Total		6.77	26.54	46.06	0.12	67.46	22.67

Annual Emissions (lbs)

AVAQMD		VOC	CO	NOx	SOx	PM10	PM2.5
Road Construction	Offroad	83.25	316.71	658.51	0.76	33.11	30.46
	Onroad	10.48	75.75	70.52	0.23	2.08	1.92
	Fugitive Dust	--	--	--	--	1,099.93	374.06
Helicopter - Hughes 500		8.38	18.78	38.34	0.32	2.09	1.92
Total		102.11	411.24	767.37	1.31	1,137.21	408.35

SCAQMD		VOC	CO	NOx	SOx	PM10	PM2.5
Road Construction	Offroad	83.25	316.71	658.51	0.76	33.11	30.46
	Onroad	16.09	115.57	110.90	0.36	3.25	2.99
	Fugitive Dust	--	--	--	--	1,165.30	341.69
Helicopter - Hughes 500		8.38	18.78	38.34	0.32	2.09	1.92
Total		107.72	451.05	807.74	1.43	1,203.74	377.06

KCAPCD		VOC	CO	NOx	SOx	PM10	PM2.5
Road Construction	Offroad	83.25	316.71	658.51	0.76	33.11	30.46
	Onroad	18.59	139.02	109.44	0.38	3.42	3.14
	Fugitive Dust	--	--	--	--	1,304.34	412.08
Helicopter - Hughes 500		8.38	18.78	38.34	0.32	2.09	1.92
Total		110.22	474.51	806.28	1.45	1,342.95	447.61

Annual Emissions (ton)

AVAQMD		VOC	CO	NOx	SOx	PM10	PM2.5
Road Construction	Offroad	0.04	0.16	0.33	0.00	0.02	0.02
	Onroad	0.01	0.04	0.04	0.00	0.00	0.00
	Fugitive Dust	--	--	--	--	0.55	0.19
Helicopter - Hughes 500		0.00	0.01	0.02	0.00	0.00	0.00
Total		0.05	0.21	0.38	0.00	0.57	0.20

SCAQMD		VOC	CO	NOx	SOx	PM10	PM2.5
Road Construction	Offroad	0.04	0.16	0.33	0.00	0.02	0.02
	Onroad	0.01	0.06	0.06	0.00	0.00	0.00
	Fugitive Dust	--	--	--	--	0.58	0.17
Helicopter - Hughes 500		0.00	0.01	0.02	0.00	0.00	0.00
Total		0.05	0.23	0.40	0.00	0.60	0.19

KCAPCD		VOC	CO	NOx	SOx	PM10	PM2.5
Road Construction	Offroad	0.04	0.16	0.33	0.00	0.02	0.02
	Onroad	0.01	0.07	0.05	0.00	0.00	0.00
	Fugitive Dust	--	--	--	--	0.65	0.21
Helicopter - Hughes 500		0.00	0.01	0.02	0.00	0.00	0.00
Total		0.06	0.24	0.40	0.00	0.67	0.22

GHG Emission Calculations

Alternative 2 - Proposed Project

Construction			Emission Factors			Emissions
		Fuel Use	CO_2	CH_4	N_2O	CO_2-eq
		gallons	kg/gal	kg/gal	kg/gal	tonnes
Offroad	Diesel	1,255,891	10.15	0.0014	0.0001	12,823
	Gasoline		8.81	0.0013	0.0001	0
	Jet A	709,571	9.57	0.0014	0.0001	6,833
Onroad	Passenger	623,964	8.55	0.0014	0.002	5,740
	Delivery	334,168	9.96	0.00072	0.0006	3,396
	HHDT	439,274	9.96	0.000312	0.00026	4,413
					Total	**33,206**

Construction	SF_6 losses	CO_2-eq
	lbs	tonnes
Elect. Eq.	2217.5	24,035

887 lbs/year final leakage rate with 5 years at 50%

Total **57,241** **tonnes, CO_2-eq**

Operation			Emission Factors			Emissions
		Fuel Use	CO_2	CH_4	N_2O	CO_2-eq
		gallons	kg/gal	kg/gal	kg/gal	tonnes
Offroad	Diesel	6,213	10.15	0.0014	0.0001	63
	Gasoline		8.81	0.0013	0.0001	0
	Jet A	787	9.57	0.0014	0.0001	8
Onroad	Passenger	641	8.55	0.0014	0.002	6
	Delivery	210	9.96	0.00072	0.0006	2
	HHDT	729	9.96	0.000312	0.00026	7
					Total	**86**

Construction	SF_6 losses	CO_2-eq
	lbs	tonnes
Elect. Eq.	887	9,614

Total **9,701** **tonnes, CO_2-eq**

Indirect GHG Emission Reductions from Wind/Solar Energy in SCE Territory

613 SCE Service Area Average GHG emissions lbs/MWh
12 Wind/Solar Energy (maintenance) GHG emissions lbs/MWh (based on Beacon Solar Project)

TRTP Renewable Capacity
3800 MW

Renewable Annual Capacity Factor
35 Percent

* Note: e-mail noted 35 percent but used 30 percent

Net Renewable Energy MWh/yr
11650800

GHG Emissions CO2eq Metric Tons/Year
3175570

Assumption
Renewable Energy Connected to TRTP is primarily Wind but will also include Solar

TRTP Alternative 3 Project Construction Emission Totals
AVAQMD Jurisdiction

Worst-Case Day
Same as Alternative 2

Incremental Annual Emissions

2009 Emissions
Same as Alternative 2

2010 Emissions - would be reduced by following;

	Emissions (ton/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	-0.0072	-0.0556	-0.0436	-0.0001	-0.0011	-0.0010
Offroad Vehicles/Equipm	-0.0114	-0.0385	-0.0744	-0.0001	-0.0046	-0.0042
Helicopter	-0.0005	-0.0011	-0.0023	0.0000	-0.0001	-0.0001
Fugitive Dust	--	--	--	--	-0.16	-0.04
Totals	-0.02	-0.10	-0.12	0.00	-0.16	-0.04

2011 Emissions
Same as Alternative 2

2012 Emissions
Same as Alternative 2

2013 Emissions
Same as Alternative 2

Note: This alternative does not significantly impact the SCAQMD, KCAPCD, or the ANF.

TRTP Alternative 4.C. Project Construction Emission Totals
SCAQMD Juridiction

Incremental Annual Emissions

2009 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.00	-0.01	-0.02	0.00	0.00	0.00
Offroad Vehicles/Equipment	-0.11	-0.37	-0.76	0.00	-0.04	-0.04
Helicopter	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust	--	--	--	--		
Totals	**-0.11**	**-0.38**	**-0.77**	**0.00**	**-0.04**	**-0.04**

2010 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	-0.61	-4.61	-3.87	-0.01	-0.09	-0.09
Offroad Vehicles/Equipment	-1.35	-4.61	-8.62	-0.01	-0.55	-0.51
Helicopter	-0.043	-0.096	-0.196	-0.002	-0.011	-0.010
Fugitive Dust	--	--	--	--		
Totals	**-2.00**	**-9.32**	**-12.68**	**-0.02**	**-0.65**	**-0.60**

2011 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.46	3.11	3.36	0.01	0.08	0.07
Offroad Vehicles/Equipment	1.00	3.86	9.63	0.01	0.42	0.39
Helicopter	-0.019	-0.042	-0.086	-0.001	-0.005	-0.004
Fugitive Dust	--	--	--	--		0.00
Totals	**1.45**	**6.93**	**12.90**	**0.02**	**0.50**	**0.46**

2012 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.13	1.00	0.71	0.00	0.02	0.02
Offroad Vehicles/Equipment	0.46	1.71	3.00	0.00	0.18	0.17
Helicopter	-0.017	-0.038	-0.077	-0.001	-0.004	-0.004
Fugitive Dust	--	--	--	--		
Totals	**0.57**	**2.67**	**3.63**	**0.01**	**0.20**	**0.18**

2013 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.00	0.00	0.00	0.00	0.00	0.00
Offroad Vehicles/Equipment	0.00	0.00	0.00	0.00	0.00	0.00
Helicopter	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust	--	--	--	--		
Totals	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Note: This alternative does not significantly impact the AVAQMD, KCAPCD, or the ANF.

TRTP Alternative 4.A. Project Construction Emission Totals
SCAQMD Juridiction

Incremental Annual Emissions

2009 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.00	-0.01	-0.02	0.00	0.00	0.00
Offroad Vehicles/Equipment	-0.11	-0.37	-0.76	0.00	-0.04	-0.04
Helicopter	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust	--	--	--	--		
Totals	**-0.11**	**-0.38**	**-0.77**	**0.00**	**-0.04**	**-0.04**

2010 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	-0.61	-4.61	-3.87	-0.01	-0.09	-0.09
Offroad Vehicles/Equipment	-1.35	-4.61	-8.62	-0.01	-0.55	-0.51
Helicopter	-0.04	-0.10	-0.20	0.00	-0.01	-0.01
Fugitive Dust	--	--	--	--		
Totals	**-2.00**	**-9.32**	**-12.68**	**-0.02**	**-0.65**	**-0.60**

2011 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.17	0.88	1.74	0.00	0.03	0.03
Offroad Vehicles/Equipment	0.22	0.80	3.26	0.00	0.08	0.07
Helicopter	-0.047	-0.105	-0.215	-0.002	-0.012	-0.011
Fugitive Dust	--	--	--	--		
Totals	**0.34**	**1.57**	**4.79**	**0.01**	**0.10**	**0.09**

2012 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	-0.01	1.26	0.83	0.00	0.02	0.02
Offroad Vehicles/Equipment	0.18	1.53	2.77	0.00	0.16	0.15
Helicopter	-0.064	-0.143	-0.291	-0.002	-0.016	-0.01
Fugitive Dust	--	--	--	--		
Totals	**0.10**	**2.64**	**3.31**	**0.00**	**0.17**	**0.16**

2013 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.00	0.00	0.00	0.00	0.00	0.00
Offroad Vehicles/Equipment	0.00	0.00	0.00	0.00	0.00	0.00
Helicopter	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust	--	--	--	--		
Totals	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Note: This alternative does not significantly impact the AVAQMD, KCAPCD, or the ANF.

TRTP Alternative 4.B. Project Construction Emission Totals
SCAQMD Juridiction

Incremental Annual Emissions

2009 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.00	-0.01	-0.02	0.00	0.00	0.00
Offroad Vehicles/Equipment	-0.11	-0.37	-0.76	0.00	-0.04	-0.04
Helicopter	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust	--	--	--	--		
Totals	**-0.11**	**-0.38**	**-0.77**	**0.00**	**-0.04**	**-0.04**

2010 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	-0.61	-4.61	-3.87	-0.01	-0.09	-0.09
Offroad Vehicles/Equipment	-1.35	-4.61	-8.62	-0.01	-0.55	-0.51
Helicopter	-0.04	-0.10	-0.20	0.00	-0.01	-0.01
Fugitive Dust	--	--	--	--		
Totals	**-2.00**	**-9.32**	**-12.68**	**-0.02**	**-0.65**	**-0.60**

2011 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.31	1.94	2.51	0.01	0.05	0.05
Offroad Vehicles/Equipment	0.59	2.25	6.28	0.01	0.24	0.22
Helicopter	-0.034	-0.075	-0.154	-0.001	-0.008	-0.008
Fugitive Dust	--	--	--	--		
Totals	**0.87**	**4.12**	**8.64**	**0.01**	**0.29**	**0.27**

2012 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.06	0.45	0.24	0.00	0.01	0.01
Offroad Vehicles/Equipment	0.31	1.14	2.03	0.00	0.12	0.11
Helicopter	-0.041	-0.093	-0.189	-0.002	-0.010	-0.009
Fugitive Dust	--	--	--	--		
Totals	**0.32**	**1.49**	**2.07**	**0.00**	**0.12**	**0.11**

2013 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.00	0.00	0.00	0.00	0.00	0.00
Offroad Vehicles/Equipment	0.00	0.00	0.00	0.00	0.00	0.00
Helicopter	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust	--	--	--	--		
Totals	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Note: This alternative does not significantly impact the AVAQMD, KCAPCD, or the ANF.

TRTP Alternative 4.D. Project Construction Emission Totals
SCAQMD Juridiction

Incremental Annual Emissions

2009 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.00	-0.01	-0.02	0.00	0.00	0.00
Offroad Vehicles/Equipment	-0.11	-0.37	-0.76	0.00	-0.04	-0.04
Helicopter	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust	--	--	--	--		
Totals	**-0.11**	**-0.38**	**-0.77**	**0.00**	**-0.04**	**-0.04**

2010 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	-0.61	-4.61	-3.87	-0.01	-0.09	-0.09
Offroad Vehicles/Equipment	-1.35	-4.61	-8.62	-0.01	-0.55	-0.51
Helicopter	-0.04	-0.10	-0.20	0.00	-0.01	-0.01
Fugitive Dust	--	--	--	--		
Totals	**-2.00**	**-9.32**	**-12.68**	**-0.02**	**-0.65**	**-0.60**

2011 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.38	2.50	2.92	0.01	0.07	0.06
Offroad Vehicles/Equipment	0.79	3.02	7.88	0.01	0.33	0.30
Helicopter	-0.027	-0.059	-0.121	-0.001	-0.007	-0.006
Fugitive Dust	--	--	--	--		
Totals	**1.15**	**5.46**	**10.67**	**0.02**	**0.39**	**0.36**

2012 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.09	0.71	0.46	0.00	0.01	0.01
Offroad Vehicles/Equipment	0.38	1.41	2.49	0.00	0.15	0.14
Helicopter	0.066	0.147	0.300	0.002	0.016	0.015
Fugitive Dust	--	--	--	--		
Totals	**0.54**	**2.27**	**3.25**	**0.01**	**0.18**	**0.17**

2013 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.00	0.00	0.00	0.00	0.00	0.00
Offroad Vehicles/Equipment	0.00	0.00	0.00	0.00	0.00	0.00
Helicopter	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust	--	--	--	--		
Totals	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Note: This alternative does not significantly impact the AVAQMD, KCAPCD, or the ANF.

Alternative 4C Schedule

Major Elements
 # Days in Full Month (6 days/week)
Onsite Construction Elements Begin in 2009

Segment 8	Crew Size	Total Days	Start Date	End Date	Employee Vehicel no. of vehicle	Paved	Unpaved	Total VMT/day	Delivery Truck no. of vehicle	Paved	Unpaved	Total VMT/day	Heavy Heavy Duty Truck no. of vehicle	Paved	Unpaved	Total VMT/day
Marshalling Yards, -5 & +5 other elements	4	**282**	**1-May-11**	**5-Apr-12**	4	40	0.10	160.40	1	40	0.10	40.10	1	90	0.10	90.10
Road Maintenance	2	**253**	**1-Jun-11**	**31-Mar-12**	2	40	0.10	80.20	1	40	3.00	43.00	0	60	3.00	0.00
500 kV T/L Construction	**Crew Size**															
Road Construction	8	**60**	**1-May-11**	**12-Jul-11**	8	40	0.10	320.80	2	40	3.00	86.00	3	40	3.00	129.00
Foundation Construction	24	**85**	**16-May-11**	**23-Aug-11**	24	40	0.10	962.40	8	40	3.00	344.00	7	40	3.00	301.00
Tower Construction	48	**175**	**16-Jun-11**	**13-Jan-12**	48	40	0.10	1924.80	14	40	3.00	602.00	3	40	3.00	129.00
String Cable	40	**120**	**5-Nov-11**	**31-Mar-12**	40	40	0.10	1604.00	15	40	3.00	645.00	6	40	3.00	258.00
Restoration/Guard Poles	7	**75**	**7-Jan-12**	**5-Apr-12**	7	40	0.10	280.70	3	40	3.00	129.00	3	40	3.00	129.00
IT/Communications	6	**20**	**6-Apr-12**	**29-Apr-12**	6	40	0.10	240.60	1	40	3.00	43.00	0	40	3.00	0.00
230 kV Wreckout	26	**65**	**20-Jan-12**	**5-Apr-12**	26	40	0.10	1042.60	12	40	0.50	486.00	10	40	0.50	405.00
New Switchyard																
Grading Element	15	**80**	**1-May-11**	**4-Aug-11**	15	40	0.25	603.75	81	40	0.25	3260.25	3	40	0.25	120.75
Civil Element	25	**100**	**5-Aug-11**	**3-Dec-11**	25	40	0.25	1006.25	6	40	0.25	241.5	4	90	0.25	361
Electrical Element	25	**120**	**5-Dec-11**	**26-Apr-02**	25	40	0.10	1002.5	6	40	0.1	240.6	0	40	0.1	0
Testing	4	**10**	**19-Apr-12**	**30-Apr-02**	4	40	0.10	160.4	0	40	0.1	0	0	40	0.1	0

Assumptions/Notes

No incremental change in construction of marshalling yards for Segment 8 as a whole.

New switchyard estimate, not provided by SCE, is based partially on Whirlwind Substation estimate assuming more per acre grading required at the switchyard site and assuming no transformer element assumed for a switchyard and total construction duration of one year.

Crew sizes and equipment for various constrution elements have been made consistent with those assumed for the proposed project.

Many of the SCE durations are inconsistently long in comparison to other segment/subsegment construction assumptions and may overestimate the construction requirements for the T-Line construction.

Marshalling Yard duration increased to account for 6 day/week construction schedule and otherwise fill schedule during other elements

Alternative 4C Schedule

Major Elements	PAVED						UNPAVED						TOTAL					
# Days in Full Month (6 days/week)	2011			2012			2011			2012			2011			2012		
Onsite Construction Elements Begin in 2009																		
Segment 8	Employ Vehicle	Delivery Truck	HHDT	Vehicle	Truck	HHDT	Employ Vehicle	Delivery Truck	HHDT	Vehicle	Truck	HHDT	Employ Vehicle	Delivery Truck	HHDT	Vehicle	Truck	HHDT
Marshalling Yards, -5 & +5 other elements	32480	8120	18270	12640	3160	7110	81.20	20.30	20.30	31.60	7.90	7.90	32561.20	8140.30	18290.30	12671.60	3167.90	7117.90
Road Maintenance	14240	7120	0	6000	3000	0	35.60	534.00	0.00	15.00	225.00	0.00	14275.60	7654.00	0.00	6015.00	3225.00	0.00
500 kV T/L Construction																		
Road Construction	19200	4800	7200	0	0	0	48	360	540	0	0	0	19248	5160	7740	0	0	0
Foundation Construction	81600	27200	23800	0	0	0	204	2040	1785	0	0	0	81804	29240	25585	0	0	0
Tower Construction	316800	92400	19800	19200	5600	1200	792	6930	1485	48	420	90	317592	99330	21285	19248	6020	1290
String Cable	72000	27000	10800	120000	45000	18000	180	2025	810	300	3375	1350	72180	29025	11610	120300	48375	19350
Restoration/Guard Poles	0	0	0	21000	9000	9000	0	0	0	53	675	675	0	0	0	21053	9675	9675
IT/Communications	0	0	0	4800	800	0	0	0	0	12	60	0	0	0	0	4812	860	0
230 kV Wreckout	0	0	0	67600	31200	26000	0	0	0	169	390	325	0	0	0	67769	31590	26325
New Switchyard																		
Grading Element	48000	259200	9600	0	0	0	300	1620	60	0	0	0	48300	260820	9660	0	0	0
Civil Element	100000	24000	36000	0	0	0	625	150	100	0	0	0	100625	24150	36100	0	0	0
Electrical Element	23000	5520	0	97000	23280	0	58	14	0	243	58	0	23058	5534	0	97243	23338	0
Testing	0	0	0	1600	0	0	0	0	0	4	0	0	0	0	0	1604	0	0

Alternative 4 C

Onroad Equipment Maximum Daily Emissions

Segment 8

			Emissions lbs/year-2011				
2011	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	709,643	720.29	6,576.97	675.58	6.39	58.83
	Delivery	469,053	952.65	5,659.13	7,992.66	15.48	167.61
	Heavy-Heavy Duty	130,270	115.66	530.02	2,881.20	6.01	61.83
		Totals	1,788.59	12,766.12	11,549.45	27.87	288.28
		Tons/year	0.89	6.38	5.77	0.01	0.14

			Emissions lbs/day-2012				
2012	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	350,715	330.02	2,985.28	304.42	3.16	29.14
	Delivery	126,251	241.01	1,386.49	1,930.38	4.29	42.53
	Heavy-Heavy Duty	63,758	51.84	241.17	1,235.65	2.95	27.92
		Totals	622.87	4,612.94	3,470.45	10.40	99.60
		Tons/year	0.31	2.31	1.74	0.01	0.05

Swtichyard construction only

			Emissions lbs/year-2011				
2011	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	171,983	174.56	1,593.93	163.73	1.55	14.26
	Delivery	290,504	590.01	3,504.93	4,950.18	9.59	103.81
	Heavy-Heavy Duty	45,760	40.63	186.18	1,012.08	2.11	21.72
		Totals	805.20	5,285.04	6,125.99	13.24	139.79
		Tons/year	0.40	2.64	3.06	0.01	0.07

			Emissions lbs/day-2012				
2012	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	98,847	93.01	841.38	85.80	0.89	8.21
	Delivery	23,338	44.55	256.30	356.84	0.79	7.86
	Heavy-Heavy Duty	0	0.00	0.00	0.00	0.00	0.00
		Totals	137.57	1,097.68	442.64	1.68	16.08
		Tons/year	0.07	0.55	0.22	0.00	0.01

500 kV Line Addition

			Emissions lbs/year-2011				
2011	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	537,661	545.73	4,983.04	511.85	4.84	44.57
	Delivery	178,549	362.63	2,154.20	3,042.48	5.89	63.80
	Heavy-Heavy Duty	84,510	75.03	343.84	1,869.12	3.90	40.11
		Totals	983.39	7,481.08	5,423.46	14.63	148.49
		Tons/year	0.49	3.74	2.71	0.01	0.07

			Emissions lbs/day-2012				
2012	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	251,868	237.01	2,143.90	218.62	2.27	20.93
	Delivery	102,913	196.46	1,130.19	1,573.54	3.50	34.67
	Heavy-Heavy Duty	63,758	51.84	241.17	1,235.65	2.95	27.92
		Totals	485.31	3,515.26	3,027.81	8.72	83.52
		Tons/year	0.24	1.76	1.51	0.00	0.04

Alt. 4 C - Offroad Equipment Emission Calculations

2011 Emission Calculations

Marshalling Yards

Segment 8 Alt 4C				Daily Emissions lbs							Annual Emissions lbs					
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	CO2	Days	ROG	CO	NOX	SOX	PM	CO2
Crane, Hydraulic, Rough Terrain 35 ton	155	1	3	0.28	1.11	1.96	0.00	0.13	173.41	203	56.44	224.89	397.79	0.40	27.16	35,202
Forklift, 5 ton	75	1	5	0.29	0.96	1.07	0.00	0.10	102.92	203	58.09	194.56	216.58	0.26	21.07	20,892
Forklift, 10 ton	85	1	5	0.28	0.99	1.19	0.00	0.12	114.74	203	57.47	201.36	242.03	0.28	23.43	23,293
				0.85	3.06	4.22	0.00	0.35	391.07		172.01	620.81	856.40	0.94	71.65	79,387

Road Maintenance

Segment 8 Alt 4C				Daily Emissions lbs							Annual Emissions lbs					
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	CO2	Days	ROG	CO	NOX	SOX	PM	CO2
Motor Grader	140	1	2	0.30	1.22	2.04	0.00	0.16	185.53	178	54.14	218.04	362.93	0.38	27.79	33,025
Crawler, Track Type, w/ blade (D6 Type)	185	1	2	0.37	1.45	2.91	0.00	0.16	254.36	178	66.27	258.62	518.59	0.51	28.69	45,276
				0.68	2.68	4.95	0.00	0.32	439.90		120.41	476.65	881.52	0.89	56.48	78,301

Roads & Landing Work

Segment 8 Alt 4C				Daily Emissions lbs							Annual Emissions lbs					
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	CO2	Days	ROG	CO	NOX	SOX	PM	CO2
Crawler, Track Type, w/ blade (D8 type)	305	2	8	3.41	10.71	31.71	0.03	1.26	2985.81	60	204.78	642.60	1902.83	1.94	75.79	179,149
Crawler, Track Type, w/ blade (D6 Type)	185	1	8	1.49	5.81	11.65	0.01	0.64	1017.44	60	89.36	348.69	699.23	0.69	38.68	61,047
Backhoe w/ Bucket; backhoe w/ concrete hammer	85	2	3	0.59	2.10	2.51	0.00	0.23	246.23	60	35.28	126.18	150.44	0.18	13.81	14,774
Excavator, Grade - All	165	2	8	2.17	10.29	15.85	0.02	1.03	1683.26	60	130.45	617.28	950.97	1.14	61.86	100,996
Motor Grader	140	1	5	0.76	3.06	5.10	0.01	0.39	463.84	60	45.62	183.74	305.84	0.32	23.42	27,830
				8.42	31.97	66.82	0.07	3.56	6396.57		505.48	1918.50	4009.30	4.27	213.55	383,794

Install Foundations

Segment 8 Alt 4C				Daily Emissions lbs							Annual Emissions lbs					
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	CO2	Days	ROG	CO	NOX	SOX	PM	CO2
Crawler, Track Type, w/ blade (D6 Type)	185	1	3	0.56	2.18	4.37	0.00	0.24	381.54	85	47.47	185.24	371.46	0.36	20.55	32,431
Crawler, track type, drill dig, Pheumatic D8	305	1	8	1.71	5.36	15.86	0.02	0.63	1492.91	85	145.05	455.18	1347.83	1.37	53.68	126,897
Generator, Concrete Batch Plant	50	1	6	0.63	1.70	1.81	0.00	0.16	183.74	85	53.19	144.14	154.04	0.20	13.78	15,618
Backhoe w/ Bucket; backhoe w/ concrete hammer	85	2	4	0.78	2.80	3.34	0.00	0.31	328.30	85	66.63	238.35	284.16	0.34	26.08	27,906
Motor, Auxilary Power	5	2	2	0.02	0.09	0.15	0.00	0.01	13.61	85	1.86	8.07	12.58	0.02	0.74	1,157
Excavator, Grade - All	165	1	4	0.54	2.57	3.96	0.00	0.26	420.81	85	46.20	218.62	336.80	0.40	21.91	35,769
				4.24	14.70	29.49	0.03	1.61	2820.91		360.41	1249.60	2506.88	2.70	136.73	239,777

Steel (Hauling, Shake-out, Light Assembly, Heavy Assembly, Erection)

Segment 8 Alt 4C				Daily Emissions lbs							Annual Emissions lbs					
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	CO2	Days	ROG	CO	NOX	SOX	PM	CO2
Crane, Hydraulic, 150/300 Ton	450	1	8	1.29	5.20	8.50	0.01	0.55	862.94	165	213.14	857.74	1402.89	1.61	91.15	142,386
Crane, Hydraulic, Rough Terrain 35 ton	155	3	8	2.67	10.08	11.88	0.01	1.14	1106.68	165	440.43	1663.03	1960.62	2.23	187.94	182,603
Compressor, Air	75	5	7.5	3.92	16.58	50.66	0.05	1.90	5225.09	165	646.25	2735.25	8359.63	9.06	314.10	862,141
Motor, Auxilary Power	5	2	2	0.02	0.77	0.85	0.00	0.08	82.33	165	3.62	126.51	140.83	0.17	13.70	13,585
				7.90	32.62	71.90	0.08	3.68	7277.06		1303.44	5382.53	11863.97	13.07	606.89	1,200,714

Conductor & OHGW Installation

Segment 8 Alt 4C				Daily Emissions lbs							Annual Emissions lbs					
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	CO2	Days	ROG	CO	NOX	SOX	PM	CO2
Backhoe w/ Bucket; backhoe w/ concrete hammer	85	1	3	0.29	1.05	1.25	0.00	0.12	123.11	45	13.23	47.32	56.41	0.07	5.18	5,540
Crane, Hydraulic, Rough Terrain 35 ton	155	3	3	1.00	3.99	7.05	0.01	0.48	624.28	45	45.04	179.47	317.45	0.32	21.67	28,092
Crawler, Track Type, w/ blade (D8 type)	305	1	2	0.43	1.34	3.96	0.00	0.16	373.23	45	19.20	60.24	178.39	0.18	7.11	16,795
Crawler, Track Type, Sagging (D8 type)	305	2	2	0.85	2.68	7.93	0.01	0.32	746.45	45	38.40	120.49	356.78	0.36	14.21	33,590
Motor, Auxilary Power	5	4	2	0.04	0.19	0.30	0.00	0.02	27.22	45	1.97	8.55	13.32	0.02	0.78	1,225
Tension machine, conductor	135	2	3	0.71	3.31	5.05	0.01	0.39	527.14	45	31.75	148.76	227.14	0.27	17.42	23,721
Tension machine, static	135	1	2	0.24	1.10	1.68	0.00	0.13	175.71	45	10.58	49.59	75.71	0.09	5.81	7,907
				3.56	13.65	27.23	0.03	1.60	2597.14		160.17	614.42	1225.20	1.32	72.17	116,871

New Switchyard Construction

Grading Element

Segment 8 - New Switchyard	HP	Number	Hours/day	Daily Emissions lbs ROG	CO	NOX	SOX	PM	CO2	Days	Annual Emissions lbs ROG	CO	NOX	SOX	PM	CO2
980 Loader	318	3	8	3.81	11.69	37.92	0.04	1.38	4150.11	80	304.54	935.13	3033.70	3.56	110.41	332,009
Grader	285	2	8	2.75	8.06	27.22	0.03	0.99	2882.32	80	219.87	644.65	2177.81	2.54	79.57	230,586
Compactor	80	2	6	1.39	4.24	5.46	0.01	0.51	481.54	80	111.43	339.14	437.08	0.47	40.40	38,523
				7.95	23.99	70.61	0.08	2.88	7513.97		635.83	1918.92	5648.59	6.56	230.38	601,118

Civil Element

Segment 8 - New Switchyard	HP	Number	Hours/day	Daily Emissions lbs ROG	CO	NOX	SOX	PM	CO2	Days	Annual Emissions lbs ROG	CO	NOX	SOX	PM	CO2
14 ton Crane	180	1	4	0.46	1.90	3.58	0.00	0.20	329.86	100	46.01	190.08	358.39	0.37	20.35	32,986
Driller	305	2	8	1.61	6.25	17.89	0.04	0.59	3443.32	100	161.27	624.99	1788.94	3.72	58.63	344,332
Ditch Digger	75	2	6	1.96	5.34	6.48	0.01	0.62	532.06	100	196.00	534.41	647.60	0.65	62.01	53,206
Forklift	75	1	4	0.23	0.77	0.85	0.00	0.08	82.33	100	22.89	76.67	85.35	0.10	8.30	8,233
Tractors	85	2	6	1.18	4.21	5.01	0.01	0.46	492.45	100	117.59	420.61	501.46	0.60	46.02	49,245
				5.44	18.47	33.82	0.05	1.95	4880.03		543.76	1846.76	3381.74	5.44	195.31	488,003

Electrical Element

Segment 8 - New Switchyard	HP	Number	Hours/day	Daily Emissions lbs ROG	CO	NOX	SOX	PM	CO2	Days	Annual Emissions lbs ROG	CO	NOX	SOX	PM	CO2
14 ton Crane	180	2	6	1.38	5.70	10.75	0.01	0.61	989.59	23	31.75	131.15	247.29	0.26	14.04	22,760
Crane, Hydraulic, 150 Ton (150 ton crane)	350	2	6	1.67	5.30	16.21	0.02	0.61	1672.03	23	38.44	122.01	372.89	0.40	14.01	38,457
Forklift	75	1	6	0.34	1.15	1.28	0.00	0.12	123.50	23	7.90	26.45	29.45	0.03	2.86	2,841
Manlifts	75	4	6	1.37	4.60	5.12	0.01	0.50	494.01	23	31.59	105.81	117.79	0.14	11.46	11,362
				4.77	16.76	33.37	0.04	1.84	3279.13		109.68	385.43	767.41	0.83	42.37	75,420

2012 Emission Calculations

Marshalling Yards

Segment 8 Alt 4C	HP	Number	Hours/day	Daily Emissions lbs ROG	CO	NOX	SOX	PM	CO2	Days	Annual Emissions lbs ROG	CO	NOX	SOX	PM	CO2
Crane, Hydraulic, Rough Terrain 35 ton	155	1	3	0.26	1.10	1.85	0.00	0.12	173.41	79	20.73	87.02	145.77	0.16	9.86	13,699
Forklift, 5 ton	75	1	5	0.25	0.93	1.02	0.00	0.09	102.92	79	19.94	73.69	80.34	0.10	7.37	8,131
Forklift, 10 ton	85	1	5	0.25	0.97	1.13	0.00	0.10	114.74	79	19.80	76.59	88.97	0.11	8.16	9,065
				0.77	3.00	3.99	0.00	0.32	391.07		60.48	237.30	315.08	0.37	25.39	30,895

Road Maintenance

Segment 8 Alt 4C	HP	Number	Hours/day	Daily Emissions lbs ROG	CO	NOX	SOX	PM	CO2	Days	Annual Emissions lbs ROG	CO	NOX	SOX	PM	CO2
Motor Grader	140	1	2	0.28	1.22	1.91	0.00	0.14	185.53	75	21.34	91.28	143.57	0.16	10.82	13,915
Crawler, Track Type, w/ blade (D6 Type)	185	1	2	0.35	1.44	2.75	0.00	0.15	254.36	75	26.57	107.83	206.27	0.21	11.28	19,077
				0.64	2.65	4.66	0.00	0.29	439.90		47.91	199.11	349.84	0.37	22.10	32,992

Steel (Hauling, Shake-out, Light Assembly, Heavy Assembly, Erection)

Segment 8 Alt 4C	HP	Number	Hours/day	Daily Emissions lbs ROG	CO	NOX	SOX	PM	CO2	Days	Annual Emissions lbs ROG	CO	NOX	SOX	PM	CO2
Crane, Hydraulic, 150/300 Ton	450	1	8	1.22	4.14	11.52	0.01	0.43	1332.10	10	12.23	41.39	115.23	0.13	4.28	13,321
Crane, Hydraulic, Rough Terrain 35 ton	155	3	8	2.52	10.57	17.71	0.02	1.20	1664.74	10	25.19	105.75	177.14	0.19	11.98	16,647
Compressor, Air	75	5	7.5	3.63	10.78	12.71	0.01	1.23	1165.69	10	36.28	107.81	127.11	0.14	12.35	11,657
Motor, Auxilary Power	5	2	2	0.02	0.09	0.14	0.00	0.01	13.61	10	0.21	0.93	1.42	0.00	0.08	136
				7.39	25.59	42.09	0.05	2.87	4176.14		73.91	255.87	420.90	0.47	28.68	41,761

Conductor & OHGW Installation

Segment 8 Alt 4C				Daily Emissions lbs							Annual Emissions lbs					
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	CO2	Days	ROG	CO	NOX	SOX	PM	CO2
Backhoe w/ Bucket; backhoe w/ concrete hammer	85	1	3	0.26	1.03	1.19	0.00	0.10	123.11	75	19.87	77.20	89.33	0.11	7.86	9,233
Crane, Hydraulic, Rough Terrain 35 ton	155	3	3	0.94	3.97	6.64	0.01	0.45	624.28	75	70.86	297.41	498.22	0.53	33.68	46,821
Crawler, Track Type, w/ blade (D8 type)	305	1	2	0.41	1.26	3.71	0.00	0.15	373.23	75	30.47	94.84	278.33	0.30	10.92	27,992
Crawler, Track Type, Sagging (D8 type)	305	2	2	0.81	2.53	7.42	0.01	0.29	746.45	75	60.94	189.69	556.66	0.61	21.84	55,984
Motor, Auxilary Power	5	4	2	0.04	0.19	0.28	0.00	0.02	27.22	75	3.13	13.96	21.26	0.03	1.23	2,042
Tension machine, conductor	135	2	3	0.65	3.28	4.70	0.01	0.35	527.14	75	48.50	246.28	352.28	0.46	26.46	39,535
Tension machine, static	135	1	2	0.22	1.09	1.57	0.00	0.12	175.71	75	16.17	82.09	117.43	0.15	8.82	13,178
				3.33	13.35	25.51	0.03	1.48	2597.14		249.94	1001.48	1913.51	2.19	110.80	194,785

Restoration & Guard Poles

Segment 8 Alt 4C				Daily Emissions lbs							Annual Emissions lbs					
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	CO2	Days	ROG	CO	NOX	SOX	PM	CO2
Backhoe	85	1	5	0.44	1.72	1.99	0.00	0.17	205.19	75	33.11	128.66	148.89	0.19	13.10	15,389
Motor Grader	140	1	8	1.14	4.87	7.66	0.01	0.58	742.14	75	85.38	365.11	574.26	0.64	43.26	55,660
				1.58	6.58	9.64	0.01	0.75	947.33		118.49	493.77	723.15	0.83	56.36	71,049

Wreck-Out (conductors, structures, & Foundations)

Segment 8 Alt 4C				Daily Emissions lbs							Annual Emissions lbs					
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	CO2	Days	ROG	CO	NOX	SOX	PM	CO2
Tension Machine, Conductor or Static	135	2	3	0.65	3.28	4.70	0.01	0.35	527.14	65	42.04	213.44	305.31	0.40	22.93	34,264
Crawler, Track Type, w/ blade (D8 type)	305	1	8	1.62	5.06	14.84	0.02	0.58	1492.90	65	105.62	328.79	964.88	1.05	37.85	97,039
Backhoe w/ Bucket; backhoe w/ concrete hammer	85	4	8	2.83	10.98	12.70	0.02	1.12	1313.20	65	183.66	713.63	825.82	1.04	72.67	85,358
Crane, Hydraulic, Rough Terrain 35 ton	155	2	4	0.84	3.52	5.90	0.01	0.40	554.91	65	54.59	229.12	383.81	0.41	25.95	36,069
Motor, Auxilary Power	5	3	2	0.03	0.14	0.21	0.00	0.01	20.42	65	2.04	9.08	13.82	0.02	0.80	1,327
				5.97	22.99	38.36	0.04	2.46	3908.57		387.95	1494.06	2493.64	2.92	160.19	254,057

New Switchyard Construction

Electrical Element

Segment 8 Alt 4C				Daily Emissions lbs							Annual Emissions lbs					
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	CO2	Days	ROG	CO	NOX	SOX	PM	CO2
14 ton Crane	180	2	6	1.31	5.67	10.11	0.01	0.57	989.59	97	126.81	549.67	980.40	1.08	55.10	95,990
Crane, Hydraulic, 150 Ton (150 ton crane)	350	2	6	1.58	4.97	15.07	0.02	0.55	1672.03	97	153.15	481.67	1461.77	1.70	53.70	162,187
Forklift	75	1	6	0.30	1.12	1.22	0.00	0.11	123.50	97	29.38	108.58	118.37	0.15	10.86	11,980
Manlifts	75	4	6	1.21	4.48	4.88	0.01	0.45	494.01	97	117.53	434.32	473.49	0.59	43.45	47,919
				4.40	16.23	31.28	0.04	1.68	3279.13		426.88	1574.24	3034.03	3.52	163.12	318,075

Total

	Project Emissions					
	ROG	CO	NOX	SOX	PM	CO2
Total	2.64	9.83	20.20	0.02	1.10	2103.50
2011	1.96	7.21	15.57	0.02	0.81	1631.69
2012	0.68	2.63	4.63	0.01	0.28	471.81

Switchyard

	Project Emissions					
	ROG	CO	NOX	SOX	PM	CO2
Total	0.86	2.86	6.42	0.01	0.32	741.31
2011	0.64	2.08	4.90	0.01	0.23	582.27
2012	0.21	0.79	1.52	0.00	0.08	159.04

Addition

	Project Emissions					
	ROG	CO	NOX	SOX	PM	CO2
Total	1.78	6.97	13.78	0.02	0.78	1362.19
2011	1.31	5.13	10.67	0.01	0.58	1049.42
2012	0.47	1.84	3.11	0.00	0.20	312.77

Alternative 4 C.
Helicopter Emissions

2011

Approach/Climbout	Hours/day	Days	Emissions lbs/hour				
			HC	CO	NOx	SOx	PM
Hughes 500	5	45	0.05	0.11	0.22	0.00	0.01

2012

Approach/Climbout	Hours/day	Days	Emissions lbs/hour				
			HC	CO	NOx	SOx	PM
Hughes 500	5	75	0.08	0.18	0.36	0.00	0.02

Fugitive Dust Emissions - Segment 8 Alternative 4C

Emission Categories
1) Earthmoving
2) Road Dust Paved/Unpaved
3) Disturbed Area Windblown Emissions

1) Earthmoving

Emission Types
A) Dozing
B) Grading
C) Material Loading/Handling
D) Disturbed Area Windblown Emissions

A) Dozing (AP-42 Section 11.9 for overburden)

$E = k \times (s)^{1.5} / (M)^{1.4}$ For PM10 and $k \times 5.7 \times (s)^{1.2} / (M)^{1.3}$ for PM2.5
E = lb/hr
k = Scaling Constant (0.75 for PM10 and 0.105 for PM2.5)
s = Silt Content (assumed to be 12% - SCAQMD Handbook for Mountain Roads)
M = Moisture Content = 10% (assumes watering when necessary for mitigation)

PM10 Emission Factor
1.241175323 lb/hr

PM2.5 Emission Factor
0.591672862 lb/hr

Total Dozer Use

	Hrs/year
2011	3341
2012	820

Dozer Emissions

Tons/year	PM10	PM2.5
2011	2.07	0.99
2012	0.51	0.24

B) Grading

$E = k \times 0.051 \times (S)^{2.0}$ for PM10 and $k \times 0.040 \times (S)^{2.5}$ for PM2.5
E = lb/VMT
k = Scaling Constant (0.60 for PM10 and 0.031 for PM2.5)
S = Mean Vehicle Speed assumed to be 3 mph
Assumes VMT = 3 x hours in use

PM10 Emission Factor
0.2754 lb/VMT

PM2.5 Emission Factor
0.019329687 lb/VMT

Annual Grader VMT

	Hrs/year	VMT/year
2011	1936	5808
2012	750	2250

Grading Emissions

Tons/year	PM10	PM2.5
2011	0.80	0.06
2012	0.31	0.02

C) Material Loading/Handling (AP-42, p. 13.2.4-3)

$E = (k)(0.0032)[(U/5)^{1.3}]/[(M/2)^{1.4}]$
E = lb/ton
k = Particle Size Constant (0.35 for PM10 and 0.11 for PM2.5)
U = average wind speed = 25 MPH worst day, 8 MPH avg daytime (engineering assumption)
M = moisture content = 10% (mitigated)
Four separate drops are assumed

2011	190,000	Annual tons
2012	0	Annual tons

Emission Factors and Emissions
Emission Factors

PM10 Daily	PM2.5 Daily	PM10 Annual	PM2.5 Annual
0.00103	0.00032	0.00029	0.00009

Emissions tons/year

	PM10	PM2.5
2011	0.11	0.03
2012	0.00	0.00

Fugitive Dust Emissions - Segment 8 Alternative 4C

2) Road Dust
Emission Types
A) Paved Road Dust
B) Unpaved Road Dust

A) Paved Road Dust

E = [k x (sL/2)0.65 x (W/3)1.5 -C] x (1-P/4N)
E = lb/VMT
k = Constant (0.016 for PM10 and 0.0040 for PM2.5)
sL = Silt Loading (assumed to be 0.06 g/m2 - assumes 5,000 to 10,000 ADT profile of Table 13.2.1-3 average for all traffic)
W = Average weight of vehicles in tons (calculated below)
C = Correction for exhaust, break wear, tire wear (0.00047 lb/VMT for PM10, 0.00036 lb/VMT for PM2.5)
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Passenger Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Paved VMT	Average Weight (Tons)
2011	707,320	455,360	125,470	1,288,150	6.8
2012	349,840	121,040	61,310	532,190	6.6

	PM10 Annual	PM2.5 Annual
2011	0.0052	0.0011
2012	0.0049	0.0010

Emissions tons/year

	PM10	PM2.5
2011	3.34	0.68
2012	1.29	0.26

B) Unpaved Road Dust

$E = (k)[(s/12)^{0.9}][(W/3)^{0.45}][(365-P)/365]$ (for industrial sites)

k = constant = 1.5 lb/VMT for PM10 and 0.23 lb/VMT for PM2.5
s = Silt Content (assumed to be 12% - SCAQMD Handbook for Mountain Roads)
W = avg. vehicle weight = calculated below
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Personal/Professionals/inspection Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Paved VMT	Average Weight (Tons)
2011	2,323	13,693	4,800	20,817	12.4
2012	875	5,211	2,448	8,534	13.7

	PM10 Annual	PM2.5 Annual
2011	2.84	0.44
2012	2.97	0.46

Emissions tons/year

	PM10	PM2.5
2011	29.57	4.53
2012	12.68	1.94

Controlled Emissions (assumes 84% efficiency with use of soil binder)

Emission Control
84%

Emissions tons/year

	PM10	PM2.5
2011	4.73	0.73
2012	2.03	0.31

Fugitive Dust Emissions - Segment 8 Alternative 4C

3) Disturbed Area Windblown Emissions

Assumptions
Emission Factor is 0.38 tons/disturbed acres/year of Total Suspended Particulate (AP-42 Section 11.9)
PM10 and PM2.5 fractions of TSP are 0.489 and 0.102 respectively per CEIDARS factors from SCAQMD CEQA Website
There are permanent and temporary disturbed acres that make up the total acre-years of disturbed area for each Segment
Disturbed areas are controlled by dust suppressants 84% control

Disturbed Acres (acre-years)	
2011	48
2012	28

Emissions (tons/year)	
PM10	PM2.5
1.46	0.30
0.84	0.17

Fugitive Dust Emission Totals	2011		2012	
	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
Dozer	2.07	0.99	0.51	0.24
Grading	0.80	0.06	0.31	0.02
Soil Handling	0.11	0.03	0.00	0.00
Paved Road Dust	3.34	0.68	1.29	0.26
Unpaved Road Dust	4.73	0.73	2.03	0.31
Disturbed Area Dust	1.46	0.30	0.84	0.17
Totals	12.51	2.78	4.98	1.01

Alternative 5 Underground Construction Emission Calculation Assumptions

Proposed Project General Assumptions

1) Work occurs 6 days a week, 8 hours a day, excepting major holidays, except for tunneling which has two shifts working and one shift for maintenance (24 hour construction)
2) Project schedule is 24 months and ends at the same time as the proposed project' Segment 8 Mesa to Chino su

Offroad Equipment Emission Calculation Assumptions

1) Emission factors are the latest available from the SCAQMD website, where the nearest horsepower sized equipment given in the SCAQMD emission factor database are used with a ratio of actual assumed equipment
2) This work subtasks will be done by one contractor so equipment for each will be used throughout, so subtasks starting in 2010 would use 2010 EFs for all years for that subtask, etc.
3) Construction subtasks, durations, equipment type, number, and usage estimates are used are engineering estimates by Aspen Environment Group using very limited equipment information provided by SCE.
4) The following vehicle types, which could be offroad vehicles are assumed to be onroad vehicles considering the project description, needs and location: water trucks and dump trucks.
5) Generators to power lights and forced air through the confined spaces (access shafts, ventilation shafts, and tunnel) in the total amount of 1,000 hp (~750 kW) will be required 24 hours per day/7 days per week after the initiation of construction of elements with confined space.
6) Diesel powered water pumps, which could be additional generator power, will be needed 24 hours per day/7 days per week to remove water in the access shafts, ventilation shafts, and tunnel until the final tunnel grouting is

Onroad Equipment Emission Calculations Assumptions

1) Emission factors are the latest available from the SCAQMD website, where the vehicles have been assigned three classes, passenger (i.e. employee vehicles and pickups), delivery (all nonpassenger vehicles smaller than
2) Emission factors from each year assumed in the project schedule are used to calculate the annual emissions.
3) Trip estimates are based on engineering estimates of import/export quantities, equipment and worker trips.
4) All onroad traffic for the project is assumed to occur within SCAQMD jurisdiction.
5) Grout (i.e. concrete) for lining the access shafts, tunnel, ventilation shafts is assumed to be imported by truck
6) Soil waste truck are assumed to be double trailers with 20 cubic yard capacity. Grout loads are 10 cubic yards.
7) A ten percent contingency is added to the grout and soil waste trips. This contingency considers excavated soil expansion and grout wastage.

Fugitive Dust Emission Calculations Assumptions

1) Unpaved road travel is minimized to the extent feasible and shall be no more than one-half mile per round trip for all employee trips and for equipment that must access the access shafts sites and no more than one mile per round trip for equipment to access the ventilation shaft sites.
2) Unpaved road emission factors are calculated using the most current version of USEPA AP-42 Section 13.2.1 and use the following assumptions: 1) Silt content is assumed to be 6% on average (SCAQMD level for sand and
and 2) average vehicle weight based on VMT estimate for unpaved roads
3) Paved road emission factors are calculated using the most current version of USEPA AP-42 Section 13.2.1 and use the following assumptions: 1) Silt loading is average for 5000-10000 ADT road; 2) average vehicle weight
4) Earthmoving emission factors are calculated using the recent version of USEPA AP-42 Section 11.9 for Dozing and Grading, and Section 13.2.4 for soil handling (drop emissions).
5) Due to the work areas primarily being in pits and SCAQMD fugitive dust measure requirement for any waste piles the wind erosion potential is considered negligible for most of the project.

TRTP Alternative 5 Project Construction Emission Totals
SCAQMD Juridiction

Worst-Case Day	Emissions (lbs/day)					
(Year 2010)	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	32.24	246.81	217.42	0.50	5.26	4.84
Offroad Vehicles/Equipment	104.44	348.73	953.55	1.04	42.49	39.09
Helicopter	275.95	1,004.12	1,092.23	9.14	60.30	55.47
Fugitive Dust	---	---	---	---	590.78	136.82
Totals	**412.64**	**1,599.66**	**2,263.20**	**10.68**	**698.83**	**236.23**

Incremental Annual Emissions

2010 Emissions

	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.382	2.975	3.049	0.007	0.074	0.068
Offroad Vehicles/Equipment	5.625	18.682	56.026	0.062	2.290	2.107
Helicopter	0.000	0.000	0.000	0.000	0.000	0.000
Fugitive Dust	---	---	---	---	5.222	0.984
Totals	**6.01**	**21.66**	**59.08**	**0.07**	**7.59**	**3.16**

2011 Emissions

	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.333	2.562	2.861	0.008	0.075	0.069
Offroad Vehicles/Equipment	6.264	20.855	64.549	0.073	2.519	2.317
Helicopter	0.000	0.000	0.000	0.000	0.000	0.000
Fugitive Dust	---	---	---	---	6.498	1.229
Totals	**6.60**	**23.42**	**67.41**	**0.08**	**9.09**	**3.62**

2012 Emissions

	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.048	0.326	0.525	0.001	0.013	0.012
Offroad Vehicles/Equipment	1.086	3.598	12.391	0.016	0.413	0.380
Helicopter	0.000	0.000	0.000	0.000	0.000	0.000
Fugitive Dust	---	---	---	---	1.326	0.272
Totals	**1.13**	**3.92**	**12.92**	**0.02**	**1.75**	**0.66**

Note: This alternative does not significantly impact the AVAQMD, KCAPCD, or the ANF.

TRTP Alternative 5 Project Construction Emission Totals
Incremental Tower Construction Reduction Emission Totals
SCAQMD Juridiction

Worst-Case Day	Emissions (lbs/day)					
(Year 2010)	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	26.51	202.71	169.31	0.39	4.11	3.78
Offroad Vehicles/Equipment	25.54	86.57	165.52	0.17	10.25	9.43
Helicopter	275.95	1,004.12	1,092.23	9.14	60.30	55.47
Fugitive Dust	---	---	---	---	494.30	115.44
Totals	**328.01**	**1,293.40**	**1,427.06**	**9.70**	**568.96**	**184.13**

Incremental Annual Emissions

2010 Emissions

	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	-0.019	-0.139	-0.159	0.000	-0.004	-0.003
Offroad Vehicles/Equipment	-0.053	-0.184	-0.329	0.000	-0.022	-0.020
Helicopter	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust	---	---	---	---		
Totals	**-0.07**	**-0.32**	**-0.49**	**0.00**	**-0.03**	**-0.02**

2011 Emissions

	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	-0.142	-1.087	-0.749	-0.002	-0.021	-0.019
Offroad Vehicles/Equipment	-0.067	-0.258	-0.515	-0.001	-0.030	-0.028
Helicopter	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust	---	---	---	---		
Totals	**-0.21**	**-1.34**	**-1.26**	**0.00**	**-0.05**	**-0.05**

2012 Emissions

	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	-0.011	-0.079	-0.090	0.000	-0.002	-0.002
Offroad Vehicles/Equipment	-0.003	-0.012	-0.017	0.000	-0.001	-0.001
Helicopter	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust						
Totals	**-0.01**	**-0.09**	**-0.11**	**0.00**	**0.00**	**0.00**

Note: This alternative does not significantly impact the AVAQMD, KCAPCD, or the ANF.

TRTP Alternative 5 Project Construction Emission Totals
Underground Construction Emission Totals
SCAQMD Juridiction

Worst-Case Day 2010	Emissions (lbs/day)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	5.73	44.11	48.12	0.11	1.15	1.06
Offroad Vehicles/Equipment	78.90	262.16	788.03	0.87	32.24	29.66
Helicopter	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust	---	---	---	---	96.48	21.38
Totals	**84.63**	**306.27**	**836.15**	**0.98**	**129.87**	**52.10**

Worst-Case Day 2011	Emissions (lbs/day)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	4.88	38.18	33.18	0.09	0.91	0.84
Offroad Vehicles/Equipment	59.48	201.64	597.79	0.66	24.26	22.32
Helicopter	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust	---	---	---	---	70.94	14.60
Totals	**64.36**	**239.81**	**630.97**	**0.76**	**96.12**	**37.77**

Worst-Case Day 2012	Emissions (lbs/day)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	2.31	15.28	28.12	0.07	0.70	0.64
Offroad Vehicles/Equipment	35.91	117.86	410.10	0.52	13.54	12.46
Helicopter	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust	---	---	---	---	66.23	14.60
Totals	**38.22**	**133.14**	**438.22**	**0.59**	**80.47**	**27.71**

Annual Emissions

2010 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.40	3.11	3.21	0.01	0.08	0.07
Offroad Vehicles/Equipment	5.68	18.87	56.36	0.06	2.31	2.13
Helicopter	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust	---	---	---	---	5.22	0.98
Totals	**6.08**	**21.98**	**59.56**	**0.07**	**7.61**	**3.18**

2011 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.48	3.65	3.61	0.01	0.10	0.09
Offroad Vehicles/Equipment	6.33	21.11	65.06	0.07	2.55	2.34
Helicopter	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust	---	---	---	---	6.50	1.23
Totals	**6.81**	**24.76**	**68.67**	**0.08**	**9.14**	**3.66**

2012 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.06	0.40	0.62	0.00	0.02	0.01
Offroad Vehicles/Equipment	1.09	3.61	12.41	0.02	0.41	0.38
Helicopter	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust	---	---	---	---	1.33	0.27
Totals	**1.15**	**4.01**	**13.02**	**0.02**	**1.76**	**0.67**

Note: This alternative does not significantly impact the AVAQMD, KCAPCD, or the ANF.

Construction Schedule - Alternative 5 Underground																		
Major Elements																		
# Days in Full Month (6 days/week)																		
Onsite Construction Elements Begin in 2009							**Employee Vehicel**			**Total**	**Delivery Truck**			**Total**	**Heavy Heavy Duty Truck**			**Total**
Segment 8	**Crew Size**	**Total Days**	**Start Date**	**End Date**	**Hrs/day**		**no. of vehicle**	**Paved**	**Unpaved**	**VMT/day**	**no. of vehicle**	**Paved**	**Unpaved**	**VMT/day**	**no. of vehicle**	**Paved**	**Unpaved**	**VMT/day**
500 kV Undergrounding																		
Clear, Grub, Stage	6	**25**	**24-Apr-10**	**24-May-10**	8		6	29.5	0.50	180.00	2	19.50	0.50	40.00	2	24.50	0.50	60.00
Marshalling Yard	4	**590**	**18-May-10**	**28-Apr-12**	8		4	29.5	0.50	120.00	2	19.50	0.50	40.00	0	0.00	0.00	0.00
Access Shaft Excavation	20	**91**	**25-May-10**	**9-Sep-10**	8		20	29.5	0.50	600.00	4	19.50	0.50	80.00	26	20.01	0.50	526.95
Tunneling	90	**322**	**1-Jul-10**	**25-Jul-11**	24		90	29.5	0.50	2700.00	7	19.50	0.50	140.00	50	19.65	0.50	1005.45
Ventilation Shaft Excavation	15	**91**	**1-Jul-11**	**24-Oct-11**	8		15	29.5	0.50	450.00	4	19.50	1.00	82.00	7	20.43	1.00	152.30
Tunnel Grouting	20	**60**	**16-Sep-11**	**28-Nov-11**	8		20	29.5	0.50	600.00	4	19.50	0.50	80.00	10	20.49	0.50	212.33
Cable Installation	20	**90**	**28-Nov-11**	**18-Feb-12**	8		20	29.5	0.50	600.00	4	19.50	0.50	80.00	11	109.20	0.50	1231.11
Access Features and Cleanup	10	**75**	**27-Jan-12**	**23-Apr-12**	8		10	29.5	0.50	300.00	2	19.50	0.50	40.00	2	21.32	0.50	48.00

PAVED

	2009			**2010**			**2011**			**2012**			**2013**					
Segment 8	**Employee Vehicle**	**Delivery Truck**	**HHDT**	**Employee Vehicle**	**Delivery Truck**	**HHDT**	**Employee Vehicle**	**Delivery Truck**	**HHDT**	**Employee Vehicle**	**Delivery Truck**	**HHDT**	**Employee Vehicle**	**Delivery Truck**	**HHDT**			
500 kV Undergrounding																		
Clear, Grub, Stage	0.0	0.0	0.0	4425.0	975.0	1470.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Marshalling Yard	0.0	0.0	0.0	22066.0	7293.0	0.0	35754.0	11817.0	0.0	11800.0	3900.0	0.0	0.0	0.0	0.0			
Access Shaft Excavation	0.0	0.0	0.0	53690.0	7098.0	46783.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Tunneling	0.0	0.0	0.0	400905.0	20611.5	148056.0	454005.0	23341.5	167666.1	0.0	0.0	0.0	0.0	0.0	0.0			
Ventilation Shaft Excavation	0.0	0.0	0.0	0.0	0.0	0.0	40267.5	7098.0	13212.6	0.0	0.0	0.0	0.0	0.0	0.0			
Tunnel Grouting	0.0	0.0	0.0	0.0	0.0	0.0	35400.0	4680.0	12436.5	0.0	0.0	0.0	0.0	0.0	0.0			
Cable Installation	0.0	0.0	0.0	0.0	0.0	0.0	29500.0	3900.0	61275.0	23600.0	3120.0	49020.0	0.0	0.0	0.0			
Access Features and Cleanup	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22125.0	2925.0	3517.5	0.0	0.0	0.0			

UNPAVED

	2009			**2010**			**2011**			**2012**			**2013**					
Segment 8	**Employee Vehicle**	**Delivery Truck**	**HHDT**	**Employee Vehicle**	**Delivery Truck**	**HHDT**	**Employee Vehicle**	**Delivery Truck**	**HHDT**	**Employee Vehicle**	**Delivery Truck**	**HHDT**	**Employee Vehicle**	**Delivery Truck**	**HHDT**			
500 kV Undergrounding																		
Clear, Grub, Stage	0.0	0.0	0.0	75.0	25.0	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Marshalling Yard	0.0	0.0	0.0	374.0	187.0	0.0	606.0	303.0	0.0	200.0	100.0	0.0	0.0	0.0	0.0			
Access Shaft Excavation	0.0	0.0	0.0	910.0	182.0	1168.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Tunneling	0.0	0.0	0.0	6795.0	528.5	3767.5	7695.0	598.5	4266.5	0.0	0.0	0.0	0.0	0.0	0.0			
Ventilation Shaft Excavation	0.0	0.0	0.0	0.0	0.0	0.0	682.5	364.0	646.8	0.0	0.0	0.0	0.0	0.0	0.0			
Tunnel Grouting	0.0	0.0	0.0	0.0	0.0	0.0	600.0	120.0	303.5	0.0	0.0	0.0	0.0	0.0	0.0			
Cable Installation	0.0	0.0	0.0	0.0	0.0	0.0	500.0	100.0	280.6	400.0	80.0	224.4	0.0	0.0	0.0			
Access Features and Cleanup	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	375.0	75.0	82.5	0.0	0.0	0.0			

TOTAL

	2009			**2010**			**2011**			**2012**			**2013**					
Segment 8	**Employee Vehicle**	**Delivery Truck**	**HHDT**	**Employee Vehicle**	**Delivery Truck**	**HHDT**	**Employee Vehicle**	**Delivery Truck**	**HHDT**	**Employee Vehicle**	**Delivery Truck**	**HHDT**	**Employee Vehicle**	**Delivery Truck**	**HHDT**			
500 kV Undergrounding																		
Clear, Grub, Stage	0.0	0.0	0.0	4500.0	1000.0	1500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Marshalling Yard	0.0	0.0	0.0	22440.0	7480.0	0.0	36360.0	12120.0	0.0	12000.0	4000.0	0.0	0.0	0.0	0.0			
Access Shaft Excavation	0.0	0.0	0.0	54600.0	7280.0	47952.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Tunneling	0.0	0.0	0.0	407700.0	21140.0	151823.5	461700.0	23940.0	171932.5	0.0	0.0	0.0	0.0	0.0	0.0			
Ventilation Shaft Excavation	0.0	0.0	0.0	0.0	0.0	0.0	40950.0	7462.0	13859.4	0.0	0.0	0.0	0.0	0.0	0.0			
Tunnel Grouting	0.0	0.0	0.0	0.0	0.0	0.0	36000.0	4800.0	12740.0	0.0	0.0	0.0	0.0	0.0	0.0			
Cable Installation	0.0	0.0	0.0	0.0	0.0	0.0	30000.0	4000.0	61555.6	24000.0	3200.0	49244.4	0.0	0.0	0.0			
Access Features and Cleanup	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22500.0	3000.0	3600.0	0.0	0.0	0.0			

Alternative 5 - Segment 8

Onroad Equipment Maximum Daily Emissions

			Emissions lbs/day-2010				
2010	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	3,420	3.72	34.04	3.55	0.03	0.28
	Delivery	260	0.56	3.42	5.03	0.01	0.10
	Heavy-Heavy Duty	1,532	1.45	6.64	39.54	0.07	0.78
		Totals	5.73	44.11	48.12	0.11	1.15

			Emissions lbs/day-2011				
2011	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	3,270	3.32	30.31	3.11	0.03	0.27
	Delivery	262	0.53	3.16	4.46	0.01	0.09
	Heavy-Heavy Duty	1,158	1.03	4.71	25.61	0.05	0.55
		Totals	4.88	38.18	33.18	0.09	0.91

			Emissions lbs/day-2012				
2012	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	1,020	0.96	8.68	0.89	0.01	0.08
	Delivery	160	0.31	1.76	2.45	0.01	0.05
	Heavy-Heavy Duty	1,279	1.04	4.84	24.79	0.06	0.56
		Totals	2.31	15.28	28.12	0.07	0.70

Annual Emissions

			Emissions lbs/year				
2010	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	489,240	531.80	4,869.89	507.83	4.40	39.64
	Delivery	36,900	79.00	485.90	713.61	1.22	13.78
	Heavy-Heavy Duty	201,275	190.82	872.44	5,193.29	9.27	102.01
		Totals	801.63	6,228.24	6,414.73	14.89	155.43

			Emissions lbs/year				
2011	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	605,010	614.09	5,607.23	575.97	5.45	50.16
	Delivery	52,322	106.27	631.26	891.57	1.73	18.70
	Heavy-Heavy Duty	260,087	230.91	1,058.20	5,752.39	11.99	123.45
		Totals	951.26	7,296.70	7,219.92	19.16	192.30

			Emissions lbs/year				
2012	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	58,500	55.05	497.95	50.78	0.53	4.86
	Delivery	10,200	19.47	112.02	155.96	0.35	3.44
	Heavy-Heavy Duty	52,844	42.96	199.89	1,024.14	2.45	23.14
		Totals	117.48	809.85	1,230.88	3.32	31.44

Offroad Equipment Emission Calculations - Alternative 5 Underground

SCAQMD Offroad Emission Factors

Equipment Item	HP	2011 SCAQMD Emission Factor lbs/hour						2012 SCAQMD Emission Factor lbs/hour					
		ROG	CO	NOX	SOX	PM	CO2	ROG	CO	NOX	SOX	PM	CO2
Backhoe	85	0.097992	0.35051	0.417886	0.0005	0.038348	41.037558	0.0883005	0.343093	0.39702851	0.0005	0.034936	41.0375559
Chippers - WC 342G	100	0.177898	0.575933	0.832781	0.000859	0.079424	71.962395	0.1639574	0.5653877	0.78499017	0.000859	0.074011	71.96238934
Crane Rough Terrain 35 Ton	155	0.111219	0.443131	0.78383	0.000789	0.053511	69.363988	0.1049741	0.4406114	0.73809733	0.000789	0.049903	69.36400041
Crane 250 Tons	390	0.148156	0.487839	1.430589	0.001545	0.053941	150.20664	0.1400863	0.4552245	1.32965249	0.001545	0.04906	150.2066281
Dozer, D7	240	0.193626	0.57479	1.764898	0.001802	0.073702	160.13911	0.1841272	0.5526783	1.65375783	0.001802	0.068047	160.1390532
Excavator Cat 345	345	0.156785	0.453354	1.514752	0.001979	0.053106	187.20276	0.149252	0.4337845	1.38341518	0.001979	0.047567	187.2027438
Excavator/Rock Drill Cat 320	138	0.131576	0.573202	0.86731	0.000994	0.069265	86.255301	0.121734	0.5696887	0.80567328	0.000994	0.062845	86.25532614
Forklift - 5 ton	75	0.057235	0.191686	0.213382	0.000253	0.020756	20.58372	0.0504835	0.1865626	0.20338758	0.000253	0.018663	20.58372046
Forklift - 10 ton	85	0.056618	0.198383	0.238449	0.000278	0.02308	22.948431	0.0501331	0.1938913	0.22522885	0.000278	0.020671	22.94842936
Generator - 250 hp	250	0.148282	0.470218	1.937316	0.002391	0.055788	212.50499	0.1372256	0.4502258	1.80474186	0.002391	0.05078	212.5049889
Generator - TBM	1500	0.703322	2.626148	9.259722	0.010935	0.272092	1087.5799	0.6513473	2.4591368	8.60377143	0.010935	0.248174	1087.579967
Grout Pump	100	0.132263	0.458792	0.722904	0.00078	0.060041	65.488108	0.1222974	0.4519594	0.68361792	0.00078	0.056322	65.48810904
Loader - 928	143	0.123605	0.509538	0.848985	0.000902	0.062686	78.736013	0.1156661	0.5065743	0.79639783	0.000902	0.057874	78.73603193
Motor, Auxiliary Power	5	0.005484	0.023747	0.036995	5.29E-05	0.002167	3.4025538	0.0052242	0.0232711	0.03542569	5.29E-05	0.002044	3.402554632
Motor Grader - 120H	125	0.14667	0.558506	0.911125	0.000926	0.079569	79.41549	0.1366816	0.5537758	0.85596396	0.000926	0.073543	79.41545235
Pile Driver Crane	240	0.11679	0.348697	1.115603	0.001214	0.043969	107.91696	0.1101061	0.3334087	1.03850706	0.001214	0.040047	107.9169786
Vertical Shaft Machine	550	0.239063	0.913326	3.158838	0.003739	0.093607	378.24026	0.2212913	0.8552421	2.93205536	0.003739	0.085303	378.2401983
Vib. Compactor CS-433E	100	0.114354	0.383432	0.577872	0.00059	0.051641	49.558584	0.1068762	0.3782827	0.5493083	0.00059	0.048546	49.55857703
Water Pump - 100 hp	100	0.132263	0.458792	0.722904	0.00078	0.060041	65.488108	0.1222974	0.4519594	0.68361792	0.00078	0.056322	65.48810904
Welder	50	0.115728	0.294932	0.268298	0.000336	0.02746	25.958061	0.1070863	0.2854484	0.26366783	0.000336	0.025961	25.95805764

Other Emission Factors

Chainsaws Stihl MS 460	6	All Years

Offroad Equipment Emission Calculations - Alternative 5 Underground

2010 Emission Calculations

Clear, Grub, Stage

				Daily Emissions lbs							Annual Emissions lbs					
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	CO2	Days	ROG	CO	NOX	SOX	PM	CO2
Dozer, D7	240	1	8	1.63	4.79	15.06	0.01	0.64	1,281.11	25	40.74	119.81	376.40	0.36	15.88	32,027.81
Forklift - 10 ton	85	1	2	0.13	0.41	0.50	0.00	0.05	45.90	25	3.17	10.17	12.57	0.01	1.26	1,147.42
Motor Grader - 120H	125	1	4	0.63	2.25	3.86	0.00	0.34	317.66	25	15.70	56.36	96.55	0.09	8.43	7,941.55
Loader - 928	143	1	4	0.53	2.05	3.61	0.00	0.26	314.94	25	13.19	51.29	90.19	0.09	6.62	7,873.60
Chippers - WC 342G	100	1	2	0.38	1.17	1.75	0.00	0.17	143.92	10	3.81	11.70	17.52	0.02	1.67	1,439.25
Chainsaws Stihl MS 460	6	1	4	3.18	11.90	0.11	0.00	0.20	0.20	10	31.76	118.96	1.06	0.00	2.04	2.04
				6.47	22.57	24.89	0.02	1.66	2,103.74		108.37	368.28	594.29	0.58	35.89	50,431.67

Marshalling Yard

				Daily Emissions lbs							Annual Emissions lbs					
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	CO2	Days	ROG	CO	NOX	SOX	PM	CO2
Crane Rough Terrain 35 Ton	155	1	2	0.24	0.89	1.66	0.00	0.11	138.73	187	44.00	166.77	310.35	0.30	21.00	25,942.13
Forklift, 5 ton	75	1	6	0.39	1.18	1.34	0.00	0.14	123.50	187	72.14	221.42	250.53	0.28	25.45	23,094.93
Forklift, 10 ton	85	1	6	0.38	1.22	1.51	0.00	0.15	137.69	187	71.10	228.14	282.06	0.31	28.32	25,748.14
Motor, Auxilary Power	5	1	1	0.01	0.02	0.04	0.00	0.00	3.40	187	1.07	4.52	7.19	0.01	0.43	636.28
				1.01	3.32	4.55	0.00	0.40	403.32		188.32	620.86	850.13	0.90	75.21	75,421.48

Access Shaft Excavation

				Daily Emissions lbs							Annual Emissions lbs					
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	CO2	Days	ROG	CO	NOX	SOX	PM	CO2
Excavator Cat 345	345	1	8	1.32	3.82	13.27	0.02	0.47	1,497.62	91	120.39	348.01	1,207.64	1.44	43.11	136,283.62
Excavator/Rock Drill Cat 320	138	2	8	2.27	9.23	14.88	0.02	1.19	1,380.09	91	206.78	840.22	1,353.90	1.45	108.06	125,587.74
Pile Driver Crane	240	1	8	0.99	2.92	9.57	0.01	0.38	863.34	91	90.17	265.90	870.90	0.88	34.87	78,563.54
Loader - 928	143	1	8	1.05	4.10	7.22	0.01	0.53	629.89	91	96.00	373.36	656.60	0.66	48.20	57,319.83
Crane 250 Ton	390	1	2	0.31	1.05	3.07	0.00	0.12	300.41	91	28.52	95.26	279.70	0.28	10.74	27,337.60
Generator - 250 hp	250	4	24	15.54	48.18	198.92	0.23	5.93	20,400.47	106	1,646.74	5,106.58	21,085.16	24.33	628.82	2,162,450.33
Grout Pump	100	1	8	1.13	3.72	6.06	0.01	0.50	523.90	91	102.81	338.36	551.59	0.57	45.63	47,675.34
Water Pumps - 100 hp	100	2	24	6.78	22.31	36.37	0.04	3.01	3,143.43	106	718.52	2,364.82	3,855.08	3.97	318.92	333,203.50
				29.40	95.33	289.35	0.32	12.13	28,739.15		3,009.92	9,732.50	29,860.57	33.58	1,238.34	2,968,421.51

Tunneling

				Daily Emissions lbs							Annual Emissions lbs					
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	CO2	Days	ROG	CO	NOX	SOX	PM	CO2
Generator - TBM	1500	1	16	12.28	45.76	158.87	0.17	4.81	17,401.28	151	1,854.29	6,909.58	23,989.08	26.42	725.56	2,627,592.56
Loader - 928	143	1	16	2.11	8.21	14.43	0.01	1.06	1,259.78	151	318.60	1,239.06	2,179.04	2.18	159.95	190,226.26
Crane 250 Ton	390	2	16	5.01	16.75	49.18	0.05	1.89	4,806.61	151	757.09	2,528.99	7,426.00	7.47	285.24	725,798.29
Generator - 250 hp	250	4	24	15.54	48.18	198.92	0.23	5.93	20,400.47	176	2,734.20	8,478.85	35,009.31	40.40	1,044.08	3,590,483.57
Water Pump - 100 hp	100	4	24	13.56	44.62	72.74	0.07	6.02	6,286.86	176	2,386.03	7,852.97	12,801.77	13.18	1,059.04	1,106,487.10
				48.50	163.51	494.13	0.54	19.70	50,155.00		8,050.23	27,009.45	81,405.21	89.64	3,273.87	8,240,587.78

2011 Emission Calculations

Marshalling Yard

				Daily Emissions lbs							Annual Emissions lbs					
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	CO2	Days	ROG	CO	NOX	SOX	PM	CO2
Crane, Hydraulic, Rough Terrain 35 ton	155	1	2	0.24	0.89	1.66	0.00	0.11	0.11	303	38.59	146.26	272.18	0.26	18.42	18.42
Forklift, 5 ton	75	1	6	0.39	1.18	1.34	0.00	0.14	0.14	303	63.27	194.19	219.71	0.25	22.32	22.32
Forklift, 10 ton	85	1	6	0.38	1.22	1.51	0.00	0.15	0.15	303	62.36	200.08	247.36	0.27	24.84	24.84
Motor, Auxilary Power	5	1	1	0.05	0.18	0.38	0.00	0.02	0.02	303	8.44	29.32	62.73	0.07	3.45	3.45
				1.05	3.47	4.89	0.01	0.42	0.42		172.66	569.85	801.99	0.86	69.03	69.03

Tunneling

				Daily Emissions lbs							Annual Emissions lbs					
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	CO2	Days	ROG	CO	NOX	SOX	PM	CO2
Generator - TBM	1500	1	16	12.28	45.76	158.87	0.17	4.81	17,401.28	171	2,099.89	7,824.76	27,166.44	29.92	821.66	2,975,618.06
Loader - 928	143	1	16	2.11	8.21	14.43	0.01	1.06	1,259.78	171	360.80	1,403.17	2,467.66	2.47	181.13	215,421.79
Crane 250 Ton	390	2	16	5.01	16.75	49.18	0.05	1.89	4,806.61	171	857.37	2,863.96	8,409.58	8.46	323.02	821,930.52
Generator - 250 hp	250	4	24	15.54	48.18	198.92	0.23	5.93	20,400.47	200	3,107.05	9,635.05	39,783.31	45.91	1,186.45	4,080,094.96
Water Pump - 100 hp	100	4	24	13.56	44.62	72.74	0.07	6.02	6,286.86	200	2,711.40	8,923.83	14,547.47	14.98	1,203.46	1,257,371.71
				48.50	163.51	494.13	0.54	19.70	50,155.00		9,136.52	30,650.78	92,374.45	101.73	3,715.72	9,350,437.04

Ventilation Shaft Excavation

				Daily Emissions lbs							Annual Emissions lbs					
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	CO2	Days	ROG	CO	NOX	SOX	PM	CO2
Vertical Shaft Machine	550	1	8	1.91	7.31	25.27	0.03	0.75	3,025.92	91	174.04	664.90	2,299.63	2.72	68.15	275,358.91
Loader - 928	143	1	8	0.99	4.08	6.79	0.01	0.50	629.89	91	89.98	370.94	618.06	0.66	45.64	57,319.82
Crane 250 Ton	390	1	2	0.30	0.98	2.86	0.00	0.11	300.41	91	26.96	88.79	260.37	0.28	9.82	27,337.61
Generator - 250 hp	250	1	24	3.56	11.29	46.50	0.06	1.34	5,100.12	106	377.23	1,196.23	4,928.53	6.08	141.92	540,612.69
Water Pump - 100 hp	100	1	24	3.17	11.01	17.35	0.02	1.44	1,571.71	106	336.48	1,167.17	1,839.07	1.98	152.74	166,601.75
				9.93	34.65	98.77	0.12	4.14	10,628.06		1,004.70	3,488.03	9,945.66	11.73	418.27	1,067,230.77

Tunnel Grouting

				Daily Emissions lbs							Annual Emissions lbs					
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	CO2	Days	ROG	CO	NOX	SOX	PM	CO2
Crane 250 Ton	390	1	6	0.89	2.93	8.58	0.01	0.32	901.24	60	53.34	175.62	515.01	0.56	19.42	54,074.39
Grout Pump	100	1	6	0.79	2.75	4.34	0.00	0.36	392.93	60	47.61	165.17	260.25	0.28	21.61	23,575.72
Generator - 250 hp	250	4	24	14.24	45.14	185.98	0.23	5.36	20,400.48	70	996.46	3,159.87	13,018.76	16.07	374.90	1,428,033.51
Water Pump - 100 hp	100	1	24	3.17	11.01	17.35	0.02	1.44	1,571.71	70	222.20	770.77	1,214.48	1.31	100.87	110,020.02
				19.09	61.83	216.25	0.26	7.48	23,266.36		1,319.61	4,271.42	15,008.50	18.22	516.80	1,615,703.64

Cable Installation

				Daily Emissions lbs							Annual Emissions lbs					
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	CO2	Days	ROG	CO	NOX	SOX	PM	CO2
Welder	50	2	6	1.39	3.54	3.22	0.00	0.33	311.50	50	69.44	176.96	160.98	0.20	16.48	15,574.84
Generator - 250 hp	250	4	24	14.24	45.14	185.98	0.23	5.36	20,400.48	58	825.64	2,618.17	10,786.98	13.31	310.63	1,183,227.76
Forklift, 5 ton	75	2	8	0.91	3.17	3.82	0.00	0.37	367.17	50	45.29	158.71	190.76	0.22	18.46	18,358.75
Crane 250 Ton	240	2	6	1.78	5.85	17.17	0.02	0.65	1,802.48	50	88.89	292.70	858.35	0.93	32.36	90,123.99
				18.31	57.71	210.18	0.26	6.70	22,881.63		1,029.26	3,246.54	11,997.07	14.66	377.93	1,307,285.33

2012 Emission Calculations

Marshalling Yard

				Daily Emissions lbs							Annual Emissions lbs					
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	CO2	Days	ROG	CO	NOX	SOX	PM	CO2
Crane, Hydraulic, Rough Terrain 35 ton	155	1	2	0.24	0.89	1.66	0.00	0.11	138.73	100	23.53	89.18	165.96	0.16	11.23	13,872.80
Forklift, 5 ton	75	1	6	0.39	1.18	1.34	0.00	0.14	123.50	100	38.58	118.41	133.97	0.15	13.61	12,350.23
Forklift, 10 ton	85	1	6	0.38	1.22	1.51	0.00	0.15	137.69	100	38.02	122.00	150.83	0.17	15.15	13,769.06
Motor, Auxilary Power	5	1	1	0.01	0.02	0.04	0.00	0.00	3.40	100	0.57	2.42	3.85	0.01	0.23	340.26
				1.01	3.32	4.55	0.00	0.40	403.32		100.71	332.01	454.61	0.48	40.22	40,332.34

Cable Installation

				Daily Emissions lbs							Annual Emissions lbs					
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	CO2	Days	ROG	CO	NOX	SOX	PM	CO2
Welder	50	2	6	1.39	3.54	3.22	0.00	0.33	311.50	40	55.55	141.57	128.78	0.16	13.18	12,459.87
Generator - 250 hp	250	4	24	14.24	45.14	185.98	0.23	5.36	20,400.48	47	669.05	2,121.62	8,741.17	10.79	251.72	958,822.50
Forklift, 5 ton	75	2	8	0.91	3.17	3.82	0.00	0.37	367.17	40	36.24	126.97	152.61	0.18	14.77	14,687.00
Crane 250 Ton	240	2	6	1.78	5.85	17.17	0.02	0.65	1,802.48	40	71.11	234.16	686.68	0.74	25.89	72,099.19
				18.31	57.71	210.18	0.26	6.70	22,881.63		831.95	2,624.32	9,709.24	11.87	305.56	1,058,068.55

Access Features and Cleanup

				Daily Emissions lbs							Annual Emissions lbs					
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	CO2	Days	ROG	CO	NOX	SOX	PM	CO2
Excavator - 320	188	1	4	0.49	2.28	3.22	0.00	0.25	345.02	75	36.52	170.91	241.70	0.30	18.85	25,876.60
Backhoe	85	2	4	0.71	2.74	3.18	0.00	0.28	328.30	75	52.98	205.86	238.22	0.30	20.96	24,622.53
Crane 250 Ton	390	1	4	0.56	1.82	5.32	0.01	0.20	600.83	75	42.03	136.57	398.90	0.46	14.72	45,061.99
Loader - 928	143	1	6	0.69	3.04	4.78	0.01	0.35	472.42	75	52.05	227.96	358.38	0.41	26.04	35,431.21
Motor Grader - 120H	125	1	4	0.55	2.22	3.42	0.00	0.29	317.66	75	41.00	166.13	256.79	0.28	22.06	23,824.64
Vib. Compactor CS-433E	100	1	4	0.43	1.51	2.20	0.00	0.19	198.23	75	32.06	113.48	164.79	0.18	14.56	14,867.57
Generator - 250 hp	250	4	24	13.17	43.22	173.26	0.23	4.87	20,400.48	75	988.02	3,241.63	12,994.14	17.22	365.62	1,530,035.92
				16.60	56.83	195.37	0.26	6.44	22,662.94		1,244.67	4,262.53	14,652.92	19.14	482.82	1,699,720.46

Maximum Day - Lbs/Day

Year	ROG	CO	NOX	SOX	PM	CO2
2010	78.90	262.16	788.03	0.87	32.24	79297.47
2011	59.48	201.64	597.79	0.66	24.26	60783.47
2012	35.91	117.86	410.10	0.52	13.54	45947.89

Annual - Tons/Year

Year	ROG	CO	NOX	SOX	PM	CO2
2010	5.68	18.87	56.36	0.06	2.31	5,667.43
2011	6.33	21.11	65.06	0.07	2.55	6,670.36
2012	1.09	3.61	12.41	0.02	0.41	1,399.06
Total Tons	13.10	43.59	133.83	0.15	5.27	13,736.85

Incremental Worst Case Day SCAQMD

Year	ROG	CO	NOX	SOX	PM	CO2
2010	49.50	166.83	498.68	0.55	20.11	50,558.32

Fugitive Dust Emissions - Alternative 5 Underground

Emission Categories

1) Earthmoving
2) Road Dust Paved/Unpaved
3) Disturbed Area Windblown Emissions

1) Earthmoving

Emission Types
A) Dozing
B) Grading
C) Material Loading/Handling

A) Dozing (AP-42 Section 11.9 for overburden)

$E = k \times (s)^{1.5} / (M)^{1.4}$ For PM10 and $k \times 5.7 \times (s)^{1.2} / (M)^{1.3}$ for PM2.5
E = lb/hr
k = Scaling Constant (0.75 for PM10 and 0.105 for PM2.5)
s = Silt Content (assumed to be 6% - SCAQMD Handbook for Sand and Gravel Plant Road)
M = Moisture Content = 10% (assumes watering when necessary for mitigation)

PM10 Emission Factor
0.438821744 lb/hr

PM2.5 Emission Factor
0.257540572 lb/hr

Maximum Daily Dozer Use

	Hrs/day
2010	8
2011	0
2012	0

Total Dozer Use

	Hrs/year
2010	200
2011	0
2012	0

Dozer Emissions

Lbs/Day	PM10	PM2.5
2010	3.51	2.06
2011	0.00	0.00
2012	0.00	0.00

Tons/year	PM10	PM2.5
2010	0.04	0.03
2011	0.00	0.00
2012	0.00	0.00

B) Grading

$E = k \times 0.051 \times (S)^{2.0}$ for PM10 and $k \times 0.040 \times (S)^{2.5}$ for PM2.5
E = lb/VMT
k = Scaling Constant (0.60 for PM10 and 0.031 for PM2.5)
S = Mean Vehicle Speed assumed to be 3 mph
Assumes VMT = 3 x hours in use

PM10 Emission Factor
0.2754 lb/VMT

PM2.5 Emission Factor
0.019329687 lb/VMT

Maximum Daily Grader VMT

	Hrs/day	VMT/day
2010	4	12
2011	0	0
2012	4	12

Annual Grader VMT

	Hrs/year	VMT/year
2010	100	300
2011	0	0
2012	300	900

Grading Emissions

Lbs/Day	PM10	PM2.5
2010	3.30	0.23
2011	0.00	0.00
2012	3.30	0.23

Tons/year	PM10	PM2.5
2010	0.04	0.00
2011	0.00	0.00
2012	0.12	0.01

C) Material Loading/Handling (AP-42, p. 13.2.4-3)

$E = (k)(0.0032)[(U/5)^{1.3}]/[(M/2)^{1.4}]$
E = lb/ton
k = Particle Size Constant (0.35 for PM10 and 0.11 for PM2.5)
U = average wind speed = 26.5 MPH worst day, 6.4 MPH avg from Norco Met File
M = moisture content = 10% (mitigated)
Max daily productivity is assume to be two times average
Three separate drops are assumed

2010	2646	Maximum daily tons
2011	1882	Maximum daily tons
2012	0	Maximum daily tons
2010	170400	Annual tons
2011	152730	Annual tons
2012	0	Annual tons

Emission Factors and Emissions
Emission Factors

PM10 Daily	PM2.5 Daily	PM10 Annual	PM2.5 Annual
0.00103	0.00032	0.00016	0.00005

Emissions lbs/day

	PM10	PM2.5
2010	8.16	2.57
2011	5.81	1.83
2012	0.00	0.00

Emissions tons/year

	PM10	PM2.5
2010	0.04	0.01
2011	0.04	0.01
2012	0.00	0.00

2) Road Dust
Emission Types
A) Paved Road Dust
B) Unpaved Road Dust

A) Paved Road Dust

E = [k x (sL/2)0.65 x (W/3)1.5 -C] x (1-P/4N)
E = lb/VMT
k = Constant (0.016 for PM10 and 0.0040 for PM2.5)
sL = Silt Loading (assumed to be 0.06 g/m2 - assumes 5,000 to 10,000 ADT profile of Table 13.2.1-3 average for all traffic)
W = Average weight of vehicles in tons (calculated below)
C = Correction for exhaust, break wear, tire wear (0.00047 lb/VMT for PM10, 0.00036 lb/VMT for PM2.5)
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Passenger Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Paved VMT	Average Weight (Tons)
2010	3,363	254	1,495	5111	10.5
2011	3,216	254	1,126	4595	9.2
2012	1,003	156	1,272	2431	17.0

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Paved VMT	Average Weight (Tons)
2010	481,086	35,978	196,309	713373	10.0
2011	594,927	50,837	254,590	900353	10.3
2012	57,525	9,945	52,538	120008	14.8

Emission Factors and Emissions
Emission Factors

Daily Efs	PM10 Daily	PM2.5 Daily
2010	0.0102	0.0023
2011	0.0083	0.0018
2012	0.0217	0.0052

Emissions lbs/day

	PM10	PM2.5
2010	52.29	11.83
2011	38.19	8.43
2012	52.75	12.60

Annual Efs	PM10 Annual	PM2.5 Annual
2010	0.0095	0.0021
2011	0.0099	0.0022
2012	0.0174	0.0041

Emissions tons/year

	PM10	PM2.5
2010	3.39	0.76
2011	4.45	1.00
2012	1.04	0.25

B) Unpaved Road Dust

$E = (k)[(s/12)^{0.9}][(W/3)^{0.45}][(365-P)/365]$ (for industrial sites)

k = constant = 1.5 lb/VMT for PM10 and 0.23 lb/VMT for PM2.5
s = Silt Content (assumed to be 6% - SCAQMD Handbook for Sand and Gravel Plant Road)
W = avg. vehicle weight = calculated below
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Personal/Professionals/inspection Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Unpaved VMT	Average Weight (Tons)
2010	57	7	38	101	12.8
2011	55	9	32	95	12.0
2012	17	4	7	28	9.6

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Unpaved VMT	Average Weight (Tons)
2010	8,154	923	4,966	14043	12.3
2011	10,084	1,486	5,497	17066	11.5
2012	975	255	307	1537	8.6

Uncontrolled Emission Factors and Emissions
Emission Factors (lb/VMT)

Annual Efs	PM10 Daily	PM2.5 Daily
2010	1.55	0.24
2011	1.50	0.23
2012	1.36	0.21

Emissions lbs/day

	PM10	PM2.5
2010	156.59	24.01
2011	142.48	21.85
2012	37.68	5.78

Annual Efs	PM10 Annual	PM2.5 Annual
2010	1.52	0.16
2011	1.47	0.16
2012	1.29	0.14

Emissions tons/year

	PM10	PM2.5
2010	10.65	1.13
2011	12.58	1.34
2012	0.99	0.11

Controlled Emissions (assumes 84% efficiency with use of soil binder)

Emissions lbs/day

	PM10	PM2.5
2010	25.06	3.84
2011	22.80	3.50
2012	6.03	0.92

Emission Control
84%

Emissions tons/year

	PM10	PM2.5
2010	1.70	0.18
2011	2.01	0.21
2012	0.16	0.02

3) Disturbed Area Windblown Emissions

Assumptions
Emission Factor is 0.38 tons/disturbed acres/year of Total Suspended Particulate (AP-42 Section 11.9)
PM10 and PM2.5 fractions of TSP are 0.489 and 0.102 respectively per CEIDARS factors from SCAQMD CEQA Website
Disturbed areas are controlled by dust suppressants 84% control

	Disturbed Acres		Emissions (lbs/day)		Emissions (tons/year)	
	Acres	Acre-years	PM10	PM2.5	PM10	PM2.5
2010	25	15	4.15	0.85	0.45	0.09
2011	25	25	4.15	0.85	0.76	0.16
2012	25	8	4.15	0.85	0.24	0.05

Fugitive Dust Emission Totals	2010		2011		2012	
Maximum Daily Emissions	PM10 lb/day	PM2.5 lb/day	PM10 lb/day	PM2.5 lb/day	PM10 lb/day	PM2.5 lb/day
Dozer	3.51	2.06	0.00	0.00	0.00	0.00
Grading	3.30	0.23	0.00	0.00	3.30	0.23
Soil Handling	8.16	2.57	5.81	1.83	0.00	0.00
Paved Road Dust	52.29	11.83	38.19	8.43	52.75	12.60
Unpaved Road Dust	25.06	3.84	22.80	3.50	6.03	0.92
Disturbed Area Dust	4.15	0.85	4.15	0.85	4.15	0.85
Totals	96.48	21.38	70.94	14.60	66.23	14.60

Annual Emissions	2010		2011		2012	
	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
Dozer	0.04	0.03	0.00	0.00	0.00	0.00
Grading	0.04	0.00	0.00	0.00	0.12	0.01
Soil Handling	0.04	0.01	0.04	0.01	0.00	0.00
Paved Road Dust	3.39	0.76	4.45	1.00	1.04	0.25
Unpaved Road Dust	1.70	0.18	2.01	0.21	0.16	0.02
Disturbed Area Dust	0.45	0.09	0.76	0.16	0.24	0.05
Totals	5.22	0.98	6.50	1.23	1.33	0.27

TRTP Alternative 6 Project Construction Emission Totals
All Jurisdictions

Incremental Annual Emissions

2010 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.0072	0.0376	0.1415	0.0003	0.0028	0.0025
Offroad Vehicles/Equipment	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Helicopter	7.2911	22.0975	21.8634	0.1835	1.2063	1.1098
Fugitive Dust	---	---	---	---	0.0000	0.0000
Totals	**7.30**	**22.14**	**22.00**	**0.18**	**1.21**	**1.11**

2011 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.0046	0.0268	0.0440	0.0001	0.0009	0.0009
Offroad Vehicles/Equipment	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Helicopter	3.2950	16.1810	20.2866	0.1689	1.1211	1.0314
Fugitive Dust	---	---	---	---	0.0000	0.0000
Totals	**3.30**	**16.21**	**20.33**	**0.17**	**1.12**	**1.03**

2012 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	-0.0115	-0.0638	-0.1251	-0.0003	-0.0028	-0.0026
Offroad Vehicles/Equipment	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Helicopter	6.9167	27.2240	30.0369	0.2511	1.6597	1.5269
Fugitive Dust	---	---	---	---	0.0000	0.0000
Totals	**6.91**	**27.16**	**29.91**	**0.25**	**1.66**	**1.52**

Note: This alternative does not significantly impact the KCAPCD.

TRTP Alternative 6 Project Construction Emission Totals
SCAQMD Jurisdiction

Incremental Annual Emissions

2010 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.0055	0.0331	0.1000	0.0002	0.0018	0.0017
Offroad Vehicles/Equipment	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Helicopter	5.0452	14.7541	13.8057	0.1161	0.7624	0.7014
Fugitive Dust	---	---	---	---	0.0000	0.0000
Totals	**5.05**	**14.79**	**13.91**	**0.12**	**0.76**	**0.70**

2011 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.0029	0.0170	0.0261	0.0001	0.0005	0.0005
Offroad Vehicles/Equipment	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Helicopter	3.0018	14.3640	17.9474	0.1495	0.9916	0.9123
Fugitive Dust	---	---	---	---	0.0000	0.0000
Totals	**3.00**	**14.38**	**17.97**	**0.15**	**0.99**	**0.91**

2012 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	-0.0070	-0.0389	-0.0745	-0.0002	-0.0017	-0.0015
Offroad Vehicles/Equipment	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Helicopter	4.1113	16.1284	17.8785	0.1494	0.9877	0.9087
Fugitive Dust	---	---	---	---	0.0000	0.0000
Totals	**4.10**	**16.09**	**17.80**	**0.15**	**0.99**	**0.91**

TRTP Alternative 6 Project Construction Emission Totals
AVAQMD Jurisdiction

Incremental Annual Emissions

2010 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.0027	0.0145	0.0516	0.0001	0.0010	0.0009
Offroad Vehicles/Equipment	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Helicopter	2.2459	7.3434	8.0577	0.0674	0.4440	0.4084
Fugitive Dust	---	---	---	---	0.0000	0.0000
Totals	**2.25**	**7.36**	**8.11**	**0.07**	**0.44**	**0.41**

2011 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.0017	0.0097	0.0180	0.0000	0.0004	0.0003
Offroad Vehicles/Equipment	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Helicopter	0.2932	1.8170	2.3392	0.0195	0.1295	0.1191
Fugitive Dust	---	---	---	---	0.0000	0.0000
Totals	**0.29**	**1.83**	**2.36**	**0.02**	**0.13**	**0.12**

2012 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	-0.0045	-0.0249	-0.0506	-0.0001	-0.0011	-0.0010
Offroad Vehicles/Equipment	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Helicopter	2.8054	11.0956	12.1584	0.1016	0.6720	0.6182
Fugitive Dust	---	---	---	---	0.0000	0.0000
Totals	**2.80**	**11.07**	**12.11**	**0.10**	**0.67**	**0.62**

TRTP Alternative 6 Project Construction Emission Totals
All Jurisdictions - ANF Total

2009 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.104	0.788	0.708	0.001	0.016	0.014
Offroad Vehicles/Equipment	0.128	0.391	0.550	0.001	0.050	0.046
Helicopter	0.000	0.000	0.000	0.000	0.000	0.000
Fugitive Dust	---	---	---	---	2.512	0.511
Totals	**0.23**	**1.18**	**1.26**	**0.00**	**2.58**	**0.57**

2010 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.615	4.469	5.026	0.011	0.113	0.104
Offroad Vehicles/Equipment	1.314	4.613	8.864	0.009	0.542	0.498
Helicopter	8.787	29.822	30.537	0.256	1.686	1.551
Fugitive Dust	---	---	---	---	22.690	5.298
Totals	**10.72**	**38.90**	**44.43**	**0.28**	**25.03**	**7.45**

2011 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.945	7.132	5.435	0.014	0.147	0.135
Offroad Vehicles/Equipment	1.466	5.166	9.078	0.010	0.601	0.553
Helicopter	4.348	20.951	26.287	0.219	1.452	1.336
Fugitive Dust	---	---	---	---	25.426	5.213
Totals	**6.76**	**33.25**	**40.80**	**0.24**	**27.63**	**7.24**

2012 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.750	5.521	4.438	0.013	0.125	0.115
Offroad Vehicles/Equipment	1.350	5.033	8.598	0.010	0.550	0.506
Helicopter	9.271	36.345	40.372	0.337	2.230	2.052
Fugitive Dust	---	---	---	---	25.919	5.641
Totals	**11.37**	**46.90**	**53.41**	**0.36**	**28.82**	**8.31**

2013 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.006	0.039	0.041	0.000	0.001	0.001
Offroad Vehicles/Equipment	0.008	0.033	0.049	0.000	0.003	0.003
Helicopter	0.001	0.002	0.003	0.000	0.000	0.000
Fugitive Dust	---	---	---	---	0.000	0.000
Totals	**0.014**	**0.074**	**0.093**	**0.000**	**0.005**	**0.004**

TRTP Alternative 6 Project Construction Emission Totals
ANF - SCAQMD Jurisdiction

2009 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.057	0.432	0.389	0.001	0.009	0.008
Offroad Vehicles/Equipment	0.070	0.213	0.300	0.000	0.027	0.025
Helicopter	0.000	0.000	0.000	0.000	0.000	0.000
Fugitive Dust	---	---	---	---	1.592	0.314
Totals	**0.13**	**0.64**	**0.69**	**0.00**	**1.63**	**0.35**

2010 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.456	3.315	3.701	0.008	0.084	0.077
Offroad Vehicles/Equipment	0.979	3.439	6.656	0.007	0.403	0.371
Helicopter	6.541	22.479	22.480	0.189	1.242	1.142
Fugitive Dust	---	---	---	---	14.306	3.352
Totals	**7.98**	**29.23**	**32.84**	**0.20**	**16.03**	**4.94**

2011 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.740	5.582	4.289	0.011	0.116	0.106
Offroad Vehicles/Equipment	1.176	4.152	7.326	0.008	0.482	0.443
Helicopter	4.034	19.088	23.854	0.199	1.318	1.212
Fugitive Dust	---	---	---	---	20.925	4.341
Totals	**5.95**	**28.82**	**35.47**	**0.22**	**22.84**	**6.10**

2012 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.379	2.803	2.219	0.007	0.063	0.058
Offroad Vehicles/Equipment	0.645	2.409	4.039	0.005	0.264	0.243
Helicopter	4.982	19.496	21.701	0.181	1.199	1.103
Fugitive Dust	---	---	---	---	15.412	3.340
Totals	**6.01**	**24.71**	**27.96**	**0.19**	**16.94**	**4.74**

2013 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.003	0.018	0.024	0.000	0.001	0.001
Offroad Vehicles/Equipment	0.005	0.021	0.030	0.000	0.002	0.002
Helicopter	0.000	0.000	0.000	0.000	0.000	0.000
Fugitive Dust	---	---	---	---	0.000	0.000
Totals	**0.008**	**0.039**	**0.053**	**0.000**	**0.003**	**0.003**

TRTP Alternative 6 Project Construction Emission Totals
ANF - AVAQMD Jurisdiction

2009 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.047	0.357	0.318	0.001	0.007	0.007
Offroad Vehicles/Equipment	0.058	0.178	0.250	0.000	0.023	0.021
Helicopter	0.000	0.000	0.000	0.000	0.000	0.000
Fugitive Dust	---	---	---	---	0.920	0.197
Totals	**0.11**	**0.53**	**0.57**	**0.00**	**0.95**	**0.22**

2010 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.159	1.153	1.326	0.003	0.030	0.028
Offroad Vehicles/Equipment	0.336	1.174	2.208	0.002	0.138	0.127
Helicopter	2.246	7.343	8.058	0.067	0.444	0.408
Fugitive Dust	---	---	---	---	8.385	1.946
Totals	**2.74**	**9.67**	**11.59**	**0.07**	**9.00**	**2.51**

2011 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.205	1.551	1.147	0.003	0.031	0.029
Offroad Vehicles/Equipment	0.290	1.015	1.753	0.002	0.119	0.110
Helicopter	0.314	1.863	2.433	0.020	0.135	0.124
Fugitive Dust	---	---	---	---	4.501	0.873
Totals	**0.81**	**4.43**	**5.33**	**0.03**	**4.79**	**1.13**

2012 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.371	2.718	2.219	0.007	0.062	0.057
Offroad Vehicles/Equipment	0.705	2.624	4.559	0.005	0.286	0.263
Helicopter	4.289	16.849	18.671	0.156	1.032	0.949
Fugitive Dust	---	---	---	---	10.507	2.301
Totals	**5.36**	**22.19**	**25.45**	**0.17**	**11.89**	**3.57**

2013 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.003	0.021	0.017	0.000	0.001	0.000
Offroad Vehicles/Equipment	0.003	0.012	0.020	0.000	0.001	0.001
Helicopter	0.001	0.002	0.003	0.000	0.000	0.000
Fugitive Dust	---	---	---	---	0.000	0.000
Totals	**0.006**	**0.034**	**0.040**	**0.000**	**0.002**	**0.002**

Alternative 6

Helicopter Trip Emissions for Alternative 6 (Segment 6)

Summary of Total Number of Helicopter Trips for Entire Tower Sites

	220 kV Construction	500 kV Construction
Hughes 500		
Eurocopter	6818	10072
Skyking	965	6526
Skycrane	24	1424

220 kV	Suspension	7387
	Dead End	420
500 kV	Suspension	16102
	Dead End	1920

230kV Wreckout - Total Emissions (lbs)

Helicopter Type	Year	HC	CO	NOx	SOx	PM
Eurocopter	2010	1,828.94	4,097.47	8,366.53	69.37	455.26
	2012	91.53	205.06	418.71	3.47	22.78
Skyking	2010	2,279.25	8,252.79	7,336.54	61.70	406.71
	2012	114.07	413.02	367.16	3.09	20.35
Skycrane	2010	63.97	453.48	584.66	4.86	32.39
	2012	3.20	22.69	29.26	0.24	1.62

500kV Construction - Total Emissions (lbs)

Helicopter Type	Year	HC	CO	NOx	SOx	PM
Eurocopter	2010	1,218.36	2,729.57	5,573.43	46.21	303.27
	2011	1,514.25	3,392.46	6,926.98	57.43	376.92
	2012	104.43	233.96	477.72	3.96	25.99
Skyking	2010	12,182.48	44,110.68	39,213.38	329.80	2,173.86
	2011	2,958.60	10,712.59	9,523.25	80.09	527.94
	2012	1,044.21	3,780.92	3,361.15	28.27	186.33
Skycrane	2010	0.00	0.00	0.00	0.00	0.00
	2011	3,728.52	26,430.02	34,075.85	283.23	1,887.86
	2012	257.14	1,822.76	2,350.06	19.53	130.20

Total Emissions (lbs)

Helicopter Type	Year	HC	CO	NOx	SOx	PM
Eurocopter	2010	3,047.30	6,827.04	13,939.96	115.57	758.53
	2011	1,514.25	3,392.46	6,926.98	57.43	376.92
	2012	195.96	439.02	896.43	7.43	48.78
Skyking	2010	14,461.74	52,363.47	46,549.91	391.51	2,580.58
	2011	2,958.60	10,712.59	9,523.25	80.09	527.94
	2012	1,158.28	4,193.93	3,728.31	31.36	206.69
Skycrane	2010	63.97	453.48	584.66	4.86	32.39
	2011	3,728.52	26,430.02	34,075.85	283.23	1,887.86
	2012	260.34	1,845.45	2,379.32	19.78	131.82

Total Emissions (ton)

Helicopter Type	Year	HC	CO	NOx	SOx	PM
Eurocopter	2010	1.52	3.41	6.97	0.06	0.38
	2011	0.76	1.70	3.46	0.03	0.19
	2012	0.10	0.22	0.45	0.00	0.02
Skyking	2010	7.23	26.18	23.27	0.20	1.29
	2011	1.48	5.36	4.76	0.04	0.26
	2012	0.58	2.10	1.86	0.02	0.10
Skycrane	2010	0.03	0.23	0.29	0.00	0.02
	2011	1.86	13.22	17.04	0.14	0.94
	2012	0.13	0.92	1.19	0.01	0.07

Total Emissions (ton)

Helicopter Type	HC	CO	NOx	SOx	PM
Hughes 500					
Eurocopter	2.38	5.33	10.88	0.09	0.59
Skyking	9.29	33.63	29.90	0.25	1.66
Skycrane	2.03	14.36	18.52	0.15	1.03

Helicopter Trip Emissions for Alternative 6 (Segment 11)

Summary of Total Number of Helicopter Trips for Entire Tower Sites

	220 kV Construction	500 kV Construction
Hughes 500		
Eurocopter	4150	6436
Skyking	587	4088
Skycrane	12	912

220 kV	Suspension	4539
	Dead End	210
500 kV	Suspension	10476
	Dead End	960

230kV Wreckout - Total Emissions (lbs)

Helicopter Type	Year	HC	CO	NOx	SOx	PM
Eurocopter	2011	138.69	310.71	634.44	5.26	34.52
	2012	1,030.27	2,308.17	4,712.98	39.07	256.45
Skyking	2011	172.73	625.41	555.98	4.68	30.82
	2012	1,283.11	4,645.91	4,130.11	34.74	228.96
Skycrane	2011	3.98	28.25	36.42	0.30	2.02
	2012	29.60	209.84	270.54	2.25	14.99

500kV Construction - Total Emissions (lbs)

Helicopter Type	Year	HC	CO	NOx	SOx	PM
Eurocopter	2012	1,812.87	4,061.47	8,293.02	68.76	451.26
Skyking	2012	10,138.75	36,710.69	32,634.95	274.47	1,809.18
Skycrane	2012	2,552.61	18,094.48	23,328.95	193.90	1,292.46

Total Emissions (lbs)

Helicopter Type	Year	HC	CO	NOx	SOx	PM
Eurocopter	2011	138.69	310.71	634.44	5.26	34.52
	2012	2,843.13	6,369.64	13,006.00	107.83	707.71
Skyking	2011	172.73	625.41	555.98	4.68	30.82
	2012	11,421.86	41,356.60	36,765.06	309.21	2,038.14
Skycrane	2011	3.98	28.25	36.42	0.30	2.02
	2012	2,582.22	18,304.32	23,599.49	196.15	1,307.45

Total Emissions (tons)

Helicopter Type	Year	HC	CO	NOx	SOx	PM
Eurocopter	2011	0.07	0.16	0.32	0.00	0.02
	2012	1.42	3.18	6.50	0.05	0.35
Skyking	2011	0.09	0.31	0.28	0.00	0.02
	2012	5.71	20.68	18.38	0.15	1.02
Skycrane	2011	0.00	0.01	0.02	0.00	0.00
	2012	1.29	9.15	11.80	0.10	0.65

Total Emissions (ton)

Helicopter Type	HC	CO	NOx	SOx	PM
Hughes 500					
Eurocopter	1.49	3.34	6.82	0.06	0.37
Skyking	5.80	20.99	18.66	0.16	1.03
Skycrane	1.29	9.17	11.82	0.10	0.65

Alt. 6 Segment 6 + Segment 11

Total Emissions (ton)

Helicopter Type	HC	CO	NOx	SOx	PM
Hughes 500	1.03	2.31	4.71	0.04	0.26
Eurocopter	3.87	8.67	17.70	0.15	0.96
Skyking	15.09	54.63	48.56	0.41	2.69
Skycrane	3.32	23.53	30.34	0.25	1.68
Totals	23.31	89.13	101.31	0.85	5.59

Total Helipcopter Emissions - Alternative 6

Helicopter Type	Year	HC	CO	NOx	SOx	PM
Hughes 500	2010	0.205	0.460	0.939	0.008	0.051
	2011	0.473	1.061	2.166	0.018	0.118
	2012	0.346	0.776	1.584	0.013	0.086
	2013	0.005	0.011	0.022	0.000	0.001
Eurocopter	2010	1.52	3.41	6.97	0.06	0.38
	2011	0.83	1.85	3.78	0.03	0.21
	2012	1.52	3.40	6.95	0.06	0.38
Skyking	2010	7.23	26.18	23.27	0.20	1.29
	2011	1.57	5.67	5.04	0.04	0.28
	2012	6.29	22.78	20.25	0.17	1.12
Skycrane	2010	0.03	0.23	0.29	0.00	0.02
	2011	1.87	13.23	17.06	0.14	0.94
	2012	1.42	10.07	12.99	0.11	0.72

Total Emissions (ton)

Year	HC	CO	NOx	SOx	PM
2010	8.99	30.28	31.48	0.26	1.74
2011	4.73	21.81	28.04	0.23	1.55
2012	9.58	37.03	41.77	0.35	2.31
2013	0.00	0.01	0.02	0.00	0.00

Total Emissions (ton)

Helicopter Type	HC	CO	NOx	SOx	PM
Hughes 500	1.03	2.31	4.71	0.04	0.26
Eurocopter	3.87	8.67	17.70	0.15	0.96
Skyking	15.09	54.63	48.56	0.41	2.69
Skycrane	3.32	23.53	30.34	0.25	1.68
Totals	23.31	89.13	101.31	0.85	5.59

Alternative 6 By Jurisdiction

Helicopter Trip Emissions for SCE's Alternative 6 (Segment 6)

AVAQMD (lbs)

		Helicopter Type	Year	HC	CO	NOx	SOx	PM
Segment 6	Wreckout	Eurocopter	2010	330.54	740.52	1,512.05	12.54	82.28
			2012	91.53	205.06	418.71	3.47	22.78
		Skyking	2010	411.92	1,491.49	1,325.90	11.15	73.50
			2012	114.07	413.02	367.16	3.09	20.35
		Skycrane	2010	11.56	81.95	105.66	0.88	5.85
			2012	3.20	22.69	29.26	0.24	1.62
Segment 6	Construction	Eurocopter	2010	841.21	1,884.61	3,848.14	31.90	209.39
			2011	0.00	0.00	0.00	0.00	0.00
			2012	104.43	233.96	477.72	3.96	25.99
		Skyking	2010	2,896.61	10,488.14	9,323.71	78.42	516.88
			2011	0.00	0.00	0.00	0.00	0.00
			2012	1,044.21	3,780.92	3,361.15	28.27	186.33
		Skycrane	2010	0.00	0.00	0.00	0.00	0.00
			2011	456.77	3,237.87	4,174.53	34.70	231.28
			2012	257.14	1,822.76	2,350.06	19.53	130.20

Segment 6 Totals (ton)					
2010	2.25	7.34	8.06	0.07	0.44
2011	0.23	1.62	2.09	0.02	0.12
2012	0.81	3.24	3.50	0.03	0.19

SCAQMD (lbs)

		Helicopter Type	Year	HC	CO	NOx	SOx	PM
Segment 6	Wreckout	Eurocopter	2010	1,498.40	3,356.95	6,854.48	56.83	372.98
			2012	0.00	0.00	0.00	0.00	0.00
		Skyking	2010	1,867.33	6,761.30	6,010.64	50.55	333.21
			2012	0.00	0.00	0.00	0.00	0.00
		Skycrane	2010	52.41	371.52	479.00	3.98	26.54
			2012	0.00	0.00	0.00	0.00	0.00
Segment 6	Construction	Eurocopter	2010	377.15	844.95	1,725.29	14.30	93.88
			2011	1,514.25	3,392.46	6,926.98	57.43	376.92
			2012	0.00	0.00	0.00	0.00	0.00
		Skyking	2010	9,285.87	33,622.55	29,889.67	251.39	1,656.99
			2011	2,958.60	10,712.59	9,523.25	80.09	527.94
			2012	0.00	0.00	0.00	0.00	0.00
		Skycrane	2010	0.00	0.00	0.00	0.00	0.00
			2011	3,271.75	23,192.16	29,901.32	248.53	1,656.58
			2012	0.00	0.00	0.00	0.00	0.00

Segment 6 Totals (ton)					
2010	6.54	22.48	22.48	0.19	1.24
2011	3.87	18.65	23.18	0.19	1.28
2012	0.00	0.00	0.00	0.00	0.00

Helicopter Trip Emissions for SCE's Alternative 6 (Segment 11)

SCAQMD

		Helicopter Type	Year	HC	CO	NOx	SOx	PM
Segment 11	Wreckout	Eurocopter	2011	81.73	183.10	373.87	3.10	20.34
			2012	607.12	1,360.17	2,777.29	23.03	151.12
		Skyking	2011	101.78	368.55	327.63	2.76	18.16
			2012	756.12	2,737.77	2,433.81	20.47	134.92
		Skycrane	2011	2.35	16.65	21.46	0.18	1.19
			2012	17.44	123.65	159.43	1.33	8.83
Segment 11	Construction	Eurocopter	2012	1,068.30	2,393.37	4,886.96	40.52	265.92
		Skyking	2012	5,974.62	21,633.08	19,231.31	161.74	1,066.12
		Skycrane	2012	1,504.22	10,662.82	13,747.42	114.26	761.63

Segment 11 Totals (ton)	2011	0.09	0.28	0.36	0.00	0.02
	2012	4.96	19.46	21.62	0.18	1.19

AVAQMD

		Helicopter Type	Year	HC	CO	NOx	SOx	PM
Segment 11	Wreckout	Eurocopter	2011	56.96	127.61	260.57	2.16	14.18
			2012	423.14	948.00	1,935.69	16.05	105.33
		Skyking	2011	70.94	256.87	228.35	1.92	12.66
			2012	526.99	1,908.14	1,696.29	14.27	94.04
		Skycrane	2011	1.64	11.60	14.96	0.12	0.83
			2012	12.16	86.18	111.12	0.92	6.16
Segment 11	Construction	Eurocopter	2012	744.57	1,668.10	3,406.06	28.24	185.34
		Skyking	2012	4,164.13	15,077.60	13,403.64	112.73	743.05
		Skycrane	2012	1,048.40	7,431.66	9,581.53	79.64	530.83

Segment 11 Totals (ton)	2011	0.06	0.20	0.25	0.00	0.01
	2012	3.46	13.56	15.07	0.13	0.83

Total Helicopter Trip Emissions for SCE's Alternative 6 by Jurisdiction

KCAPCD

Year	HC	CO	NOx	SOx	PM
2010	0.09	0.21	0.42	0.00	0.02
2011	0.03	0.07	0.15	0.00	0.01

SCAQMD

Year	HC	CO	NOx	SOx	PM
2010	6.61	22.63	22.80	0.19	1.26
2011	4.30	19.67	25.05	0.21	1.38
2012	5.27	20.14	23.01	0.19	1.27

AVAQMD

Year	HC	CO	NOx	SOx	PM
2010	2.29	7.44	8.26	0.07	0.45
2011	0.40	2.06	2.84	0.02	0.16
2012	4.31	16.89	18.76	0.16	1.04
2013	0.00	0.01	0.02	0.00	0.00

Alternative 7 Underground Construction Emission Calculation Assumptions

Proposed Project General Assumptions

1) Work occurs 6 days a week, 8 hours a day, excepting major holidays
2) Project schedule mirrors existing 66kV schedules.

Offroad Equipment Emission Calculation Assumptions

1) Emission factors are the latest available from the SCAQMD website, where the nearest horsepower sized equipment given in the SCAQMD emission factor database are used with a ratio of actual assumed equipment horsepower to derive hourly emission factors.
2) Construction subtasks, durations, equipment type, number, and usage estimates are used are engineering estimates by Aspen Environment Group using very limited equipment information provided by SCE.
3) The following vehicle types, which could be offroad vehicles are assumed to be onroad vehicles considering the project description, needs and location: water trucks and dump trucks.

Onroad Equipment Emission Calculations Assumptions

1) Emission factors are the latest available from the SCAQMD website, where the vehicles have been assigned three classes, passenger (i.e. employee vehicles and pickups), delivery (all nonpassenger vehicles smaller than Heavy-Heavy Duty), and heavy-heavy duty vehicles.
2) Emission factors from each year assumed in the project schedule are used to calculate the annual emissions.
3) Trip estimates are based on engineering estimates of import/export quantities, equipment and worker trips.
4) All onroad traffic for the project is assumed to occur within SCAQMD jurisdiction.
6) Soil waste truck are assumed to be single trailers with 10 cubic yard capacity. Concrete loads are 10 cubic yards.
7) A ten percent contingency is added to the concrete and soil waste trips. This contingency considers excavated soil expansion and concrete wastage.

Fugitive Dust Emission Calculations Assumptions

1) Unpaved road travel is minimized to the extent feasible and shall be no more than one-half mile per round trip.
2) Unpaved road emission factors are calculated using the most current version of USEPA AP-42 Section 13.2.1 and use the following assumptions: 1) Silt content is assumed to be 6% on average (SCAQMD level for sand and gravel plant roads);
and 2) average vehicle weight based on VMT estimate for unpaved roads
3) Paved road emission factors are calculated using the most current version of USEPA AP-42 Section 13.2.1 and use the following assumptions: 1) Silt loading is average for 5000-10000 ADT road; 2) average vehicle weight is calculated on VMT average basis.

4) Earthmoving emission factors are calculated, as necessary, using the recent version of USEPA AP-42 Section 11.9 for Dozing and Grading, and Section 13.2.4 for soil handling (drop emissions).
5) Due to SCAQMD fugitive dust measure requirements, limited overall disturbed acreage, and short construction duration the wind erosion potential is considered negligible.

TRTP Alternative 7 Project Construction Emission Totals
Incremental Underground Construction Emission Totals
SCAQMD Juridiction

Worst-Case Day 2011	Emissions (lbs/day)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	1.11	6.87	17.61	0.04	0.40	0.37
Offroad Vehicles/Equipment	2.69	10.65	15.85	0.02	1.29	1.19
Helicopter	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust	---	---	---	---	39.02	8.95
Totals	**3.81**	**17.53**	**33.46**	**0.06**	**40.71**	**10.50**

Incremental Annual Emissions

2011 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.02	0.11	0.25	0.00	0.01	0.01
Offroad Vehicles/Equipment	0.04	0.16	0.25	0.00	0.02	0.02
Helicopter	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust	---	---	---	---	0.53	0.12
Totals	**0.06**	**0.27**	**0.50**	**0.00**	**0.56**	**0.14**

Note: This alternative does not significantly impact the AVAQMD, KCAPCD, or the ANF.

Construction Schedule - Alternative 7 66kV Underground					Daily VMT								
					Employee Vehicle			Delivery Truck			Heavy Heavy Duty Truck		
					Paved	Unpaved	Total	Paved	Unpaved	Total	Paved	Unpaved	Total
Segment 7	**Crew Size**	**Total Days**	**Date**		**VMT/day**	**VMT/day**	**VMT/day**	**VMT/day**	**VMT/day**	**VMT/day**	**VMT/day**	**VMT/day**	**VMT/day**
66kV Undergrounding at Duck Farm													
Construction	12	20	Mar 2011		354	6.00	360.00	39	1.00	40.00	737.5	12.50	750.00
66kV Undergrounding at Whittier Narrows													
Construction	12	13	Apr 2011		354	6.00	360.00	39	1.00	40.00	737.5	12.50	750.00
					Totals - Max Day								
					354	6	360	39	1	40	738	13	750
					Annual VMT								
					PAVED			**UNPAVED**			**TOTAL**		
					2011			**2011**			**2011**		
					Employee	**Delivery**	**HHDT**	**Employee**	**Delivery**	**HHDT**	**Employee**	**Delivery**	**HHDT**
Segment 7					**Vehicle**	**Truck**	**HHDT**	**Vehicle**	**Truck**	**HHDT**	**Vehicle**	**Truck**	**HHDT**
66kV Undergrounding at Duck Farm													
Construction					7080	780	12537.5	120.00	20.00	212.50	7200.00	800.00	12750.00
66kV Undergrounding at Whittier Narrows													
Construction					4602	507	7994.5	78.00	13.00	135.50	4680.00	520.00	8130.00
					Totals - Annual								
					11,682	1,287	20,532	198	33	348	11,880	1,320	20,880

Construction Schedule - Alternative 7 66kV Underground			
Delivery Size Vehicles	**Trips**	**Mi/Trip**	**Miles**
Duck Farm	40	20	800
Whitter Narrows	26	20	520
HHDT Vehicles			
Duck Farm	**Total Days**	**Max Veh/day**	**Total Veh**
Trench	14	25	350
Vault	3	21	63
Boring	1	4	4
End Structure	2	4	8
			425
Whittier Narrows			
Trench	8	25	200
Vault	3	21	63
Boring	0	4	0
End Structure	2	4	8
			271

Alternative 7 - Segment 7

Onroad Equipment Maximum Daily Emissions

			Emissions lbs/day-2011				
2011	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	360	0.37	3.34	0.34	0.00	0.03
	Delivery	40	0.08	0.48	0.68	0.00	0.01
	Heavy-Heavy Duty	750	0.67	3.05	16.59	0.03	0.36
		Totals	1.11	6.87	17.61	0.04	0.40

Annual Emissions

			Emissions lbs/year				
2011	Vehicle Type	Total	VOC	CO	NOx	SOx	PM
	Passenger	11,880	12.06	110.10	11.31	0.11	0.98
	Delivery	1,320	2.68	15.93	22.49	0.04	0.47
	Heavy-Heavy Duty	20,880	18.54	84.95	461.81	0.96	9.91
		Totals	33.28	210.98	495.61	1.11	11.37

Offroad Equipment Emission Calculations - Alternative 7 66 kV Underground

SCAQMD Offroad Emission Factors

Equipment Item	HP
Backhoe	85
Boring Machine/Drill Rig	250
Excavator Cat 320	138
Forklift - 10 ton	85
Loader - 928	143
Water Pump - 100 hp	100

2011 Emission Calculations

Trenching

				Daily Emissions lbs						Annual Emissions lbs				
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	Days	ROG	CO	NOX	SOX	PM
Excavator Cat 320	138	1	8	1.05	4.59	6.94	0.01	0.55	25	26.32	114.64	173.46	0.20	13.85
Forklift - 10 ton	85	1	4	0.23	0.79	0.95	0.00	0.09	25	5.66	19.84	23.84	0.03	2.31
Backhoe	85	1	4	0.39	1.40	1.67	0.00	0.15	25	9.80	35.05	41.79	0.05	3.83
Water Pumps - 100 hp	100	1	4	0.53	1.84	2.89	0.00	0.24	25	13.23	45.88	72.29	0.08	6.00
Loader - 928	143	1	4	0.49	2.04	3.40	0.00	0.25	25	12.36	50.95	84.90	0.09	6.27
				2.69	10.65	15.85	0.02	1.29		67.36	266.36	396.28	0.44	32.27

Vault Construction

				Daily Emissions lbs						Annual Emissions lbs				
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	Days	ROG	CO	NOX	SOX	PM
Excavator Cat 320	138	1	6	0.79	3.44	5.20	0.01	0.42	6	4.74	20.64	31.22	0.04	2.49
Water Pumps - 100 hp	100	1	6	0.79	2.75	4.34	0.00	0.36	6	4.76	16.52	26.02	0.03	2.16
Forklift, 10 ton	85	1	2	0.11	0.40	0.48	0.00	0.05	6	0.68	2.38	2.86	0.00	0.28
Loader - 928	143	1	1	0.12	0.51	0.85	0.00	0.06	6	0.74	3.06	5.09	0.01	0.38
				1.82	7.10	10.87	0.01	0.88		10.92	42.59	65.20	0.07	5.31

Boring

				Daily Emissions lbs						Annual Emissions lbs				
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	Days	ROG	CO	NOX	SOX	PM
Boring Machine	250	1	6	0.54	2.07	6.08	0.01	0.19	1	0.54	2.07	6.08	0.01	0.19
Water Pumps - 100 hp	100	1	4	0.53	1.84	2.89	0.00	0.24	1	0.53	1.84	2.89	0.00	0.24
Forklift, 10 ton	85	1	2	0.11	0.40	0.48	0.00	0.05	1	0.11	0.40	0.48	0.00	0.05
Loader - 928	143	1	2	0.25	1.02	1.70	0.00	0.13	1	0.25	1.02	1.70	0.00	0.13
				1.42	5.32	11.14	0.02	0.61		1.42	5.32	11.14	0.02	0.61

End Structures

				Daily Emissions lbs						Annual Emissions lbs				
	HP	Number	Hours/day	ROG	CO	NOX	SOX	PM	Days	ROG	CO	NOX	SOX	PM
Drill Rig	250	1	4	0.36	1.38	4.05	0.01	0.13	4	1.43	5.51	16.21	0.03	0.52
Loader - 928	143	1	2	0.25	1.02	1.70	0.00	0.13	4	0.99	4.08	6.79	0.01	0.50
Backhoe	85	1	2	0.20	0.70	0.84	0.00	0.08	4	0.78	2.80	3.34	0.00	0.31
				0.80	3.10	6.59	0.01	0.33		3.20	12.39	26.34	0.05	1.32

	Maximum Day - Lbs/Day						Annual - Tons/Year					
Year	ROG	CO	NOX	SOX	PM	Year	ROG	CO	NOX	SOX	PM
2011	2.69	10.65	15.85	0.02	1.29	2011	0.04	0.16	0.25	0.00	0.02

Fugitive Dust Emissions - Alternative 7 66kV Underground

Emission Categories

1) Earthmoving
2) Road Dust Paved/Unpaved

1) Earthmoving

Material Loading/Handling (AP-42, p. 13.2.4-3)

$E = (k)(0.0032)[(U/5)^{1.3}]/[(M/2)^{1.4}]$
E = lb/ton
k = Particle Size Constant (0.35 for PM10 and 0.11 for PM2.5)
U = average wind speed = 26.5 MPH worst day, 6.4 MPH avg from Norco Met File
M = moisture content = 10% (mitigated)
Max daily productivity is assume to be two times average
Three separate drops are assumed

2011	200	Maximum daily tons
2011	5800	Annual tons

Emission Factors and Emissions
Emission Factors

PM10 Daily	PM2.5 Daily	PM10 Annual	PM2.5 Annual
0.00103	0.00032	0.00016	0.00005

Emissions lbs/day

	PM10	PM2.5
2011	0.62	0.19

Emissions tons/year

	PM10	PM2.5
2011	0.00	0.00

2) Road Dust

Emission Types
A) Paved Road Dust
B) Unpaved Road Dust

A) Paved Road Dust

E = [k x (sL/2)0.65 x (W/3)1.5 -C] x (1-P/4N)
E = lb/VMT
k = Constant (0.016 for PM10 and 0.0040 for PM2.5)
sL = Silt Loading (assumed to be 0.06 g/m2 - assumes 5,000 to 10,000 ADT profile of Table 13.2.1-3 average for all traffic)
W = Average weight of vehicles in tons (calculated below)
C = Correction for exhaust, break wear, tire wear (0.00047 lb/VMT for PM10, 0.00036 lb/VMT for PM2.5)
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Passenger Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Paved VMT	Average Weight (Tons)
2011	354	39	738	1131	20.5

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Paved VMT	Average Weight (Tons)
2011	11,682	1,287	20,532	33501	19.4

Emission Factors and Emissions
Emission Factors

Daily Efs	PM10 Daily	PM2.5 Daily
2011	0.0287	0.0069

Emissions lbs/day

	PM10	PM2.5
2011	32.48	7.84

Annual Efs	PM10 Annual	PM2.5 Annual
2011	0.0264	0.0064

Emissions tons/year

	PM10	PM2.5
2011	0.44	0.11

B) Unpaved Road Dust

$E = (k)[(s/12)^{0.9}][(W/3)^{0.45}][(365-P)/365]$ (for industrial sites)

k = constant = 1.5 lb/VMT for PM10 and 0.23 lb/VMT for PM2.5
s = Silt Content (assumed to be 6% - SCAQMD Handbook for Sand and Gravel Plant Road)
W = avg. vehicle weight = calculated below
No correction for number of wet days due to assumption of working in dry season

Average Vehicle Weight Calculation

Assumptions
Personal/Professionals/inspection Vehicles = 2 tons average
Midsize "Delivery" Vehicles = 8 ton average
Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Unpaved VMT	Average Weight (Tons)
2011	6	1	13	20	20.3

Annual Case VMT	Passenger Vehicles	Delivery/Work Vehicles	Heavy-Heavy Duty Vehicles	Total Unpaved VMT	Average Weight (Tons)
2011	198	33	348	579	19.2

Uncontrolled Emission Factors and Emissions
Emission Factors (lb/VMT)

Annual Efs	PM10 Daily	PM2.5 Daily
2011	1.90	0.29

Emissions lbs/day

	PM10	PM2.5
2011	37.02	5.68

Annual Efs	PM10 Annual	PM2.5 Annual
2011	1.85	0.20

Emissions tons/year

	PM10	PM2.5
2011	0.54	0.06

Controlled Emissions (assumes 84% efficiency with use of soil binder)

Emissions lbs/day

	PM10	PM2.5
2011	5.92	0.91

Emission Control
84%

Emissions tons/year

	PM10	PM2.5
2011	0.09	0.01

Fugitive Dust Emission Totals

Maximum Daily Emissions	2011	
	PM10 lb/day	PM2.5 lb/day
Soil Handling	0.62	0.19
Paved Road Dust	32.48	7.84
Unpaved Road Dust	5.92	0.91
Totals	39.02	8.95

Annual Emissions	2011	
	PM10 t/yr	PM2.5 t/yr
Soil Handling	0.00	0.00
Paved Road Dust	0.44	0.11
Unpaved Road Dust	0.09	0.01
Totals	0.53	0.12