

## **Appendix 3. Air Quality Calculations**

## El Casco Construction - Emission Calculation Assumptions

### Proposed Project General Assumptions

- 1) Work occurs 5 days a week, 8 hours a day, excepting major holidays
- 2) Proposed Project integrated construction schedule is from the SCE emissions calculations
- 3) For Alternative 1 the Schedule is revised assuming all new 115 kV poles are part of the Phase II construction, schedule end date is the same, schedule logic is the same, and schedule duration lengthened proportionately with the increase in the number of poles to be installed
- 4) For Alternative 2, the schedule assumptions are listed in Section C.4.2.2 with the total schedule being 295 days of work effort and the calendar schedule, with activity overlap, being approximate 10 months. Additionally, the schedule timeframe is assumed to have the same end date as the proposed project 115 kV Phase II schedule

### Offroad Equipment Emission Calculation Assumptions

- 1) Emission factors are the latest available from the SCAQMD website, where the assumed horsepower is interpolated between the available horsepower data given in the SCAQMD emission factor database to determine equipment specific 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 provided by the 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 truck

### 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 import/export quantities, equipment and worker trips estimated using information provided by SCE and determined through engineering estimate:
- 4) All onroad traffic for the project is assumed to occur within SCAQMD jurisdiction
- 5) Dump truck waste loads are 10 cubic yards or 40,000 lbs depending on the units of the SCE information provided. Concrete and thermal fill loads are 10 cubic yard:
- 6) Non-recycled soil waste from the two large excavation/soil movement construction actions (El Casco Substation and Alternative 2 115 kV undergrounding) is trucked to the nearest landfill (Lam Canyon or San Timoteo).

### Fugitive Dust Emission Calculations Assumptions

- 1) Unpaved road travel is minimized to the extent feasible and shall be no more than one mile per trip for equipment that must access the working site:
- 2) Unpaved road emission factors are calculated using the most current version of USEPA AP-42 Section 13.2.2 and use the following assumptions: a) Silt content is assumed to be 12% on average (SCAQMD Handbook assumption for Mountain Road); and b) 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: a) Silt loading is average for 5000-10000 ADT road b) 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) Due to short duration of site grading work and most work areas primarily being in pits and trenches, and soil piles being assumed to be covered, the wind erosion potential is considered negligible for most of the project.

### Helicopter Emission Calculations Assumptions

(provided with helicopter emission estimate)







## El Casco Construction Emissions Totals - Proposed Project

Worst-Case Day	Emissions (lbs/day)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	7.38	51.29	53.24	0.08	2.42	2.06
Offroad Vehicles/Equipment	23.46	73.31	156.32	0.16	8.98	8.26
Fugitive Dust	---	---	---	---	179.58	34.14
<b>Totals</b>	<b>30.84</b>	<b>124.60</b>	<b>209.56</b>	<b>0.24</b>	<b>190.98</b>	<b>44.46</b>

2008 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.07	0.44	0.50	0.00	0.02	0.02
Offroad Vehicles/Equipment	0.22	0.59	1.49	0.00	0.07	0.07
Fugitive Dust	---	---	---	---	5.47	0.89
<b>Totals</b>	<b>0.28</b>	<b>1.03</b>	<b>1.99</b>	<b>0.00</b>	<b>5.57</b>	<b>0.97</b>

2009 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.43	3.19	2.80	0.00	0.12	0.11
Offroad Vehicles/Equipment	1.14	3.60	6.85	0.01	0.43	0.40
Fugitive Dust	---	---	---	---	12.36	2.13
<b>Totals</b>	<b>1.57</b>	<b>6.79</b>	<b>9.66</b>	<b>0.01</b>	<b>12.92</b>	<b>2.63</b>

2009 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.26	1.92	1.45	0.00	0.07	0.05
Offroad Vehicles/Equipment	0.41	1.69	2.86	0.00	0.16	0.15
Fugitive Dust	---	---	---	---	5.05	0.79
<b>Totals</b>	<b>0.67</b>	<b>3.61</b>	<b>4.30</b>	<b>0.01</b>	<b>5.27</b>	<b>0.99</b>

Total Project Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.75	5.55	4.75	0.01	0.21	0.18
Offroad Vehicles/Equipment	1.77	5.87	11.20	0.01	0.67	0.61
Fugitive Dust	---	---	---	---	22.88	3.81
<b>Totals</b>	<b>2.53</b>	<b>11.42</b>	<b>15.95</b>	<b>0.02</b>	<b>23.76</b>	<b>4.60</b>

## El Casco Project Construction Emissions Totals - Alternative 1

Worst-Case Day	Emissions (lbs/day)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	8.41	60.29	56.83	0.09	2.61	2.20
Offroad Vehicles/Equipment	24.13	75.68	164.89	0.17	9.24	8.50
Fugitive Dust	---	---	---	---	205.45	37.94
<b>Totals</b>	<b>32.54</b>	<b>135.97</b>	<b>221.72</b>	<b>0.27</b>	<b>217.30</b>	<b>48.65</b>

2008 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.07	0.44	0.50	0.00	0.02	0.02
Offroad Vehicles/Equipment	0.22	0.59	1.49	0.00	0.07	0.07
Fugitive Dust	---	---	---	---	5.47	0.89
<b>Totals</b>	<b>0.28</b>	<b>1.03</b>	<b>1.99</b>	<b>0.00</b>	<b>5.57</b>	<b>0.98</b>

2009 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.51	3.68	3.35	0.01	0.15	0.13
Offroad Vehicles/Equipment	1.15	3.63	6.99	0.01	0.44	0.40
Fugitive Dust	---	---	---	---	13.95	2.39
<b>Totals</b>	<b>1.66</b>	<b>7.32</b>	<b>10.34</b>	<b>0.01</b>	<b>14.54</b>	<b>2.92</b>

2009 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.25	1.85	1.34	0.00	0.06	0.05
Offroad Vehicles/Equipment	0.42	1.73	2.93	0.00	0.17	0.15
Fugitive Dust	---	---	---	---	3.87	0.61
<b>Totals</b>	<b>0.67</b>	<b>3.58</b>	<b>4.28</b>	<b>0.01</b>	<b>4.10</b>	<b>0.81</b>

Total Project Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.82	5.98	5.19	0.01	0.24	0.20
Offroad Vehicles/Equipment	1.79	5.95	11.42	0.01	0.68	0.62
Fugitive Dust	---	---	---	---	23.30	3.89
<b>Totals</b>	<b>2.61</b>	<b>11.93</b>	<b>16.60</b>	<b>0.02</b>	<b>24.21</b>	<b>4.71</b>

## El Casco Project Construction Emissions Totals - Alternative 2

Worst-Case Day	Emissions (lbs/day)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	8.28	58.02	58.29	0.09	2.68	2.28
Offroad Vehicles/Equipment	25.98	80.49	165.31	0.17	9.85	9.06
Fugitive Dust	---	---	---	---	215.07	39.71
<b>Totals</b>	<b>34.26</b>	<b>138.52</b>	<b>223.60</b>	<b>0.26</b>	<b>227.60</b>	<b>51.05</b>

2008 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.07	0.44	0.50	0.00	0.02	0.02
Offroad Vehicles/Equipment	0.22	0.59	1.49	0.00	0.07	0.07
Fugitive Dust	---	---	---	---	5.47	0.89
<b>Totals</b>	<b>0.28</b>	<b>1.03</b>	<b>1.99</b>	<b>0.00</b>	<b>5.57</b>	<b>0.98</b>

2009 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.50	3.58	3.47	0.01	0.16	0.13
Offroad Vehicles/Equipment	1.26	3.95	7.29	0.01	0.47	0.44
Fugitive Dust	---	---	---	---	14.88	2.55
<b>Totals</b>	<b>1.77</b>	<b>7.53</b>	<b>10.76</b>	<b>0.01</b>	<b>15.51</b>	<b>3.12</b>

2009 Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.32	2.34	1.84	0.00	0.09	0.07
Offroad Vehicles/Equipment	0.55	2.16	3.70	0.00	0.22	0.00
Fugitive Dust	---	---	---	---	6.25	0.99
<b>Totals</b>	<b>0.87</b>	<b>4.50</b>	<b>5.54</b>	<b>0.01</b>	<b>6.56</b>	<b>1.06</b>

Total Project Emissions	Emissions (tons/year)					
	VOC	CO	NOx	SOx	PM10	PM2.5
Onroad Vehicles	0.89	6.36	5.81	0.01	0.27	0.22
Offroad Vehicles/Equipment	2.03	6.70	12.49	0.01	0.77	0.50
Fugitive Dust	---	---	---	---	26.60	4.43
<b>Totals</b>	<b>2.92</b>	<b>13.06</b>	<b>18.29</b>	<b>0.02</b>	<b>27.64</b>	<b>5.15</b>



# Onroad Emission Calculations - Proposed Project

## ONROAD EMISSIONS: SCAQMD EMISSION FACTORS FOR 2008

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

Passenger Vehicles		Delivery Trucks		Heavy-Heavy Duty Trucks	
CO	0.01054844	CO	0.02194915	CO	0.01361368
NOx	0.00110288	NOx	0.02371258	NOx	0.04458017
ROG	0.00107919	ROG	0.00299270	ROG	0.00351579
SOx	0.00001075	SOx	0.00002565	SOx	0.00004136
PM10	0.00008505	PM10	0.00085607	PM10	0.00215635
PM2.5	0.00005293	PM2.5	0.00073933	PM2.5	0.00189990
	lb/mile		lb/mile		lb/mile

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

Passenger Vehicles		Delivery Trucks		Heavy-Heavy Duty Trucks	
CO	0.00968562	CO	0.02016075	CO	0.01282236
NOx	0.00100518	NOx	0.02236636	NOx	0.04184591
ROG	0.00099245	ROG	0.00278899	ROG	0.00329320
SOx	0.00001066	SOx	0.00002679	SOx	0.00004013
PM10	0.00008601	PM10	0.00080550	PM10	0.00199572
PM2.5	0.00005384	PM2.5	0.00069228	PM2.5	0.00175227
	lb/mile		lb/mile		lb/mile

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

Passenger Vehicles		Delivery Trucks		Heavy-Heavy Duty Trucks	
CO	0.00826276	CO	0.01843765	CO	0.01195456
NOx	0.00091814	NOx	0.02062460	NOx	0.03822102
ROG	0.00091399	ROG	0.00258958	ROG	0.00304157
SOx	0.00001077	SOx	0.00002701	SOx	0.00004131
PM10	0.00008698	PM10	0.00075121	PM10	0.00183062
PM2.5	0.00005478	PM2.5	0.00064233	PM2.5	0.00160083
	lb/mile		lb/mile		lb/mile

### Proposed Project Onroad Equipment Maximum Daily Emissions

Vehicle Type	Emissions lbs/day						
	Total	VOC	CO	NOx	SOx	PM	PM2.5
Passenger	2,569	2.55	24.88	2.58	0.03	0.22	0.14
Delivery	818	2.28	16.49	18.29	0.02	0.66	0.57
Heavy-Heavy Duty	773	2.55	9.92	32.36	0.03	1.54	1.36
<b>Totals</b>		7.38	51.29	53.24	0.08	2.42	2.06

### Onroad Equipment Total Project Emissions

Vehicle Type	Emissions lbs/year - 2008						
	Total	VOC	CO	NOx	SOx	PM	PM2.5
Passenger	40,130	43.31	423.31	44.26	0.43	3.41	2.12
Delivery	11,588	34.68	254.34	274.77	0.30	9.92	8.57
Heavy-Heavy Duty	15,128	53.19	205.94	674.39	0.63	32.62	28.74
<b>Totals</b>		131.17	883.59	993.41	1.35	45.95	39.43
<b>Tons</b>		0.07	0.44	0.50	0.00	0.02	0.02

Vehicle Type	Emissions lbs/year - 2009						
	Total	VOC	CO	NOx	SOx	PM	PM2.5
Passenger	332,460	329.95	3220.08	334.18	3.55	28.59	17.90
Delivery	115,943	323.36	2337.49	2593.21	3.11	93.39	80.26
Heavy-Heavy Duty	63,968	210.66	820.21	2676.78	2.57	127.66	112.09
<b>Totals</b>		863.97	6377.78	5604.17	9.22	249.65	210.25
<b>Tons</b>		0.43	3.19	2.80	0.00	0.12	0.11

Vehicle Type	Emissions lbs/year - 2010						
	Total	VOC	CO	NOx	SOx	PM	PM2.5
Passenger	255,520	233.54	2111.30	234.60	2.75	22.22	14.00
Delivery	72,690	188.24	1340.23	1499.20	1.96	54.61	46.69
Heavy-Heavy Duty	30,380	92.40	389.54	1161.15	1.26	55.61	48.63
<b>Totals</b>		514.18	3841.08	2894.96	5.97	132.44	109.32
<b>Tons</b>		0.26	1.92	1.45	0.00	0.07	0.05

# Onroad Emission Calculations - Alternative 1

## ONROAD EMISSIONS: SCAQMD EMISSION FACTORS FOR 2008

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

Passenger Vehicles		Delivery Trucks		Heavy-Heavy Duty Trucks	
CO	0.01054844	CO	0.02194915	CO	0.01361368
NOx	0.00110288	NOx	0.02371258	NOx	0.04458017
ROG	0.00107919	ROG	0.00299270	ROG	0.00351579
SOx	0.00001075	SOx	0.00002565	SOx	0.00004136
PM10	0.00008505	PM10	0.00085607	PM10	0.00215635
PM2.5	0.00005293	PM2.5	0.00073933	PM2.5	0.00189990
	lb/mile		lb/mile		lb/mile

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

Passenger Vehicles		Delivery Trucks		Heavy-Heavy Duty Trucks	
CO	0.00968562	CO	0.02016075	CO	0.01282236
NOx	0.00100518	NOx	0.02236636	NOx	0.04184591
ROG	0.00099245	ROG	0.00278899	ROG	0.00329320
SOx	0.00001066	SOx	0.00002679	SOx	0.00004013
PM10	0.00008601	PM10	0.00080550	PM10	0.00199572
PM2.5	0.00005384	PM2.5	0.00069228	PM2.5	0.00175227
	lb/mile		lb/mile		lb/mile

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

Passenger Vehicles		Delivery Trucks		Heavy-Heavy Duty Trucks	
CO	0.00826276	CO	0.01843765	CO	0.01195456
NOx	0.00091814	NOx	0.02062460	NOx	0.03822102
ROG	0.00091399	ROG	0.00258958	ROG	0.00304157
SOx	0.00001077	SOx	0.00002701	SOx	0.00004131
PM10	0.00008698	PM10	0.00075121	PM10	0.00183062
PM2.5	0.00005478	PM2.5	0.00064233	PM2.5	0.00160083
	lb/mile		lb/mile		lb/mile

### Proposed Project

#### Onroad Equipment Maximum Daily Emissions

Vehicle Type	Total	Emissions lbs/day					
		VOC	CO	NOx	SOx	PM	PM2.5
Passenger	3,320	3.29	32.16	3.34	0.04	0.29	0.18
Delivery	883	2.46	17.79	19.74	0.02	0.71	0.61
Heavy-Heavy Duty	807	2.66	10.34	33.75	0.03	1.61	1.41
<b>Totals</b>		<b>8.41</b>	<b>60.29</b>	<b>56.83</b>	<b>0.09</b>	<b>2.61</b>	<b>2.20</b>

#### Onroad Equipment Total Project Emissions

Vehicle Type	Total	Emissions lbs/year - 2008					
		VOC	CO	NOx	SOx	PM	PM2.5
Passenger	40,130	43.31	423.31	44.26	0.43	3.41	2.12
Delivery	11,588	34.68	254.34	274.77	0.30	9.92	8.57
Heavy-Heavy Duty	15,128	53.19	205.94	674.39	0.63	32.62	28.74
<b>Totals</b>		<b>131.17</b>	<b>883.59</b>	<b>993.41</b>	<b>1.35</b>	<b>45.95</b>	<b>39.43</b>
<b>Tons</b>		<b>0.07</b>	<b>0.44</b>	<b>0.50</b>	<b>0.00</b>	<b>0.02</b>	<b>0.02</b>

Vehicle Type	Total	Emissions lbs/year - 2009					
		VOC	CO	NOx	SOx	PM	PM2.5
Passenger	395,040	392.06	3826.21	397.09	4.21	33.98	21.27
Delivery	121,013	337.50	2439.70	2706.61	3.24	97.48	83.77
Heavy-Heavy Duty	85,978	283.14	1102.43	3597.81	3.45	171.59	150.66
<b>Totals</b>		<b>1012.70</b>	<b>7368.34</b>	<b>6701.50</b>	<b>10.91</b>	<b>303.04</b>	<b>255.70</b>
<b>Tons</b>		<b>0.51</b>	<b>3.68</b>	<b>3.35</b>	<b>0.01</b>	<b>0.15</b>	<b>0.13</b>

Vehicle Type	Total	Emissions lbs/year - 2010					
		VOC	CO	NOx	SOx	PM	PM2.5
Passenger	250,520	228.97	2069.99	230.01	2.70	21.79	13.72
Delivery	70,530	182.64	1300.41	1454.65	1.91	52.98	45.30
Heavy-Heavy Duty	26,090	79.35	334.54	997.19	1.08	47.76	41.77
<b>Totals</b>		<b>490.97</b>	<b>3704.93</b>	<b>2681.85</b>	<b>5.68</b>	<b>122.53</b>	<b>100.79</b>
<b>Tons</b>		<b>0.25</b>	<b>1.85</b>	<b>1.34</b>	<b>0.00</b>	<b>0.06</b>	<b>0.05</b>

## Onroad Emission Calculations - Alternative 2

### ONROAD EMISSIONS: SCAQMD EMISSION FACTORS FOR 2008

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

Passenger Vehicles		Delivery Trucks		Heavy-Heavy Duty Trucks	
CO	0.01054844	CO	0.02194915	CO	0.01361368
NOx	0.00110288	NOx	0.02371258	NOx	0.04458017
ROG	0.00107919	ROG	0.00299270	ROG	0.00351579
SOx	0.00001075	SOx	0.00002565	SOx	0.00004136
PM10	0.00008505	PM10	0.00085607	PM10	0.00215635
PM2.5	0.00005293	PM2.5	0.00073933	PM2.5	0.00189990
	lb/mile		lb/mile		lb/mile

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

Passenger Vehicles		Delivery Trucks		Heavy-Heavy Duty Trucks	
CO	0.00968562	CO	0.02016075	CO	0.01282236
NOx	0.00100518	NOx	0.02236636	NOx	0.04184591
ROG	0.00099245	ROG	0.00278899	ROG	0.00329320
SOx	0.00001066	SOx	0.00002679	SOx	0.00004013
PM10	0.00008601	PM10	0.00080550	PM10	0.00199572
PM2.5	0.00005384	PM2.5	0.00069228	PM2.5	0.00175227
	lb/mile		lb/mile		lb/mile

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

Passenger Vehicles		Delivery Trucks		Heavy-Heavy Duty Trucks	
CO	0.00826276	CO	0.01843765	CO	0.01195456
NOx	0.00091814	NOx	0.02062460	NOx	0.03822102
ROG	0.00091399	ROG	0.00258958	ROG	0.00304157
SOx	0.00001077	SOx	0.00002701	SOx	0.00004131
PM10	0.00008698	PM10	0.00075121	PM10	0.00183062
PM2.5	0.00005478	PM2.5	0.00064233	PM2.5	0.00160083
	lb/mile		lb/mile		lb/mile

### Proposed Project

#### Onroad Equipment Maximum Daily Emissions

Vehicle Type	Total	Emissions lbs/day					
		VOC	CO	NOx	SOx	PM	PM2.5
Passenger	3,120	3.10	30.22	3.14	0.03	0.27	0.17
Delivery	819	2.29	16.52	18.33	0.02	0.66	0.57
Heavy-Heavy Duty	880	2.90	11.28	36.82	0.04	1.76	1.54
<b>Totals</b>		<b>8.28</b>	<b>58.02</b>	<b>58.29</b>	<b>0.09</b>	<b>2.68</b>	<b>2.28</b>

#### Onroad Equipment Total Project Emissions

Vehicle Type	Total	Emissions lbs/year - 2008					
		VOC	CO	NOx	SOx	PM	PM2.5
Passenger	40,130	43.31	423.31	44.26	0.43	3.41	2.12
Delivery	11,588	34.68	254.34	274.77	0.30	9.92	8.57
Heavy-Heavy Duty	15,128	53.19	205.94	674.39	0.63	32.62	28.74
<b>Totals</b>		<b>131.17</b>	<b>883.59</b>	<b>993.41</b>	<b>1.35</b>	<b>45.95</b>	<b>39.43</b>
<b>Tons</b>		<b>0.07</b>	<b>0.44</b>	<b>0.50</b>	<b>0.00</b>	<b>0.02</b>	<b>0.02</b>

Vehicle Type	Total	Emissions lbs/year - 2009					
		VOC	CO	NOx	SOx	PM	PM2.5
Passenger	372,680	369.87	3609.64	374.61	3.97	32.05	20.07
Delivery	115,838	323.07	2335.37	2590.86	3.10	93.31	80.19
Heavy-Heavy Duty	94,783	312.14	1215.34	3966.26	3.80	189.16	166.08
<b>Totals</b>		<b>1005.08</b>	<b>7160.34</b>	<b>6931.73</b>	<b>10.88</b>	<b>314.52</b>	<b>266.34</b>
<b>Tons</b>		<b>0.50</b>	<b>3.58</b>	<b>3.47</b>	<b>0.01</b>	<b>0.16</b>	<b>0.13</b>

Vehicle Type	Total	Emissions lbs/year - 2010					
		VOC	CO	NOx	SOx	PM	PM2.5
Passenger	319,060	291.62	2636.32	292.94	3.44	27.75	17.48
Delivery	78,660	203.70	1450.31	1622.33	2.12	59.09	50.53
Heavy-Heavy Duty	46,355	140.99	594.38	1771.74	1.92	84.86	74.21
<b>Totals</b>		<b>636.31</b>	<b>4681.00</b>	<b>3687.01</b>	<b>7.48</b>	<b>171.70</b>	<b>142.21</b>
<b>Tons</b>		<b>0.32</b>	<b>2.34</b>	<b>1.84</b>	<b>0.00</b>	<b>0.09</b>	<b>0.07</b>

# Offroad Equipment Emission Calculations - Proposed Project

## SCAQMD Offroad Emission Factors

Description	HP
Backhoe	200
Backhoe	85
Bore/Drill Rigs	225
Crew Truck	180
Crane 14-ton	180
30-ton crane (150' crane)	215
Crane 50-ton	200
Crane 150-ton	250
Compactor	80
Compressor	75
Ditch Digger	75
Driller	305
Forklift	75
Forklift 5-ton	75
Foreman Truck	180
Graders	350
Motor grader	110
Horizontal directional drill	225
Loader - 980	350
manlifts	75
Paving machine	200
Road Grader	350
Roller/Compactor	145
Single Drum Puller	310
3 Drum Puller	310
Tractors	85
D-6 Cat	200
Track Type Dozer	350
Tensioner	135
truck crane (150' Lift Truck)	215

2008 SCAQMD Emission Factor lbs/hour					
ROG	CO	NOX	SOX	PM	
0.1470	0.5420	1.3454	0.0014	0.0622	
0.1310	0.3767	0.4866	0.0005	0.0478	
0.1104	0.4848	1.3559	0.0019	0.0468	
0.1953	0.7478	1.5035	0.0014	0.0853	
0.1348	0.4865	1.0647	0.0009	0.0585	
0.1370	0.4373	1.2257	0.0011	0.0560	
0.1361	0.4584	1.1567	0.0010	0.0571	
0.1392	0.3881	1.3867	0.0013	0.0535	
0.1406	0.3743	0.5138	0.0005	0.0486	
0.1210	0.3078	0.3893	0.0004	0.0388	
0.1897	0.4702	0.5945	0.0005	0.0580	
0.1167	0.3970	1.5841	0.0023	0.0460	
0.0802	0.2122	0.2479	0.0003	0.0267	
0.0802	0.2122	0.2479	0.0003	0.0267	
0.1953	0.7478	1.5035	0.0014	0.0853	
0.2123	0.6821	2.1695	0.0021	0.0813	
0.1757	0.5331	0.9354	0.0008	0.0864	
0.1104	0.4848	1.3559	0.0019	0.0468	
0.1855	0.2520	2.6904	0.0030	0.0549	
0.0802	0.2122	0.2479	0.0003	0.0267	
0.2399	0.8003	2.0371	0.0017	0.1007	
0.2123	0.6821	2.1695	0.0021	0.0813	
0.1495	0.5214	1.0580	0.0009	0.0709	
0.1600	0.6403	1.6153	0.0017	0.0674	
0.1600	0.6403	1.6153	0.0017	0.0674	
0.1310	0.3767	0.4866	0.0005	0.0478	
0.2185	0.7276	1.8198	0.0015	0.0918	
0.2628	0.9436	2.5113	0.0021	0.1017	
0.1512	0.5645	1.0312	0.0010	0.0778	
0.1429	0.6072	1.2844	0.0014	0.0626	

2009 SCAQMD Emission Factor lbs/hour					
ROG	CO	NOX	SOX	PM	
0.1371	0.5337	1.2487	0.0014	0.0584	
0.1193	0.3673	0.4618	0.0005	0.0446	
0.1017	0.4833	1.2146	0.0019	0.0440	
0.1834	0.7438	1.3989	0.0014	0.0804	
0.1279	0.4822	1.0066	0.0009	0.0559	
0.1296	0.4243	1.1586	0.0011	0.0530	
0.1289	0.4491	1.0934	0.0010	0.0543	
0.1314	0.3664	1.3105	0.0013	0.0501	
0.1322	0.3671	0.4932	0.0005	0.0464	
0.1165	0.3048	0.3786	0.0004	0.0378	
0.1808	0.4617	0.5754	0.0005	0.0559	
0.1114	0.3944	1.4291	0.0023	0.0446	
0.0723	0.2046	0.2348	0.0003	0.0248	
0.0723	0.2046	0.2348	0.0003	0.0248	
0.1834	0.7438	1.3989	0.0014	0.0804	
0.2014	0.6360	2.0417	0.0021	0.0764	
0.1641	0.5258	0.8846	0.0008	0.0819	
0.1017	0.4833	1.2146	0.0019	0.0440	
0.2000	0.6138	2.1682	0.0027	0.0749	
0.0723	0.2046	0.2348	0.0003	0.0248	
0.2283	0.7815	1.9396	0.0017	0.0963	
0.2014	0.6360	2.0417	0.0021	0.0764	
0.1408	0.5168	1.0021	0.0009	0.0679	
0.1489	0.6169	1.5047	0.0017	0.0635	
0.1489	0.6169	1.5047	0.0017	0.0635	
0.1193	0.3673	0.4618	0.0005	0.0446	
0.2078	0.7121	1.7249	0.0015	0.0874	
0.2507	0.8799	2.3806	0.0021	0.0962	
0.1391	0.5595	0.9629	0.0010	0.0731	
0.1326	0.5990	1.1959	0.0014	0.0592	

2010 SCAQMD Emission Factor lbs/hour					
ROG	CO	NOX	SOX	PM	
0.1284	0.5266	1.1595	0.0014	0.0549	
0.1083	0.3586	0.4389	0.0005	0.0414	
0.0948	0.4821	1.0947	0.0019	0.0417	
0.1725	0.8082	2.1082	0.0020	0.0937	
0.1213	0.4785	0.9507	0.0009	0.0534	
0.1228	0.4124	1.0939	0.0011	0.0502	
0.1222	0.4408	1.0325	0.0010	0.0516	
0.1243	0.3464	1.2372	0.0013	0.0470	
0.1240	0.3601	0.4737	0.0005	0.0442	
0.1110	0.3005	0.3668	0.0004	0.0365	
0.1720	0.4534	0.5571	0.0005	0.0538	
0.1074	0.3924	1.2992	0.0023	0.0435	
0.0643	0.1973	0.2233	0.0003	0.0227	
0.0643	0.1973	0.2233	0.0003	0.0227	
0.1725	0.7404	1.3019	0.0014	0.0758	
0.1916	0.5970	1.9222	0.0021	0.0720	
0.1531	0.5191	0.8367	0.0008	0.0774	
0.0948	0.4821	1.0947	0.0019	0.0417	
0.1903	0.5820	2.0193	0.0027	0.0706	
0.0643	0.1973	0.2233	0.0003	0.0227	
0.2175	0.7643	1.8464	0.0017	0.0920	
0.1916	0.5970	1.9222	0.0021	0.0720	
0.1327	0.5128	0.9492	0.0009	0.0649	
0.1391	0.5970	1.4037	0.0017	0.0599	
0.1391	0.5970	1.4037	0.0017	0.0599	
0.1430	0.3511	0.1840	0.0003	0.0210	
0.1978	0.6979	1.6339	0.0015	0.0832	
0.2396	0.8218	2.2566	0.0021	0.0911	
0.1279	0.5550	0.8997	0.0010	0.0686	
0.1234	0.5921	1.1145	0.0014	0.0559	

## USEPA Phase II Engine Base Emission Factors (EPA420-R-05-019)

Small Engines Generators/Pumps (gas)	5	All Years	0.0338	1.9354	0.0101	0.0001	0.0003
--------------------------------------	---	-----------	--------	--------	--------	--------	--------

## 2008 Emission Calculations

### El Casco Substation Phase I

Grading	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
			Compactor	80	2	0.1406	0.3743		0.5138	0.0005	0.0486	6	1.69		4.49	6.17	0.01	0.58	20
Graders	350	2	0.2123	0.6821	2.1695	0.0021	0.0813	6	2.55	8.18	26.03	0.02	0.98	20	50.96	163.69	520.69	0.50	19.50
Loader - 980	350	2	0.1855	0.2520	2.6904	0.0030	0.0549	6	2.23	3.02	32.29	0.04	0.66	20	44.52	60.48	645.71	0.72	13.18
									6.46	15.70	64.49	0.07	2.22		129.22	314.01	1289.70	1.33	44.34

## Offroad Equipment Emission Calculations - Proposed Project

### El Casco Substation Phase I

#### Civil

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	1	0.1348	0.4865	1.0647	0.0009	0.0585	4	0.54	1.95	4.26	0.00	0.23	15	8.09	29.19	63.88	0.06	3.51
Ditch Digger	75	3	0.1897	0.4702	0.5945	0.0005	0.0580	6	3.42	8.46	10.70	0.01	1.04	35	119.54	296.19	374.52	0.34	36.57
Driller	305	2	0.1167	0.3970	1.5841	0.0023	0.0460	6	1.40	4.76	19.01	0.03	0.55	30	42.02	142.93	570.27	0.84	16.56
Forklift	75	2	0.0802	0.2122	0.2479	0.0003	0.0267	4	0.64	1.70	1.98	0.00	0.21	45	28.87	76.38	89.24	0.09	9.62
Tractors	85	2	0.1310	0.3767	0.4866	0.0005	0.0478	6	1.57	4.52	5.84	0.01	0.57	45	70.73	203.42	262.77	0.27	25.84
									7.57	21.39	41.79	0.05	2.62		269.25	748.11	1360.67	1.60	92.09

### Mill Creek Tower

#### Grading

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Graders	350	2	0.2123	0.6821	2.1695	0.0021	0.0813	6	2.55	8.18	26.03	0.02	0.98	10	25.48	81.85	260.34	0.25	9.75
									2.55	8.18	26.03	0.02	0.98		25.48	81.85	260.34	0.25	9.75

### Mill Creek Tower

#### Dig Foundations

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Bore/Drill Rigs	225	1	0.1104	0.4848	1.3559	0.0019	0.0468	6	0.66	2.91	8.14	0.01	0.28	3	1.99	8.73	24.41	0.03	0.84
Graders	350	1	0.2123	0.6821	2.1695	0.0021	0.0813	2	0.42	1.36	4.34	0.00	0.16	3	1.27	4.09	13.02	0.01	0.49
									1.09	4.27	12.47	0.02	0.44		3.26	12.82	37.42	0.05	1.33

## 2009 Emission Calculations

### El Casco Substation Phase I

#### Electrical Element

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	2	0.1279	0.4822	1.0066	0.0009	0.0559	6	1.53	5.79	12.08	0.01	0.67	140	214.85	810.16	1691.13	1.56	94.00
crane 150-ton	250	2	0.1314	0.3664	1.3105	0.0013	0.0501	6	1.58	4.40	15.73	0.02	0.60	40	63.07	175.86	629.03	0.61	24.06
forklift	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.43	1.23	1.41	0.00	0.15	120	52.03	147.34	169.07	0.18	17.82
Manlifts	75	4	0.0723	0.2046	0.2348	0.0003	0.0248	6	1.73	4.91	5.64	0.01	0.59	120	208.11	589.37	676.29	0.73	71.29
									5.28	16.32	34.85	0.03	2.02		538.06	1722.73	3165.52	3.07	207.16

### El Casco Substation Phase I

#### Transformer Assembly

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 50-ton	200	2	0.1289	0.4491	1.0934	0.0010	0.0543	6	1.55	5.39	13.12	0.01	0.65	15	23.20	80.84	196.82	0.18	9.77
forklift	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.43	1.23	1.41	0.00	0.15	15	6.50	18.42	21.13	0.02	2.23
manlifts	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.43	1.23	1.41	0.00	0.15	20	8.67	24.56	28.18	0.03	2.97
									2.41	7.85	15.94	0.02	0.95	50	38.37	123.82	246.13	0.24	14.97

### El Casco Substation Phase I

#### Maintenance

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
manlifts	75	6	0.0723	0.2046	0.2348	0.0003	0.0248	6	2.60	7.37	8.45	0.01	0.89	40	104.05	294.69	338.14	0.36	35.64
									2.60	7.37	8.45	0.01	0.89	40	104.05	294.69	338.14	0.36	35.64

## Offroad Equipment Emission Calculations - Proposed Project

### El Casco Substation Phase II

#### Civil

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	1	0.1279	0.4822	1.0066	0.0009	0.0559	4	0.51	1.93	4.03	0.00	0.22	40	20.46	77.16	161.06	0.15	8.95
Drillers	305	1	0.1114	0.3944	1.4291	0.0023	0.0446	8	0.89	3.16	11.43	0.02	0.36	70	62.38	220.88	800.29	1.30	24.97
Ditch Digger	75	1	0.1808	0.4617	0.5754	0.0005	0.0559	6	1.08	2.77	3.45	0.00	0.34	75	81.37	207.78	258.92	0.25	25.15
Forklifts	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	4	0.29	0.82	0.94	0.00	0.10	90	26.01	73.67	84.54	0.09	8.91
Tractors	85	1	0.1193	0.3673	0.4618	0.0005	0.0446	6	0.72	2.20	2.77	0.00	0.27	90	64.44	198.36	249.38	0.27	24.06
									3.49	10.88	22.62	0.03	1.28	365	254.66	777.84	1554.18	2.06	92.04

### El Casco Substation Phase II

#### Electrical Element

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	1	0.1279	0.4822	1.0066	0.0009	0.0559	6	0.77	2.89	6.04	0.01	0.34	30	23.02	86.80	181.19	0.17	10.07
Crane 150-ton	250	1	0.1314	0.3664	1.3105	0.0013	0.0501	6	0.79	2.20	7.86	0.01	0.30	20	15.77	43.96	157.26	0.15	6.01
Forklift	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.43	1.23	1.41	0.00	0.15	40	17.34	49.11	56.36	0.06	5.94
Manlifts	75	2	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.87	2.46	2.82	0.00	0.30	40	34.68	98.23	112.71	0.12	11.88
									2.86	8.78	18.13	0.02	1.08	130	90.81	278.11	507.52	0.50	33.91

### El Casco Substation Phase II

#### Transformer Assembly

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 50-ton	200	2	0.1289	0.4491	1.0934	0.0010	0.0543	6	1.55	5.39	13.12	0.01	0.65	30	46.40	161.69	393.64	0.37	19.54
Forklift	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.43	1.23	1.41	0.00	0.15	45	19.51	55.25	63.40	0.07	6.68
Manlifts	75	2	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.87	2.46	2.82	0.00	0.30	40	34.68	98.23	112.71	0.12	11.88
									2.85	9.07	17.35	0.02	1.10	115	100.60	315.17	569.75	0.56	38.11

### El Casco Substation Phase II

#### Maintenance

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Manlifts	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.43	1.23	1.41	0.00	0.15	20	8.67	24.56	28.18	0.03	2.97
									0.43	1.23	1.41	0.00	0.15	20	8.67	24.56	28.18	0.03	2.97

### El Casco Substation Phase II

#### Asphalt etc.

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Grader	350	2	0.2014	0.6360	2.0417	0.0021	0.0764	6	2.42	7.63	24.50	0.02	0.92	5	12.08	38.16	122.50	0.12	4.58
Paving Machine	200	1	0.2283	0.7815	1.9396	0.0017	0.0963	6	1.37	4.69	11.64	0.01	0.58	10	13.70	46.89	116.38	0.10	5.78
Roller/Compactor	145	1	0.1408	0.5168	1.0021	0.0009	0.0679	6	0.85	3.10	6.01	0.01	0.41	12	10.14	37.21	72.15	0.07	4.89
Tractors	85	2	0.1193	0.3673	0.4618	0.0005	0.0446	6	1.43	4.41	5.54	0.01	0.53	19	27.21	83.75	105.29	0.11	10.16
									6.06	19.83	47.69	0.05	2.44	46	63.13	206.01	416.33	0.41	25.41

### Banning Substation

#### Grading

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Tractors	85	2	0.1193	0.3673	0.4618	0.0005	0.0446	6	1.43	4.41	5.54	0.01	0.53	18	25.78	79.34	99.75	0.11	9.62
									1.43	4.41	5.54	0.01	0.53		25.78	79.34	99.75	0.11	9.62

## Offroad Equipment Emission Calculations - Proposed Project

### Banning Substation

Civil	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	1	0.1279	0.4822	1.0066	0.0009	0.0559	4	0.51	1.93	4.03	0.00	0.22	15	7.67	28.93	60.40	0.06	3.36
Drillers	305	2	0.1114	0.3944	1.4291	0.0023	0.0446	8	1.78	6.31	22.87	0.04	0.71	30	53.47	189.32	685.97	1.12	21.40
Ditch Digger	75	1	0.1808	0.4617	0.5754	0.0005	0.0559	6	1.08	2.77	3.45	0.00	0.34	35	37.97	96.96	120.83	0.11	11.74
Forklifts	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	4	0.29	0.82	0.94	0.00	0.10	45	13.01	36.84	42.27	0.05	4.46
Tractors	85	2	0.1193	0.3673	0.4618	0.0005	0.0446	6	1.43	4.41	5.54	0.01	0.53	45	64.44	198.36	249.38	0.27	24.06
									5.10	16.24	36.83	0.05	1.91		176.56	550.41	1158.84	1.60	65.01

### Banning Substation

Electrical Element	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	2	0.1279	0.4822	1.0066	0.0009	0.0559	6	1.53	5.79	12.08	0.01	0.67	150	230.20	868.03	1811.92	1.67	100.71
Crane 150-ton	250	2	0.1314	0.3664	1.3105	0.0013	0.0501	6	1.58	4.40	15.73	0.02	0.60	35	55.18	153.87	550.40	0.53	21.05
Forklift	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.43	1.23	1.41	0.00	0.15	100	43.36	122.79	140.89	0.15	14.85
Manlifts	75	4	0.0723	0.2046	0.2348	0.0003	0.0248	6	1.73	4.91	5.64	0.01	0.59	150	260.14	736.71	845.36	0.91	89.11
									5.28	16.32	34.85	0.03	2.02	435	588.88	1881.40	3348.57	3.26	225.72

### Zanja Substation

Grading	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Tractors	85	2	0.1193	0.3673	0.4618	0.0005	0.0446	6	1.43	4.41	5.54	0.01	0.53	5	7.16	22.04	27.71	0.03	2.67
									1.43	4.41	5.54	0.01	0.53	5	7.16	22.04	27.71	0.03	2.67

### Zanja Substation

Civil	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	1	0.1279	0.4822	1.0066	0.0009	0.0559	4	0.51	1.93	4.03	0.00	0.22	15	7.67	28.93	60.40	0.06	3.36
Drillers	305	2	0.1114	0.3944	1.4291	0.0023	0.0446	8	1.78	6.31	22.87	0.04	0.71	30	53.47	189.32	685.97	1.12	21.40
Ditch Digger	75	1	0.1808	0.4617	0.5754	0.0005	0.0559	6	1.08	2.77	3.45	0.00	0.34	15	16.27	41.56	51.78	0.05	5.03
Forklifts	75	2	0.0723	0.2046	0.2348	0.0003	0.0248	4	0.58	1.64	1.88	0.00	0.20	30	17.34	49.11	56.36	0.06	5.94
Tractors	85	2	0.1193	0.3673	0.4618	0.0005	0.0446	6	1.43	4.41	5.54	0.01	0.53	25	35.80	110.20	138.54	0.15	13.37
									5.39	17.06	37.76	0.05	2.01		130.56	419.13	993.05	1.43	49.10

### 115 kV Phase I

Road Grading	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Road Grader	350	1	0.2014	0.6360	2.0417	0.0021	0.0764	6	1.21	3.82	12.25	0.01	0.46	2	2.42	7.63	24.50	0.02	0.92
Track Type Dozer	350	1	0.2507	0.8799	2.3806	0.0021	0.0962	6	1.50	5.28	14.28	0.01	0.58	1	1.50	5.28	14.28	0.01	0.58
Backhoe	85	1	0.1193	0.3673	0.4618	0.0005	0.0446	6	0.72	2.20	2.77	0.00	0.27	2	1.43	4.41	5.54	0.01	0.53
									3.43	11.30	29.31	0.03	1.30		5.35	17.32	44.33	0.04	2.03

### 115 kV Phase I and II

Pole Framing and Setting	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Driller	305	1	0.1114	0.3944	1.4291	0.0023	0.0446	6	0.67	2.37	8.57	0.01	0.27	9	6.02	21.30	77.17	0.13	2.41
									0.67	2.37	8.57	0.01	0.27		6.02	21.30	77.17	0.13	2.41

## Offroad Equipment Emission Calculations - Proposed Project

### 115 kV Phase I

Conductor Installation	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Single Drum Puller	310	2	0.1489	0.6169	1.5047	0.0017	0.0635	4	1.19	4.94	12.04	0.01	0.51	4	4.77	19.74	48.15	0.06	2.03
									1.19	4.94	12.04	0.01	0.51		4.77	19.74	48.15	0.06	2.03

### 220 kV

Receiving and Loadout	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 50-ton	200	1	0.1289	0.4491	1.0934	0.0010	0.0543	6	0.77	2.69	6.56	0.01	0.33	10	7.73	26.95	65.61	0.06	3.26
Loader - 980	350	1	0.2000	0.6138	2.1682	0.0027	0.0749	6	1.20	3.68	13.01	0.02	0.45	10	12.00	36.83	130.09	0.16	4.50
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	10	4.34	12.28	14.09	0.02	1.49
									2.41	7.61	20.98	0.02	0.92		24.07	76.05	209.79	0.24	9.24

### 220 kV

Road Grading	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
D-6 Cat	200	1	0.2078	0.7121	1.7249	0.0015	0.0874	6	1.25	4.27	10.35	0.01	0.52	5	6.23	21.36	51.75	0.05	2.62
Motor Grader	350	1	0.2123	0.6821	2.1695	0.0021	0.0813	6	1.27	4.09	13.02	0.01	0.49	5	6.37	20.46	65.09	0.06	2.44
									2.52	8.36	23.37	0.02	1.01		12.60	41.82	116.83	0.11	5.06

### 220 kV

Foundations	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Driller	305	1	0.1114	0.3944	1.4291	0.0023	0.0446	6	0.67	2.37	8.57	0.01	0.27	10	6.68	23.67	85.75	0.14	2.68
backhoe	85	1	0.1193	0.3673	0.4618	0.0005	0.0446	6	0.72	2.20	2.77	0.00	0.27	10	7.16	22.04	27.71	0.03	2.67
									1.38	4.57	11.35	0.02	0.53		13.84	45.70	113.45	0.17	5.35

### 220 kV

Steel Assembly	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 150-ton	250	1	0.1314	0.3664	1.3105	0.0013	0.0501	6	0.79	2.20	7.86	0.01	0.30	40	31.53	87.93	314.52	0.30	12.03
Compressor	75	1	0.1165	0.3048	0.3786	0.0004	0.0378	6	0.70	1.83	2.27	0.00	0.23	40	27.96	73.16	90.87	0.09	9.06
									1.49	4.03	10.13	0.01	0.53		59.50	161.09	405.39	0.39	21.09

### Mill Creek Tower

Dig Foundations	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Bore/Drill Rigs	225	1	0.1017	0.4833	1.2146	0.0019	0.0440	6	0.61	2.90	7.29	0.01	0.26	2	1.22	5.80	14.57	0.02	0.53
motor grader	110	1	0.1641	0.5258	0.8846	0.0008	0.0819	2	0.33	1.05	1.77	0.00	0.16	2	0.66	2.10	3.54	0.00	0.33
									0.94	3.95	9.06	0.01	0.43		1.88	7.90	18.11	0.03	0.86

### Erect Tower

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 150'	215	1	0.1296	0.4243	1.1586	0.0011	0.0530	6	0.78	2.55	6.95	0.01	0.32	5	3.89	12.73	34.76	0.03	1.59
Lift Truck 150'	215	1	0.1326	0.5990	1.1959	0.0014	0.0592	6	0.80	3.59	7.18	0.01	0.35	5	3.98	17.97	35.88	0.04	1.77
									1.57	6.14	14.13	0.01	0.67		7.87	30.70	70.63	0.07	3.37



## Offroad Equipment Emission Calculations - Proposed Project

12 kV

### Directional Drilling

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Backhoe	85	1	0.1193	0.3673	0.4618	0.0005	0.0446	6	0.72	2.20	2.77	0.00	0.27	15	10.74	33.06	41.56	0.04	4.01
Horizontal Directional Drill	225	1	0.1017	0.4833	1.2146	0.0019	0.0440	6	0.61	2.90	7.29	0.01	0.26	15	9.15	43.50	109.31	0.17	3.96
									1.33	5.10	10.06	0.01	0.53		19.89	76.56	150.87	0.22	7.97

## 2010 Emission Calculations

### El Casco Substation Phase II

#### Electrical Element

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	1	0.1213	0.4785	0.9507	0.0009	0.0534	6	0.73	2.87	5.70	0.01	0.32	60	43.67	172.27	342.24	0.33	19.22
Crane 150-ton	250	1	0.1243	0.3464	1.2372	0.0013	0.0470	6	0.75	2.08	7.42	0.01	0.28	40	29.83	83.13	296.93	0.30	11.28
Forklift	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.39	1.18	1.34	0.00	0.14	80	30.86	94.73	107.18	0.12	10.89
Manlifts	75	2	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.77	2.37	2.68	0.00	0.27	80	61.72	189.45	214.35	0.24	21.77
									2.63	8.50	17.15	0.02	1.01		166.08	539.57	960.70	1.00	63.16

### El Casco Substation Phase II

#### Maintenance

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Manlifts	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.39	1.18	1.34	0.00	0.14	10	3.86	11.84	13.40	0.02	1.36
									0.39	1.18	1.34	0.00	0.14		3.86	11.84	13.40	0.02	1.36

### Banning Substation

#### Electrical Element

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	2	0.1213	0.4785	0.9507	0.0009	0.0534	6	1.46	5.74	11.41	0.01	0.64	30	43.67	172.27	342.24	0.33	19.22
Crane 150-ton	250	2	0.1243	0.3464	1.2372	0.0013	0.0470	6	1.49	4.16	14.85	0.02	0.56	5	7.46	20.78	74.23	0.08	2.82
Forklift	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.39	1.18	1.34	0.00	0.14	20	7.72	23.68	26.79	0.03	2.72
Manlifts	75	4	0.0643	0.1973	0.2233	0.0003	0.0227	6	1.54	4.74	5.36	0.01	0.54	30	46.29	142.09	160.77	0.18	16.33
									4.88	15.82	32.95	0.03	1.88		105.13	358.82	604.03	0.62	41.09

### Banning Substation

#### Transformer Assembly

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 50-ton	200	2	0.1243	0.3464	1.2372	0.0013	0.0470	6	1.49	4.16	14.85	0.02	0.56	15	22.37	62.35	222.70	0.23	8.46
Forklift	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.39	1.18	1.34	0.00	0.14	15	5.79	17.76	20.10	0.02	2.04
Manlifts	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.39	1.18	1.34	0.00	0.14	20	7.72	23.68	26.79	0.03	2.72
									2.26	6.52	17.53	0.02	0.84		35.87	103.79	269.59	0.28	13.22

### Banning Substation

#### Maintenance

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Manlifts	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.39	1.18	1.34	0.00	0.14	40	15.43	47.36	53.59	0.06	5.44
									0.39	1.18	1.34	0.00	0.14	40	15.43	47.36	53.59	0.06	5.44

## Offroad Equipment Emission Calculations - Proposed Project

### Zanja Substation Electrical Element

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	2	0.1213	0.4785	0.9507	0.0009	0.0534	6	1.46	5.74	11.41	0.01	0.64	60	87.34	344.54	684.47	0.67	38.44
Crane 150-ton	250	2	0.1243	0.3464	1.2372	0.0013	0.0470	6	1.49	4.16	14.85	0.02	0.56	40	59.66	166.26	593.87	0.61	22.55
Forklift	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.39	1.18	1.34	0.00	0.14	60	23.15	71.04	80.38	0.09	8.17
Manlifts	75	4	0.0643	0.1973	0.2233	0.0003	0.0227	6	1.54	4.74	5.36	0.01	0.54	70	108.02	331.54	375.12	0.42	38.10
									4.88	15.82	32.95	0.03	1.88		278.16	913.38	1733.84	1.79	107.26

### Zanja Substation Maintenance

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Manlifts	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.39	1.18	1.34	0.00	0.14	10	3.86	11.84	13.40	0.02	1.36
									0.39	1.18	1.34	0.00	0.14		3.86	11.84	13.40	0.02	1.36

### 115 kV Phase II Pole Framing and Setting

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Driller	305	1	0.1074	0.3924	1.2992	0.0023	0.0435	6	0.64	2.35	7.80	0.01	0.26	23	14.82	54.14	179.29	0.32	6.00
									0.64	2.35	7.80	0.01	0.26		14.82	54.14	179.29	0.32	6.00

### 115 kV Phase II Conductor Installation

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Single Drum Puller	310	2	0.1391	0.5970	1.4037	0.0017	0.0599	4	1.11	4.78	11.23	0.01	0.48	36	40.07	171.94	404.27	0.50	17.25
									1.11	4.78	11.23	0.01	0.48		40.07	171.94	404.27	0.50	17.25

### 220 kV Conductor Installation

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Tensioner	135	1	0.1279	0.5550	0.8997	0.0010	0.0686	6	0.77	3.33	5.40	0.01	0.41	15	11.51	49.95	80.98	0.09	6.18
3 Drum Puller	310	1	0.1391	0.5970	1.4037	0.0017	0.0599	6	0.83	3.58	8.42	0.01	0.36	15	12.52	53.73	126.33	0.16	5.39
Single Drum Puller	310	1	0.1391	0.5970	1.4037	0.0017	0.0599	6	0.83	3.58	8.42	0.01	0.36	15	12.52	53.73	126.33	0.16	5.39
50-Ton Crane	200	1	0.1222	0.4408	1.0325	0.0010	0.0516	6	0.73	2.64	6.20	0.01	0.31	15	10.99	39.67	92.93	0.09	4.64
Sagger Dozer	350	1	0.2396	0.8218	2.2566	0.0021	0.0911	6	1.44	4.93	13.54	0.01	0.55	15	21.56	73.97	203.10	0.19	8.20
Small Engines Generators/Pumps (gas)	15	3	0.0338	1.9354	0.0101	0.0001	0.0003	6	0.61	34.84	0.18	0.00	0.01	15	9.12	522.57	2.72	0.02	0.09
									5.22	52.91	42.16	0.05	1.99		78.23	793.62	632.39	0.70	29.89

### Fiber Optics Cable Construction

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Single Drum Puller	250	1	0.1391	0.5970	1.4037	0.0017	0.0599	6	0.83	3.58	8.42	0.01	0.36	100	83.48	358.20	842.23	1.04	35.94
									0.83	3.58	8.42	0.01	0.36		83.48	358.20	842.23	1.04	35.94

### Fiber Optics Receive and Loadout

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Forklift 5-ton	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	2	0.13	0.39	0.45	0.00	0.05	15	1.93	5.92	6.70	0.01	0.68
									0.13	0.39	0.45	0.00	0.05		1.93	5.92	6.70	0.01	0.68

## Offroad Equipment Emission Calculations - Proposed Project

Maximum regional daily emissions assume overlap in November 2009 of El Casco Substation 1) Civil, 2) electrical, 3) transformer assembly, 4) asphalt, landscaping and drainage, 5) Banning Substation electrical, 6) Zanja Substation electrical, and 7) 220 kV steel assembly.

	Project Emissions					
	ROG	CO	NOX	SOX	PM	PM2.5
Maximum lbs/day	23.46	73.31	156.32	0.16	8.98	8.26
Total Tons	1.77	5.86	11.18	0.01	0.67	0.61
2008 Tons	0.21	0.58	1.47	0.00	0.07	0.07
2009 Tons	1.14	3.60	6.85	0.01	0.43	0.40
2010 Tons	0.41	1.69	2.86	0.00	0.16	0.15

## Offroad Equipment Emission Calculations - Alternative 1

### SCAQMD Offroad Emission Factors

Description	HP	2008 SCAQMD Emission Factor lbs/hour					2009 SCAQMD Emission Factor lbs/hour					2010 SCAQMD Emission Factor lbs/hour				
		ROG	CO	NOX	SOX	PM	ROG	CO	NOX	SOX	PM	ROG	CO	NOX	SOX	PM
Backhoe	200	0.1470	0.5420	1.3454	0.0014	0.0622	0.1371	0.5337	1.2487	0.0014	0.0584	0.1284	0.5266	1.1595	0.0014	0.0549
Backhoe	85	0.1310	0.3767	0.4866	0.0005	0.0478	0.1193	0.3673	0.4618	0.0005	0.0446	0.1083	0.3586	0.4389	0.0005	0.0414
Bore/Drill Rigs	225	0.1104	0.4848	1.3559	0.0019	0.0468	0.1017	0.4833	1.2146	0.0019	0.0440	0.0948	0.4821	1.0947	0.0019	0.0417
Crew Truck	180	0.1953	0.7478	1.5035	0.0014	0.0853	0.1834	0.7438	1.3989	0.0014	0.0804	0.1725	0.8082	2.1082	0.0020	0.0937
Crane 14-ton	180	0.1348	0.4865	1.0647	0.0009	0.0585	0.1279	0.4822	1.0066	0.0009	0.0559	0.1213	0.4785	0.9507	0.0009	0.0534
30-ton crane (150' crane)	215	0.1370	0.4373	1.2257	0.0011	0.0560	0.1296	0.4243	1.1586	0.0011	0.0530	0.1228	0.4124	1.0939	0.0011	0.0502
Crane 50-ton	200	0.1361	0.4584	1.1567	0.0010	0.0571	0.1289	0.4491	1.0934	0.0010	0.0543	0.1222	0.4408	1.0325	0.0010	0.0516
Crane 150-ton	250	0.1392	0.3881	1.3867	0.0013	0.0535	0.1314	0.3664	1.3105	0.0013	0.0501	0.1243	0.3464	1.2372	0.0013	0.0470
Compactor	80	0.1406	0.3743	0.5138	0.0005	0.0486	0.1322	0.3671	0.4932	0.0005	0.0464	0.1240	0.3601	0.4737	0.0005	0.0442
Compressor	75	0.1210	0.3078	0.3893	0.0004	0.0388	0.1165	0.3048	0.3786	0.0004	0.0378	0.1110	0.3005	0.3668	0.0004	0.0365
Ditch Digger	75	0.1897	0.4702	0.5945	0.0005	0.0580	0.1808	0.4617	0.5754	0.0005	0.0559	0.1720	0.4534	0.5571	0.0005	0.0538
Driller	305	0.1167	0.3970	1.5841	0.0023	0.0460	0.1114	0.3944	1.4291	0.0023	0.0446	0.1074	0.3924	1.2992	0.0023	0.0435
Forklift	75	0.0802	0.2122	0.2479	0.0003	0.0267	0.0723	0.2046	0.2348	0.0003	0.0248	0.0643	0.1973	0.2233	0.0003	0.0227
Forklift 5-ton	75	0.0802	0.2122	0.2479	0.0003	0.0267	0.0723	0.2046	0.2348	0.0003	0.0248	0.0643	0.1973	0.2233	0.0003	0.0227
Foreman Truck	180	0.1953	0.7478	1.5035	0.0014	0.0853	0.1834	0.7438	1.3989	0.0014	0.0804	0.1725	0.7404	1.3019	0.0014	0.0758
Graders	350	0.2123	0.6821	2.1695	0.0021	0.0813	0.2014	0.6360	2.0417	0.0021	0.0764	0.1916	0.5970	1.9222	0.0021	0.0720
Motor grader	110	0.1757	0.5331	0.9354	0.0008	0.0864	0.1641	0.5258	0.8846	0.0008	0.0819	0.1531	0.5191	0.8367	0.0008	0.0774
Horizontal directional drill	225	0.1104	0.4848	1.3559	0.0019	0.0468	0.1017	0.4833	1.2146	0.0019	0.0440	0.0948	0.4821	1.0947	0.0019	0.0417
Loader - 980	350	0.1855	0.2520	2.6904	0.0030	0.0549	0.2000	0.6138	2.1682	0.0027	0.0749	0.1903	0.5820	2.0193	0.0027	0.0706
manlifts	75	0.0802	0.2122	0.2479	0.0003	0.0267	0.0723	0.2046	0.2348	0.0003	0.0248	0.0643	0.1973	0.2233	0.0003	0.0227
Paving machine	200	0.2399	0.8003	2.0371	0.0017	0.1007	0.2283	0.7815	1.9396	0.0017	0.0963	0.2175	0.7643	1.8464	0.0017	0.0920
Road Grader	350	0.2123	0.6821	2.1695	0.0021	0.0813	0.2014	0.6360	2.0417	0.0021	0.0764	0.1916	0.5970	1.9222	0.0021	0.0720
Roller/Compactor	145	0.1495	0.5214	1.0580	0.0009	0.0709	0.1408	0.5168	1.0021	0.0009	0.0679	0.1327	0.5128	0.9492	0.0009	0.0649
Single Drum Puller	310	0.1600	0.6403	1.6153	0.0017	0.0674	0.1489	0.6169	1.5047	0.0017	0.0635	0.1391	0.5970	1.4037	0.0017	0.0599
3 Drum Puller	310	0.1600	0.6403	1.6153	0.0017	0.0674	0.1489	0.6169	1.5047	0.0017	0.0635	0.1391	0.5970	1.4037	0.0017	0.0599
Tractors	85	0.1310	0.3767	0.4866	0.0005	0.0478	0.1193	0.3673	0.4618	0.0005	0.0446	0.1430	0.3511	0.1840	0.0003	0.0210
D-6 Cat	200	0.2185	0.7276	1.8198	0.0015	0.0918	0.2078	0.7121	1.7249	0.0015	0.0874	0.1978	0.6979	1.6339	0.0015	0.0832
Track Type Dozer	350	0.2628	0.9436	2.5113	0.0021	0.1017	0.2507	0.8799	2.3806	0.0021	0.0962	0.2396	0.8218	2.2566	0.0021	0.0911
Tensioner	135	0.1512	0.5645	1.0312	0.0010	0.0778	0.1391	0.5595	0.9629	0.0010	0.0731	0.1279	0.5550	0.8997	0.0010	0.0686
truck crane (150' Lift Truck)	215	0.1429	0.6072	1.2844	0.0014	0.0626	0.1326	0.5990	1.1959	0.0014	0.0592	0.1234	0.5921	1.1145	0.0014	0.0559

### USEPA Phase II Engine Base Emission Factors (EPA420-R-05-019)

Small Engines Generators/Pumps (gas)	5	All Years	0.0338	1.9354	0.0101	0.0001	0.0003
--------------------------------------	---	-----------	--------	--------	--------	--------	--------

### 2008 Emission Calculations

#### El Casco Substation Phase I

Grading	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Compactor	80	2	0.1406	0.3743	0.5138	0.0005	0.0486	6	1.69	4.49	6.17	0.01	0.58	20	33.73	89.84	123.31	0.12	11.66
Graders	350	2	0.2123	0.6821	2.1695	0.0021	0.0813	6	2.55	8.18	26.03	0.02	0.98	20	50.96	163.69	520.69	0.50	19.50
Loader - 980	350	2	0.1855	0.2520	2.6904	0.0030	0.0549	6	2.23	3.02	32.29	0.04	0.66	20	44.52	60.48	645.71	0.72	13.18
									6.46	15.70	64.49	0.07	2.22		129.22	314.01	1289.70	1.33	44.34

## Offroad Equipment Emission Calculations - Alternative 1

### El Casco Substation Phase I

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	1	0.1348	0.4865	1.0647	0.0009	0.0585	4	0.54	1.95	4.26	0.00	0.23	15	8.09	29.19	63.88	0.06	3.51
Ditch Digger	75	3	0.1897	0.4702	0.5945	0.0005	0.0580	6	3.42	8.46	10.70	0.01	1.04	35	119.54	296.19	374.52	0.34	36.57
Driller	305	2	0.1167	0.3970	1.5841	0.0023	0.0460	6	1.40	4.76	19.01	0.03	0.55	30	42.02	142.93	570.27	0.84	16.56
Forklift	75	2	0.0802	0.2122	0.2479	0.0003	0.0267	4	0.64	1.70	1.98	0.00	0.21	45	28.87	76.38	89.24	0.09	9.62
Tractors	85	2	0.1310	0.3767	0.4866	0.0005	0.0478	6	1.57	4.52	5.84	0.01	0.57	45	70.73	203.42	262.77	0.27	25.84
									7.57	21.39	41.79	0.05	2.62		269.25	748.11	1360.67	1.60	92.09

### Mill Creek Tower

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Graders	350	2	0.2123	0.6821	2.1695	0.0021	0.0813	6	2.55	8.18	26.03	0.02	0.98	10	25.48	81.85	260.34	0.25	9.75
									2.55	8.18	26.03	0.02	0.98		25.48	81.85	260.34	0.25	9.75

### Mill Creek Tower

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Bore/Drill Rigs	225	1	0.1104	0.4848	1.3559	0.0019	0.0468	6	0.66	2.91	8.14	0.01	0.28	3	1.99	8.73	24.41	0.03	0.84
Graders	350	1	0.2123	0.6821	2.1695	0.0021	0.0813	2	0.42	1.36	4.34	0.00	0.16	3	1.27	4.09	13.02	0.01	0.49
									1.09	4.27	12.47	0.02	0.44		3.26	12.82	37.42	0.05	1.33

## 2009 Emission Calculations

### El Casco Substation Phase I

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	2	0.1279	0.4822	1.0066	0.0009	0.0559	6	1.53	5.79	12.08	0.01	0.67	140	214.85	810.16	1691.13	1.56	94.00
crane 150-ton	250	2	0.1314	0.3664	1.3105	0.0013	0.0501	6	1.58	4.40	15.73	0.02	0.60	40	63.07	175.86	629.03	0.61	24.06
forklift	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.43	1.23	1.41	0.00	0.15	120	52.03	147.34	169.07	0.18	17.82
Manlifts	75	4	0.0723	0.2046	0.2348	0.0003	0.0248	6	1.73	4.91	5.64	0.01	0.59	120	208.11	589.37	676.29	0.73	71.29
									5.28	16.32	34.85	0.03	2.02		538.06	1722.73	3165.52	3.07	207.16

### El Casco Substation Phase I

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 50-ton	200	2	0.1289	0.4491	1.0934	0.0010	0.0543	6	1.55	5.39	13.12	0.01	0.65	15	23.20	80.84	196.82	0.18	9.77
forklift	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.43	1.23	1.41	0.00	0.15	15	6.50	18.42	21.13	0.02	2.23
manlifts	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.43	1.23	1.41	0.00	0.15	20	8.67	24.56	28.18	0.03	2.97
									2.41	7.85	15.94	0.02	0.95	50	38.37	123.82	246.13	0.24	14.97

### El Casco Substation Phase I

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
manlifts	75	6	0.0723	0.2046	0.2348	0.0003	0.0248	6	2.60	7.37	8.45	0.01	0.89	40	104.05	294.69	338.14	0.36	35.64
									2.60	7.37	8.45	0.01	0.89	40	104.05	294.69	338.14	0.36	35.64

## Offroad Equipment Emission Calculations - Alternative 1

### El Casco Substation Phase II

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	1	0.1279	0.4822	1.0066	0.0009	0.0559	4	0.51	1.93	4.03	0.00	0.22	40	20.46	77.16	161.06	0.15	8.95
Drillers	305	1	0.1114	0.3944	1.4291	0.0023	0.0446	8	0.89	3.16	11.43	0.02	0.36	70	62.38	220.88	800.29	1.30	24.97
Ditch Digger	75	1	0.1808	0.4617	0.5754	0.0005	0.0559	6	1.08	2.77	3.45	0.00	0.34	75	81.37	207.78	258.92	0.25	25.15
Forklifts	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	4	0.29	0.82	0.94	0.00	0.10	90	26.01	73.67	84.54	0.09	8.91
Tractors	85	1	0.1193	0.3673	0.4618	0.0005	0.0446	6	0.72	2.20	2.77	0.00	0.27	90	64.44	198.36	249.38	0.27	24.06
									3.49	10.88	22.62	0.03	1.28	365	254.66	777.84	1554.18	2.06	92.04

### El Casco Substation Phase II

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	1	0.1279	0.4822	1.0066	0.0009	0.0559	6	0.77	2.89	6.04	0.01	0.34	30	23.02	86.80	181.19	0.17	10.07
Crane 150-ton	250	1	0.1314	0.3664	1.3105	0.0013	0.0501	6	0.79	2.20	7.86	0.01	0.30	20	15.77	43.96	157.26	0.15	6.01
Forklift	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.43	1.23	1.41	0.00	0.15	40	17.34	49.11	56.36	0.06	5.94
Manlifts	75	2	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.87	2.46	2.82	0.00	0.30	40	34.68	98.23	112.71	0.12	11.88
									2.86	8.78	18.13	0.02	1.08	130	90.81	278.11	507.52	0.50	33.91

### El Casco Substation Phase II

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 50-ton	200	2	0.1289	0.4491	1.0934	0.0010	0.0543	6	1.55	5.39	13.12	0.01	0.65	30	46.40	161.69	393.64	0.37	19.54
Forklift	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.43	1.23	1.41	0.00	0.15	45	19.51	55.25	63.40	0.07	6.68
Manlifts	75	2	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.87	2.46	2.82	0.00	0.30	40	34.68	98.23	112.71	0.12	11.88
									2.85	9.07	17.35	0.02	1.10	115	100.60	315.17	569.75	0.56	38.11

### El Casco Substation Phase II

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Manlifts	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.43	1.23	1.41	0.00	0.15	20	8.67	24.56	28.18	0.03	2.97
									0.43	1.23	1.41	0.00	0.15	20	8.67	24.56	28.18	0.03	2.97

### El Casco Substation Phase II

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Grader	350	2	0.2014	0.6360	2.0417	0.0021	0.0764	6	2.42	7.63	24.50	0.02	0.92	5	12.08	38.16	122.50	0.12	4.58
Paving Machine	200	1	0.2283	0.7815	1.9396	0.0017	0.0963	6	1.37	4.69	11.64	0.01	0.58	10	13.70	46.89	116.38	0.10	5.78
Roller/Compactor	145	1	0.1408	0.5168	1.0021	0.0009	0.0679	6	0.85	3.10	6.01	0.01	0.41	12	10.14	37.21	72.15	0.07	4.89
Tractors	85	2	0.1193	0.3673	0.4618	0.0005	0.0446	6	1.43	4.41	5.54	0.01	0.53	19	27.21	83.75	105.29	0.11	10.16
									6.06	19.83	47.69	0.05	2.44	46	63.13	206.01	416.33	0.41	25.41

### Banning Substation

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Tractors	85	2	0.1193	0.3673	0.4618	0.0005	0.0446	6	1.43	4.41	5.54	0.01	0.53	18	25.78	79.34	99.75	0.11	9.62
									1.43	4.41	5.54	0.01	0.53		25.78	79.34	99.75	0.11	9.62

## Offroad Equipment Emission Calculations - Alternative 1

### Banning Substation

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	1	0.1279	0.4822	1.0066	0.0009	0.0559	4	0.51	1.93	4.03	0.00	0.22	15	7.67	28.93	60.40	0.06	3.36
Drillers	305	2	0.1114	0.3944	1.4291	0.0023	0.0446	8	1.78	6.31	22.87	0.04	0.71	30	53.47	189.32	685.97	1.12	21.40
Ditch Digger	75	1	0.1808	0.4617	0.5754	0.0005	0.0559	6	1.08	2.77	3.45	0.00	0.34	35	37.97	96.96	120.83	0.11	11.74
Forklifts	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	4	0.29	0.82	0.94	0.00	0.10	45	13.01	36.84	42.27	0.05	4.46
Tractors	85	2	0.1193	0.3673	0.4618	0.0005	0.0446	6	1.43	4.41	5.54	0.01	0.53	45	64.44	198.36	249.38	0.27	24.06
									5.10	16.24	36.83	0.05	1.91		176.56	550.41	1158.84	1.60	65.01

### Banning Substation

Electrical Element	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	2	0.1279	0.4822	1.0066	0.0009	0.0559	6	1.53	5.79	12.08	0.01	0.67	150	230.20	868.03	1811.92	1.67	100.71
Crane 150-ton	250	2	0.1314	0.3664	1.3105	0.0013	0.0501	6	1.58	4.40	15.73	0.02	0.60	35	55.18	153.87	550.40	0.53	21.05
Forklift	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.43	1.23	1.41	0.00	0.15	100	43.36	122.79	140.89	0.15	14.85
Manlifts	75	4	0.0723	0.2046	0.2348	0.0003	0.0248	6	1.73	4.91	5.64	0.01	0.59	150	260.14	736.71	845.36	0.91	89.11
									5.28	16.32	34.85	0.03	2.02	435	588.88	1881.40	3348.57	3.26	225.72

### Zanja Substation

Grading	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Tractors	85	2	0.1193	0.3673	0.4618	0.0005	0.0446	6	1.43	4.41	5.54	0.01	0.53	5	7.16	22.04	27.71	0.03	2.67
									1.43	4.41	5.54	0.01	0.53	5	7.16	22.04	27.71	0.03	2.67

### Zanja Substation

Civil	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	1	0.1279	0.4822	1.0066	0.0009	0.0559	4	0.51	1.93	4.03	0.00	0.22	15	7.67	28.93	60.40	0.06	3.36
Drillers	305	2	0.1114	0.3944	1.4291	0.0023	0.0446	8	1.78	6.31	22.87	0.04	0.71	30	53.47	189.32	685.97	1.12	21.40
Ditch Digger	75	1	0.1808	0.4617	0.5754	0.0005	0.0559	6	1.08	2.77	3.45	0.00	0.34	15	16.27	41.56	51.78	0.05	5.03
Forklifts	75	2	0.0723	0.2046	0.2348	0.0003	0.0248	4	0.58	1.64	1.88	0.00	0.20	30	17.34	49.11	56.36	0.06	5.94
Tractors	85	2	0.1193	0.3673	0.4618	0.0005	0.0446	6	1.43	4.41	5.54	0.01	0.53	25	35.80	110.20	138.54	0.15	13.37
									5.39	17.06	37.76	0.05	2.01		130.56	419.13	993.05	1.43	49.10

### 115 kV Phase I

Road Grading	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Road Grader	350	1	0.2014	0.6360	2.0417	0.0021	0.0764	6	1.21	3.82	12.25	0.01	0.46	2	2.42	7.63	24.50	0.02	0.92
Track Type Dozer	350	1	0.2507	0.8799	2.3806	0.0021	0.0962	6	1.50	5.28	14.28	0.01	0.58	1	1.50	5.28	14.28	0.01	0.58
Backhoe	85	1	0.1193	0.3673	0.4618	0.0005	0.0446	6	0.72	2.20	2.77	0.00	0.27	2	1.43	4.41	5.54	0.01	0.53
									3.43	11.30	29.31	0.03	1.30		5.35	17.32	44.33	0.04	2.03

### 115 kV Phase I and II

Pole Framing and Setting	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Driller	305	1	0.1114	0.3944	1.4291	0.0023	0.0446	6	0.67	2.37	8.57	0.01	0.27	41	27.40	97.03	351.56	0.57	10.97
									0.67	2.37	8.57	0.01	0.27		27.40	97.03	351.56	0.57	10.97

## Offroad Equipment Emission Calculations - Alternative 1

### 115 kV Phase I

#### Conductor Installation

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Single Drum Puller	310	2	0.1489	0.6169	1.5047	0.0017	0.0635	4	1.19	4.94	12.04	0.01	0.51	4	4.77	19.74	48.15	0.06	2.03
									1.19	4.94	12.04	0.01	0.51		4.77	19.74	48.15	0.06	2.03

### 220 kV

#### Receiving and Loadout

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 50-ton	200	1	0.1289	0.4491	1.0934	0.0010	0.0543	6	0.77	2.69	6.56	0.01	0.33	10	7.73	26.95	65.61	0.06	3.26
Loader - 980	350	1	0.2000	0.6138	2.1682	0.0027	0.0749	6	1.20	3.68	13.01	0.02	0.45	10	12.00	36.83	130.09	0.16	4.50
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	10	4.34	12.28	14.09	0.02	1.49
									2.41	7.61	20.98	0.02	0.92		24.07	76.05	209.79	0.24	9.24

### 220 kV

#### Road Grading

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
D-6 Cat	200	1	0.2078	0.7121	1.7249	0.0015	0.0874	6	1.25	4.27	10.35	0.01	0.52	5	6.23	21.36	51.75	0.05	2.62
Motor Grader	350	1	0.2123	0.6821	2.1695	0.0021	0.0813	6	1.27	4.09	13.02	0.01	0.49	5	6.37	20.46	65.09	0.06	2.44
									2.52	8.36	23.37	0.02	1.01		12.60	41.82	116.83	0.11	5.06

### 220 kV

#### Foundations

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Driller	305	1	0.1114	0.3944	1.4291	0.0023	0.0446	6	0.67	2.37	8.57	0.01	0.27	10	6.68	23.67	85.75	0.14	2.68
backhoe	85	1	0.1193	0.3673	0.4618	0.0005	0.0446	6	0.72	2.20	2.77	0.00	0.27	10	7.16	22.04	27.71	0.03	2.67
									1.38	4.57	11.35	0.02	0.53		13.84	45.70	113.45	0.17	5.35

### 220 kV

#### Steel Assembly

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 150-ton	250	1	0.1314	0.3664	1.3105	0.0013	0.0501	6	0.79	2.20	7.86	0.01	0.30	40	31.53	87.93	314.52	0.30	12.03
Compressor	75	1	0.1165	0.3048	0.3786	0.0004	0.0378	6	0.70	1.83	2.27	0.00	0.23	40	27.96	73.16	90.87	0.09	9.06
									1.49	4.03	10.13	0.01	0.53		59.50	161.09	405.39	0.39	21.09

### Mill Creek Tower

#### Dig Foundations

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Bore/Drill Rigs	225	1	0.1017	0.4833	1.2146	0.0019	0.0440	6	0.61	2.90	7.29	0.01	0.26	2	1.22	5.80	14.57	0.02	0.53
motor grader	110	1	0.1641	0.5258	0.8846	0.0008	0.0819	2	0.33	1.05	1.77	0.00	0.16	2	0.66	2.10	3.54	0.00	0.33
									0.94	3.95	9.06	0.01	0.43		1.88	7.90	18.11	0.03	0.86

### Erect Tower

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 150'	215	1	0.1296	0.4243	1.1586	0.0011	0.0530	6	0.78	2.55	6.95	0.01	0.32	5	3.89	12.73	34.76	0.03	1.59
Lift Truck 150'	215	1	0.1326	0.5990	1.1959	0.0014	0.0592	6	0.80	3.59	7.18	0.01	0.35	5	3.98	17.97	35.88	0.04	1.77
									1.57	6.14	14.13	0.01	0.67		7.87	30.70	70.63	0.07	3.37



## Offroad Equipment Emission Calculations - Alternative 1

12 kV  
Directional Drilling

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Backhoe	85	1	0.1193	0.3673	0.4618	0.0005	0.0446	6	0.72	2.20	2.77	0.00	0.27	15	10.74	33.06	41.56	0.04	4.01
Horizontal Directional Drill	225	1	0.1017	0.4833	1.2146	0.0019	0.0440	6	0.61	2.90	7.29	0.01	0.26	15	9.15	43.50	109.31	0.17	3.96
									1.33	5.10	10.06	0.01	0.53		19.89	76.56	150.87	0.22	7.97

## 2010 Emission Calculations

El Casco Substation Phase II  
Electrical Element

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	1	0.1213	0.4785	0.9507	0.0009	0.0534	6	0.73	2.87	5.70	0.01	0.32	60	43.67	172.27	342.24	0.33	19.22
Crane 150-ton	250	1	0.1243	0.3464	1.2372	0.0013	0.0470	6	0.75	2.08	7.42	0.01	0.28	40	29.83	83.13	296.93	0.30	11.28
Forklift	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.39	1.18	1.34	0.00	0.14	80	30.86	94.73	107.18	0.12	10.89
Manlifts	75	2	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.77	2.37	2.68	0.00	0.27	80	61.72	189.45	214.35	0.24	21.77
									2.63	8.50	17.15	0.02	1.01		166.08	539.57	960.70	1.00	63.16

El Casco Substation Phase II  
Maintenance

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Manlifts	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.39	1.18	1.34	0.00	0.14	10	3.86	11.84	13.40	0.02	1.36
									0.39	1.18	1.34	0.00	0.14		3.86	11.84	13.40	0.02	1.36

Banning Substation  
Electrical Element

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	2	0.1213	0.4785	0.9507	0.0009	0.0534	6	1.46	5.74	11.41	0.01	0.64	30	43.67	172.27	342.24	0.33	19.22
Crane 150-ton	250	2	0.1243	0.3464	1.2372	0.0013	0.0470	6	1.49	4.16	14.85	0.02	0.56	5	7.46	20.78	74.23	0.08	2.82
Forklift	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.39	1.18	1.34	0.00	0.14	20	7.72	23.68	26.79	0.03	2.72
Manlifts	75	4	0.0643	0.1973	0.2233	0.0003	0.0227	6	1.54	4.74	5.36	0.01	0.54	30	46.29	142.09	160.77	0.18	16.33
									4.88	15.82	32.95	0.03	1.88		105.13	358.82	604.03	0.62	41.09

Banning Substation  
Transformer Assembly

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 50-ton	200	2	0.1243	0.3464	1.2372	0.0013	0.0470	6	1.49	4.16	14.85	0.02	0.56	15	22.37	62.35	222.70	0.23	8.46
Forklift	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.39	1.18	1.34	0.00	0.14	15	5.79	17.76	20.10	0.02	2.04
Manlifts	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.39	1.18	1.34	0.00	0.14	20	7.72	23.68	26.79	0.03	2.72
									2.26	6.52	17.53	0.02	0.84		35.87	103.79	269.59	0.28	13.22

Banning Substation  
Maintenance

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Manlifts	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.39	1.18	1.34	0.00	0.14	40	15.43	47.36	53.59	0.06	5.44
									0.39	1.18	1.34	0.00	0.14	40	15.43	47.36	53.59	0.06	5.44

## Offroad Equipment Emission Calculations - Alternative 1

### Zanja Substation Electrical Element

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	2	0.1213	0.4785	0.9507	0.0009	0.0534	6	1.46	5.74	11.41	0.01	0.64	60	87.34	344.54	684.47	0.67	38.44
Crane 150-ton	250	2	0.1243	0.3464	1.2372	0.0013	0.0470	6	1.49	4.16	14.85	0.02	0.56	40	59.66	166.26	593.87	0.61	22.55
Forklift	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.39	1.18	1.34	0.00	0.14	60	23.15	71.04	80.38	0.09	8.17
Manlifts	75	4	0.0643	0.1973	0.2233	0.0003	0.0227	6	1.54	4.74	5.36	0.01	0.54	70	108.02	331.54	375.12	0.42	38.10
									4.88	15.82	32.95	0.03	1.88		278.16	913.38	1733.84	1.79	107.26

### Zanja Substation Maintenance

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Manlifts	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.39	1.18	1.34	0.00	0.14	10	3.86	11.84	13.40	0.02	1.36
									0.39	1.18	1.34	0.00	0.14		3.86	11.84	13.40	0.02	1.36

### 115 kV Phase II Pole Framing and Setting

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Driller	305	1	0.1074	0.3924	1.2992	0.0023	0.0435	6	0.64	2.35	7.80	0.01	0.26	7	4.51	16.48	54.57	0.10	1.83
									0.64	2.35	7.80	0.01	0.26		4.51	16.48	54.57	0.10	1.83

### 115 kV Phase II Conductor Installation

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Single Drum Puller	310	2	0.1391	0.5970	1.4037	0.0017	0.0599	4	1.11	4.78	11.23	0.01	0.48	60	66.78	286.56	673.78	0.83	28.75
									1.11	4.78	11.23	0.01	0.48		66.78	286.56	673.78	0.83	28.75

### 220 kV Conductor Installation

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Tensioner	135	1	0.1279	0.5550	0.8997	0.0010	0.0686	6	0.77	3.33	5.40	0.01	0.41	15	11.51	49.95	80.98	0.09	6.18
3 Drum Puller	310	1	0.1391	0.5970	1.4037	0.0017	0.0599	6	0.83	3.58	8.42	0.01	0.36	15	12.52	53.73	126.33	0.16	5.39
Single Drum Puller	310	1	0.1391	0.5970	1.4037	0.0017	0.0599	6	0.83	3.58	8.42	0.01	0.36	15	12.52	53.73	126.33	0.16	5.39
50-Ton Crane	200	1	0.1222	0.4408	1.0325	0.0010	0.0516	6	0.73	2.64	6.20	0.01	0.31	15	10.99	39.67	92.93	0.09	4.64
Sagger Dozer	350	1	0.2396	0.8218	2.2566	0.0021	0.0911	6	1.44	4.93	13.54	0.01	0.55	15	21.56	73.97	203.10	0.19	8.20
Small Engines Generators/Pumps (gas)	15	3	0.0338	1.9354	0.0101	0.0001	0.0003	6	0.61	34.84	0.18	0.00	0.01	15	9.12	522.57	2.72	0.02	0.09
									5.22	52.91	42.16	0.05	1.99		78.23	793.62	632.39	0.70	29.89

### Fiber Optics Cable Construction

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Single Drum Puller	250	1	0.1391	0.5970	1.4037	0.0017	0.0599	6	0.83	3.58	8.42	0.01	0.36	100	83.48	358.20	842.23	1.04	35.94
									0.83	3.58	8.42	0.01	0.36		83.48	358.20	842.23	1.04	35.94

### Fiber Optics Receive and Loadout

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Forklift 5-ton	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	2	0.13	0.39	0.45	0.00	0.05	15	1.93	5.92	6.70	0.01	0.68
									0.13	0.39	0.45	0.00	0.05		1.93	5.92	6.70	0.01	0.68

## Offroad Equipment Emission Calculations - Alternative 1

Maximum regional daily emissions assume overlap in November 2009 of El Casco Substation 1) Civil, 2) electrical, 3) transformer assembly, 4) asphalt, landscaping and drainage, 5) Banning Substation electrical, 6) Zanja Substation electrical, 7) 220 kV steel assembly, and 8) 115 kV Phase II pole setting.

	Project Emissions					
	ROG	CO	NOX	SOX	PM	PM2.5
Maximum lbs/day	24.13	75.68	164.89	0.17	9.24	8.50
Total Tons	1.79	5.94	11.39	0.01	0.67	0.62
2008 Tons	0.21	0.58	1.47	0.00	0.07	0.07
2009 Tons	1.15	3.63	6.99	0.01	0.44	0.40
2010 Tons	0.42	1.72	2.93	0.00	0.16	0.15

## Offroad Equipment Emission Calculations - Alternative 2

### SCAQMD Offroad Emission Factors

Description	HP	2008 SCAQMD Emission Factor lbs/hour					2009 SCAQMD Emission Factor lbs/hour					2010 SCAQMD Emission Factor lbs/hour				
		ROG	CO	NOX	SOX	PM	ROG	CO	NOX	SOX	PM	ROG	CO	NOX	SOX	PM
Backhoe	200	0.1470	0.5420	1.3454	0.0014	0.0622	0.1371	0.5337	1.2487	0.0014	0.0584	0.1284	0.5266	1.1595	0.0014	0.0549
Backhoe	85	0.1310	0.3767	0.4866	0.0005	0.0478	0.1193	0.3673	0.4618	0.0005	0.0446	0.1083	0.3586	0.4389	0.0005	0.0414
Bore/Drill Rigs	225	0.1104	0.4848	1.3559	0.0019	0.0468	0.1017	0.4833	1.2146	0.0019	0.0440	0.0948	0.4821	1.0947	0.0019	0.0417
Crew Truck	180	0.1953	0.7478	1.5035	0.0014	0.0853	0.1834	0.7438	1.3989	0.0014	0.0804	0.1725	0.8082	2.1082	0.0020	0.0937
Crane 14-ton	180	0.1348	0.4865	1.0647	0.0009	0.0585	0.1279	0.4822	1.0066	0.0009	0.0559	0.1213	0.4785	0.9507	0.0009	0.0534
30-ton crane (150' crane)	215	0.1370	0.4373	1.2257	0.0011	0.0560	0.1296	0.4243	1.1586	0.0011	0.0530	0.1228	0.4124	1.0939	0.0011	0.0502
Crane 50-ton	200	0.1361	0.4584	1.1567	0.0010	0.0571	0.1289	0.4491	1.0934	0.0010	0.0543	0.1222	0.4408	1.0325	0.0010	0.0516
Crane 150-ton	250	0.1392	0.3881	1.3867	0.0013	0.0535	0.1314	0.3664	1.3105	0.0013	0.0501	0.1243	0.3464	1.2372	0.0013	0.0470
Compactor	80	0.1406	0.3743	0.5138	0.0005	0.0486	0.1322	0.3671	0.4932	0.0005	0.0464	0.1240	0.3601	0.4737	0.0005	0.0442
Compressor	75	0.1210	0.3078	0.3893	0.0004	0.0388	0.1165	0.3048	0.3786	0.0004	0.0378	0.1110	0.3005	0.3668	0.0004	0.0365
Ditch Digger	75	0.1897	0.4702	0.5945	0.0005	0.0580	0.1808	0.4617	0.5754	0.0005	0.0559	0.1720	0.4534	0.5571	0.0005	0.0538
Driller	305	0.1167	0.3970	1.5841	0.0023	0.0460	0.1114	0.3944	1.4291	0.0023	0.0446	0.1074	0.3924	1.2992	0.0023	0.0435
Forklift	75	0.0802	0.2122	0.2479	0.0003	0.0267	0.0723	0.2046	0.2348	0.0003	0.0248	0.0643	0.1973	0.2233	0.0003	0.0227
Forklift 5-ton	75	0.0802	0.2122	0.2479	0.0003	0.0267	0.0723	0.2046	0.2348	0.0003	0.0248	0.0643	0.1973	0.2233	0.0003	0.0227
Foreman Truck	180	0.1953	0.7478	1.5035	0.0014	0.0853	0.1834	0.7438	1.3989	0.0014	0.0804	0.1725	0.7404	1.3019	0.0014	0.0758
Generator	120	0.1558	0.5141	0.9918	0.0009	0.0767	0.1479	0.5099	0.9509	0.0009	0.0742	0.1395	0.5054	0.9075	0.0009	0.0714
Graders	350	0.2123	0.6821	2.1695	0.0021	0.0813	0.2014	0.6360	2.0417	0.0021	0.0764	0.1916	0.5970	1.9222	0.0021	0.0720
Motor grader	110	0.1757	0.5331	0.9354	0.0008	0.0864	0.1641	0.5258	0.8846	0.0008	0.0819	0.1531	0.5191	0.8367	0.0008	0.0774
Horizontal directional drill	225	0.1104	0.4848	1.3559	0.0019	0.0468	0.1017	0.4833	1.2146	0.0019	0.0440	0.0948	0.4821	1.0947	0.0019	0.0417
Loader - 980	350	0.1855	0.2520	2.6904	0.0030	0.0549	0.2000	0.6138	2.1682	0.0027	0.0749	0.1903	0.5820	2.0193	0.0027	0.0706
manlifts	75	0.0802	0.2122	0.2479	0.0003	0.0267	0.0723	0.2046	0.2348	0.0003	0.0248	0.0643	0.1973	0.2233	0.0003	0.0227
Paving machine	200	0.2399	0.8003	2.0371	0.0017	0.1007	0.2283	0.7815	1.9396	0.0017	0.0963	0.2175	0.7643	1.8464	0.0017	0.0920
Road Grader	350	0.2123	0.6821	2.1695	0.0021	0.0813	0.2014	0.6360	2.0417	0.0021	0.0764	0.1916	0.5970	1.9222	0.0021	0.0720
Roller/Compactor	145	0.1495	0.5214	1.0580	0.0009	0.0709	0.1408	0.5168	1.0021	0.0009	0.0679	0.1327	0.5128	0.9492	0.0009	0.0649
Single Drum Puller	310	0.1600	0.6403	1.6153	0.0017	0.0674	0.1489	0.6169	1.5047	0.0017	0.0635	0.1391	0.5970	1.4037	0.0017	0.0599
3 Drum Puller	310	0.1600	0.6403	1.6153	0.0017	0.0674	0.1489	0.6169	1.5047	0.0017	0.0635	0.1391	0.5970	1.4037	0.0017	0.0599
Tractors	85	0.1310	0.3767	0.4866	0.0005	0.0478	0.1193	0.3673	0.4618	0.0005	0.0446	0.1083	0.3511	0.1840	0.0003	0.0210
D-6 Cat	200	0.2185	0.7276	1.8198	0.0015	0.0918	0.2078	0.7121	1.7249	0.0015	0.0874	0.1978	0.6979	1.6339	0.0015	0.0832
Track Type Dozer	350	0.2628	0.9436	2.5113	0.0021	0.1017	0.2507	0.8799	2.3806	0.0021	0.0962	0.2396	0.8218	2.2566	0.0021	0.0911
Tensioner	135	0.1512	0.5645	1.0312	0.0010	0.0778	0.1391	0.5595	0.9629	0.0010	0.0731	0.1279	0.5550	0.8997	0.0010	0.0686
truck crane (150' Lift Truck)	215	0.1429	0.6072	1.2844	0.0014	0.0626	0.1326	0.5990	1.1959	0.0014	0.0592	0.1234	0.5921	1.1145	0.0014	0.0559

### USEPA Phase II Engine Base Emission Factors (EPA420-R-05-019)

Small Engines Generators/Pumps (gas)	5	All Years	0.0338	1.9354	0.0101	0.0001	0.0003
--------------------------------------	---	-----------	--------	--------	--------	--------	--------

### 2008 Emission Calculations

#### El Casco Substation Phase I

Grading	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Compactor	80	2	0.1406	0.3743	0.5138	0.0005	0.0486	6	1.69	4.49	6.17	0.01	0.58	20	33.73	89.84	123.31	0.12	11.66
Graders	350	2	0.2123	0.6821	2.1695	0.0021	0.0813	6	2.55	8.18	26.03	0.02	0.98	20	50.96	163.69	520.69	0.50	19.50
Loader - 980	350	2	0.1855	0.2520	2.6904	0.0030	0.0549	6	2.23	3.02	32.29	0.04	0.66	20	44.52	60.48	645.71	0.72	13.18
									6.46	15.70	64.49	0.07	2.22		129.22	314.01	1289.70	1.33	44.34

## Offroad Equipment Emission Calculations - Alternative 2

### El Casco Substation Phase I

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	1	0.1348	0.4865	1.0647	0.0009	0.0585	4	0.54	1.95	4.26	0.00	0.23	15	8.09	29.19	63.88	0.06	3.51
Ditch Digger	75	3	0.1897	0.4702	0.5945	0.0005	0.0580	6	3.42	8.46	10.70	0.01	1.04	35	119.54	296.19	374.52	0.34	36.57
Driller	305	2	0.1167	0.3970	1.5841	0.0023	0.0460	6	1.40	4.76	19.01	0.03	0.55	30	42.02	142.93	570.27	0.84	16.56
Forklift	75	2	0.0802	0.2122	0.2479	0.0003	0.0267	4	0.64	1.70	1.98	0.00	0.21	45	28.87	76.38	89.24	0.09	9.62
Tractors	85	2	0.1310	0.3767	0.4866	0.0005	0.0478	6	1.57	4.52	5.84	0.01	0.57	45	70.73	203.42	262.77	0.27	25.84
									7.57	21.39	41.79	0.05	2.62		269.25	748.11	1360.67	1.60	92.09

### Mill Creek Tower

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Graders	350	2	0.2123	0.6821	2.1695	0.0021	0.0813	6	2.55	8.18	26.03	0.02	0.98	10	25.48	81.85	260.34	0.25	9.75
									2.55	8.18	26.03	0.02	0.98		25.48	81.85	260.34	0.25	9.75

### Mill Creek Tower

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Bore/Drill Rigs	225	1	0.1104	0.4848	1.3559	0.0019	0.0468	6	0.66	2.91	8.14	0.01	0.28	3	1.99	8.73	24.41	0.03	0.84
Graders	350	1	0.2123	0.6821	2.1695	0.0021	0.0813	2	0.42	1.36	4.34	0.00	0.16	3	1.27	4.09	13.02	0.01	0.49
									1.09	4.27	12.47	0.02	0.44		3.26	12.82	37.42	0.05	1.33

## 2009 Emission Calculations

### El Casco Substation Phase I

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	2	0.1279	0.4822	1.0066	0.0009	0.0559	6	1.53	5.79	12.08	0.01	0.67	140	214.85	810.16	1691.13	1.56	94.00
crane 150-ton	250	2	0.1314	0.3664	1.3105	0.0013	0.0501	6	1.58	4.40	15.73	0.02	0.60	40	63.07	175.86	629.03	0.61	24.06
forklift	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.43	1.23	1.41	0.00	0.15	120	52.03	147.34	169.07	0.18	17.82
Manlifts	75	4	0.0723	0.2046	0.2348	0.0003	0.0248	6	1.73	4.91	5.64	0.01	0.59	120	208.11	589.37	676.29	0.73	71.29
									5.28	16.32	34.85	0.03	2.02		538.06	1722.73	3165.52	3.07	207.16

### El Casco Substation Phase I

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 50-ton	200	2	0.1289	0.4491	1.0934	0.0010	0.0543	6	1.55	5.39	13.12	0.01	0.65	15	23.20	80.84	196.82	0.18	9.77
forklift	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.43	1.23	1.41	0.00	0.15	15	6.50	18.42	21.13	0.02	2.23
manlifts	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.43	1.23	1.41	0.00	0.15	20	8.67	24.56	28.18	0.03	2.97
									2.41	7.85	15.94	0.02	0.95	50	38.37	123.82	246.13	0.24	14.97

### El Casco Substation Phase I

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
manlifts	75	6	0.0723	0.2046	0.2348	0.0003	0.0248	6	2.60	7.37	8.45	0.01	0.89	40	104.05	294.69	338.14	0.36	35.64
									2.60	7.37	8.45	0.01	0.89	40	104.05	294.69	338.14	0.36	35.64

## Offroad Equipment Emission Calculations - Alternative 2

### El Casco Substation Phase II

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	1	0.1279	0.4822	1.0066	0.0009	0.0559	4	0.51	1.93	4.03	0.00	0.22	40	20.46	77.16	161.06	0.15	8.95
Drillers	305	1	0.1114	0.3944	1.4291	0.0023	0.0446	8	0.89	3.16	11.43	0.02	0.36	70	62.38	220.88	800.29	1.30	24.97
Ditch Digger	75	1	0.1808	0.4617	0.5754	0.0005	0.0559	6	1.08	2.77	3.45	0.00	0.34	75	81.37	207.78	258.92	0.25	25.15
Forklifts	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	4	0.29	0.82	0.94	0.00	0.10	90	26.01	73.67	84.54	0.09	8.91
Tractors	85	1	0.1193	0.3673	0.4618	0.0005	0.0446	6	0.72	2.20	2.77	0.00	0.27	90	64.44	198.36	249.38	0.27	24.06
									3.49	10.88	22.62	0.03	1.28	365	254.66	777.84	1554.18	2.06	92.04

### El Casco Substation Phase II

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	1	0.1279	0.4822	1.0066	0.0009	0.0559	6	0.77	2.89	6.04	0.01	0.34	30	23.02	86.80	181.19	0.17	10.07
Crane 150-ton	250	1	0.1314	0.3664	1.3105	0.0013	0.0501	6	0.79	2.20	7.86	0.01	0.30	20	15.77	43.96	157.26	0.15	6.01
Forklift	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.43	1.23	1.41	0.00	0.15	40	17.34	49.11	56.36	0.06	5.94
Manlifts	75	2	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.87	2.46	2.82	0.00	0.30	40	34.68	98.23	112.71	0.12	11.88
									2.86	8.78	18.13	0.02	1.08	130	90.81	278.11	507.52	0.50	33.91

### El Casco Substation Phase II

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 50-ton	200	2	0.1289	0.4491	1.0934	0.0010	0.0543	6	1.55	5.39	13.12	0.01	0.65	30	46.40	161.69	393.64	0.37	19.54
Forklift	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.43	1.23	1.41	0.00	0.15	45	19.51	55.25	63.40	0.07	6.68
Manlifts	75	2	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.87	2.46	2.82	0.00	0.30	40	34.68	98.23	112.71	0.12	11.88
									2.85	9.07	17.35	0.02	1.10	115	100.60	315.17	569.75	0.56	38.11

### El Casco Substation Phase II

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Manlifts	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.43	1.23	1.41	0.00	0.15	20	8.67	24.56	28.18	0.03	2.97
									0.43	1.23	1.41	0.00	0.15	20	8.67	24.56	28.18	0.03	2.97

### El Casco Substation Phase II

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Grader	350	2	0.2014	0.6360	2.0417	0.0021	0.0764	6	2.42	7.63	24.50	0.02	0.92	5	12.08	38.16	122.50	0.12	4.58
Paving Machine	200	1	0.2283	0.7815	1.9396	0.0017	0.0963	6	1.37	4.69	11.64	0.01	0.58	10	13.70	46.89	116.38	0.10	5.78
Roller/Compactor	145	1	0.1408	0.5168	1.0021	0.0009	0.0679	6	0.85	3.10	6.01	0.01	0.41	12	10.14	37.21	72.15	0.07	4.89
Tractors	85	2	0.1193	0.3673	0.4618	0.0005	0.0446	6	1.43	4.41	5.54	0.01	0.53	19	27.21	83.75	105.29	0.11	10.16
									6.06	19.83	47.69	0.05	2.44	46	63.13	206.01	416.33	0.41	25.41

### Banning Substation

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Tractors	85	2	0.1193	0.3673	0.4618	0.0005	0.0446	6	1.43	4.41	5.54	0.01	0.53	18	25.78	79.34	99.75	0.11	9.62
									1.43	4.41	5.54	0.01	0.53		25.78	79.34	99.75	0.11	9.62

## Offroad Equipment Emission Calculations - Alternative 2

### Banning Substation

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	1	0.1279	0.4822	1.0066	0.0009	0.0559	4	0.51	1.93	4.03	0.00	0.22	15	7.67	28.93	60.40	0.06	3.36
Drillers	305	2	0.1114	0.3944	1.4291	0.0023	0.0446	8	1.78	6.31	22.87	0.04	0.71	30	53.47	189.32	685.97	1.12	21.40
Ditch Digger	75	1	0.1808	0.4617	0.5754	0.0005	0.0559	6	1.08	2.77	3.45	0.00	0.34	35	37.97	96.96	120.83	0.11	11.74
Forklifts	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	4	0.29	0.82	0.94	0.00	0.10	45	13.01	36.84	42.27	0.05	4.46
Tractors	85	2	0.1193	0.3673	0.4618	0.0005	0.0446	6	1.43	4.41	5.54	0.01	0.53	45	64.44	198.36	249.38	0.27	24.06
									5.10	16.24	36.83	0.05	1.91		176.56	550.41	1158.84	1.60	65.01

### Banning Substation

Electrical Element	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	2	0.1279	0.4822	1.0066	0.0009	0.0559	6	1.53	5.79	12.08	0.01	0.67	150	230.20	868.03	1811.92	1.67	100.71
Crane 150-ton	250	2	0.1314	0.3664	1.3105	0.0013	0.0501	6	1.58	4.40	15.73	0.02	0.60	35	55.18	153.87	550.40	0.53	21.05
Forklift	75	1	0.0723	0.2046	0.2348	0.0003	0.0248	6	0.43	1.23	1.41	0.00	0.15	100	43.36	122.79	140.89	0.15	14.85
Manlifts	75	4	0.0723	0.2046	0.2348	0.0003	0.0248	6	1.73	4.91	5.64	0.01	0.59	150	260.14	736.71	845.36	0.91	89.11
									5.28	16.32	34.85	0.03	2.02	435	588.88	1881.40	3348.57	3.26	225.72

### Zanja Substation

Grading	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Tractors	85	2	0.1193	0.3673	0.4618	0.0005	0.0446	6	1.43	4.41	5.54	0.01	0.53	5	7.16	22.04	27.71	0.03	2.67
									1.43	4.41	5.54	0.01	0.53	5	7.16	22.04	27.71	0.03	2.67

### Zanja Substation

Civil	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	1	0.1279	0.4822	1.0066	0.0009	0.0559	4	0.51	1.93	4.03	0.00	0.22	15	7.67	28.93	60.40	0.06	3.36
Drillers	305	2	0.1114	0.3944	1.4291	0.0023	0.0446	8	1.78	6.31	22.87	0.04	0.71	30	53.47	189.32	685.97	1.12	21.40
Ditch Digger	75	1	0.1808	0.4617	0.5754	0.0005	0.0559	6	1.08	2.77	3.45	0.00	0.34	15	16.27	41.56	51.78	0.05	5.03
Forklifts	75	2	0.0723	0.2046	0.2348	0.0003	0.0248	4	0.58	1.64	1.88	0.00	0.20	30	17.34	49.11	56.36	0.06	5.94
Tractors	85	2	0.1193	0.3673	0.4618	0.0005	0.0446	6	1.43	4.41	5.54	0.01	0.53	25	35.80	110.20	138.54	0.15	13.37
									5.39	17.06	37.76	0.05	2.01		130.56	419.13	993.05	1.43	49.10

### 115 kV Phase I

Road Grading	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Road Grader	350	1	0.2014	0.6360	2.0417	0.0021	0.0764	6	1.21	3.82	12.25	0.01	0.46	2	2.42	7.63	24.50	0.02	0.92
Track Type Dozer	350	1	0.2507	0.8799	2.3806	0.0021	0.0962	6	1.50	5.28	14.28	0.01	0.58	1	1.50	5.28	14.28	0.01	0.58
Backhoe	85	1	0.1193	0.3673	0.4618	0.0005	0.0446	6	0.72	2.20	2.77	0.00	0.27	2	1.43	4.41	5.54	0.01	0.53
									3.43	11.30	29.31	0.03	1.30		5.35	17.32	44.33	0.04	2.03

### 115 kV Phase I and II

Pole Framing and Setting	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Driller	305	1	0.1114	0.3944	1.4291	0.0023	0.0446	6	0.67	2.37	8.57	0.01	0.27	9	6.02	21.30	77.17	0.13	2.41
									0.67	2.37	8.57	0.01	0.27		6.02	21.30	77.17	0.13	2.41

## Offroad Equipment Emission Calculations - Alternative 2

### 115 kV Phase I

#### Conductor Installation

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Single Drum Puller	310	2	0.1489	0.6169	1.5047	0.0017	0.0635	4	1.19	4.94	12.04	0.01	0.51	4	4.77	19.74	48.15	0.06	2.03
									1.19	4.94	12.04	0.01	0.51		4.77	19.74	48.15	0.06	2.03

### 220 kV

#### Receiving and Loadout

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 50-ton	200	1	0.1289	0.4491	1.0934	0.0010	0.0543	6	0.77	2.69	6.56	0.01	0.33	10	7.73	26.95	65.61	0.06	3.26
Loader - 980	350	1	0.2000	0.6138	2.1682	0.0027	0.0749	6	1.20	3.68	13.01	0.02	0.45	10	12.00	36.83	130.09	0.16	4.50
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	10	4.34	12.28	14.09	0.02	1.49
									2.41	7.61	20.98	0.02	0.92		24.07	76.05	209.79	0.24	9.24

### 220 kV

#### Road Grading

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
D-6 Cat	200	1	0.2078	0.7121	1.7249	0.0015	0.0874	6	1.25	4.27	10.35	0.01	0.52	5	6.23	21.36	51.75	0.05	2.62
Motor Grader	350	1	0.2123	0.6821	2.1695	0.0021	0.0813	6	1.27	4.09	13.02	0.01	0.49	5	6.37	20.46	65.09	0.06	2.44
									2.52	8.36	23.37	0.02	1.01		12.60	41.82	116.83	0.11	5.06

### 220 kV

#### Foundations

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Driller	305	1	0.1114	0.3944	1.4291	0.0023	0.0446	6	0.67	2.37	8.57	0.01	0.27	10	6.68	23.67	85.75	0.14	2.68
backhoe	85	1	0.1193	0.3673	0.4618	0.0005	0.0446	6	0.72	2.20	2.77	0.00	0.27	10	7.16	22.04	27.71	0.03	2.67
									1.38	4.57	11.35	0.02	0.53		13.84	45.70	113.45	0.17	5.35

### 220 kV

#### Steel Assembly

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 150-ton	250	1	0.1314	0.3664	1.3105	0.0013	0.0501	6	0.79	2.20	7.86	0.01	0.30	40	31.53	87.93	314.52	0.30	12.03
Compressor	75	1	0.1165	0.3048	0.3786	0.0004	0.0378	6	0.70	1.83	2.27	0.00	0.23	40	27.96	73.16	90.87	0.09	9.06
									1.49	4.03	10.13	0.01	0.53		59.50	161.09	405.39	0.39	21.09

### Mill Creek Tower

#### Dig Foundations

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Bore/Drill Rigs	225	1	0.1017	0.4833	1.2146	0.0019	0.0440	6	0.61	2.90	7.29	0.01	0.26	2	1.22	5.80	14.57	0.02	0.53
motor grader	110	1	0.1641	0.5258	0.8846	0.0008	0.0819	2	0.33	1.05	1.77	0.00	0.16	2	0.66	2.10	3.54	0.00	0.33
									0.94	3.95	9.06	0.01	0.43		1.88	7.90	18.11	0.03	0.86

### Erect Tower

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 150'	215	1	0.1296	0.4243	1.1586	0.0011	0.0530	6	0.78	2.55	6.95	0.01	0.32	5	3.89	12.73	34.76	0.03	1.59
Lift Truck 150'	215	1	0.1326	0.5990	1.1959	0.0014	0.0592	6	0.80	3.59	7.18	0.01	0.35	5	3.98	17.97	35.88	0.04	1.77
									1.57	6.14	14.13	0.01	0.67		7.87	30.70	70.63	0.07	3.37



## Offroad Equipment Emission Calculations - Alternative 2

			SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
	HP	Number	ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Directional Drilling																			
Backhoe	85	1	0.1193	0.3673	0.4618	0.0005	0.0446	6	0.72	2.20	2.77	0.00	0.27	15	10.74	33.06	41.56	0.04	4.01
Horizontal Directional Drill	225	1	0.1017	0.4833	1.2146	0.0019	0.0440	6	0.61	2.90	7.29	0.01	0.26	15	9.15	43.50	109.31	0.17	3.96
									1.33	5.10	10.06	0.01	0.53		19.89	76.56	150.87	0.22	7.97

			SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
	HP	Number	ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
115 KV Undergrounding																			
Substructure Installation																			
Backhoe	85	2	0.1193	0.4785	0.4618	0.0005	0.0446	6	1.43	4.41	5.54	0.01	0.53	98	140.33	431.97	543.09	0.59	52.40
Auger Machine	75	1	0.1808	0.4617	0.5754	0.0005	0.0559	6	1.08	2.77	3.45	0.00	0.34	98	106.32	271.50	338.32	0.32	32.87
									2.52	7.18	8.99	0.01	0.87		246.65	703.47	881.41	0.91	85.26

## 2010 Emission Calculations

			SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
	HP	Number	ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
El Casco Substation Phase II																			
Electrical Element																			
Crane 14-ton	180	1	0.1213	0.4785	0.9507	0.0009	0.0534	6	0.73	2.87	5.70	0.01	0.32	60	43.67	172.27	342.24	0.33	19.22
Crane 150-ton	250	1	0.1243	0.3464	1.2372	0.0013	0.0470	6	0.75	2.08	7.42	0.01	0.28	40	29.83	83.13	296.93	0.30	11.28
Forklift	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.39	1.18	1.34	0.00	0.14	80	30.86	94.73	107.18	0.12	10.89
Manlifts	75	2	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.77	2.37	2.68	0.00	0.27	80	61.72	189.45	214.35	0.24	21.77
									2.63	8.50	17.15	0.02	1.01		166.08	539.57	960.70	1.00	63.16

			SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
	HP	Number	ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
El Casco Substation Phase II																			
Maintenance																			
Manlifts	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.39	1.18	1.34	0.00	0.14	10	3.86	11.84	13.40	0.02	1.36
									0.39	1.18	1.34	0.00	0.14		3.86	11.84	13.40	0.02	1.36

			SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
	HP	Number	ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Banning Substation																			
Electrical Element																			
Crane 14-ton	180	2	0.1213	0.4785	0.9507	0.0009	0.0534	6	1.46	5.74	11.41	0.01	0.64	30	43.67	172.27	342.24	0.33	19.22
Crane 150-ton	250	2	0.1243	0.3464	1.2372	0.0013	0.0470	6	1.49	4.16	14.85	0.02	0.56	5	7.46	20.78	74.23	0.08	2.82
Forklift	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.39	1.18	1.34	0.00	0.14	20	7.72	23.68	26.79	0.03	2.72
Manlifts	75	4	0.0643	0.1973	0.2233	0.0003	0.0227	6	1.54	4.74	5.36	0.01	0.54	30	46.29	142.09	160.77	0.18	16.33
									4.88	15.82	32.95	0.03	1.88		105.13	358.82	604.03	0.62	41.09

			SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
	HP	Number	ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Banning Substation																			
Transformer Assembly																			
Crane 50-ton	200	2	0.1243	0.3464	1.2372	0.0013	0.0470	6	1.49	4.16	14.85	0.02	0.56	15	22.37	62.35	222.70	0.23	8.46
Forklift	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.39	1.18	1.34	0.00	0.14	15	5.79	17.76	20.10	0.02	2.04
Manlifts	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.39	1.18	1.34	0.00	0.14	20	7.72	23.68	26.79	0.03	2.72
									2.26	6.52	17.53	0.02	0.84		35.87	103.79	269.59	0.28	13.22

## Offroad Equipment Emission Calculations - Alternative 2

### Banning Substation Maintenance

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Manlifts	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.39	1.18	1.34	0.00	0.14	40	15.43	47.36	53.59	0.06	5.44
									0.39	1.18	1.34	0.00	0.14	40	15.43	47.36	53.59	0.06	5.44

### Zanja Substation Electrical Element

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Crane 14-ton	180	2	0.1213	0.4785	0.9507	0.0009	0.0534	6	1.46	5.74	11.41	0.01	0.64	60	87.34	344.54	684.47	0.67	38.44
Crane 150-ton	250	2	0.1243	0.3464	1.2372	0.0013	0.0470	6	1.49	4.16	14.85	0.02	0.56	40	59.66	166.26	593.87	0.61	22.55
Forklift	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.39	1.18	1.34	0.00	0.14	60	23.15	71.04	80.38	0.09	8.17
Manlifts	75	4	0.0643	0.1973	0.2233	0.0003	0.0227	6	1.54	4.74	5.36	0.01	0.54	70	108.02	331.54	375.12	0.42	38.10
									4.88	15.82	32.95	0.03	1.88		278.16	913.38	1733.84	1.79	107.26

### Zanja Substation Maintenance

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Manlifts	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	6	0.39	1.18	1.34	0.00	0.14	10	3.86	11.84	13.40	0.02	1.36
									0.39	1.18	1.34	0.00	0.14		3.86	11.84	13.40	0.02	1.36

### 115 kV Phase II Pole Framing and Setting

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Driller	305	1	0.1074	0.3924	1.2992	0.0023	0.0435	6	0.64	2.35	7.80	0.01	0.26	22	14.17	51.79	171.50	0.31	5.74
									0.64	2.35	7.80	0.01	0.26		14.17	51.79	171.50	0.31	5.74

### 115 kV Phase II Conductor Installation

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Single Drum Puller	310	2	0.1391	0.5970	1.4037	0.0017	0.0599	4	1.11	4.78	11.23	0.01	0.48	34	37.84	162.38	381.81	0.47	16.29
									1.11	4.78	11.23	0.01	0.48		37.84	162.38	381.81	0.47	16.29

### 220 kV Conductor Installation

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Tensioner	135	1	0.1279	0.5550	0.8997	0.0010	0.0686	6	0.77	3.33	5.40	0.01	0.41	15	11.51	49.95	80.98	0.09	6.18
3 Drum Puller	310	1	0.1391	0.5970	1.4037	0.0017	0.0599	6	0.83	3.58	8.42	0.01	0.36	15	12.52	53.73	126.33	0.16	5.39
Single Drum Puller	310	1	0.1391	0.5970	1.4037	0.0017	0.0599	6	0.83	3.58	8.42	0.01	0.36	15	12.52	53.73	126.33	0.16	5.39
50-Ton Crane	200	1	0.1222	0.4408	1.0325	0.0010	0.0516	6	0.73	2.64	6.20	0.01	0.31	15	10.99	39.67	92.93	0.09	4.64
Sagger Dozer	350	1	0.2396	0.8218	2.2566	0.0021	0.0911	6	1.44	4.93	13.54	0.01	0.55	15	21.56	73.97	203.10	0.19	8.20
Small Engines Generators/Pumps (gas)	15	3	0.0338	1.9354	0.0101	0.0001	0.0003	6	0.61	34.84	0.18	0.00	0.01	15	9.12	522.57	2.72	0.02	0.09
									5.22	52.91	42.16	0.05	1.99		78.23	793.62	632.39	0.70	29.89

### Fiber Optics Cable Construction

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Single Drum Puller	250	1	0.1391	0.5970	1.4037	0.0017	0.0599	6	0.83	3.58	8.42	0.01	0.36	100	83.48	358.20	842.23	1.04	35.94
									0.83	3.58	8.42	0.01	0.36		83.48	358.20	842.23	1.04	35.94

## Offroad Equipment Emission Calculations - Alternative 2

### Fiber Optics

#### Receive and Loadout

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Forklift 5-ton	75	1	0.0643	0.1973	0.2233	0.0003	0.0227	2	0.13	0.39	0.45	0.00	0.05	15	1.93	5.92	6.70	0.01	0.68
									0.13	0.39	0.45	0.00	0.05		1.93	5.92	6.70	0.01	0.68

### 115 KV Undergrounding

#### Substructure Installation

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Backhoe	85	2	0.1083	0.3586	0.4389	0.0005	0.0414	6	1.30	4.30	5.27	0.01	0.50	32	41.59	137.70	168.54	0.19	15.88
Auger Machine	75	1	0.1720	0.4534	0.5571	0.0005	0.0538	6	1.03	2.72	3.34	0.00	0.32	32	33.02	87.06	106.96	0.10	10.32
									2.33	7.02	8.61	0.01	0.82		74.62	224.76	275.50	0.30	26.20

### 115 KV Undergrounding

#### Steel Riser Installation

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
80 Ton Crane	200	1	0.1222	0.4408	1.0325	0.0010	0.0516	6	0.73	2.64	6.20	0.01	0.31	10	7.33	26.45	61.95	0.06	3.09
									0.73	2.64	6.20	0.01	0.31		7.33	26.45	61.95	0.06	3.09

### 115 KV Undergrounding

#### Cable Pulling

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Cable Pulling Machine	310	1	0.1397	0.5970	1.4037	0.0017	0.0599	6	0.83	3.58	8.42	0.01	0.36	50	41.74	179.10	421.11	0.52	17.97
									0.83	3.58	8.42	0.01	0.36		41.74	179.10	421.11	0.52	17.97

### 115 KV Undergrounding

#### Vault Splicing

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Generator	120	1	0.1395	0.5054	0.9075	0.0009	0.0714	24	3.35	12.13	21.78	0.02	1.71	40	133.89	485.23	871.23	0.88	68.56
									3.35	12.13	21.78	0.02	1.71		133.89	485.23	871.23	0.88	68.56

### 115 KV Undergrounding

#### Clean-up and Restoration

	HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Annual Emissions lbs				
			ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM		ROG	CO	NOX	SOX	PM
Roller Compactor	145	1	0.1327	0.5128	0.9492	0.0009	0.0649	8	1.06	4.10	7.59	0.01	0.52	10	10.61	41.03	75.93	0.07	5.19
									1.06	4.10	7.59	0.01	0.52		10.61	41.03	75.93	0.07	5.19

Maximum regional daily emissions assume overlap in November 2009 of El Casco Substation 1) Civil,

2) electrical, 3) transformer assembly, 4) asphalt, landscaping and drainage, 5) Banning Substation electrical,

6) Zanja Substation electrical, 7) 220 kV steel assembly, and 8) 115 kV Undergrounding substructure installation.

	Project Emissions					
	ROG	CO	NOX	SOX	PM	PM2.5
Maximum lbs/day	25.98	80.49	165.31	0.17	9.85	9.06
Total Tons	1.89	6.21	11.61	0.01	0.71	0.65
2008 Tons	0.21	0.58	1.47	0.00	0.07	0.07
2009 Tons	1.26	3.95	7.29	0.01	0.47	0.44
2010 Tons	0.55	2.16	3.69	0.00	0.22	0.00

# Fugitive Dust Emissions - Proposed Project

## 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)

$$E = k \times (s)^{1.5} / (M)^{1.4} \text{ For PM10 and } k \times 5.7 \times (s)^{1.2} / (M)^{1.3} \text{ for PM2.5}$$

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

0.43882174 lb/hr

PM2.5 Emission Factor

0.25754057 lb/hr

Maximum Daily Dozer Use

30 hrs/day

Total Dozer Use

540 hrs/year	2008
1920 hrs/year	2009
0 hrs/year	2010

Dozer Emissions

Lbs/Day		Tons/year - 2008		Tons/year - 2009		Tons/year - 2010	
PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
13.16	7.73	0.12	0.07	0.42	0.25	0.00	0.00

B) Grading

$$E = k \times 0.051 \times (S)^{2.0} \text{ for PM10 and } k \times 0.040 \times (S)^{2.5} \text{ for PM2.5}$$

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

0.01932969 lb/VMT

## Fugitive Dust Emissions - Proposed Project

Maximum Daily Grader VMT  
36 VMT/day

Annual Grader VMT  
1098 VMT/year                      2008  
321 VMT/year                        2009  
0 VMT/year                            2010

### Grading Emissions

Lbs/Day		Tons/year - 2008		Tons/year - 2009		Tons/year - 2010	
PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
9.91	0.70	0.15	0.01	0.04	0.00	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 = 19.0 MPH worst day, 7.3 MPH avg from 1981 Banning Met File

M = moisture content = 10% (mitigated)

Three separate drops are assumed

0 Maximum daily tons	
23100 Annual tons	2008
3300 Annual tons	2009
0 Annual tons	2010

### Emission Factors and Emissions

Emission Factors				Emissions lbs/day	
PM10 Daily	PM2.5 Daily	PM10 Annual	PM2.5 Annual	PM10	PM2.5
0.00067	0.00021	0.00019	0.00006	0.00	0.00

Emissions tons/year - 2008		Emissions tons/year - 2009		Emissions tons/year - 2010	
PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
0.00	0.00	0.00	0.00	0.00	0.00

## 2) Road Dust

Emission Types

A) Paved Road Dust

B) Unpaved Road Dust

A) Paved Road Dust

$$E = [k \times (sL/2)0.65 \times (W/3)^{1.5} - C] \times (1-P/4N)$$

E = lb/VMT

k = Constant (0.016 for PM10 and 0.0040 for PM2.5)

sL = Silt Loading (assumed to be 0.06 g/m<sup>2</sup> - 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

# Fugitive Dust Emissions - Proposed Project

## Average Vehicle Weight Calculation

### Assumptions

Passenger Vehicles = 2 tons average

Midsized "Delivery" Vehicles = 8 ton average

Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

### Worst Case Day VMT

2540 Passenger Vehicles

743 Delivery/Work Vehicles

731 Heavy-Heavy Duty Vehicles

4014 Total Paved VMT (2009)

Average Weight = 8.2 Tons

### Annual Case VMT 2008

39426.25 Passenger Vehicles

9721 Delivery/Work Vehicles

8783.75 Heavy-Heavy Duty Vehicles

57931 Total Paved VMT

### Annual Case VMT 2009

327709.75 Passenger Vehicles

104182.7 Delivery/Work Vehicles

56412.6 Heavy-Heavy Duty Vehicles

488305 Total Paved VMT

### Annual Case VMT 2009

250605 Passenger Vehicles

68974.6 Delivery/Work Vehicles

27779.6 Heavy-Heavy Duty Vehicles

347359 Total Paved VMT

Average Weight = 7.3 Tons - 2008

6.5 Tons - 2009

5.4 Tons - 2010

## Emission Factors and Emissions

### Emission Factors

PM10 Daily	PM2.5 Daily	PM10 Annual	PM2.5 Annual	Emissions lbs/day		
0.0069	0.0015	0.0057	0.0012	2008	PM10	PM2.5
		0.0048	0.0010	2009	27.87	5.99
		0.0035	0.0006	2009		

### Emissions tons/year - 2008

PM10

0.16

PM2.5

0.03

### Emissions tons/year - 2009

PM10

1.16

PM2.5

0.23

### Emissions tons/year - 2010

PM10

0.61

PM2.5

0.11

## B) Unpaved Road Dust

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

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 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

Midsized "Delivery" Vehicles = 8 ton average

Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

# Fugitive Dust Emissions - Proposed Project

## Worst Case Day VMT

28.8421053 Passenger Vehicles  
 74.9842105 Delivery/Work Vehicles  
 42.4315789 Heavy-Heavy Duty Vehicles  
 146.257895 Total Unpaved VMT

Average Weight = 13.3 Tons

## Annual Case VMT 2008

704 Passenger Vehicles  
 1867 Delivery/Work Vehicles  
 6344 Heavy-Heavy Duty Vehicles  
 8914 Total Unpaved VMT

## Annual Case VMT 2009

4750 Passenger Vehicles  
 11760 Delivery/Work Vehicles  
 7555 Heavy-Heavy Duty Vehicles  
 24065 Total Unpaved VMT

## Annual Case VMT 2010

4915 Passenger Vehicles  
 3715 Delivery/Work Vehicles  
 2600 Heavy-Heavy Duty Vehicles  
 11231 Total Unpaved VMT

Average Weight = 23.2 Tons - 2008  
 13.7 Tons - 2009  
 10.5 Tons - 2010

## Uncontrolled Emission Factors and Emissions

Emission Factors (lb/VMT)				Emissions lbs/day	
PM10 Daily	PM2.5 Daily	PM10 Annual	PM2.5 Annual	PM10	PM2.5
2.93	0.45	3.76	0.58	428.75	65.74
		2.97	0.46		
		2.63	0.40		

Emissions tons/year - 2008		Emissions tons/year - 2009		Emissions tons/year - 2010	
PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
16.78	2.57	35.78	5.49	14.78	2.27

Controlled Emissions (assumes 70% efficiency with minimum 3x daily watering of unpaved roads)

Emissions lbs/day		Emission Control
PM10	PM2.5	70%
128.63	19.72	

Emissions tons/year - 2008		Emissions tons/year - 2009		Emissions tons/year - 2010	
PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
5.03	0.77	10.73	1.65	4.43	0.68

Fugitive Dust Emission Totals	Maximum Day		2008		2009		2009	
	PM10 lb/day	PM2.5 lb/day	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
Dozer	13.16	7.73	0.12	0.07	0.42	0.25	0.00	0.00
Grading	9.91	0.70	0.15	0.01	0.04	0.00	0.00	0.00
Soil Handling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paved Road Dust	27.87	5.99	0.16	0.03	1.16	0.23	0.61	0.11
Unpaved Road Dust	128.63	19.72	5.03	0.77	10.73	1.65	4.43	0.68
Totals	179.58	34.14	5.47	0.89	12.36	2.13	5.05	0.79

# Fugitive Dust Emissions - Alternative 1

## 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)

$$E = k \times (s)^{1.5} / (M)^{1.4} \text{ For PM10 and } k \times 5.7 \times (s)^{1.2} / (M)^{1.3} \text{ for PM2.5}$$

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

0.43882174 lb/hr

PM2.5 Emission Factor

0.25754057 lb/hr

Maximum Daily Dozer Use

30 hrs/day

Total Dozer Use

540 hrs/year	2008
1920 hrs/year	2009
0 hrs/year	2010

Dozer Emissions

Lbs/Day		Tons/year - 2008		Tons/year - 2009		Tons/year - 2010	
PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
13.16	7.73	0.12	0.07	0.42	0.25	0.00	0.00

B) Grading

$$E = k \times 0.051 \times (S)^{2.0} \text{ for PM10 and } k \times 0.040 \times (S)^{2.5} \text{ for PM2.5}$$

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

0.01932969 lb/VMT



# Fugitive Dust Emissions - Alternative 1

Maximum Daily Grader VMT  
36 VMT/day

Annual Grader VMT  
1098 VMT/year            2008  
321 VMT/year            2009  
0 VMT/year                2010

## Grading Emissions

Lbs/Day		Tons/year - 2008		Tons/year - 2009		Tons/year - 2010	
PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
9.91	0.70	0.15	0.01	0.04	0.00	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 = 19.0 MPH worst day, 7.3 MPH avg from 1981 Banning Met File

M = moisture content = 10% (mitigated)

Three separate drops are assumed

0 Maximum daily tons  
23100 Annual tons            2008  
3300 Annual tons            2009  
0 Annual tons                2010

## Emission Factors and Emissions

Emission Factors				Emissions lbs/day	
PM10 Daily	PM2.5 Daily	PM10 Annual	PM2.5 Annual	PM10	PM2.5
0.00067	0.00021	0.00019	0.00006	0.00	0.00

Emissions tons/year - 2008		Emissions tons/year - 2009		Emissions tons/year - 2010	
PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
0.00	0.00	0.00	0.00	0.00	0.00

## 2) Road Dust

Emission Types

A) Paved Road Dust

B) Unpaved Road Dust

A) Paved Road Dust

$$E = [k \times (sL/2)0.65 \times (W/3)^{1.5} - C] \times (1-P/4N)$$

E = lb/VMT

k = Constant (0.016 for PM10 and 0.0040 for PM2.5)

sL = Silt Loading (assumed to be 0.06 g/m<sup>2</sup> - 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

# Fugitive Dust Emissions - Alternative 1

## Average Vehicle Weight Calculation

### Assumptions

Passenger Vehicles = 2 tons average

Midsized "Delivery" Vehicles = 8 ton average

Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

### Worst Case Day VMT

3273 Passenger Vehicles

805 Delivery/Work Vehicles

754 Heavy-Heavy Duty Vehicles

4833 Total Paved VMT (2009)

Average Weight = 7.4 Tons

### Annual Case VMT 2008

39426.25 Passenger Vehicles

9721 Delivery/Work Vehicles

8783.75 Heavy-Heavy Duty Vehicles

57931 Total Paved VMT

### Annual Case VMT 2009

388899.55 Passenger Vehicles

109064.2 Delivery/Work Vehicles

77257.1 Heavy-Heavy Duty Vehicles

575221 Total Paved VMT

### Annual Case VMT 2009

246793.8 Passenger Vehicles

66989.6 Delivery/Work Vehicles

24523.85 Heavy-Heavy Duty Vehicles

338307 Total Paved VMT

Average Weight = 7.3 Tons - 2008

6.9 Tons - 2009

5.2 Tons - 2010

## Emission Factors and Emissions

### Emission Factors

PM10 Daily	PM2.5 Daily	PM10 Annual	PM2.5 Annual	Emissions lbs/day		
0.0058	0.0012	0.0057	0.0012	2008	PM10	PM2.5
		0.0052	0.0011	2009	28.20	5.88
		0.0033	0.0006	2009		

### Emissions tons/year - 2008

PM10

0.16

PM2.5

0.03

### Emissions tons/year - 2009

PM10

1.51

PM2.5

0.31

### Emissions tons/year - 2010

PM10

0.56

PM2.5

0.10

## B) Unpaved Road Dust

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

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 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

Midsized "Delivery" Vehicles = 8 ton average

Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

# Fugitive Dust Emissions - Alternative 1

## Worst Case Day VMT

46.7263158 Passenger Vehicles  
 77.5894737 Delivery/Work Vehicles  
 52.3789474 Heavy-Heavy Duty Vehicles  
 176.694737 Total Unpaved VMT

Average Weight = 13.1 Tons

## Annual Case VMT 2008

704 Passenger Vehicles  
 1867 Delivery/Work Vehicles  
 6344 Heavy-Heavy Duty Vehicles  
 8914 Total Unpaved VMT

## Annual Case VMT 2009

6140 Passenger Vehicles  
 11948 Delivery/Work Vehicles  
 8720 Heavy-Heavy Duty Vehicles  
 26809 Total Unpaved VMT

## Annual Case VMT 2010

3726 Passenger Vehicles  
 3540 Delivery/Work Vehicles  
 1566 Heavy-Heavy Duty Vehicles  
 8833 Total Unpaved VMT

Average Weight = 23.2 Tons - 2008  
 13.8 Tons - 2009  
 9.4 Tons - 2010

## Uncontrolled Emission Factors and Emissions

Emission Factors (lb/VMT)				Emissions lbs/day	
PM10 Daily	PM2.5 Daily	PM10 Annual	PM2.5 Annual	PM10	PM2.5
2.91	0.45	3.76	0.58	513.92	78.80
		2.98	0.46		
		2.50	0.38		

Emissions tons/year - 2008		Emissions tons/year - 2009		Emissions tons/year - 2010	
PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
16.78	2.57	39.93	6.12	11.06	1.70

Controlled Emissions (assumes 70% efficiency with minimum 3x daily watering of unpaved roads)

Emissions lbs/day		Emission Control
PM10	PM2.5	70%
154.17	23.64	

Emissions tons/year - 2008		Emissions tons/year - 2009		Emissions tons/year - 2010	
PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
5.03	0.77	11.98	1.84	3.32	0.51

Fugitive Dust Emission Totals	Maximum Day		2008		2009		2009	
	PM10 lb/day	PM2.5 lb/day	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
Dozer	13.16	7.73	0.12	0.07	0.42	0.25	0.00	0.00
Grading	9.91	0.70	0.15	0.01	0.04	0.00	0.00	0.00
Soil Handling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paved Road Dust	28.20	5.88	0.16	0.03	1.51	0.31	0.56	0.10
Unpaved Road Dust	154.17	23.64	5.03	0.77	11.98	1.84	3.32	0.51
Totals	205.45	37.94	5.47	0.89	13.95	2.39	3.87	0.61

## Fugitive Dust Emissions - Alternative 2

### 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)

$$E = k \times (s)^{1.5} / (M)^{1.4} \text{ For PM10 and } k \times 5.7 \times (s)^{1.2} / (M)^{1.3} \text{ for PM2.5}$$

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

0.43882174 lb/hr

PM2.5 Emission Factor

0.25754057 lb/hr

Maximum Daily Dozer Use

30 hrs/day

Total Dozer Use

540 hrs/year	2008
1920 hrs/year	2009
0 hrs/year	2010

Dozer Emissions

Lbs/Day		Tons/year - 2008		Tons/year - 2009		Tons/year - 2010	
PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
13.16	7.73	0.12	0.07	0.42	0.25	0.00	0.00

B) Grading

$$E = k \times 0.051 \times (S)^{2.0} \text{ for PM10 and } k \times 0.040 \times (S)^{2.5} \text{ for PM2.5}$$

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

0.01932969 lb/VMT

## Fugitive Dust Emissions - Alternative 2

Maximum Daily Grader VMT  
36 VMT/day

Annual Grader VMT  
1098 VMT/year                      2008  
321 VMT/year                        2009  
0 VMT/year                            2010

### Grading Emissions

Lbs/Day		Tons/year - 2008		Tons/year - 2009		Tons/year - 2010	
PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
9.91	0.70	0.15	0.01	0.04	0.00	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 = 19.0 MPH worst day, 7.3 MPH avg from 1981 Banning Met File

M = moisture content = 10% (mitigated)

Three separate drops are assumed

557 Maximum daily tons	
23100 Annual tons	2008
30589.2308 Annual tons	2009
8910.76923 Annual tons	2010

### Emission Factors and Emissions

Emission Factors				Emissions lbs/day	
PM10 Daily	PM2.5 Daily	PM10 Annual	PM2.5 Annual	PM10	PM2.5
0.00067	0.00021	0.00019	0.00006	0.37	0.12

  

Emissions tons/year - 2008		Emissions tons/year - 2009		Emissions tons/year - 2010	
PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
0.00	0.00	0.00	0.00	0.00	0.00

## 2) Road Dust

Emission Types

A) Paved Road Dust

B) Unpaved Road Dust

A) Paved Road Dust

$$E = [k \times (sL/2)0.65 \times (W/3)^{1.5} - C] \times (1-P/4N)$$

E = lb/VMT

k = Constant (0.016 for PM10 and 0.0040 for PM2.5)

sL = Silt Loading (assumed to be 0.06 g/m<sup>2</sup> - 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

## Fugitive Dust Emissions - Alternative 2

### Average Vehicle Weight Calculation

#### Assumptions

Passenger Vehicles = 2 tons average

Midsized "Delivery" Vehicles = 8 ton average

Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

#### Worst Case Day VMT

3085 Passenger Vehicles

744 Delivery/Work Vehicles

816 Heavy-Heavy Duty Vehicles

4645 Total Paved VMT (2009)

Average Weight = 7.9 Tons

#### Annual Case VMT 2008

39426.25 Passenger Vehicles

9721 Delivery/Work Vehicles

8783.75 Heavy-Heavy Duty Vehicles

57931 Total Paved VMT

#### Annual Case VMT 2009

368048.75 Passenger Vehicles

104093.2 Delivery/Work Vehicles

84116.35 Heavy-Heavy Duty Vehicles

556258 Total Paved VMT

#### Annual Case VMT 2009

314043.5 Passenger Vehicles

74829.6 Delivery/Work Vehicles

42486.1 Heavy-Heavy Duty Vehicles

431359 Total Paved VMT

Average Weight = 7.3 Tons - 2008

7.4 Tons - 2009

5.8 Tons - 2010

### Emission Factors and Emissions

#### Emission Factors

PM10 Daily	PM2.5 Daily	PM10 Annual	PM2.5 Annual	Emissions lbs/day		
0.0065	0.0014	0.0057	0.0012	2008	PM10	PM2.5
		0.0058	0.0012	2009	30.21	6.43
		0.0039	0.0007	2009		

#### Emissions tons/year - 2008

PM10

0.16

PM2.5

0.03

#### Emissions tons/year - 2009

PM10

1.62

PM2.5

0.34

#### Emissions tons/year - 2010

PM10

0.85

PM2.5

0.16

### B) Unpaved Road Dust

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

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 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

Midsized "Delivery" Vehicles = 8 ton average

Heavy-Heavy Duty Trucks = 30 tons average (loaded 40 tons, unloaded 20 tons)

## Fugitive Dust Emissions - Alternative 2

### Worst Case Day VMT

35.1184211 Passenger Vehicles  
 75.0368421 Delivery/Work Vehicles  
 63.8789474 Heavy-Heavy Duty Vehicles  
 174.034211 Total Unpaved VMT

Average Weight = 15.0 Tons

### Annual Case VMT 2008

704 Passenger Vehicles  
 1867 Delivery/Work Vehicles  
 6344 Heavy-Heavy Duty Vehicles  
 8914 Total Unpaved VMT

### Annual Case VMT 2009

4631 Passenger Vehicles  
 11744 Delivery/Work Vehicles  
 10666 Heavy-Heavy Duty Vehicles  
 27042 Total Unpaved VMT

### Annual Case VMT 2010

5017 Passenger Vehicles  
 3830 Delivery/Work Vehicles  
 3869 Heavy-Heavy Duty Vehicles  
 12716 Total Unpaved VMT

Average Weight = 23.2 Tons - 2008  
 15.6 Tons - 2009  
 12.3 Tons - 2010

### Uncontrolled Emission Factors and Emissions

Emission Factors (lb/VMT)				Emissions lbs/day	
PM10 Daily	PM2.5 Daily	PM10 Annual	PM2.5 Annual	PM10	PM2.5
3.09	0.47	3.76	0.58	538.03	82.50
		3.15	0.48		
		2.83	0.43		

Emissions tons/year - 2008		Emissions tons/year - 2009		Emissions tons/year - 2010	
PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
16.78	2.57	42.65	6.54	18.01	2.76

Controlled Emissions (assumes 70% efficiency with minimum 3x daily watering of unpaved roads)

Emissions lbs/day		Emission Control
PM10	PM2.5	70%
161.41	24.75	

Emissions tons/year - 2008		Emissions tons/year - 2009		Emissions tons/year - 2010	
PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
5.03	0.77	12.80	1.96	5.40	0.83

Fugitive Dust Emission Totals	Maximum Day		2008		2009		2009	
	PM10 lb/day	PM2.5 lb/day	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
Dozer	13.16	7.73	0.12	0.07	0.42	0.25	0.00	0.00
Grading	9.91	0.70	0.15	0.01	0.04	0.00	0.00	0.00
Soil Handling	0.37	0.12	0.00	0.00	0.00	0.00	0.00	0.00
Paved Road Dust	30.21	6.43	0.16	0.03	1.62	0.34	0.85	0.16
Unpaved Road Dust	161.41	24.75	5.03	0.77	12.80	1.96	5.40	0.83
Totals	215.07	39.71	5.47	0.89	14.88	2.55	6.25	0.99

## Helicopter Emission Calculations - Proposed Project and Alternatives

### Emission Factor Derivation

Approach/Climbout (i.e. Working)			Emissions lbs/hour				
Equiv. Engs	Engine HP	Number	HC	CO	NOx	SOx	PM
T53-L-11D	1100	1	0.20	2.04	5.00	0.04	0.27

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

Idle			Emissions lbs/hour				
Engine HP	Number	HC	CO	NOx	SOx	PM	
T53-L-11D	1100	1	9.00	4.21	0.20	0.01	0.01

Source: FAEED database, 2001

FAEED - FAA Aircraft Engine Emission Database

### Relating Factors to Potential Construction/Operating Helicopters

Approach/Climbout			Emissions lbs/hour				
Engine HP	Number	HC	CO	NOx	SOx	PM	
Bell B-204	1400	1	0.25	2.59	6.36	0.05	0.35
Hughes 500	420	1	0.08	0.78	1.91	0.02	0.10

Idle			Emissions lbs/hour				
Engine HP	Number	HC	CO	NOx	SOx	PM	
Bell B-204	1400	1	11.46	5.35	0.25	0.01	0.02
Hughes 500	420	1	3.44	1.61	0.08	0.00	0.01

### Construction Assumptions:

One Bell B-204 "midsize" helicopter is used to deliver sections of the antenna tower for 5 hours one day.

One Hughes "small" helicopter is in operation during line stringing the three new 220 kV towers, 6 hours for one day.

Idle time is 10% of working time for small helicopters.

Assumes helicopters stay within 3000 feet of the ground.

### Total Proposed Project Emissions

Peak Day and Total			Emissions lbs/day				
Working hours	Idle hr/hr	VOC	CO	NOx	SOx	PM	
Bell B-204	5	0.1	6.98	15.65	31.95	0.26	1.74
Hughes 500	6	0.1	2.51	5.63	11.50	0.10	0.63
<b>Totals</b>			<b>9.50</b>	<b>21.28</b>	<b>43.45</b>	<b>0.36</b>	<b>2.36</b>



# LST Onsite Maximum Construction Emissions

## Proposed Project

Assumptions:

- 1) Worst-case construction site activity overlap is based on the project schedule precedence to determine the worst case onsite emissions.
- 2) Only NOx, PM10 and PM2.5 LSTs are pertinent.

El Casco Substation (Sep/Oct '08 for PM, Nov '09 for other pollutants)

Worst-Case Onsite Day	Emissions (lb/day)		
	NOx	PM10	PM2.5
Onroad Vehicles	2.20	0.24	0.21
Offroad Vehicles/Equipment	105.79	2.22	2.04
Fugitive Dust	---	118.92	18.00
<b>Totals</b>	<b>107.99</b>	<b>121.38</b>	<b>20.26</b>

Banning Substation (Feb '09 for PM, Jan '10 for other pollutants)

Worst-Case Onsite Day	Emissions (lb/day)		
	NOx	PM10	PM2.5
Onroad Vehicles	0.99	0.07	0.06
Offroad Vehicles/Equipment	50.48	2.72	2.50
Fugitive Dust	---	18.98	5.22
<b>Totals</b>	<b>51.47</b>	<b>21.77</b>	<b>7.78</b>

Zanja Substation (Dec '09)

Worst-Case Onsite Day	Emissions (lb/day)		
	NOx	PM10	PM2.5
Onroad Vehicles	1.68	0.08	0.07
Offroad Vehicles/Equipment	37.76	2.01	1.84
Fugitive Dust	---	19.02	5.24
<b>Totals</b>	<b>39.44</b>	<b>21.10</b>	<b>7.15</b>

115 kV Installation (Apr '10)

Worst-Case Onsite Day	Emissions (lb/day)		
	NOx	PM10	PM2.5
Onroad Vehicles	0.77	0.04	0.03
Offroad Vehicles/Equipment	11.23	0.48	0.44
Fugitive Dust	---	19.36	2.97
<b>Totals</b>	<b>12.00</b>	<b>19.88</b>	<b>3.44</b>

220 kV Installation (Jan '10)

Worst-Case Onsite Day	Emissions (lb/day)		
	NOx	PM10	PM2.5
Onroad Vehicles	0.72	0.03	0.03
Offroad Vehicles/Equipment	42.16	1.99	1.83
Fugitive Dust	---	6.48	1.02
<b>Totals</b>	<b>42.88</b>	<b>8.50</b>	<b>2.88</b>

# LST Onsite Maximum Construction Emissions

## Mill Creek Tower Installation (Dec '08)

Worst-Case Onsite Day	Emissions (lb/day)		
	NOx	PM10	PM2.5
Onroad Vehicles	0.42	0.02	0.01
Offroad Vehicles/Equipment	26.03	0.98	0.90
Fugitive Dust	---	18.59	2.57
<b>Totals</b>	<b>26.46</b>	<b>19.58</b>	<b>3.49</b>

## Fiber Optics Installation (Mar '10)

Worst-Case Onsite Day	Emissions (lb/day)		
	NOx	PM10	PM2.5
Onroad Vehicles	0.23	0.01	0.01
Offroad Vehicles/Equipment	8.42	0.36	0.33
Fugitive Dust	---	0.28	0.06
<b>Totals</b>	<b>8.65</b>	<b>0.65</b>	<b>0.40</b>

## 12 kV Installation (Mar '09)

Worst-Case Onsite Day	Emissions (lb/day)		
	NOx	PM10	PM2.5
Onroad Vehicles	0.72	0.03	0.03
Offroad Vehicles/Equipment	10.06	0.53	0.49
Fugitive Dust	---	4.45	0.70
<b>Totals</b>	<b>10.78</b>	<b>5.02</b>	<b>1.22</b>

## Alternative 1

Assumptions:

- 1) The potential worst-case construction site emissions are the same as the project activity types are the same.

## Alternative 2

Assumptions:

- 1) The potential worst-case construction site emissions are the same as the project 115 kV undergrounding, as all of the construction activity types are the same
- 2) Worst-case undergrounding construction overlap is based on the project schedule precedence to determine the worst case onsite emissions.

## 115 kV Underground Installation (Jan '10)

Worst-Case Onsite Day	Emissions (lb/day)		
	NOx	PM10	PM2.5
Onroad Vehicles	1.08	0.05	0.05
Offroad Vehicles/Equipment	23.23	1.49	1.37
Fugitive Dust	---	26.88	4.15
<b>Totals</b>	<b>24.30</b>	<b>28.42</b>	<b>5.56</b>