

## DPV2 Construction Emission Totals

### Worst-Case Day (SCAQMD)

	Emissions (lbs/day)					
	CO	NOx	PM10	SOx	VOC	PM2.5
Onroad Vehicles	208.12	236.25	4.84	0.40	28.16	4.84
Offroad Vehicles/Equipment	254.86	333.41	25.82	0.40	51.36	25.82
Helicopters	4.69	9.58	0.52	0.00	2.10	0.52
Fugitive Dust	---	---	734.10	---	---	142.80
<b>Totals</b>	<b>467.67</b>	<b>579.24</b>	<b>765.28</b>	<b>0.81</b>	<b>81.61</b>	<b>173.97</b>

### Worst-Case Day (MDAQMD)

	Emissions (lbs/day)					
	CO	NOx	PM10	SOx	VOC	PM2.5
Onroad Vehicles	184.51	206.90	4.24	0.35	24.95	4.24
Offroad Vehicles/Equipment	145.35	185.49	13.94	0.24	25.17	13.94
Helicopters	4.69	9.58	0.52	0.00	2.10	0.52
Fugitive Dust	---	---	583.32	---	---	115.92
<b>Totals</b>	<b>334.55</b>	<b>401.97</b>	<b>602.02</b>	<b>0.59</b>	<b>52.22</b>	<b>134.62</b>

### Annual SCAB 2008

	Emissions (tons/year)					
	CO	NOx	PM10	SOx	VOC	PM2.5
Onroad Vehicles	11.42	15.19	0.31	0.03	1.57	0.31
Offroad Vehicles/Equipment	12.10	16.51	1.26	0.02	2.31	1.26
Helicopters	0.42	0.85	0.05	0.00	0.19	0.05
Fugitive Dust	---	---	14.23	---	---	2.96
<b>Totals</b>	<b>23.94</b>	<b>32.55</b>	<b>15.85</b>	<b>0.05</b>	<b>4.07</b>	<b>4.57</b>

### Annual SSAB 2008

	Emissions (tons/year)					
	CO	NOx	PM10	SOx	VOC	PM2.5
Onroad Vehicles	14.91	16.91	0.35	0.03	2.02	0.35
Offroad Vehicles/Equipment	10.66	14.26	1.10	0.02	2.02	1.10
Helicopters	0.26	0.53	0.03	0.00	0.12	0.03
Fugitive Dust	---	---	48.67	---	---	3.89
<b>Totals</b>	<b>25.82</b>	<b>31.69</b>	<b>50.14</b>	<b>0.05</b>	<b>4.16</b>	<b>5.37</b>

### Annual MDAB 2008

	Emissions (tons/year)					
	CO	NOx	PM10	SOx	VOC	PM2.5
Onroad Vehicles	7.70	8.74	0.18	0.01	1.04	0.18
Offroad Vehicles/Equipment	6.33	8.30	0.62	0.01	1.14	0.62
Helicopters	0.12	0.24	0.01	0.00	0.05	0.01
Fugitive Dust	---	---	23.08	---	---	4.71
<b>Totals</b>	<b>14.15</b>	<b>17.28</b>	<b>23.89</b>	<b>0.03</b>	<b>2.24</b>	<b>5.52</b>

### Annual ADEQ 2008

	Emissions (tons/year)					
	CO	NOx	PM10	SOx	VOC	PM2.5
Onroad Vehicles	1.74	1.97	0.04	0.00	0.24	0.04
Offroad Vehicles/Equipment	1.24	2.02	0.15	0.00	0.30	0.15
Helicopters	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust	---	---	13.39	---	---	2.42
<b>Totals</b>	<b>2.98</b>	<b>3.99</b>	<b>13.58</b>	<b>0.01</b>	<b>0.53</b>	<b>2.62</b>

### Annual MCAQD 2008

	Emissions (tons/year)					
	CO	NOx	PM10	SOx	VOC	PM2.5
Onroad Vehicles	0.50	0.56	0.01	0.00	0.07	0.01
Offroad Vehicles/Equipment	0.32	0.54	0.04	0.00	0.08	0.04
Helicopters	0.00	0.00	0.00	0.00	0.00	0.00
Fugitive Dust	---	---	4.37	---	---	0.83
<b>Totals</b>	<b>0.81</b>	<b>1.10</b>	<b>4.43</b>	<b>0.00</b>	<b>0.15</b>	<b>0.89</b>

### Project Totals

	Emissions (tons/year)					
	CO	NOx	PM10	SOx	VOC	PM2.5
2008 totals	67.71	86.62	107.89	0.12	11.14	18.97
2009 totals	53.93	66.37	181.72	0.10	8.73	35.29
<b>total project</b>	<b>121.64</b>	<b>152.99</b>	<b>289.61</b>	<b>0.23</b>	<b>19.88</b>	<b>54.26</b>

### Annual SCAB 2009

	Emissions (tons/year)					
	CO	NOx	PM10	SOx	VOC	PM2.5
Onroad Vehicles	4.76	4.79	0.10	0.01	0.64	0.10
Offroad Vehicles/Equipment	4.90	6.51	0.55	0.01	1.04	0.55
Helicopters	0.16	0.32	0.02	0.00	0.07	0.02
Fugitive Dust	---	---	6.73	---	---	1.40
<b>Totals</b>	<b>9.82</b>	<b>11.62</b>	<b>7.40</b>	<b>0.02</b>	<b>1.75</b>	<b>2.07</b>

### Annual SSAB 2009

	Emissions (tons/year)					
	CO	NOx	PM10	SOx	VOC	PM2.5
Onroad Vehicles	1.52	1.65	0.04	0.00	0.21	0.04
Offroad Vehicles/Equipment	3.36	4.44	0.34	0.01	0.61	0.34
Helicopters	0.15	0.30	0.02	0.00	0.07	0.02
Fugitive Dust	---	---	4.14	---	---	1.04
<b>Totals</b>	<b>5.02</b>	<b>6.39</b>	<b>4.52</b>	<b>0.01</b>	<b>0.88</b>	<b>1.43</b>

### Annual MDAB 2009

	Emissions (tons/year)					
	CO	NOx	PM10	SOx	VOC	PM2.5
Onroad Vehicles	3.74	4.12	0.09	0.01	0.51	0.09
Offroad Vehicles/Equipment	3.04	4.82	0.34	0.01	0.61	0.34
Helicopters	0.11	0.22	0.01	0.00	0.05	0.01
Fugitive Dust	---	---	12.60	---	---	2.76
<b>Totals</b>	<b>6.89</b>	<b>9.16</b>	<b>13.05</b>	<b>0.01</b>	<b>1.17</b>	<b>3.21</b>

### Annual ADEQ 2009

	Emissions (tons/year)					
	CO	NOx	PM10	SOx	VOC	PM2.5
Onroad Vehicles	12.11	13.32	0.28	0.02	1.66	0.28
Offroad Vehicles/Equipment	8.95	11.07	0.84	0.01	1.46	0.84
Helicopters	0.30	0.60	0.03	0.00	0.13	0.03
Fugitive Dust	---	---	97.25	---	---	16.55
<b>Totals</b>	<b>21.35</b>	<b>24.99</b>	<b>98.40</b>	<b>0.04</b>	<b>3.25</b>	<b>17.70</b>

### Annual MCAQD 2009

	Emissions (tons/year)					
	CO	NOx	PM10	SOx	VOC	PM2.5
Onroad Vehicles	6.49	8.79	0.18	0.02	0.92	0.18
Offroad Vehicles/Equipment	4.25	5.20	0.41	0.01	0.72	0.41
Helicopters	0.11	0.23	0.01	0.00	0.05	0.01
Fugitive Dust	---	---	57.74	---	---	10.28
<b>Totals</b>	<b>10.85</b>	<b>14.22</b>	<b>58.34</b>	<b>0.02</b>	<b>1.69</b>	<b>10.89</b>

# General Emission Calculation Assumptions

## General Assumptions

- 1) PM for all but fugitive dust is both PM10 and PM2.5, Fugitive Dust Emissions have been partitioned into PM10 and PM2.5
- 2) Activity durations for East of Devers within the various jurisdictions/non-attainment areas are linear with number of towers in each
- 3) Construction starts at Devers moving east and at Mid-point moving east based on SCE schedule nomenclature
- 4) Physical Construction will not start until January 2008. This maximizes annual calendar emissions in the non-attainment areas
- 5) Levels of activity for WOD are consistent with EOD levels provided in SCE emission estimates.

## Trip Length Assumptions

Major equipment Items originating from Port of LA or Phoenix

Average trip distance from either to work area of East of Devers is 150 miles/trip (300 miles RT)

Average Trip Distance for major equipment for West of Devers is 100 miles/trip

From Port Average Distance = 200 miles one way, from Phoenix 100 miles one way

Assuming 50/50 average then 150 miles one way.

Second trip from marshalling yard to site of 60 miles RT assumed

Average concrete trip = 60 mile round trip

Waste/Recycle material hauling trips = 200 mile round trip avg.

## Emission Assumptions and Notes

Emissions are recalculated using SCAQMD offroad and on-road factors for 2008 and 2009.

Train/ship emissions not included in totals

Train assumed not to be major carrier to site areas

Heavy hauling vehicles assume meet SCAQMD emission factors

Significant traffic from Mexico (i.e. structural steel) possible but not assumed.

## Helicopter Assumptions

Operation of helicopters will be within 3000 feet of ground level

## Dirt Road Emissions

Unpaved road travel will be minimized by routing with the shortest unpaved road distance

Based on inspection of random towers along site for East of Devers the minimum unpaved road distance assumptions are as follows

EOD	Miles/RT	Notes:
SCAQMD	4	Spur roads off I-10 are generally paved, maintenance road to towers is not.
SSAB	4	Spur roads off I-10 are generally paved, maintenance road to towers is not.
MDAB	3.5	Reduced unpaved road distances in Blythe.
MDAQMD	3	Reduced unpaved road distances in Blythe.
ADEQ	15	Route farther from I-10 and fewer unpaved connector roads in area (Kofa)
Maricopa	4	Less remote, similar to western part of route

WOD Miles/RT

SCAQMD 1 Area West of Devers is built up minimizing unpaved access  
and SCAB

## East of Devers Construction Assumptions

Activity	Start	Finish		2008	2009	Days	2008 total
Marshalling Yards	1/8/2007	11/24/2008	1/1/2008	358	328	490	256
Foundations	2/19/2007	7/28/2008	1/1/2008	316	209	375	226
Steel	4/2/2007	9/29/2008	1/1/2008	274	272	375	188
Conductor	5/21/2007	11/3/2008	1/1/2008	225	307	380	161
Cleanup	7/2/2007	11/24/2008	1/1/2008	183	328	365	131

West to east construction

Midpoint Substation construction in 2009.

EOD activity	2008	2009
Marshalling Yards	256	234
Road Work	185	
Foundations	226	149
Steel Assembly	188	187
Conductor Installation	161	219
Cleanup and Guard Poles	131	234

### EOD Tower Locations

SCAB	SSAB	MDAB	ADEQ	MCAQD	Total	
0	226	201	248	96	771	Towers
0	226	201	261	96	784	Conductors
0.00%	29.31%	26.07%	32.17%	12.45%	100.00%	Towers
0.00%	28.83%	25.64%	33.29%	12.24%	100.00%	Conductors

EOD All	SSAB	MDAB	ADEQ	MCAQD	Sum
Marshalling Yards	196	98	98	98	490
Road Work	54	48	60	23	185
Foundations	110	98	120	47	375
Steel Assembly	110	98	120	47	375
Conductor Installation	110	97	126	47	380
Cleanup and Guard Poles	107	95	117	46	365

2008	SSAB	MDAB	ADEQ	MCAQD	Sum
Marshalling Yards	196	60	0	0	256
Road Work	54	48	60	23	185
Foundations	110	98	18	0	226
Steel Assembly	110	78	0	0	188
Conductor Installation	110	51	0	0	161
Cleanup and Guard Poles	107	24	0	0	131

2009	SSAB	MDAB	ADEQ	MCAQD	Sum
Marshalling Yards	0	38	98	98	234
Road Work	0	0	0	0	0
Foundations	0	0	102	47	149
Steel Assembly	0	20	120	47	187
Conductor Installation	0	46	126	47	219
Cleanup and Guard Poles	0	71	117	46	234

## West of Devers Construction Assumptions

WOD Activity from Schedule (working days)

Activity	Schedule Page																Sum	Activity Multiplier
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
All																		
Roads/Pads	5	5	10		5	10		5	5		3	6	3		10		67	1
Crossing Structures	10	5		5	15	10		5			2	3	6	20	10		91	
Reinforce Towers	10																10	
Conductor Removal	12	9		17	65			3	1	1	1	5	8	1	26		149	1
Conductor Installation	17	10	33	27	64	27	78	6	2	2	4	2	12		24		308	1
Clean up	6	7	23	17	40		44	21						32	12		202	1
Tower Wreckout		30		14	11	23								44	29		151	1
Foundation			66		9	36									10		121	1
Steel			46	21	25	42									31		165	1
Rephase Conductors							2	2	3								7	
Receive/Haul Materials	15	145	7	55	67	148	47	5	5	1	13	10	5	4	82		609	0.5
Shoo-fly (inst/remove)											5			2			7	
2009																	Sum	Multiplier
Roads/Pads							5	5		3	6	3		10			32	1
Crossing Structures							5			2	3	6	20	10			46	
Reinforce Towers																	0	
Conductor Removal								3	1	1	1	5	8	1	26		46	1
Conductor Installation							78	6	2	2	4	2	12		24		130	1
Clean up							44	21						32	12		109	1
Tower Wreckout														44	29		73	1
Foundation					5										10		15	1
Steel					22										31		53	1
Rephase Conductors							2	2	3								7	
Receive/Haul Materials					99	47	5	5	1	13	10	5	4	82			271	0.5
Shoo-fly (inst/remove)											5			2			7	

Not included as separate activity or not a listed activity  
 Included as separate activity

Reorganized to fit existing offroad emission activities

2008	Sum	Multiplier
Roads/Pads	35	1
Crossing Structures	45	
Reinforce Towers	10	
Conductor Removal	103	1
Conductor Installation	178	1
Clean up	93	1
Tower Wreckout	78	1
Foundation	106	1
Steel	112	1
Rephase Conductors	0	
Receive/Haul Materials	338	0.5
Shoo-fly (inst/remove)	0	

Marshalling Yards  
 Road Work  
 Foundations  
 Steel Assembly  
 Conductor Installation  
 Cleanup and Guard Poles  
 Wreck-out  
 Bypass Installation  
 Bypass Removal  
 Conductor Removal  
 Civil (Substation Rework)  
 Electrical (Substation)

	2008		2009		Total
	SCAB	SSAB	SCAB	SSAB	
	338	0	271	0	609
	35	0	18	14	67
	96	10	0	15	121
	112	0	19	34	165
	178	0	67	63	308
	93	0	68	41	202
	78	0	42	31	151
	0	0	5	0	5
	0	0	2	0	2
	103	0	16	30	149
	0	0	60	20	80
	0	0	60	20	80

WOD Tower Locations

SCAB	SSAB	Total
138	35	173
79.77%	20.23%	

## Onroad VMT Estimates

### East of Devers

#### Personnel and Private Trips

Construction Element	Personnel	Days	Daily RT.	Vehicle/Trip Type		SCAQMD Vehicle Type	
				Personal	Work	Passenger	Delivery
Construction Management	9	490	125		424,038	424,038	
Inspection and Environmental	14	490	135		926,100	926,100	
Survey Tower Sites	3	148	130		57,720	57,720	
Marshalling Yards	6	490	30	67,846		67,846	
Road Work	12	185	60	102,462		102,462	
Foundation Installation	23	370	60	392,769		392,769	
Tower Assembly/Erection	75	370	60	1,280,769		1,280,769	
Conductor Operations	54	380	60	947,077		947,077	
Final Cleanup	6	365	60	101,077		101,077	
Midpoint Substation, etc.	20	180	30	83,077		83,077	
Support	9	490	130		573,300		573,300
				2,975,077	1,981,158	4,382,935	573,300
				<b>Total</b>	<b>4,956,235</b>		

Personal employee trips include 1.3 rideshare factor

Annualized per person personal vehicle mileage is approximately 5,650 for fixed sites and 11,300 for moving sites.

Construction Element	Personnel	Days	Daily RT.	Vehicle/Trip Type		SCAQMD Vehicle Type	
				Personal	Work	Passenger	Delivery
Management/Office	9	256	125		221,538	221,538	
Inspection and Environmental	14	256	135		483,840	483,840	
Survey Tower Sites	3	148	130		57,720	57,720	
Marshalling Yards	6	256	30	35,446		35,446	
Road Work	12	185	60	102,462		102,462	
Foundation Installation	23	226	60	239,908		239,908	
Tower Assembly/Erection	75	188	60	650,769		650,769	
Conductor Operations	54	161	60	401,262		401,262	
Final Cleanup	6	131	60	36,277		36,277	
Midpoint Substation, etc.	20	180	30	83,077		83,077	
Support	9	256	130		299,520		299,520
				1,549,200	1,062,618	2,312,298	299,520
				<b>Total</b>	<b>2,611,818</b>		

Construction Element	Personnel	Days	Daily RT.	Vehicle/Trip Type		SCAQMD Vehicle Type	
				Personal	Work	Passenger	Delivery
Management/Office	9	234	125	202,500		202,500	
Inspection and Environmental	14	234	135		442,260	442,260	
Survey Tower Sites	3	0	130		0	0	
Marshalling Yards	6	234	30	32,400		32,400	
Road Work	12	0	60	0		0	
Foundation Installation	23	144	60	152,862		152,862	
Tower Assembly/Erection	75	182	60	630,000		630,000	
Conductor Operations	54	219	60	545,815		545,815	
Final Cleanup	6	234	60	64,800		64,800	
Midpoint Substation, etc.	20	0	30	0		0	
Support	9	234	130		273,780		273,780
				1,628,377	716,040	2,070,637	273,780
				<b>Total</b>	<b>2,344,417</b>		

## Onroad VMT Estimates

### East of Devers Truck Trips

	Total Trips	RT Miles	Miles	2008	2009
<b>Heavy Duty Vehicle Trips</b>					
Deliveries					
Steel, conductor, etc. (yards)	1,820	300	546,000	297,396	248,604
Material Delivery Sites	1,820	60	109,200	59,479	49,721
Concrete	6,007	60	360,420	217,213	143,207
Waste				0	
Steel	0	100	0	0	0
Conductor	0	100	0	0	0
Wood	0	400	0	0	0
Dump Trucks	735	120	88,200	66,960	21,240
Misc.	200	100	20,000	10,000	10,000
Equipment Delivery/Removal	100	200	20,000	10,000	10,000
Equipment Shuttling	7,800	1	7,800	4,249	3,551
Fuel Transportation	287	60	17,220	9,379	7,841
Water Transportation	1,420	60	85,200	51,060	34,140
On Road Construction Equip.	8,065	60	483,900	244,980	238,920
		Totals	1,737,940	970,716	767,224
<b>Medium Duty Vehicle Trips</b>					
Fueling	980	200	196,000	106,757	89,243
On Road Construction Equip.	17,005	90	1,530,450	750,150	780,300
Sanitary Waste	1,500	60	90,000	49,021	40,979
Misc. Deliveries	3,350	60	201,000	106,920	94,080
		Totals	2,017,450	1,012,849	1,004,601

#### Notes:

Concrete assumes 8 round trips of 60 miles per trip per lattice tower

Steel, conductor, etc. ratio of Antelope Pardee Project Tower Structures and material estimates

One water transportation trip per spread per day to deal with roads and site watering

Fueling is estimated as two trips per day covering all the spreads on the Devers to Midpoint and Midpoint to Harqualala concurrent construction

It is assumed that the majority of the on road construction equipment returns each night to the Marshalling Yard

The passenger vehicle trips for pickups are assumed to be included previously.

It is assumed that a single sanitary facility requires clean up for every equivalent 25 man days.

## Onroad VMT Estimates

### West of Devers

#### Personnel and Private Trips

West of Devers				Trip Type		SCAQMD Vehicle Type	
Construction Element	Personnel	Days	Daily RT.	Personal	Work	Passenger	Delivery
Management/Office	3	520	100		120,000	120,000	
Inspection and Environmental	6	520	100		312,000	312,000	
Survey Tower Sites	3	28	60		5,040	5,040	
Marshalling Yards	6	520	30	72,000		72,000	
Road Work	4	67	30	6,185		6,185	
Foundation Installation	23	121	30	64,223		64,223	
Tower Assembly/Erection	64	165	30	243,692		243,692	
Conductor Operations	54	308	30	383,815		383,815	
Final Cleanup	6	202	30	27,969		27,969	
Conductor Removal	40	149	30	137,538		137,538	
Structure Removal	26	151	30	90,600		90,600	
Foundation Removal	12	151	30	41,815		41,815	
Miscellaneous Substation, etc.	10	180	30	41,538		41,538	
Support	5	520	60		156,000		156,000
				1,109,377	593,040	1,546,417	156,000
				Total		1,702,417	

West of Devers - 2008				Trip Type		SCAQMD Vehicle Type	
Construction Element	Personnel	Days	Daily RT.	Personal	Work	Passenger	Delivery
Management/Office	3	260	100		60,000	60,000	
Inspection and Environmental	6	260	100		156,000	156,000	
Survey Tower Sites	3	21	60		3,780	3,780	
Marshalling Yards	6	260	30	36,000		36,000	
Road Work	4	35	30	3,231		3,231	
Foundation Installation	23	106	30	56,262		56,262	
Tower Assembly/Erection	64	112	30	165,415		165,415	
Conductor Operations	54	178	30	221,815		221,815	
Final Cleanup	6	93	30	12,877		12,877	
Conductor Removal	40	103	30	95,077		95,077	
Structure Removal	26	78	30	46,800		46,800	
Foundation Removal	12	78	30	21,600		21,600	
Miscellaneous Substation, etc.	10	90	30	20,769		20,769	
Support	5	260	60		78,000		78,000
				679,846	297,780	899,626	78,000
				Total		977,626	

West of Devers - 2009				Trip Type		SCAQMD Vehicle Type	
Construction Element	Personnel	Days	Daily RT.	Personal	Work	Passenger	Delivery
Management/Office	3	260	100	60,000		60,000	
Inspection and Environmental	6	260	100		156,000	156,000	
Survey Tower Sites	3	7	60		1,260	1,260	
Marshalling Yards	6	260	30	36,000		36,000	
Road Work	4	32	30	2,954		2,954	
Foundation Installation	23	15	30	7,962		7,962	
Tower Assembly/Erection	64	53	30	78,277		78,277	
Conductor Operations	54	130	30	162,000		162,000	
Final Cleanup	6	109	30	15,092		15,092	
Conductor Removal	40	46	30	42,462		42,462	
Structure Removal	26	73	30	43,800		43,800	
Foundation Removal	12	73	30	20,215		20,215	
Miscellaneous Substation, etc.	10	90	30	20,769		20,769	
Support	5	260	60		78,000		78,000
				489,531	235,260	646,791	78,000

## Onroad VMT Estimates

Total	724,791
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## Onroad VMT Estimates

### West of Devers Truck Trips

West of Dever	Total Trips	RT Miles	Miles	2008	2009
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### Heavy Duty Vehicle Trips

#### Deliveries

Steel, conductor, etc. (yards)	390	200	78,000	62,400	15,600
Material Delivery Sites	780	30	23,400	11,700	11,700
Concrete	1,384	30	41,520	36,373	5,147

#### Waste

Steel	38	100	3,800	1,963	1,837
Conductor	103	100	10,300	7,120	3,180
Wood	50	400	20,000	10,331	9,669
Dump Trucks	578	50	28,900	18,750	10,150
Misc.	200	100	20,000	10,000	10,000

Equipment Delivery/Removal	80	200	16,000	8,000	8,000
Equipment Shuttling	1,730	1	1,730	865	865
Fuel Transportation	146	10	1,460	730	730
Water Transportation	1,078	10	10,775	5,740	5,035
On Road Construction Equip.	8,125	30	243,750	149,520	94,230
		Total	499,635		

### Medium Duty Vehicle Trips

Fueling	1,040	50	52,000	26,000	26,000
On Road Construction Equip.	15,517	30	465,510	285,870	179,640
Sanitary Waste	500	30	15,000	7,500	7,500
Misc. Deliveries	2,628	30	78,840	46,980	31,860
		Total	611,350		

## Onroad Emissions

### ONROAD EMISSIONS: SCAQMD EMISSION FACTORS FOR 2007

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

Passenger Vehicles		Delivery Trucks		Heavy-Heavy Duty Trucks	
CO	0.011798	CO	0.015942	CO	0.005116948
NOx	0.001245	NOx	0.023199	NOx	0.032442485
ROG	0.001277	ROG	0.00245	ROG	0.001133052
SOx	0.000009	SOx	0.000033	SOx	4.60123E-05
PM10	0.000080	PM10	0.000419	PM10	0.00059816
	lb/mile		lb/mile		lb/mile

### ONROAD EMISSIONS: SCAQMD EMISSION FACTORS FOR 2008

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

Passenger Vehicles		Delivery Trucks		Heavy-Heavy Duty Trucks	
CO	0.010849	CO	0.01454	CO	0.00473757
NOx	0.001138	NOx	0.021501	NOx	0.029454847
ROG	0.001179	ROG	0.002295	ROG	0.001042339
SOx	0.000009	SOx	0.000033	SOx	4.61212E-05
PM10	0.000081	PM10	0.000400	PM10	0.000558989
	lb/mile		lb/mile		lb/mile

# Onroad Emissions

## Annual Onroad Equipment Exhaust Emissions

### East of Devers 2008

Passenger Vehicles	Emissions (lbs/year)					
	VMT	CO	NOx	PM	SOx	VOC
Construction Management	221,538	2,613.7	275.8	17.8	2.0	282.9
Inspection and Environmental Survey Tower Sites	483,840	5,708.3	602.4	38.9	4.4	617.9
Marshalling Yards	57,720	681.0	71.9	4.6	0.5	73.7
Road Work	35,446	418.2	44.1	2.8	0.3	45.3
Foundation Installation	102,462	1,208.8	127.6	8.2	0.9	130.8
Tower Assembly/Erection	239,908	2,830.4	298.7	19.3	2.2	306.4
Conductor Operations	650,769	7,677.8	810.2	52.3	5.9	831.0
Final Cleanup	401,262	4,734.1	499.6	32.2	3.6	512.4
Midpoint Substation, etc.	36,277	428.0	45.2	2.9	0.3	46.3
	83,077	980.1	103.4	6.7	0.7	106.1

### Mid-Size Vehicles - "Delivery Trucks"

Support	299,520	4,774.9	6,948.6	125.6	9.9	733.8
Fueling	106,757	1,701.9	2,476.7	44.8	3.5	261.6
On Road Construction Equip.	750,150	11,958.9	17,402.7	314.5	24.8	1,837.9
Sanitary Waste	49,021	781.5	1,137.2	20.6	1.6	120.1
Misc. Deliveries	106,920	1,704.5	2,480.4	44.8	3.5	262.0

### Heavy-Heavy Duty Vehicles

Deliveries						
Steel, conductor, etc. (yards)	297,396	1,521.8	9,648.3	177.9	13.7	337.0
Material Delivery Sites	59,479	304.4	1,929.7	35.6	2.7	67.4
Concrete	217,213	1,111.5	7,046.9	129.9	10.0	246.1
Waste						
Steel	0	0.0	0.0	0.0	0.0	0.0
Conductor	0	0.0	0.0	0.0	0.0	0.0
Wood	0	0.0	0.0	0.0	0.0	0.0
Dump Trucks	66,960	342.6	2,172.3	40.1	3.1	75.9
Misc.	10,000	51.2	324.4	6.0	0.5	11.3
Equipment Delivery/Removal	10,000	51.2	324.4	6.0	0.5	11.3
Equipment Shuttling	4,249	21.7	137.8	2.5	0.2	4.8
Fuel Transportation	9,379	48.0	304.3	5.6	0.4	10.6
Water Transportation	51,060	261.3	1,656.5	30.5	2.3	57.9
On Road Construction Equip.	244,980	1,253.5	7,947.8	146.5	11.3	277.6

Totals Lbs/year	53,169	64,817	1,317	109	7,268
Totals Tons/year	26.58	32.41	0.66	0.05	3.63

## Onroad Emissions

### East of Devers 2009

	Emissions (lbs/year)					
	VMT	CO	NOx	PM	SOx	VOC
<b>Passenger Vehicles</b>						
Construction Management	202,500	2,196.9	230.4	16.4	1.8	238.7
Inspection and Environmental Survey Tower Sites	442,260	4,798.1	503.3	35.7	4.0	521.4
Marshalling Yards	0	0.0	0.0	0.0	0.0	0.0
Road Work	32,400	351.5	36.9	2.6	0.3	38.2
Foundation Installation	0	0.0	0.0	0.0	0.0	0.0
Tower Assembly/Erection	152,862	1,658.4	174.0	12.3	1.4	180.2
Conductor Operations	630,000	6,834.9	716.9	50.9	5.7	742.8
Final Cleanup	545,815	5,921.6	621.1	44.1	4.9	643.5
Midpoint Substation, etc.	64,800	703.0	73.7	5.2	0.6	76.4
	0	0.0	0.0	0.0	0.0	0.0

### Mid-Size Vehicles - "Delivery Trucks"

Support	273,780	3,980.8	5,886.5	109.5	9.0	628.3
Fueling	89,243	1,297.6	1,918.8	35.7	2.9	204.8
On Road Construction Equip.	780,300	11,345.6	16,777.2	312.0	25.7	1,790.8
Sanitary Waste	40,979	595.8	881.1	16.4	1.4	94.0
Misc. Deliveries	94,080	1,367.9	2,022.8	37.6	3.1	215.9

### Heavy-Heavy Duty Vehicles

<b>Deliveries</b>						
Steel, conductor, etc. (yards)	248,604	1,177.8	7,322.6	139.0	11.5	259.1
Material Delivery Sites	49,721	235.6	1,464.5	27.8	2.3	51.8
Concrete	143,207	678.5	4,218.1	80.1	6.6	149.3
<b>Waste</b>						
Steel	0	0.0	0.0	0.0	0.0	0.0
Conductor	0	0.0	0.0	0.0	0.0	0.0
Wood	0	0.0	0.0	0.0	0.0	0.0
Dump Trucks	21,240	100.6	625.6	11.9	1.0	22.1
Misc.	10,000	47.4	294.5	5.6	0.5	10.4
Equipment Delivery/Removal	10,000	47.4	294.5	5.6	0.5	10.4
Equipment Shuttling	3,551	16.8	104.6	2.0	0.2	3.7
Fuel Transportation	7,841	37.1	230.9	4.4	0.4	8.2
Water Transportation	34,140	161.7	1,005.6	19.1	1.6	35.6
On Road Construction Equip.	238,920	1,131.9	7,037.4	133.6	11.0	249.0

Totals Lbs/year	44,687	52,441	1,107	96	6,175
Totals Tons/year	22.34	26.22	0.55	0.05	3.09

# Onroad Emissions

## West of Devers 2008

	Emissions (lbs/year)					
	VMT	CO	NOx	PM	SOx	VOC
<b>Passenger Vehicles</b>						
Management/Office	60,000	707.9	74.7	4.8	0.5	76.6
Inspection and Environmental	156,000	1,840.5	194.2	12.5	1.4	199.2
Survey Tower Sites	3,780	44.6	4.7	0.3	0.0	4.8
Marshalling Yards	36,000	424.7	44.8	2.9	0.3	46.0
Road Work	3,231	38.1	4.0	0.3	0.0	4.1
Foundation Installation	56,262	663.8	70.0	4.5	0.5	71.8
Tower Assembly/Erection	165,415	1,951.6	205.9	13.3	1.5	211.2
Conductor Operations	221,815	2,617.0	276.2	17.8	2.0	283.3
Final Cleanup	12,877	151.9	16.0	1.0	0.1	16.4
Conductor Removal	95,077	1,121.7	118.4	7.6	0.9	121.4
Structure Removal	46,800	552.1	58.3	3.8	0.4	59.8
Foundation Removal	21,600	254.8	26.9	1.7	0.2	27.6
Miscellaneous Substation, etc.	20,769	245.0	25.9	1.7	0.2	26.5

## Mid-Size Vehicles - "Delivery Trucks"

Support	78,000	1,243.5	1,809.5	32.7	2.6	191.1
Fueling	26,000	414.5	603.2	10.9	0.9	63.7
On Road Construction Equip.	285,870	4,557.3	6,631.9	119.9	9.4	700.4
Sanitary Waste	7,500	119.6	174.0	3.1	0.2	18.4
Misc. Deliveries	46,980	749.0	1,089.9	19.7	1.6	115.1

## Heavy-Heavy Duty Vehicles

<b>Deliveries</b>						
Steel, conductor, etc. (yards)	62,400	319.3	2,024.4	37.3	2.9	70.7
Material Delivery Sites	11,700	59.9	379.6	7.0	0.5	13.3
Concrete	36,373	186.1	1,180.0	21.8	1.7	41.2
<b>Waste</b>						
Steel	1,963	10.0	63.7	1.2	0.1	2.2
Conductor	7,120	36.4	231.0	4.3	0.3	8.1
Wood	10,331	52.9	335.2	6.2	0.5	11.7
Dump Trucks	18,750	95.9	608.3	11.2	0.9	21.2
Misc.	10,000	51.2	324.4	6.0	0.5	11.3
<b>Equipment Delivery/Removal</b>						
Equipment Shuttling	8,000	40.9	259.5	4.8	0.4	9.1
Fuel Transportation	865	4.4	28.1	0.5	0.0	1.0
Water Transportation	730	3.7	23.7	0.4	0.0	0.8
On Road Construction Equip.	5,740	29.4	186.2	3.4	0.3	6.5
	149,520	765.1	4,850.8	89.4	6.9	169.4

Totals Lbs/year	19,353	21,923	452	38	2,604
Totals Tons/year	9.68	10.96	0.23	0.02	1.30

## Onroad Emissions

### West of Devers 2009

	Emissions (lbs/year)					
	VMT	CO	NOx	PM	SOx	VOC
Passenger Vehicles						
Management/Office	60,000	650.9	68.3	4.8	0.5	70.7
Inspection and Environmental	156,000	1,692.4	177.5	12.6	1.4	183.9
Survey Tower Sites	1,260	13.7	1.4	0.1	0.0	1.5
Marshalling Yards	36,000	390.6	41.0	2.9	0.3	42.4
Road Work	2,954	32.0	3.4	0.2	0.0	3.5
Foundation Installation	7,962	86.4	9.1	0.6	0.1	9.4
Tower Assembly/Erection	78,277	849.2	89.1	6.3	0.7	92.3
Conductor Operations	162,000	1,757.5	184.4	13.1	1.5	191.0
Final Cleanup	15,092	163.7	17.2	1.2	0.1	17.8
Conductor Removal	42,462	460.7	48.3	3.4	0.4	50.1
Structure Removal	43,800	475.2	49.8	3.5	0.4	51.6
Foundation Removal	20,215	219.3	23.0	1.6	0.2	23.8
Miscellaneous Substation, etc.	20,769	225.3	23.6	1.7	0.2	24.5

### Mid-Size Vehicles - "Delivery Trucks"

Support	78,000	1,134.1	1,677.1	31.2	2.6	179.0
Fueling	26,000	378.0	559.0	10.4	0.9	59.7
On Road Construction Equip.	179,640	2,612.0	3,862.4	71.8	5.9	412.3
Sanitary Waste	7,500	109.1	161.3	3.0	0.2	17.2
Misc. Deliveries	31,860	463.2	685.0	12.7	1.1	73.1

### Heavy-Heavy Duty Vehicles

#### Deliveries

Steel, conductor, etc. (yards)	15,600	73.9	459.5	8.7	0.7	16.3
Material Delivery Sites	11,700	55.4	344.6	6.5	0.5	12.2
Concrete	5,147	24.4	151.6	2.9	0.2	5.4

#### Waste

Steel	1,837	8.7	54.1	1.0	0.1	1.9
Conductor	3,180	15.1	93.7	1.8	0.1	3.3
Wood	9,669	45.8	284.8	5.4	0.4	10.1
Dump Trucks	10,150	48.1	299.0	5.7	0.5	10.6
Misc.	10,000	47.4	294.5	5.6	0.5	10.4

#### Equipment Delivery/Removal

Equipment Shuttling	8,000	37.9	235.6	4.5	0.4	8.3
Fuel Transportation	730	3.5	21.5	0.4	0.0	0.8
Water Transportation	5,035	23.9	148.3	2.8	0.2	5.2
On Road Construction Equip.	94,230	446.4	2,775.5	52.7	4.3	98.2

Totals Lbs/year	12,548	12,869	280	25	1,687
Totals Tons/year	6.27	6.43	0.14	0.01	0.84

## Onroad Emissions

### Annual Onroad Equipment Exhaust Emissions by Jurisdiction

		SCAB	SSAB	MDAB	ADEQ	MCAQMD
Annual 2008	Passenger Vehicles	1,015,241	1,318,010	680,972	153,768	43,934
	Delivery Vehicles	509,968	748,050	386,493	87,273	24,935
	Heavy Duty Vehicles	532,792	456,850	236,039	53,299	15,228
Annual 2009	Passenger Vehicles	492,149	154,642	352,008	1,138,850	579,778
	Delivery Vehicles	246,265	76,735	217,325	703,110	357,947
	Heavy Duty Vehicles	126,179	49,964	107,223	346,898	313,103
	<b>totals</b>	<b>2,922,595</b>	<b>2,804,250</b>	<b>1,980,060</b>	<b>2,483,198</b>	<b>1,334,925</b>

		Emissions (tons/year)				
		CO	NOx	PM	SOx	VOC
2008 Annual SCAB	Passenger Vehicles	5.99	0.63	0.04	0.00	0.65
	Delivery Vehicles	4.06	5.92	0.11	0.01	0.62
	Heavy Duty Vehicles	1.36	8.64	0.16	0.01	0.30
	Totals	11.42	15.19	0.31	0.03	1.57
SSAB	Passenger Vehicles	7.77	0.82	0.05	0.01	0.84
	Delivery Vehicles	5.96	8.68	0.16	0.01	0.92
	Heavy Duty Vehicles	1.17	7.41	0.14	0.01	0.26
	Totals	14.91	16.91	0.35	0.03	2.02
MDAB	Passenger Vehicles	4.02	0.42	0.03	0.00	0.43
	Delivery Vehicles	3.08	4.48	0.08	0.01	0.47
	Heavy Duty Vehicles	0.60	3.83	0.07	0.01	0.13
	Totals	7.70	8.74	0.18	0.01	1.04
ADEQ	Passenger Vehicles	0.91	0.10	0.01	0.00	0.10
	Delivery Vehicles	0.70	1.01	0.02	0.00	0.11
	Heavy Duty Vehicles	0.14	0.86	0.02	0.00	0.03
	Totals	1.74	1.97	0.04	0.00	0.24
MCAQD	Passenger Vehicles	0.26	0.03	0.00	0.00	0.03
	Delivery Vehicles	0.20	0.29	0.01	0.00	0.03
	Heavy Duty Vehicles	0.04	0.25	0.00	0.00	0.01
	Totals	0.50	0.56	0.01	0.00	0.07

		Emissions (tons/year)				
		CO	NOx	PM	SOx	VOC
2009 Annual SCAB	Passenger Vehicles	2.67	0.28	0.02	0.00	0.29
	Delivery Vehicles	1.79	2.65	0.05	0.00	0.28
	Heavy Duty Vehicles	0.30	1.86	0.04	0.00	0.07
	Totals	4.76	4.79	0.10	0.01	0.64
SSAB	Passenger Vehicles	0.84	0.09	0.01	0.00	0.09
	Delivery Vehicles	0.56	0.82	0.02	0.00	0.09
	Heavy Duty Vehicles	0.12	0.74	0.01	0.00	0.03
	Totals	1.52	1.65	0.04	0.00	0.21
MDAB	Passenger Vehicles	1.91	0.20	0.01	0.00	0.21
	Delivery Vehicles	1.58	2.34	0.04	0.00	0.25
	Heavy Duty Vehicles	0.25	1.58	0.03	0.00	0.06
	Totals	3.74	4.12	0.09	0.01	0.51
ADEQ	Passenger Vehicles	6.18	0.65	0.05	0.01	0.67
	Delivery Vehicles	5.11	7.56	0.14	0.01	0.81
	Heavy Duty Vehicles	0.82	5.11	0.10	0.01	0.18
	Totals	12.11	13.32	0.28	0.02	1.66
MCAQD	Passenger Vehicles	3.15	0.33	0.02	0.00	0.34
	Delivery Vehicles	2.60	3.85	0.07	0.01	0.41

## Onroad Emissions

Heavy Duty Vehicles	0.74	4.61	0.09	0.01	0.16
Totals	6.49	8.79	0.18	0.02	0.92

## Onroad Emissions

### Worst-Case Daily Onroad Equipment Exhaust Emissions

		SCAB	SSAB	MDAB	ADEQ	MCAQMD
Worst Case Day	Passenger Vehicles	5,798	9,194	8,086	8,201	7,718
	Delivery Vehicles	2,909	5,226	4,727	5,015	4,763
	Heavy Duty Vehicles	2,535	3,192	2,687	2,539	2,995

Note: Worst case day for SCAB, SSAB, and MDAB in 2008, others 2009

		Emissions (lbs/day)				
		CO	NOx	PM	SOx	VOC
Worst Case Day	Passenger Vehicles	68.40	7.22	0.47	0.05	7.40
	Delivery Vehicles	46.37	67.48	1.22	0.10	7.13
	Heavy Duty Vehicles	12.97	82.23	1.52	0.12	2.87
	Totals	127.74	156.92	3.20	0.26	17.40
SCAB	Passenger Vehicles	108.47	11.45	0.74	0.08	11.74
	Delivery Vehicles	83.31	121.24	2.19	0.17	12.80
	Heavy Duty Vehicles	16.33	103.57	1.91	0.15	3.62
	Totals	208.12	236.25	4.84	0.40	28.16
MDAB	Passenger Vehicles	95.40	10.07	0.65	0.07	10.33
	Delivery Vehicles	75.35	109.66	1.98	0.16	11.58
	Heavy Duty Vehicles	13.75	87.18	1.61	0.12	3.04
	Totals	184.51	206.90	4.24	0.35	24.95
ADEQ	Passenger Vehicles	88.97	9.33	0.66	0.07	9.67
	Delivery Vehicles	72.91	107.82	2.01	0.17	11.51
	Heavy Duty Vehicles	12.03	74.79	1.42	0.12	2.65
	Totals	173.92	191.94	4.09	0.36	23.82
MDAOD	Passenger Vehicles	83.74	8.78	0.62	0.07	9.10
	Delivery Vehicles	69.25	102.40	1.90	0.16	10.93
	Heavy Duty Vehicles	14.19	88.22	1.67	0.14	3.12
	Totals	167.18	199.41	4.20	0.36	23.15

# Offroad Equipment Daily Construction Spread Emissions

## 2008 SCAQMD Offroad Emission Factors

	HP	SCAQMD HP
Backhoe	85	50
Compactor	165	175
Crane, 150 Ton	250	250
Crane	180	175
Crane, Rough Terrain, 35 Ton	150	175
Crane, Rough Terrain, 25 Ton	125	120
Digger, Truck Mount	190	175
Ditch Digger	75	50
Dozer, D6	165	175
Dozer, D8	305	250
Dozer/Driller, D8	305	250
Forklift - 5 ton	75	50
Forklift - 10 ton	85	50
Loader	145	120
Loader - 980	305	250
Manlift	85	50
Motor Grader	110	120
Tension Machine	135	120
Water Truck	175	175
USEPA Phase II Engine Base Emission Factors (EPA420-R-05-019)		
Aux Power - Gasoline	5	na
Compressor - Gasoline	75	na

Assumes 50% load

SCAQMD Emission Factor lbs/hour				
CO	NOx	PM	SOx	VOC
0.476	0.352	0.052	0.00043	0.178
0.559	0.987	0.054	0.00134	0.083
0.233	1.081	0.035	0.00140	0.068
0.454	0.827	0.053	0.00100	0.082
0.454	0.827	0.053	0.00100	0.082
0.349	0.593	0.062	0.00065	0.079
0.728	1.226	0.064	0.00179	0.095
0.256	0.299	0.029	0.00047	0.066
0.727	1.607	0.101	0.00151	0.169
0.515	2.06	0.083	0.00207	0.156
0.515	2.06	0.083	0.00207	0.156
0.342	0.329	0.038	0.00049	0.098
0.342	0.329	0.038	0.00049	0.098
0.397	0.665	0.066	0.00076	0.085
0.29	1.358	0.041	0.00185	0.081
0.331	0.301	0.04	0.00040	0.134
0.501	0.869	0.085	0.00097	0.114
0.566	1.114	0.105	0.00105	0.161
0.736	1.387	0.093	0.00155	0.147
1.94	0.010	0.00033	0.00006	0.034
0.99	0.057	0.00496	0.00054	0.022

## 2008 Basis

### Marshalling Yards

	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	2008 Daily Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
Crane, Rough Terrain, 25 Ton	125	120	3	0.349	0.593	0.062	0.00065	0.079	5	5.45	9.27	0.97	0.01	1.23
Forklift - 5 ton	75	50	2	0.342	0.329	0.038	0.00049	0.098	5	5.13	4.94	0.57	0.01	1.47
Forklift - 10 ton	85	50	2	0.342	0.329	0.038	0.00049	0.098	5	5.81	5.59	0.65	0.01	1.67
Water Truck	175	175	2	0.736	1.387	0.093	0.00155	0.147	2	2.94	5.55	0.37	0.01	0.59
Aux Power - Gasoline	5	na	1	1.94	0.010	0.00033	0.00006	0.034	1	1.94	0.01	0.00	0.00	0.03
										21.28	25.35	2.56	0.03	4.99

### Road Work/Tower Pads

	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
Dozer, D8	305	250	1	0.515	2.06	0.083	0.00207	0.156	2.5	1.57	6.28	0.25	0.01	0.48
Dozer, D6	165	175	1	0.727	1.607	0.101	0.00151	0.169	5	3.43	7.58	0.48	0.01	0.80
Motor Grader	110	120	1	0.501	0.869	0.085	0.00097	0.114	7.5	3.44	5.97	0.58	0.01	0.78
Backhoe	85	50	2	0.476	0.352	0.052	0.00043	0.178	5	8.09	5.98	0.88	0.01	3.03
Water Truck	175	175	2	0.736	1.387	0.093	0.00155	0.147	7.5	11.04	20.81	1.40	0.02	2.21
										27.57	46.62	3.59	0.05	7.29

## Offroad Equipment Daily Construction Spread Emissions

Foundations	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
Digger, Truck Mount	190	175	3	0.728	1.226	0.064	0.00179	0.095	8.5	20.16	33.94	1.77	0.05	2.63
Loader	145	120	2	0.397	0.665	0.066	0.00076	0.085	3.5	3.36	5.62	0.56	0.01	0.72
Backhoe	85	50	2	0.476	0.352	0.052	0.00043	0.178	5	8.09	5.98	0.88	0.01	3.03
Water Truck	175	175	2	0.736	1.387	0.093	0.00155	0.147	8.5	12.51	23.58	1.58	0.03	2.50
Aux Power - Gasoline	5	na	2	1.94	0.010	0.00033	0.00006	0.034	0.5	1.94	0.01	0.00	0.00	0.03
										46.05	69.14	4.80	0.09	8.91

Steel Assembly	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
Crane, 150 Ton	250	250	1	0.233	1.081	0.035	0.00140	0.068	5	1.17	5.41	0.18	0.01	0.34
Crane, Rough Terrain, 25 Ton	125	120	4	0.349	0.593	0.062	0.00065	0.079	5	7.27	12.35	1.29	0.01	1.65
Water Truck	175	175	1	0.736	1.387	0.093	0.00155	0.147	7.5	5.52	10.40	0.70	0.01	1.10
Aux Power - Gasoline	5	na	2	1.94	0.010	0.00033	0.00006	0.034	0.5	1.94	0.01	0.00	0.00	0.03
Compressor - Gasoline	75	na	6	0.99	0.057	0.00496	0.00054	0.022	5	29.61	1.71	0.15	0.02	0.67
										45.51	29.88	2.31	0.05	3.79

Conductor Installation	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
Crane, Rough Terrain, 25 Ton	125	120	6	0.349	0.593	0.062	0.00065	0.079	3.5	7.63	12.97	1.36	0.01	1.73
Digger, Truck Mount	190	175	1	0.728	1.226	0.064	0.00179	0.095	2.5	1.98	3.33	0.17	0.00	0.26
Dozer/Driller, D8	305	250	2	0.515	2.06	0.083	0.00207	0.156	2.5	3.14	12.57	0.51	0.01	0.95
Dozer/Driller, D8	305	250	2	0.515	2.06	0.083	0.00207	0.156	2.5	3.14	12.57	0.51	0.01	0.95
Backhoe	85	50	2	0.476	0.352	0.052	0.00043	0.178	2.5	4.05	2.99	0.44	0.00	1.51
Tension Machine	135	120	2	0.566	1.114	0.105	0.00105	0.161	2.5	3.18	6.27	0.59	0.01	0.91
Water Truck	175	175	1	0.736	1.387	0.093	0.00155	0.147	7.5	5.52	10.40	0.70	0.01	1.10
Aux Power - Gasoline	5	na	4	1.94	0.010	0.00033	0.00006	0.034	0.5	3.87	0.02	0.00	0.00	0.07
										32.51	61.11	4.27	0.07	7.48

Cleanup and Guard Poles	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
Dozer, D6	165	175	1	0.727	1.607	0.101	0.00151	0.169	5	3.43	7.58	0.48	0.01	0.80
Motor Grader	110	120	1	0.501	0.869	0.085	0.00097	0.114	7.5	3.44	5.97	0.58	0.01	0.78
Backhoe	85	50	1	0.476	0.352	0.052	0.00043	0.178	2.5	2.02	1.50	0.22	0.00	0.76
Water Truck	175	175	1	0.736	1.387	0.093	0.00155	0.147	7.5	5.52	10.40	0.70	0.01	1.10
										14.41	25.45	1.98	0.03	3.44

Wreck-out	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
West of Devers														
Crane, Rough Terrain, 35 Ton	150	175	2	0.454	0.827	0.053	0.00100	0.082	5	3.89	7.09	0.45	0.01	0.70
Dozer, D6	165	175	1	0.727	1.607	0.101	0.00151	0.169	7.5	5.14	11.36	0.71	0.01	1.20
Backhoe	85	50	1	0.476	0.352	0.052	0.00043	0.178	7.5	6.07	4.49	0.66	0.01	2.27
Water Truck	175	175	1	0.736	1.387	0.093	0.00155	0.147	7.5	5.52	10.40	0.70	0.01	1.10
Aux Power - Gasoline	5	na	2	1.94	0.010	0.00033	0.00006	0.034	1	3.87	0.02	0.00	0.00	0.07
										24.49	33.36	2.53	0.04	5.34

## Offroad Equipment Daily Construction Spread Emissions

Bypass Installation West of Devers	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
Digger, Truck Mount	190	175	1	0.728	1.226	0.064	0.00179	0.095	2.50	1.98	3.33	0.17	0.00	0.26
Dozer/Driller, D8	305	250	1	0.515	2.06	0.083	0.00207	0.156	2.5	1.57	6.28	0.25	0.01	0.48
Dozer/Driller, D8	305	250	1	0.515	2.06	0.083	0.00207	0.156	1	0.63	2.51	0.10	0.00	0.19
Backhoe	85	50	1	0.476	0.352	0.052	0.00043	0.178	2.5	2.02	1.50	0.22	0.00	0.76
Tension Machine	135	120	1	0.566	1.114	0.105	0.00105	0.161	1	0.64	1.25	0.12	0.00	0.18
Water Truck	175	175	1	0.736	1.387	0.093	0.00155	0.147	3.5	2.58	4.85	0.33	0.01	0.51
Aux Power - Gasoline	5	na	2	1.94	0.010	0.00033	0.00006	0.034	1	3.87	0.02	0.00	0.00	0.07
										13.28	19.75	1.19	0.02	2.44

Bypass Removal West of Devers	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
Dozer, D6	165	175	1	0.727	1.607	0.101	0.00151	0.169	2.5	1.71	3.79	0.24	0.00	0.40
Backhoe	85	50	1	0.476	0.352	0.052	0.00043	0.178	5	4.05	2.99	0.44	0.00	1.51
Tension Machine	135	120	1	0.566	1.114	0.105	0.00105	0.161	1	0.64	1.25	0.12	0.00	0.18
Water Truck	175	175	1	0.736	1.387	0.093	0.00155	0.147	3.5	2.58	4.85	0.33	0.01	0.51
Aux Power - Gasoline	5	na	2	1.94	0.010	0.00033	0.00006	0.034	1	3.87	0.02	0.00	0.00	0.07
										12.84	12.91	1.12	0.01	2.67

Conductor Removal	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
Crane, Rough Terrain, 25 Ton	125	120	2	0.349	0.593	0.062	0.00065	0.079	3.5	2.54	4.32	0.45	0.00	0.58
Tension Machine	135	120	1	0.566	1.114	0.105	0.00105	0.161	2.5	1.59	3.13	0.30	0.00	0.45
Water Truck	175	175	1	0.736	1.387	0.093	0.00155	0.147	3.5	2.58	4.85	0.33	0.01	0.51
Aux Power - Gasoline	5	na	2	1.94	0.010	0.00033	0.00006	0.034	1	3.87	0.02	0.00	0.00	0.07
										10.58	12.33	1.07	0.01	1.61

Civil (Substation)	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
Forklift - 5 ton	75	50	1	0.342	0.329	0.038	0.00049	0.098	6	3.08	2.96	0.34	0.00	0.88
Backhoe	85	50	2	0.476	0.352	0.052	0.00043	0.178	5	8.09	5.98	0.88	0.01	3.03
Ditch Digger	75	50	1	0.256	0.299	0.029	0.00047	0.066	4	1.54	1.79	0.17	0.00	0.40
										12.71	10.74	1.40	0.01	4.30

Electrical (Substation)	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
Crane, 150 Ton	250	250	1	0.233	1.081	0.035	0.00140	0.068	5	1.17	5.41	0.18	0.01	0.34
Forklift - 5 ton	75	50	1	0.342	0.329	0.038	0.00049	0.098	6	3.08	2.96	0.34	0.00	0.88
Manlift	85	50	1	0.331	0.301	0.04	0.00040	0.134	4	2.25	2.05	0.27	0.00	0.91
Ditch Digger	75	50	1	0.256	0.299	0.029	0.00047	0.066	4	1.54	1.79	0.17	0.00	0.40
										8.03	12.21	0.96	0.02	2.53

# Offroad Equipment Daily Construction Spread Emissions

## 2009 SCAQMD Offroad Emission Factors

	HP	SCAQMD HP
Backhoe	85	50
Compactor	165	175
Crane, 150 Ton	250	250
Crane	180	175
Crane, Rough Terrain, 35 Ton	150	175
Crane, Rough Terrain, 25 Ton	125	120
Digger, Truck Mount	190	175
Ditch Digger	75	50
Dozer, D6	165	175
Dozer, D8	305	250
Dozer/Driller, D8	305	250
Excavator - 325B	168	175
Forklift - 5 ton	75	50
Forklift - 10 ton	85	50
Loader	145	120
Loader - 980	305	250
Manlift	85	50
Motor Grader	110	120
Scraper 623F	365	250
Tension Machine	135	120
Water Truck	175	175

SCAQMD Emission Factor lbs/hour				
CO	NOx	PM	SOx	VOC
0.477	0.35	0.052	0.000432	0.176
0.559	0.892	0.049	0.001344	0.073
0.228	0.994	0.033	0.001398	0.064
0.455	0.755	0.049	0.001002	0.075
0.455	0.755	0.049	0.001002	0.075
0.345	0.55	0.057	0.000648	0.071
0.727	1.08	0.056	0.001794	0.081
0.242	0.292	0.027	0.000474	0.054
0.727	1.557	0.1	0.001506	0.165
0.493	1.993	0.079	0.00207	0.15
0.493	1.993	0.079	0.00207	0.15
0.289	1.195	0.037	0.001974	0.069
0.327	0.321	0.036	0.000486	0.083
0.327	0.321	0.036	0.000486	0.083
0.392	0.612	0.06	0.000762	0.075
0.285	1.236	0.039	0.001854	0.076
0.329	0.299	0.04	0.000396	0.1
0.494	0.806	0.078	0.000972	0.1
0.469	2.106	0.072	0.00261	0.141
0.564	1.079	0.102	0.00105	0.14
0.734	1.269	0.088	0.001548	0.13

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

Aux Power - Gasoline	5	na
Compressor - Gasoline	75	na

1.94	0.010	0.00033	0.00006	0.034
0.99	0.057	0.00496	0.00054	0.022

Assumes 50% load

## 2009 Basis

### Marshalling Yards

	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	2008 Daily Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
Crane, Rough Terrain, 25 Ton	125	120	3	0.345	0.55	0.057	0.000648	0.071	5	5.39	8.59	0.89	0.01	1.11
Forklift - 5 ton	75	50	2	0.327	0.321	0.036	0.000486	0.083	5	4.91	4.82	0.54	0.01	1.25
Forklift - 10 ton	85	50	2	0.327	0.321	0.036	0.000486	0.083	5	5.56	5.46	0.61	0.01	1.41
Water Truck	175	175	2	0.734	1.269	0.088	0.001548	0.13	2	2.94	5.08	0.35	0.01	0.52
Aux Power - Gasoline	5	na	1	1.94	0.010	0.00033	0.00006	0.034	1	1.94	0.01	0.00	0.00	0.03
										20.73	23.95	2.39	0.03	4.32

### Road Work/Tower Pads

	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
Dozer, D8	305	250	1	0.493	1.993	0.079	0.00207	0.15	2.5	1.50	6.08	0.24	0.01	0.46
Dozer, D6	165	175	1	0.727	1.557	0.1	0.001506	0.165	5	3.43	7.34	0.47	0.01	0.78
Motor Grader	110	120	1	0.494	0.806	0.078	0.000972	0.1	7.5	3.40	5.54	0.54	0.01	0.69
Backhoe	85	50	2	0.477	0.35	0.052	0.000432	0.176	5	8.11	5.95	0.88	0.01	2.99
Water Truck	175	175	2	0.734	1.269	0.088	0.001548	0.13	7.5	11.01	19.04	1.32	0.02	1.95
										27.45	43.95	3.45	0.05	6.86

## Offroad Equipment Daily Construction Spread Emissions

Foundations	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
Digger, Truck Mount	190	175	3	0.727	1.08	0.056	0.001794	0.081	8.5	20.13	29.90	1.55	0.05	2.24
Loader	145	120	2	0.392	0.612	0.06	0.000762	0.075	3.5	3.32	5.18	0.51	0.01	0.63
Backhoe	85	50	2	0.477	0.35	0.052	0.000432	0.176	5	8.11	5.95	0.88	0.01	2.99
Water Truck	175	175	2	0.734	1.269	0.088	0.001548	0.13	8.5	12.48	21.57	1.50	0.03	2.21
Aux Power - Gasoline	5	na	2	1.94	0.010	0.00033	0.00006	0.034	0.5	1.94	0.01	0.00	0.00	0.03
										45.97	62.61	4.44	0.09	8.11

Steel Assembly	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
Crane, 150 Ton	250	250	1	0.228	0.994	0.033	0.001398	0.064	5	1.14	4.97	0.17	0.01	0.32
Crane, Rough Terrain, 25 Ton	125	120	4	0.345	0.55	0.057	0.000648	0.071	5	7.19	11.46	1.19	0.01	1.48
Water Truck	175	175	1	0.734	1.269	0.088	0.001548	0.13	7.5	5.51	9.52	0.66	0.01	0.98
Aux Power - Gasoline	5	na	2	1.94	0.010	0.00033	0.00006	0.034	0.5	1.94	0.01	0.00	0.00	0.03
Compressor - Gasoline	75	na	6	0.99	0.057	0.00496	0.00054	0.022	5	29.61	1.71	0.15	0.02	0.67
										45.38	27.67	2.16	0.05	3.48

Conductor Installation	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
Crane, Rough Terrain, 25 Ton	125	120	6	0.345	0.55	0.057	0.000648	0.071	3.5	7.55	12.03	1.25	0.01	1.55
Digger, Truck Mount	190	175	1	0.727	1.08	0.056	0.001794	0.081	2.5	1.97	2.93	0.15	0.00	0.22
Dozer/Driller, D8	305	250	2	0.493	1.993	0.079	0.00207	0.15	2.5	3.01	12.16	0.48	0.01	0.92
Dozer/Driller, D8	305	250	2	0.493	1.993	0.079	0.00207	0.15	2.5	3.01	12.16	0.48	0.01	0.92
Backhoe	85	50	2	0.477	0.35	0.052	0.000432	0.176	2.5	4.05	2.98	0.44	0.00	1.50
Tension Machine	135	120	2	0.564	1.079	0.102	0.00105	0.14	2.5	3.17	6.07	0.57	0.01	0.79
Water Truck	175	175	1	0.734	1.269	0.088	0.001548	0.13	7.5	5.51	9.52	0.66	0.01	0.98
Aux Power - Gasoline	5	na	4	1.94	0.010	0.00033	0.00006	0.034	0.5	3.87	0.02	0.00	0.00	0.07
										32.14	57.86	4.04	0.07	6.93

Cleanup and Guard Poles	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
Dozer, D6	165	175	1	0.727	1.557	0.1	0.001506	0.165	5	3.43	7.34	0.47	0.01	0.78
Motor Grader	110	120	1	0.494	0.806	0.078	0.000972	0.1	7.5	3.40	5.54	0.54	0.01	0.69
Backhoe	85	50	1	0.477	0.35	0.052	0.000432	0.176	2.5	2.03	1.49	0.22	0.00	0.75
Water Truck	175	175	1	0.734	1.269	0.088	0.001548	0.13	7.5	5.51	9.52	0.66	0.01	0.98
										14.36	23.89	1.89	0.03	3.19

Wreck-out	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
West of Devers														
Crane, Rough Terrain, 35 Ton	150	175	2	0.455	0.755	0.049	0.001002	0.075	5	3.90	6.47	0.42	0.01	0.64
Dozer, D6	165	175	1	0.727	1.557	0.1	0.001506	0.165	7.5	5.14	11.01	0.71	0.01	1.17
Backhoe	85	50	1	0.477	0.35	0.052	0.000432	0.176	7.5	6.08	4.46	0.66	0.01	2.24
Water Truck	175	175	1	0.734	1.269	0.088	0.001548	0.13	7.5	5.51	9.52	0.66	0.01	0.98
Aux Power - Gasoline	5	na	2	1.94	0.010	0.00033	0.00006	0.034	1	3.87	0.02	0.00	0.00	0.07
										24.50	31.48	2.45	0.04	5.10

## Offroad Equipment Daily Construction Spread Emissions

Bypass Installation West of Devers	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
Digger, Truck Mount	190	175	1	0.727	1.08	0.056	0.001794	0.081	2.50	1.97	2.93	0.15	0.00	0.22
Dozer/Driller, D8	305	250	1	0.493	1.993	0.079	0.00207	0.15	2.5	1.50	6.08	0.24	0.01	0.46
Dozer/Driller, D8	305	250	1	0.493	1.993	0.079	0.00207	0.15	1	0.60	2.43	0.10	0.00	0.18
Backhoe	85	50	1	0.477	0.35	0.052	0.000432	0.176	2.5	2.03	1.49	0.22	0.00	0.75
Tension Machine	135	120	1	0.564	1.079	0.102	0.00105	0.14	1	0.63	1.21	0.11	0.00	0.16
Water Truck	175	175	1	0.734	1.269	0.088	0.001548	0.13	3.5	2.57	4.44	0.31	0.01	0.46
Aux Power - Gasoline	5	na	2	1.94	0.010	0.00033	0.00006	0.034	1	3.87	0.02	0.00	0.00	0.07
										13.18	18.60	1.13	0.02	2.29

Bypass Removal West of Devers	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
Dozer, D6	165	175	1	0.727	1.557	0.1	0.001506	0.165	2.5	1.71	3.67	0.24	0.00	0.39
Backhoe	85	50	1	0.477	0.35	0.052	0.000432	0.176	5	4.05	2.98	0.44	0.00	1.50
Tension Machine	135	120	1	0.564	1.079	0.102	0.00105	0.14	1	0.63	1.21	0.11	0.00	0.16
Water Truck	175	175	1	0.734	1.269	0.088	0.001548	0.13	3.5	2.57	4.44	0.31	0.01	0.46
Aux Power - Gasoline	5	na	2	1.94	0.010	0.00033	0.00006	0.034	1	3.87	0.02	0.00	0.00	0.07
										12.84	12.32	1.10	0.01	2.57

Conductor Removal	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
Crane, Rough Terrain, 25 Ton	125	120	2	0.345	0.55	0.057	0.000648	0.071	3.5	2.52	4.01	0.42	0.00	0.52
Tension Machine	135	120	1	0.564	1.079	0.102	0.00105	0.14	2.5	1.59	3.03	0.29	0.00	0.39
Water Truck	175	175	1	0.734	1.269	0.088	0.001548	0.13	3.5	2.57	4.44	0.31	0.01	0.46
Aux Power - Gasoline	5	na	2	1.94	0.010	0.00033	0.00006	0.034	1	3.87	0.02	0.00	0.00	0.07
										10.54	11.51	1.01	0.01	1.43

Civil (Substation Rework)	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
Forklift - 5 ton	75	50	1	0.327	0.321	0.036	0.000486	0.083	6	2.94	2.89	0.32	0.00	0.75
Backhoe	85	50	2	0.477	0.35	0.052	0.000432	0.176	5	8.11	5.95	0.88	0.01	2.99
Ditch Digger	75	50	1	0.242	0.292	0.027	0.000474	0.054	4	1.45	1.75	0.16	0.00	0.32
										12.50	10.59	1.37	0.01	4.06

Electrical (Substation New or Rework)	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
Crane, 150 Ton	250	250	1	0.228	0.994	0.033	0.001398	0.064	5	1.14	4.97	0.17	0.01	0.32
Forklift - 5 ton	75	50	1	0.327	0.321	0.036	0.000486	0.083	6	2.94	2.89	0.32	0.00	0.75
Manlift	85	50	1	0.329	0.299	0.04	0.000396	0.1	4	2.24	2.03	0.27	0.00	0.68
Ditch Digger	75	50	1	0.242	0.292	0.027	0.000474	0.054	4	1.45	1.75	0.16	0.00	0.32
										7.77	11.64	0.92	0.02	2.07

Civil (New Substation)	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
Dozer/Driller, D8	305	250	1	0.493	1.993	0.079	0.00207	0.15	5	3.01	12.16	0.48	0.01	0.92
Motor Grader	110	120	1	0.494	0.806	0.078	0.000972	0.1	5	2.26	3.69	0.36	0.00	0.46
Excavator - 325B	168	175	1	0.289	1.195	0.037	0.001974	0.069	4	1.11	4.59	0.14	0.01	0.26
Compactor	165	175	1	0.559	0.892	0.049	0.001344	0.073	7.5	3.95	6.31	0.35	0.01	0.52
Loader - 980	305	250	1	0.285	1.236	0.039	0.001854	0.076	4	1.39	6.03	0.19	0.01	0.37
Water Truck	175	175	1	0.734	1.269	0.088	0.001548	0.13	7.5	5.51	9.52	0.66	0.01	0.98
										17.23	42.30	2.18	0.05	3.50

## Offroad Emissions

		Emissions tons/year)				
<b>Total Offroad Exhaust Emissions</b>		CO	NOx	PM	SOx	VOC
EOD 2008		18.32	24.77	1.89	0.03	3.50
EOD 2009		16.24	21.09	1.59	0.03	2.79
Subtotal		34.55	45.86	3.48	0.06	6.29
		Emissions tons/year)				
WOD 2008		12.33	16.85	1.29	0.02	2.35
WOD 2009		8.26	10.95	0.88	0.01	1.65
Subtotal		20.59	27.81	2.17	0.03	4.00
Project Total		55.14	73.67	5.66	0.09	10.29

<b>Worst Case Day Emissions</b>		Emissions pounds/day)				
Jurisdiction		CO	NOx	PM	SOx	VOC
SCAQMD SCAB (WOD)		254.86	333.41	25.82	0.40	51.36
SCAQMD SSAB/MDAB (EOD)		166.08	208.43	16.30	0.27	32.00
MDAQMD		145.35	185.49	13.94	0.24	25.17

<b>2008 Annual Emissions</b>		Emissions tons/year)				
		CO	NOx	PM	SOx	VOC
SCAB		12.10	16.51	1.26	0.02	2.31
SSAB		10.66	14.26	1.10	0.02	2.02
MDAB		6.33	8.30	0.62	0.01	1.14
ADEQ		1.24	2.02	0.15	0.00	0.30
Maricopa		0.32	0.54	0.04	0.00	0.08
Total		30.65	41.62	3.18	0.05	5.85

<b>2009 Annual Emissions</b>		Emissions tons/year)				
		CO	NOx	PM	SOx	VOC
SCAB		4.90	6.51	0.55	0.01	1.04
SSAB		3.36	4.44	0.34	0.01	0.61
MDAB		3.04	4.82	0.34	0.01	0.61
ADEQ		8.95	11.07	0.84	0.01	1.46
Maricopa		4.25	5.20	0.41	0.01	0.72
Total		24.49	32.05	2.47	0.04	4.44

# Helicopter Emission Calculations

## 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
T58-GE-5 (2)	1500	2	1.40	9.92	12.79	0.11	0.71

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

Idle		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
T58-GE-5 (2)	1500	2	25.86	45.12	0.40	0.02	0.03

Source: FAEED database

FAEED - FAA Aircraft Engine Emission Database

## Relating Factors to Potential Construction/Operating Helicopters

Approach/Climbout		Emissions (lbs/hour)					
	Engine HP	Number	HC	CO	NOx	SOx	PM
Hughes 500	420	1	0.08	0.78	1.91	0.00	0.10
Eurocopter	847	1	0.15	1.57	3.85	0.00	0.21
Skycrane	4500	2	4.20	29.76	38.37	0.00	2.13

Idle		Emissions (lbs/hour)					
	Engine HP	Number	HC	CO	NOx	SOx	PM
Hughes 500	420	1	3.44	1.61	0.08	0.00	0.01
Eurocopter	847	1	6.93	3.24	0.15	0.00	0.01
Skycrane	4500	2	77.59	135.36	1.20	0.00	0.08

## Construction

### Assumptions:

Only the Hughes 500 size helicopters are used during conductor installation for the proposed project.

Two Hughes helicopters are in operation during line stringing for 2.5 hours/day each.

Basis - PEA and Response to question 054

The Dever-Valley Alternative requires 8 hours per day of Skycrane, 2 hours/day of Eurocopter, and Hughes 500 helicopter use is the same as for the proposed project.

The per tower Skycrane usage is 3 hours, Eurocopter is 1 hours for the Devers-Valley Alternative

Idle time is 10% of working time for small helicopters and negligible for the Skycrane.

Assumes helicopters stay within 3000 feet of the ground.

Applicant Measure APM-G7 notes use of helicopters assisted construction in sensitive areas, but that APM is not assumed to be implemented in this emission estimate.

## Proposed Project Emissions

Peak Day (any Jurisdiction or Air Basin)		Emissions (lbs/day)					
	Working hours	Idle hr/hr	CO	NOx	PM	SOx	VOC
Hughes 500	5	0.1	4.69	9.58	0.52	0.00	2.10
Eurocopter	0	0	0.00	0.00	0.00	0.00	0.00
Skycrane	0	0	0.00	0.00	0.00	0.00	0.00
<b>Totals</b>			<b>4.69</b>	<b>9.58</b>	<b>0.52</b>	<b>0.00</b>	<b>2.10</b>

# Helicopter Emission Calculations

Total Emissions - Tons  
2008

Jurisdiction	EOD	WOD	Days	Emissions (tons/yr)				
				CO	NOx	PM	SOx	VOC
SCAB	0	178	178	0.42	0.85	0.05	0.00	0.19
SSAB	110	0	110	0.26	0.53	0.03	0.00	0.12
MDAB	51	0	51	0.12	0.24	0.01	0.00	0.05
ADEQ	0	0	0	0.00	0.00	0.00	0.00	0.00
Maricopa	0	0	0	0.00	0.00	0.00	0.00	0.00
<b>Totals</b>				<b>0.38</b>	<b>0.77</b>	<b>0.04</b>	<b>0.00</b>	<b>0.17</b>

Total Emissions - Tons  
2009

Jurisdiction	EOD	WOD	Days	Emissions (tons/yr)				
				CO	NOx	PM	SOx	VOC
SCAB	0	67	67	0.16	0.32	0.02	0.00	0.07
SSAB	0	63	63	0.15	0.30	0.02	0.00	0.07
MDAB	46	0	46	0.11	0.22	0.01	0.00	0.05
ADEQ	126	0	126	0.30	0.60	0.03	0.00	0.13
Maricopa	47	0	47	0.11	0.23	0.01	0.00	0.05
<b>Totals</b>				<b>0.66</b>	<b>1.35</b>	<b>0.07</b>	<b>0.00</b>	<b>0.30</b>

## Devers-Valley No. 2 Alternative (Alt 8) Emissions

Peak Day (any Jurisdiction or Air Basin)

	Working hours	Idle hr/hr	Emissions (lbs/day)				
			CO	NOx	PM	SOx	VOC
Hughes 500	5	0.1	4.69	9.58	0.52	0.00	2.10
Eurocopter	2	0.1	3.79	7.73	0.42	0.00	1.69
Skycrane	8	0	238.09	306.96	17.01	0.00	33.59
<b>Totals</b>			<b>246.57</b>	<b>324.28</b>	<b>17.95</b>	<b>0.00</b>	<b>37.37</b>

Towers  
6

	Hours Total	Idle hr/hr	Emissions (tons/yr)				
			CO	NOx	PM	SOx	VOC
SCAB							
Hughes	270	0.1	0.13	0.26	0.01	0.00	0.06
Eurocopter	6	0.1	0.01	0.01	0.00	0.00	0.00
Skycrane	18	0	0.27	0.35	0.02	0.00	0.04
<b>Totals</b>			<b>0.40</b>	<b>0.62</b>	<b>0.03</b>	<b>0.00</b>	<b>0.10</b>

Towers  
10

	Hours Total	Idle hr/hr	Emissions (tons/yr)				
			CO	NOx	PM	SOx	VOC
SSAB							
Hughes	80	0.1	0.04	0.08	0.00	0.00	0.02
Eurocopter	10	0.1	0.01	0.02	0.00	0.00	0.00
Skycrane	30	0	0.45	0.58	0.03	0.00	0.06
<b>Totals</b>			<b>0.49</b>	<b>0.67</b>	<b>0.04</b>	<b>0.00</b>	<b>0.08</b>

## Fugitive Dust Emissions

### 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)

$$E = k \times (s)^{1.5} / (M)^{1.4} \text{ For PM}_{10} \text{ and } k \times 5.7 \times (s)^{1.2} / (M)^{1.3} \text{ for PM}_{2.5}$$

$$E = \text{lb/hr}$$

$$k = \text{Scaling Constant (0.75 for PM}_{10} \text{ and 0.105 for PM}_{2.5}\text{)}$$

$$s = \text{Silt Content (assumed to be 8.5\% - Construction Sites)}$$

$$M = \text{Moisture Content} = 12\% \text{ (assumes watering when necessary for mitigation)}$$

PM10 Emission Factor

0.573239235 lb/hr

PM2.5 Emission Factor

0.308625101 lb/hr

Daily Dozer	Annual Dozer 2008					Annual Dozer 2009					
	All	SCAB	SSAB	MDAB	ADEQ	MCAQD	SCAB	SSAB	MDAB	ADEQ	MCAQD
Road Work	7.5	262.5	405	360	450	172.5	142.5	97.5	0	0	0
Wreckout	7.5	585	0	0	0	0	322.5	225	0	0	0
Shu-Fly rem.	2.5	5	0	0	0	0	5	0	0	0	0
Clean up	0	465	535	120	0	0	345	200	355	585	230
Mid Point Substation	0	0	0	0	0	0	0	0	300	0	0
Totals	17.5	1317.5	940	480	450	172.5	815	522.5	655	585	230

##### Dozer Emissions

	Lbs/Day		2008 Tons/year		2009 Tons/year	
	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
	SCAB	10.03	5.40	0.38	0.20	0.23
SSAB	10.03	5.40	0.27	0.15	0.15	0.08
MDAB	10.03	5.40	0.14	0.07	0.19	0.10
ADEQ	10.03	5.40	0.13	0.07	0.17	0.09
MDAQD	10.03	5.40	0.05	0.03	0.07	0.04
	<b>Totals</b>		<b>0.96</b>	<b>0.52</b>	<b>0.80</b>	<b>0.43</b>

#### B) Grading

$$E = k \times 0.051 \times (S)^{2.0} \text{ for PM}_{10} \text{ and } k \times 0.040 \times (S)^{2.5} \text{ for PM}_{2.5}$$

$$E = \text{lb/VMT}$$

$$k = \text{Scaling Constant (0.60 for PM}_{10} \text{ and 0.031 for PM}_{2.5}\text{)}$$

$$S = \text{Mean Vehicle Speed assumed to be 3 mph}$$

$$\text{Assumes VMT} = 3 \times \text{hours in use}$$

PM10 Emission Factor

0.2754 lb/VMT

PM2.5 Emission Factor

0.019329687 lb/VMT

Daily Max	Annual Grader 2008					Annual Grader 2009						
	All	SCAB	SSAB	MDAB	ADEQ	MCAQD	SCAB	SSAB	MDAB	ADEQ		MCAQD
Road Work	7.5	262.5	405	360	450	172.5	142.5	97.5	0	0	0	Hours
Clean up	0	697.5	802.5	180	0	0	322.5	300	832.5	877.5	345	Hours
Totals	22.5	2880	3622.5	1620	1350	517.5	1395	1192.5	2497.5	2632.5	1035	VMT

## Fugitive Dust Emissions

### Grading Emissions

	Lbs/Day		2008 Tons/year		2009 Tons/year	
	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
	SCAB	6.20	0.43	0.83	0.44	0.40
SSAB	6.20	0.43	1.04	0.56	0.34	0.18
MDAB	6.20	0.43	0.46	0.25	0.72	0.39
ADEQ	6.20	0.43	0.39	0.21	0.75	0.41
MDAQD	6.20	0.43	0.15	0.08	0.30	0.16
	<b>Totals</b>		<b>2.86</b>	<b>1.54</b>	<b>2.51</b>	<b>1.35</b>

### 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 (construction hours) = SCAB - 20.7 MPH worst day, 8.9 MPH avg from Banning Met File; SSAB/MDAB/ADEQ/MDAQD - 28.6 MPH worst day, 7.2 MPH avg from 1989-91 Blythe Airport Met Data

M = moisture content = 8%

This emission category is meant to pick up digger emissions, backhoe emissions, loader emissions

Amount of loose material moved is assumed to be 250 cy/tower site and materials will be dropped twice (initial removal and replacement or into truck

Daily earth movement = 500 cy/day in each air basin, and SCAB has 113 towers and MDAB has 41 tower:

Midpoint substation has 13,500,000 lbs of earth moving (6,750 tons) over a 15 day period

Material is assumed to be 1.7 tons/cy

Daily All 

1700	Daily tons
------	------------

 (two sites/day)

Annual	Total	2008	2009
SCAB	117,300	117,300	0
SSAB	221,850	192,100	29,750
MDAB	177,600	170,850	6,750
ADEQ	210,800	31,620	179,180
MDAQD	81,600	0	81,600

### Emission Factors and Emissions

	Emission Factors				Lbs/Day		2008 Tons/year		2009 Tons/year	
	PM10 Daily	PM2.5 Daily	PM10 Annual	PM2.5 Annual	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
	SCAB	0.00102	0.00032	0.00034	0.00011	1.73	0.54	0.02	0.01	0.00
SSAB	0.00155	0.00049	0.00026	0.00008	2.64	0.83	0.02	0.01	0.00	0.00
MDAB	0.00155	0.00049	0.00026	0.00008	2.64	0.83	0.02	0.01	0.00	0.00
ADEQ	0.00155	0.00049	0.00026	0.00008	2.64	0.83	0.00	0.00	0.02	0.01
MDAQD	0.00155	0.00049	0.00026	0.00008	2.64	0.83	0.00	0.00	0.01	0.00
	<b>Totals</b>						<b>0.07</b>	<b>0.02</b>	<b>0.04</b>	<b>0.01</b>

### 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 0.03 g/m2 in SCAB (>10,000 adt) and 0.22 g/m2 for rest 1/4 of each ADT category from Table 13.2.1-3

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)

P = Number of wet days over 0.01 in precipitation for averaging period (34 days/year average for SCAB - SCAQMD CEQA Handbook)

N = days of period = 365 days

Silt loading VMT class

0.03 >10,000

0.06 5,000-10,000

0.2 500-5,000

0.6 <500

(Note precipitation correction not used for worst case day calculations)

Average Vehicle Weight Calculation

Assumptions

Passenger Vehicles = 2 tons average

## Fugitive Dust Emissions

Midsize "Delivery" Vehicles = 8 ton average

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

### Worst Case Day VMT

SCAB	SSAB	MDAB	ADEQ	MCAQMD	
5,708	8,565	7,615	6,151	7,037	Passenger Vehicles
2,820	4,861	4,451	3,761	4,344	Delivery/Work Vehicles
2,477	3,039	2,583	2,116	2,856	Heavy-Heavy Duty Vehicles
11,005	16,465	14,648	12,028	14,237	Total Paved VMT
9.8	8.9	8.8	8.8	9.4	Average Weight (tons)

### Annual Case

SCAB	SSAB	MDAB	ADEQ	MCAQMD	
1,000,247	1,230,143	641,249	115,326	41,005	2008 Passenger Vehicles
495,157	698,180	363,947	65,454	23,273	2008 Delivery/Work Vehicles
522,009	436,545	226,860	44,416	14,552	2008 Heavy-Heavy Duty Vehicles
483,947	152,064	331,474	854,138	541,126	2009 Passenger Vehicles
238,056	74,177	204,648	527,332	334,084	2009 Delivery/Work Vehicles
121,973	48,298	103,053	289,082	305,254	2009 Heavy-Heavy Duty Vehicles
2,861,389	2,639,408	1,871,231	1,895,748	1,259,293	Total Paved VMT
9.8	8.9	8.8	8.8	10.8	Average Weight (tons)

### Emission Factors and Emissions

	Emission Factors (lb/VMT)				Lbs/Day		2008 Tons/year		2009 Tons/year	
	PM10 Daily	PM2.5 Daily	PM10 Annual	PM2.5 Annual	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
	SCAB	0.0057	0.0012	0.0056	0.0012	63.05	13.09	5.64	1.17	2.36
SSAB	0.0191	0.0045	0.0186	0.0044	315.05	74.77	21.94	5.21	2.55	0.60
MDAB	0.0185	0.0044	0.0181	0.0043	271.65	64.36	11.16	2.64	5.79	1.37
ADEQ	0.0187	0.0044	0.0182	0.0043	224.70	53.26	2.05	0.49	15.24	3.61
MCAQMD	0.0208	0.0050	0.0250	0.0060	296.48	70.67	0.99	0.24	14.76	3.55

### 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 = surface silt content = 11% (assumed from public roads made from local materials - WRAP 2004)

W = avg. vehicle weight = calculated below

P = Number of wet days over 0.01 in precipitation for averaging period (34 days/year average for SCAB and 18 for Desert - SCAQMD CEQA Handbook)

(Note precipitation correction not used for worst case day calculations)

### Average Vehicle Weight Calculation

#### Assumptions

Professionals/inspection Vehicles = 3 tons average

Midsize "Delivery" Vehicles = 8 ton average

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

### Worst Case Day VMT

SCAB	SSAB	MDAB	ADEQ	MCAQMD	
89	630	472	2,050	682	Professional/inspection Vehicles
89	365	276	1,254	418	Delivery/Work Vehicles
58	153	104	423	140	Heavy-Heavy Duty Vehicles
235	1,148	852	3,727	1,240	Total Unpaved VMT
11.5	8.2	7.9	7.7	7.7	Average Weight (tons)

### Annual Case VMT

SCAB	SSAB	MDAB	ADEQ	MCAQMD	
14,994	87,867	39,723	38,442	2,929	Professional/inspection Vehicles
14,812	49,870	22,545	21,818	1,662	Delivery/Work Vehicles
10,783	20,304	9,179	8,883	677	Heavy-Heavy Duty Vehicles
8,202	2,577	20,534	284,713	38,652	
8,209	2,558	12,677	175,777	23,863	
4,206	1,665	4,170	57,816	7,849	
61,206	164,842	108,829	587,450	75,632	Total Unpaved VMT
11.1	7.6	7.4	7.2	7.2	Average Weight (tons)

## Fugitive Dust Emissions

Uncontrolled Emission Factors and Emissions

	Emission Factors (lb/VMT)				Lbs/Day		2008		2009	
	PM10 Daily	PM2.5 Daily	PM10 Annual	PM2.5 Annual	PM10	PM2.5	Tons/year		Tons/year	
							PM10	PM2.5	PM10	PM2.5
SCAB	2.5384	0.3892	2.2675	0.3477	597.57	91.63	46.02	7.06	23.38	3.58
SSAB	2.1793	0.3342	2.0082	0.3079	2501.17	383.51	158.69	24.33	6.83	1.05
MDAB	2.1481	0.3294	1.9767	0.3031	1830.03	280.61	70.62	10.83	36.95	5.67
ADEQ	2.1257	0.3259	1.9550	0.2998	7922.73	1214.82	67.59	10.36	506.64	77.68
MCAQD	2.1237	0.3256	1.9530	0.2995	2632.57	403.66	5.14	0.79	68.71	10.54

## Fugitive Dust Emissions

Controlled Emissions (assumes 84% efficiency with use of CARB approved soil binders)

Efficiency	Lbs/Day	2008		2009			
		Tons/year		Tons/year			
		PM10	PM2.5	PM10	PM2.5		
84.00% All But MCAQD							
38.00% MCAQD							
	SCAB	95.61	14.66	7.36	1.13	3.74	0.57
	SSAB	400.19	61.36	25.39	3.89	1.09	0.17
	MDAB	292.81	44.90	11.30	1.73	5.91	0.91
	ADEQ	1267.64	194.37	10.81	1.66	81.06	12.43
	MCAQD	1632.19	250.27	3.19	0.49	42.60	6.53

### Fugitive Dust Emission Totals

		2008		2009			
		PM10 lb/day	PM2.5 lb/day	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
SCAB	Dozer	10.03	5.40	0.38	0.20	0.23	0.13
	Grading	6.20	0.43	0.83	0.44	0.40	0.22
	Soil Handling	1.73	0.54	0.02	0.01	0.00	0.00
	Paved Road Dust	63.05	13.09	5.64	1.17	2.36	0.49
	Unpaved Road Dust	95.61	14.66	7.36	1.13	3.74	0.57
	Totals	176.62	34.13	14.23	2.96	6.73	1.40

		2008		2009			
		PM10 lb/day	PM2.5 lb/day	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
SSAB	Dozer	10.03	5.40	0.27	0.15	0.15	0.08
	Grading	6.20	0.43	1.04	0.56	0.34	0.18
	Soil Handling	2.64	0.83	0.02	0.01	0.00	0.00
	Paved Road Dust	315.05	74.77	21.94	5.21	2.55	0.60
	Unpaved Road Dust	400.19	61.36	25.39	3.89	1.09	0.17
	Totals	734.10	142.80	48.67	9.81	4.14	1.04

		2008		2009			
		PM10 lb/day	PM2.5 lb/day	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
MDAB	Dozer	10.03	5.40	0.14	0.07	0.19	0.10
	Grading	6.20	0.43	0.46	0.25	0.72	0.39
	Soil Handling	2.64	0.83	0.02	0.01	0.00	0.00
	Paved Road Dust	271.65	64.36	11.16	2.64	5.79	1.37
	Unpaved Road Dust	292.81	44.90	11.30	1.73	5.91	0.91
	Totals	583.32	115.92	23.08	4.71	12.60	2.76

		2008		2009			
		PM10 lb/day	PM2.5 lb/day	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
ADEQ	Dozer	10.03	5.40	0.13	0.07	0.17	0.09
	Grading	6.20	0.43	0.39	0.21	0.75	0.41
	Soil Handling	2.64	0.83	0.00	0.00	0.02	0.01
	Paved Road Dust	224.70	53.26	2.05	0.49	15.24	3.61
	Unpaved Road Dust	1267.64	194.37	10.81	1.66	81.06	12.43
	Totals	1511.20	254.29	13.39	2.42	97.25	16.55

		2008		2009			
		PM10 lb/day	PM2.5 lb/day	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
MCAQD	Dozer	10.03	5.40	0.05	0.03	0.07	0.04
	Grading	6.20	0.43	0.15	0.08	0.30	0.16
	Soil Handling	2.64	0.83	0.00	0.00	0.01	0.00
	Paved Road Dust	296.48	70.67	0.99	0.24	14.76	3.55
	Unpaved Road Dust	1632.19	250.27	3.19	0.49	42.60	6.53
	Totals	1947.54	327.60	4.37	0.83	57.74	10.28

## Localized Significance Threshold Calculations

### LST Daily Emission Estimate for Tower Construction and Secondary Staging Yards

Assumptions:

- 1) The worst case daily tower construction CO and NOx emissions are based on the worst case of the daily foundation, steel assembly, and clean-up work tasks. Wreckout is not assumed to occur at tower sites close to residences.
- 2) The worst case daily tower construction PM10 emissions are based on foundation work that assumes 250 cubic yards of earth movement/grading
- 3) Marshalling yards and tower construction sites will be watered at least three times daily (68% dust control for unpaved roads and 12% minimum moisture content for earthmoving)

#### Marshalling Yard Emissions

	Daily Emissions lbs			
	CO	NOx	PM	
Equipment	21.28	25.35	2.56	(from Marshalling Yards off-road equipment estimate)
Fugitive Dust	--	--	1.62	(assumes two miles unpaved vehicle travel on these five acre staging sites)
<b>Totals</b>	<b>21.28</b>	<b>25.35</b>	<b>4.18</b>	

#### Tower Construction Emissions

	Daily Emissions lbs			
	CO	NOx	PM	
Equipment	46.05	69.14	3.59	(includes dozing, earthmoving and unpaved vehicle travel of 2 miles on small tower pad construction sites)
Fugitive Dust	--	--	6.79	
<b>Totals</b>	<b>46.05</b>	<b>69.14</b>	<b>10.38</b>	

#### Substation Upgrade Construction Emissions

	Daily Emissions lbs			
	CO	NOx	PM	
Equipment	12.71	12.21	1.40	(assumes earthmoving and two miles unpaved vehicle travel on these five acre construction areas)
Fugitive Dust	--	--	2.49	
<b>Totals</b>	<b>12.71</b>	<b>12.21</b>	<b>3.89</b>	

#### LST Significance Criteria (construction)

	One Acre Sites			Five Acre Sites		
	CO	NOx	PM10	CO	NOx	PM10
	25M	25M	25M	25M	25M	25M
SRA 17	305	137	4	785	289	12
SRA 21	515	158	3	1,343	334	11
SRA 24	418	144	4	1,078	365	13
SRA 28	650	230	4	1,677	584	13
SRA 29	907	230	6	2,768	585	21
SRA 30	904	215	4	2,489	548	14
SRA 31	904	215	4	2,489	548	14
SRA 34	407	172	4	1,155	438	14
SRA 35	475	172	4	1,226	438	13

Source: SCAQMD

# Operating Emissions

## Direct Operating Emissions

### Stationary Source Emissions

**Assumptions:**

There are two new engines, one at the Blythe Optical Repeater Site (MDAB) and one at the Harquahala Mountain (ADEQ) telecommunications facility.

The engines will operate for 1 hour every two weeks for testing purposes (26 hours/year)

The Blythe ORS engine is 300 horsepower (basis is fuel storage good for two days at 100% load)

The Harquahala Mountain engine is 150 horsepower

Emission factors from AP-42 for natural gas I.C. Engine (four-stroke full load)

AP-42 Emission Factors					
Units	CO	NOx	PM	SOx	VOC
lb/MMBtu	0.317	4.08	7.71E-05	5.88E-04	0.118
lb/Hp-hr	0.002219	0.02856	5.397E-07	0.000004116	0.000826

Daily Emissions						
	HP	CO	NOx	PM	SOx	VOC
Blythe	300	0.67	8.57	0.00	0.00	0.25
Harquahala	150	0.33	4.28	0.00	0.00	0.12

Annual Emissions						
	Days	CO	NOx	PM	SOx	VOC
Blythe	26	0.01	0.11	0.00	0.00	0.00
Harquahala	26	0.00	0.06	0.00	0.00	0.00

## Indirect Operating Emissions

### Inspection emissions

**Assumptions:**

- Proposed project will increase helicopter and/or truck inspection surveys by 4 hours and one week, respectively.
- The helicopter is assumed to be a Hughes 500
- Helicopter Emission Factor is developed from ratio of engine size from FAEED data.
- The truck is assumed to be a Crew Truck - Emissions will be calculated using SCAQMD delivery vehicle emission factors assuming 100 miles a day of road travel
- Road dust calculated assuming 50% paved and 50% unpaved during the inspection and a loaded truck weight of 4 tons.
- No fugitive dust control is assumed for the single truck trip inspection.
- A total of one inspection occurs per year either by Helicopter or by truck.

### Helicopter emission increase

CO	NOx	PM	SOx	VOC	
0.30	3.11	7.64	0.00	0.42	lbs/day
0.00	0.00	0.00	0.00	0.00	tons/year

### Truck emissions increase

CO	NOx	PM10	PM2.5	SOx	VOC	
1.75	2.50	79.25	12.20	0.00	0.26	lbs/day
0.00	0.01	0.20	0.03	0.00	0.00	tons/year

### Maximum Inspection Emissions

CO	NOx	PM10	PM2.5	SOx	VOC	
1.75	3.11	79.25	12.20	0.00	0.42	lbs/day
0.00	0.01	0.20	0.03	0.00	0.00	tons/year

### Maintenance Emissions

**Work Assumptions:**

Devers-Harquahala

- Routine Maintenance increases by 7 days every year
- Cleaning Tower Footings increases by 3 days every two years
- Routine Right of Way Grading increases by 16 days every three years
- Routine Washing does not change
- Unpaved road travel is 15% of total for work vehicles - zero for personal vehicles

# Operating Emissions

West of Devers

- 1) Routine Repairs is reduced by one day per year
- 2) Routine Right of Way Grading does not change
- 3) Routine Washing decreases by 15 days per year
- 5) Unpaved road travel is 5% of total for work vehicles - zero for personal vehicles

Equipment and manpower assumptions

Routine Maintenance

- 1) Crew of 9 (7 trips at 60 miles/trip)
- 2) One rough terrain 25-ton crane (four hours per day of use), two pickups (120 miles/day), two medium duty service vehicles (120 miles/day), one water truck (60 miles/day)

Tower Footing Cleaning

- 1) Crew of 3 (2 trips at 60 miles/trip)
- 2) One backhoe (4 hours/day), one medium duty vehicle rigged with boom for washing (60 miles/day), one pickup (60 miles/day), one HH Truck to haul backhoe and one water truck (120 miles/day)

Routine Right of Way Grading

- 1) Crew of 3 (2 trips at 60 miles/trip)
- 2) One small dozer (D6 - 4 hours/day), one grader (6 hours/day), one pickup (60 miles/day), One HH Truck to haul offroad equipment and one for watering (120 miles/day)

Routine Washing

- 1) Crew of 6 (4 trips at 60 miles/trip)
- 2) One rough terrain 25-ton crane (four hours per day of use), two pickups (120 miles/day), two medium duty service vehicles (120 miles/day), one HH Truck to haul equipment and one water truck (60 miles/day)

Emissions Conservatively Based on 2009 SCAQMD emission factors, and 5-ton average vehicle size for paved roads and 10-ton average vehicle size for unpaved roads

		Daily Emissions (lbs/day)					
		CO	NOx	PM10	PM2.5	SOx	VOC
Routine Maintenance	Onroad	7.89	4.96	58.99	9.49	0.01	0.97
	Offroad	1.44	2.29	0.24	0.24	0.00	0.30
	<b>Total</b>	<b>9.33</b>	<b>7.25</b>	<b>59.23</b>	<b>9.73</b>	<b>0.01</b>	<b>1.27</b>
Cleaning Footings	Onroad	3.11	3.26	34.37	5.47	0.01	0.41
	Offroad	3.24	2.38	0.35	0.35	0.00	1.20
	<b>Total</b>	<b>6.35</b>	<b>5.64</b>	<b>34.73</b>	<b>5.82</b>	<b>0.01</b>	<b>1.61</b>
Right of Way Grading	Onroad	2.52	3.74	34.38	5.48	0.01	0.34
	Offroad	5.46	10.31	4.75	2.16	0.01	1.17
	<b>Total</b>	<b>7.98</b>	<b>14.04</b>	<b>39.13</b>	<b>7.64</b>	<b>0.02</b>	<b>1.51</b>
Routine Washing	Onroad	5.93	4.76	57.59	9.17	0.01	0.76
	Offroad	1.44	2.29	0.24	0.24	0.00	0.30
	<b>Total</b>	<b>7.37</b>	<b>7.05</b>	<b>57.82</b>	<b>9.41</b>	<b>0.01</b>	<b>1.06</b>

		Worst Case Annual Emission Increase (tons/year)					
		CO	NOx	PM10	PM2.5	SOx	VOC
Devers-Harquahala	Routine Maintenance	0.03	0.03	0.21	0.03	0.00	0.00
	Cleaning Footings	0.01	0.01	0.05	0.01	0.00	0.00
	Right of Way Grading	0.06	0.11	0.31	0.06	0.00	0.01
	Routine Washing	0.00	0.00	0.00	0.00	0.00	0.00
	<b>Total</b>	<b>0.11</b>	<b>0.15</b>	<b>0.57</b>	<b>0.10</b>	<b>0.00</b>	<b>0.02</b>

		Maximum Annual Emission Decrease (tons/year)					
		CO	NOx	PM10	PM2.5	SOx	VOC
West of Devers	Routine Maintenance	0.00	0.00	-0.03	0.00	0.00	0.00
	Cleaning Footings	0.00	0.00	0.00	0.00	0.00	0.00
	Right of Way Grading	0.00	0.00	0.00	0.00	0.00	0.00
	Routine Washing	-0.06	-0.05	-0.43	-0.07	0.00	-0.01
	<b>Total</b>	<b>-0.06</b>	<b>-0.06</b>	<b>-0.46</b>	<b>-0.08</b>	<b>0.00</b>	<b>-0.01</b>

		Maximum Annual Combined O&M Emissions (tons/yr)					
		CO	NOx	PM10	PM2.5	SOx	VOC
Entire Project		0.12	0.32	0.74	0.13	0.00	0.02

## Alternative Incremental Construction Assumptions

	Name	Δ Miles	Δ Towers	Δ Poles	Δ Roads
Alt 1	SCE Harquahala West	-14	-47	-23	13
Alt 2	SCE Palo Verde	14.7	50	-23	1
Alt 3	Harquahala Junction Switchyard	-5	0	-23	-5
Alt 4	Desert Southwest Transmission Project	9.37	32	0	13
Alt 5	Alligator Rock - North of Desert Center	1.2	4	0	6.8
Alt 6	Alligator Rock - Blythe Energy Transmission	0.65	2	0	0
Alt 7	Alligator Rock - South of I-10 Frontage	0.57	2	0	3.25
Alt 8	Devers-Valley No. 2	Calculated separately, not incrementally			

(miles)

### Location and other assumptions

- Alt 1 ADEQ and MCAQD. Tower delta all in MCAQD, the road delta are split between ADEQ 9 miles and MCAQD 4 miles. Work in 2009
- Alt 2 MCAQD. Will require upgrade at PVNGS substation. Work in 2009
- Alt 3 MCAQD. Work in 2009
- Alt 4 SCAQMD and MDAQMD, MDAB, SSAB and SCAB (All delta's are in MDAB, except substation upgrade - SCAQMD portion deltas the same as Alt 7) - Work in 2008
- Alt 5 SCAQMD, MDAB, work in 2008
- Alt 6 SCAQMD, MDAB, work in 2008
- Alt 7 SCAQMD, MDAB, work in 2008
- Alt 8 SCAQMD, SSAB and SCAB. No WOD wreckout would be required.

# Alternative 1 - SCE Harquahala West

## Assumptions:

Emissions for this alternative are calculated by determining the incremental (+/-) construction requirements  
 Incremental Emissions occur in the ADEQ and MCAOD jurisdiction in 2009  
 This alternative does not change the worst-case daily emissions

### Incremental Construction Days

	ADEQ	MDAOD
Marshalling Yards	0	-36
Road Work	7	3
Foundations	0	-36
Steel Assembly	0	-36
Conductor Installation	0	-33
Cleanup and Guard Poles	0	-16
Wreck-out	0	0
Bypass Installation	0	0
Bypass Removal	0	0
Conductor Removal	0	0
Civil (Substation)	0	0
Electrical (Substation)	0	0

	Incremental Traffic VMT					
	ADEQ			MCAOD		
	Total	Paved	Unpaved	Total	Paved	Unpaved
Passenger	5,040	3,780	1,260	-369,243	-344,627	-24,616
Delivery	1,470	1,103	368	-218,906	-204,312	-14,594
Heavy-Duty	4,641	3,481	1,160	-98,529	-94,150	-4,379
Totals	11,151	8,363	2,788	-686,678	-643,089	-43,589

Note: See VMT information for additional traffic breakdown

### ADEQ Emissions - 2009 (Tons/yr)

Roadwork	Offroad Emissions				
	CO	NOx	PM	SOx	VOC
	0.10	0.15	0.01	0.00	0.02

	Onroad Emissions				
	CO	NOx	PM	SOx	VOC
Passenger	0.03	0.00	0.00	0.00	0.00
Delivery	0.01	0.02	0.00	0.00	0.00
Heavy-Duty	0.01	0.07	0.00	0.00	0.00
Total	0.05	0.09	0.00	0.00	0.01

	Fugitive Dust Emissions	
	PM10	PM2.5
Dozing	0.02	0.01
Grading	0.01	0.00
Paved	0.08	0.02
Unpaved	0.44	0.07
Total	0.53	0.09

Helicopter Emissions - no change

### Emission Totals

	CO	NOx	PM10	SOx	VOC	PM2.5
Incremental Emissions	0.15	0.24	0.55	0.00	0.03	0.11
Total ADEQ 2009 (t/yr)	21.50	25.23	98.95	0.04	3.28	17.81

### MCAOD Emissions 2009 (Tons/yr)

	Offroad Emissions				
	CO	NOx	PM	SOx	VOC
Marshalling Yards	-0.37	-0.43	-0.04	0.00	-0.08
Road Work	0.04	0.07	0.01	0.00	0.01
Foundations	-0.83	-1.13	-0.08	0.00	-0.15
Steel Assembly	-0.82	-0.50	-0.04	0.00	-0.06
Conductor Installation	-0.53	-0.95	-0.07	0.00	-0.11
Cleanup and Guard Poles	-0.11	-0.19	-0.02	0.00	-0.03
Totals	-2.62	-3.14	-0.24	0.00	-0.42

	Onroad Emissions				
	CO	NOx	PM	SOx	VOC
Passenger	-2.00	-0.21	-0.01	0.00	-0.22
Delivery	-1.59	-2.35	-0.04	0.00	-0.25
Heavy-Duty	-0.23	-1.45	-0.03	0.00	-0.05
Totals	-3.83	-4.01	-0.09	-0.01	-0.52

	Fugitive Dust Emissions	
	PM10	PM2.5
Dozing	-0.02	-0.01
Grading	-0.01	0.00
Handling	-0.01	0.00
Paved	-8.04	-1.93
Unpaved	-26.39	-4.05
Totals	-34.47	-5.99

Helicopter Emissions					
CO	NOx	PM	SOx	VOC	
	-0.08	-0.16	-0.01	0.00	-0.03

### Emission Totals

	CO	NOx	PM10	SOx	VOC	PM2.5
Incremental Emissions	-6.53	-7.31	-34.80	-0.01	-0.97	-6.33
Total MCAOD 2009 (t/yr)	4.32	6.91	23.54	0.01	0.71	4.56

## Alternative 2 - SCE Palo Verde

### Assumptions:

Emissions for this alternative are calculated by determining the incremental (+/-) construction requirements  
 Incremental Emissions occur in the MCAQD jurisdiction in 2009  
 This alternative does not change the worst-case daily emissions

### Incremental Construction Days

	Days
Marshalling Yards	16
Road Work	1
Foundations	14
Steel Assembly	14
Conductor Installation	16
Cleanup and Guard Poles	8
Wreck-out	0
Bypass Installation	0
Bypass Removal	0
Conductor Removal	0
Civil (Substation)	30
Electrical (Substation)	30

### Incremental Traffic VMT

	Incremental Traffic VMT		
	Total	Paved	Unpaved
Passenger	143,255	133,705	9,550
Delivery	84,678	79,033	5,645
Heavy-Duty	38,771	36,186	2,585
Totals	266,705	248,925	17,780

Note: See VMT information for additional traffic breakdown

### MCAQD Incremental Emissions 2009 (Tons/yr)

	Offroad Emissions				
	CO	NOx	PM	SOx	VOC
Marshalling Yards	0.17	0.19	0.02	0.00	0.03
Road Work	0.01	0.02	0.00	0.00	0.00
Foundations	0.32	0.44	0.03	0.00	0.06
Steel Assembly	0.32	0.19	0.02	0.00	0.02
Conductor Installation	0.26	0.46	0.03	0.00	0.06
Cleanup and Guard Poles	0.06	0.10	0.01	0.00	0.01
Civil (Substation)	0.19	0.16	0.02	0.00	0.06
Electrical (Substation)	0.12	0.17	0.01	0.00	0.03
Totals	1.44	1.74	0.14	0.00	0.28

	Onroad Emissions				
	CO	NOx	PM	SOx	VOC
Passenger	0.78	0.08	0.01	0.00	0.08
Delivery	0.62	0.91	0.02	0.00	0.10
Heavy-Duty	0.09	0.57	0.01	0.00	0.02
Totals	1.48	1.56	0.03	0.00	0.20

	Fugitive Dust Emissions	
	PM10	PM2.5
Dozing	0.01	0.01
Grading	0.01	0.00
Handling	0.00	0.00
Paved	3.11	0.75
Unpaved	10.76	1.65
Totals	13.90	2.41

Helicopter Emissions				
CO	NOx	PM	SOx	VOC
0.04	0.08	0.00	0.00	0.02

Note: incremental helicopter emissions based on one day of conductor installation

### Emission Totals

	CO	NOx	PM10	SOx	VOC	PM2.5
Incremental Emissions	2.96	3.38	14.08	0.01	0.50	2.59
Total MCAQD 2009 (t/yr)	13.81	17.60	72.42	0.03	2.18	13.47

## Alternative 3 - Harquahala Junction Switchyard

### Assumptions:

Emissions for this alternative are calculated by determining the incremental (+/-) construction requirements  
 Incremental Emissions occur in the MCAQD jurisdiction in 2009  
 This alternative does not change the worst-case daily emissions

### Incremental Construction Days

	Days
Marshalling Yards	-9
Road Work	-5
Foundations	-1
Steel Assembly	-1
Conductor Installation	-9
Cleanup and Guard Poles	-5
Wreck-out	0
Bypass Installation	0
Bypass Removal	0
Conductor Removal	0
Civil (Substation)	60
Electrical (Substation)	60

### Incremental Traffic VMT

	Total	Paved	Unpaved
Passenger	-50,032	-46,697	-3,335
Delivery	-4,633	-4,324	-309
Heavy-Duty	-27,267	-25,449	-1,818
Totals	-81,933	-76,471	-5,462

Note: See VMT information for additional traffic breakdown

### MCAQD Incremental Emissions 2009 (Tons/yr)

	Offroad Emissions				
	CO	NOx	PM	SOx	VOC
Marshalling Yards	-0.09	-0.11	-0.01	0.00	-0.02
Road Work	-0.07	-0.11	-0.01	0.00	-0.02
Foundations	-0.02	-0.03	0.00	0.00	0.00
Steel Assembly	-0.02	-0.01	0.00	0.00	0.00
Conductor Installation	-0.14	-0.26	-0.02	0.00	-0.03
Cleanup and Guard Poles	-0.04	-0.06	0.00	0.00	-0.01
Civil (Substation)	0.38	0.32	0.04	0.00	0.12
Electrical (Substation)	0.23	0.35	0.03	0.00	0.06
Totals	0.22	0.08	0.02	0.00	0.10

	Onroad Emissions				
	CO	NOx	PM	SOx	VOC
Passenger	-0.27	-0.03	0.00	0.00	-0.03
Delivery	-0.03	-0.05	0.00	0.00	-0.01
Heavy-Duty	-0.06	-0.40	-0.01	0.00	-0.01
Totals	-0.37	-0.48	-0.01	0.00	-0.05

	Fugitive Dust Emissions	
	PM10	PM2.5
Dozing	-0.02	-0.01
Grading	-0.01	0.00
Handling	0.00	0.00
Paved	-0.96	-0.23
Unpaved	-3.31	-0.51
Totals	-4.29	-0.75

	Helicopter Emissions				
	CO	NOx	PM	SOx	VOC
	-0.02	-0.04	0.00	0.00	-0.01

Note: incremental helicopter emissions based on one day of conductor installation

### Emission Totals

	CO	NOx	PM10	SOx	VOC	PM2.5
Incremental Emissions	-0.17	-0.44	-4.28	0.00	0.04	-0.74
Total MCAQD 2009 (t/yr)	10.68	13.78	54.07	0.02	1.73	10.15

## Alternative 4 - Desert Southwest Transmission Project

### Assumptions:

Emissions for this alternative are calculated by determining the incremental (+/-) construction requirement  
 Incremental Emissions occur in the MDAB (MDA/QMD and SCA/QMD jurisdictions) in 2008 and 2009 and SSAB in 2009  
 This alternative does not change the worst-case daily emissions

### Incremental Construction Days

	MDAB 2008	SSAB 2009	MDAB 2009
Marshalling Yards	16	0	0
Road Work	10	0	0
Foundations	16	0	0
Steel Assembly	16	0	0
Conductor Installation	16	0	0
Cleanup and Guard Poles	8	0	0
Wreck-out	0	0	0
Bypass Installation	0	0	0
Bypass Removal	0	0	0
Conductor Removal	0	0	0
Civil (Substation)	0	0	0
Electrical (Substation)	0	110	110
Civil (New Substation)	0	60	60

	Incremental Traffic VMT		
	Total	Paved	Unpaved
Passenger	171,300	161,308	9,993
Delivery	101,255	95,349	5,907
Heavy-Duty	46,218	43,522	2,696
Totals	318,774	300,179	18,595

	Incremental Traffic VMT					
	MDAB 2009			SSAB 2009		
	Total	Paved	Unpaved	Total	Paved	Unpaved
Passenger	83,077	81,415	1,662	83,077	81,415	1,662
Delivery	37,800	37,044	756	37,800	37,044	756
Heavy-Duty	16,100	15,778	322	16,100	15,778	322
Totals	136,977	134,237	2,740	136,977	134,237	2,740

Note: See VMT information for additional traffic breakdown

### MDAB Incremental Emissions 2008 (Tons/yr)

	Offroad Emissions				
	CO	NOx	PM	SOx	VOC
Marshalling Yards	0.17	0.20	0.02	0.00	0.04
Road Work	0.14	0.23	0.02	0.00	0.04
Foundations	0.37	0.55	0.04	0.00	0.07
Steel Assembly	0.36	0.24	0.02	0.00	0.03
Conductor Installation	0.26	0.49	0.03	0.00	0.06
Cleanup and Guard Poles	0.06	0.10	0.01	0.00	0.01
Totals	1.36	1.82	0.14	0.00	0.25

	Onroad Emissions				
	CO	NOx	PM	SOx	VOC
Passenger	1.01	0.11	0.01	0.00	0.11
Delivery	0.81	1.17	0.02	0.00	0.12
Heavy-Duty	0.12	0.75	0.01	0.00	0.03
Totals	1.94	2.03	0.04	0.00	0.26

	Fugitive Dust Emissions	
	PM10	PM2.5
Dozing	0.03	0.02
Grading	0.02	0.00
Handling	0.00	0.00
Paved	2.72	0.64
Unpaved	2.94	0.45
Totals	5.71	1.11

	Helicopter Emissions				
	CO	NOx	PM	SOx	VOC
	0.04	0.08	0.00	0.00	0.02

### Emission Totals

	CO	NOx	PM10	SOx	VOC	PM2.5
Incremental Emissions	3.33	3.93	5.89	0.01	0.53	1.30
Total MDAB 2008 (l/yr)	17.49	21.20	29.79	0.03	2.76	6.82

### MDAB/SSAB Incremental Emissions 2009 (Tons/yr)

	Offroad Emissions				
	CO	NOx	PM	SOx	VOC
Electrical (Substation)	0.43	0.64	0.05	0.00	0.11
Civil (New Substation)	0.52	1.27	0.07	0.00	0.11
Totals	0.94	1.91	0.12	0.00	0.22

	Onroad Emissions				
	CO	NOx	PM	SOx	VOC
Passenger	0.45	0.05	0.00	0.00	0.05
Delivery	0.27	0.41	0.01	0.00	0.04
Heavy-Duty	0.04	0.24	0.00	0.00	0.01
Totals	0.76	0.69	0.02	0.00	0.10

	MDAB Fugitive Dust Emissions			SSAB Fugitive Dust Emissions	
	PM10	PM2.5		PM10	PM2.5
Dozing	0.09	0.05	Dozing	0.09	0.05
Grading	0.04	0.00	Grading	0.04	0.00
Handling	0.00	0.00	Handling	0.00	0.00
Paved	1.22	0.29	Paved	1.25	0.30
Unpaved	0.43	0.07	Unpaved	0.44	0.07
Totals	1.78	0.40	Totals	1.81	0.41

Helicopter Emissions - no change

### Emission Totals

	CO	NOx	PM10	SOx	VOC	PM2.5
MDAB Incremental Emissions 2009	1.71	2.60	1.91	0.00	0.32	0.54
MDAB Total Emissions 2009	8.60	11.76	14.96	0.02	1.49	3.74
SSAB Incremental Emissions 2009	1.71	2.60	1.95	0.00	0.32	0.54
SSAB Total Emissions 2009	6.73	8.99	6.47	0.01	1.20	1.97

Note: MDAB 2009 has identical assumptions and emissions to SSAB 2009, except for road dust emission factor

## Alternative 5 - Alligator Rock North of Desert Center

### Assumptions:

Emissions for this alternative are calculated by determining the incremental construction requirements  
 Incremental Emissions occur in the MDAB (SCAQMD jurisdiction) in 2008  
 This alternative does not change the worst-case daily emissions

### Incremental Construction Days

	Days
Marshalling Yards	2
Road Work	5
Foundations	2
Steel Assembly	2
Conductor Installation	2
Cleanup and Guard Poles	1
Wreck-out	0
Bypass Installation	0
Bypass Removal	0
Conductor Removal	0
Civil (Substation)	0
Electrical (Substation)	0

### Incremental Traffic VMT

	Incremental Traffic VMT		
	Total	Paved	Unpaved
Passenger	21,413	20,163	1,249
Delivery	12,657	11,919	738
Heavy-Duty	5,777	5,440	337
Totals	39,847	37,522	2,324

Note: See VMT information for additional traffic breakdown

### MDAB Incremental Emissions 2008 (Tons/yr)

	Offroad Emissions				
	CO	NOx	PM	SOx	VOC
Marshalling Yards	0.02	0.03	0.00	0.00	0.00
Road Work	0.07	0.12	0.01	0.00	0.02
Foundations	0.05	0.07	0.00	0.00	0.01
Steel Assembly	0.05	0.03	0.00	0.00	0.00
Conductor Installation	0.03	0.06	0.00	0.00	0.01
Cleanup and Guard Poles	0.01	0.01	0.00	0.00	0.00
Totals	0.22	0.31	0.02	0.00	0.05

	Onroad Emissions				
	CO	NOx	PM	SOx	VOC
Passenger	0.13	0.01	0.00	0.00	0.01
Delivery	0.10	0.15	0.00	0.00	0.02
Heavy-Duty	0.01	0.09	0.00	0.00	0.00
Totals	0.24	0.25	0.01	0.00	0.03

	Fugitive Dust Emissions	
	PM10	PM2.5
Dozing	0.01	0.01
Grading	0.01	0.00
Handling	0.00	0.00
Paved	0.34	0.08
Unpaved	0.37	0.06
Totals	0.73	0.14

Helicopter Emissions				
CO	NOx	PM	SOx	VOC
0.00	0.01	0.00	0.00	0.00

Note: incremental helicopter emissions based on one day of conductor installation

### Emission Totals

	CO	NOx	PM10	SOx	VOC	PM2.5
Incremental Emissions	0.47	0.58	0.76	0.00	0.08	0.17
Total MDAB 2008 (t/yr)	14.62	17.86	24.65	0.03	2.32	5.69

## Alternative 6 - Alligator Rock Blythe Energy Transmission

### Assumptions:

Emissions for this alternative are calculated by determining the incremental construction requirements  
 Incremental Emissions occur in the MDAB (SCAQMD jurisdiction) in 2008  
 This alternative does not change the worst-case daily emissions

### Incremental Construction Days

	Days
Marshalling Yards	1
Road Work	0
Foundations	1
Steel Assembly	1
Conductor Installation	1
Cleanup and Guard Poles	1
Wreck-out	0
Bypass Installation	0
Bypass Removal	0
Conductor Removal	0
Civil (Substation)	0
Electrical (Substation)	0

	Incremental Traffic VMT		
	Total	Paved	Unpaved
Passenger	10,706	10,082	625
Delivery	6,328	5,959	369
Heavy-Duty	2,889	2,720	169
Totals	19,923	18,761	1,162

Note: See VMT information for additional traffic breakdown

### MDAB Incremental Emissions 2008 (Tons/yr)

	Offroad Emissions				
	CO	NOx	PM	SOx	VOC
Marshalling Yards	0.01	0.01	0.00	0.00	0.00
Foundations	0.02	0.03	0.00	0.00	0.00
Steel Assembly	0.02	0.01	0.00	0.00	0.00
Conductor Installation	0.02	0.03	0.00	0.00	0.00
Cleanup and Guard Poles	0.01	0.01	0.00	0.00	0.00
Totals	0.08	0.11	0.01	0.00	0.01

	Onroad Emissions				
	CO	NOx	PM	SOx	VOC
Passenger	0.06	0.01	0.00	0.00	0.01
Delivery	0.05	0.07	0.00	0.00	0.01
Heavy-Duty	0.01	0.05	0.00	0.00	0.00
Totals	0.12	0.13	0.00	0.00	0.02

	Fugitive Dust Emissions	
	PM10	PM2.5
Dozing	0.00	0.00
Grading	0.00	0.00
Handling	0.00	0.00
Paved	0.17	0.04
Unpaved	0.18	0.03
Totals	0.36	0.07

	Helicopter Emissions				
	CO	NOx	PM	SOx	VOC
	0.00	0.00	0.00	0.00	0.00

Note: incremental helicopter emissions based on one day of conductor installation

### Emission Totals

	CO	NOx	PM10	SOx	VOC	PM2.5
Incremental Emissions	0.20	0.24	0.37	0.00	0.03	0.08
Total MDAB 2008 (t/yr)	14.36	17.51	24.26	0.03	2.27	5.60

## Alternative 7 - Alligator Rock South of I-10 Frontage

### Assumptions:

Emissions for this alternative are calculated by determining the incremental construction requirements  
 Incremental Emissions occur in the MDAB (SCAQMD jurisdiction) in 2008  
 This alternative does not change the worst-case daily emissions

### Incremental Construction Days

	Days
Marshalling Yards	1
Road Work	3
Foundations	1
Steel Assembly	1
Conductor Installation	1
Cleanup and Guard Poles	1
Wreck-out	0
Bypass Installation	0
Bypass Removal	0
Conductor Removal	0
Civil (Substation)	0
Electrical (Substation)	0

### Incremental Traffic VMT

	Incremental Traffic VMT		
	Total	Paved	Unpaved
Passenger	10,706	10,082	625
Delivery	6,328	5,959	369
Heavy-Duty	2,889	2,720	169
Totals	19,923	18,761	1,162

Note: See VMT information for additional traffic breakdown

### MDAB Incremental Emissions 2008 (Tons/yr)

	Offroad Emissions				
	CO	NOx	PM	SOx	VOC
Marshalling Yards	0.01	0.01	0.00	0.00	0.00
Road Work	0.04	0.07	0.01	0.00	0.01
Foundations	0.02	0.03	0.00	0.00	0.00
Steel Assembly	0.02	0.01	0.00	0.00	0.00
Conductor Installation	0.02	0.03	0.00	0.00	0.00
Cleanup and Guard Poles	0.01	0.01	0.00	0.00	0.00
Totals	0.12	0.18	0.01	0.00	0.03

	Onroad Emissions				
	CO	NOx	PM	SOx	VOC
Passenger	0.06	0.01	0.00	0.00	0.01
Delivery	0.05	0.07	0.00	0.00	0.01
Heavy-Duty	0.01	0.05	0.00	0.00	0.00
Totals	0.12	0.13	0.00	0.00	0.02

	Fugitive Dust Emissions	
	PM10	PM2.5
Dozing	0.01	0.00
Grading	0.00	0.00
Handling	0.00	0.00
Paved	0.17	0.04
Unpaved	0.18	0.03
Total	0.37	0.07

Helicopter Emissions				
CO	NOx	PM	SOx	VOC
0.00	0.00	0.00	0.00	0.00

Note: incremental helicopter emissions based on one day of conductor installation

### Emission Totals

	CO	NOx	PM10	SOx	VOC	PM2.5
Incremental Emissions	0.24	0.31	0.38	0.00	0.04	0.09
Total MDAB 2008 (t/yr)	14.40	17.58	24.28	0.03	2.28	5.61

## Alternative 8 - Devers Valley No. 2

### Assumptions:

Emissions for this alternative are calculated by determining the total construction requirements  
 Emissions occur in the SSAB and SCAB (SCAQMD jurisdiction) in 2009  
 Worst-case daily emissions are impacted by this alternative  
 There are a total of 152 towers constructed  
 A total of 16 towers will be constructed using helicopters (10 in the MDAB and 6 in the SCAB)  
 West of Devers Wreckout and reconductoring will not occur nor will work at the directly affected substations  
 Miscellaneous substation upgrades will still be required  
 The construction day requirements are based on the productivity estimates provided by SCE  
 The onroad and offroad emission factors are the same as those used for the proposed project

### On Road Traffic Assumptions/Calculations

Construction Element	Personnel	Days	Daily RT.	Trip Type		SCAQMD Vehicle Type	
				Personal	Work	Passenger	Delivery
Management/Office	3	95	100		21,923	21,923	
Inspection and Environmental	6	95	100		57,000	57,000	
Survey Tower Sites	3	29	60		5,220	5,220	
Marshalling Yards	6	95	30	13,154		13,154	
Road Work	4	36	30	3,323		3,323	
Foundation Installation	23	72	30	38,215		38,215	
Tower Assembly/Erection	64	72	30	106,338		106,338	
Conductor Operations	54	70	30	87,231		87,231	
Final Cleanup	6	28	30	3,877		3,877	
Miscellaneous Substation, etc.	10	80	30	18,462		18,462	
Support	5	95	60		28,500		28,500
				270,600	112,643	354,743	28,500
				<b>Total</b>	<b>383,243</b>		

### Heavy Duty Truck Vehicle Trips

Delivery Vehicles	Total Trips	RT Miles	Miles
Steel, conductor, etc. (yards)	325	200	65,000
Material Delivery Sites	650	30	19,500
Concrete	1,216	30	36,480
Waste Trips			
Steel	0	100	0
Conductor	0	100	0
Wood	0	400	0
Dump Trucks	0	50	0
Misc.	20	100	2,000
Equipment Delivery/Removal	60	200	12,000
Equipment Shuttling	1,520	1	1,520
Fuel Transportation	73	10	730
Water Transportation	431	10	4,310
On Road Construction Equip.	1,538	30	46,140

# Alternative 8 - Devers Valley No. 2

## Medium Duty Vehicle Trips

Fueling	520	50	26,000
On Road Construction Equip.	2,928	30	87,840
Sanitary Waste	250	30	7,500
Misc. Deliveries	616	30	18,480

VMT Apportionment			
SCAB	SSAB	SCAB	SSAB
Percent	Percent	Unpaved	Unpaved
Passenger	90.00%	10.00%	3.33%
Delivery	85.00%	15.00%	10.00%
Heavy Duty	85.00%	10.00%	5.00%

Passenger  
Delivery  
Heavy Duty

VMT Totals				
	SCAB		SSAB	
	Paved	Unpaved	Paved	Unpaved
Passenger	354,743	10,642	34,292	1,182
Delivery	149,480	12,706	21,675	747
Heavy Duty	206,520	8,777	19,964	688
Totals	710,743	32,125	75,930	2,618

Passenger  
Delivery  
Heavy Duty

Paved		Unpaved	
Worst Case Day VMT		Worst Case Day VMT	
SCAB	SSAB	SCAB	SSAB
Passenger	4,221	146	54
Delivery	1,564	174	34
Heavy Duty	2,281	120	31
Totals	8,065	439	120
Average Vehicle Weight (tons)	11.6	12.4	11.5

Passenger  
Delivery  
Heavy Duty

Annual Same as Daily for Veh Wt.

## 2009 Onroad Emission Factors

	CO	NOx	ROG	SOx	PM10
Passenger	0.010849	0.001138	0.001179	0.000009	0.000081
Delivery	0.01454	0.021501	0.002295	0.000033	0.000400
Heavy Duty	0.00473757	0.029454847	0.00104234	4.6121E-05	0.000558989

SCAB  
Passenger  
Delivery  
Heavy Duty  
Total

Daily Onroad Emissions (lbs)				
CO	NOx	PM	SOx	VOC
Passenger	47.37	5.15	0.04	0.35
Delivery	25.26	3.99	0.06	0.69
Heavy Duty	11.37	2.50	0.11	1.34
Total	84.00	11.64	0.21	2.39

SCAB  
Passenger  
Delivery  
Heavy Duty  
Total

Annual Onroad Emissions (tons)				
CO	NOx	PM	SOx	VOC
Passenger	1.73	0.19	0.00	0.01
Delivery	0.92	0.15	0.00	0.03
Heavy Duty	0.42	0.09	0.00	0.05
Total	3.07	0.43	0.01	0.09

## Alternative 8 - Devers Valley No. 2

	Daily Onroad Emissions (lbs)				
	CO	NOx	PM	SOx	VOC
SSAB					
Passenger	17.59	1.85	1.91	0.01	0.13
Delivery	14.90	22.04	2.35	0.03	0.41
Heavy Duty	4.47	27.81	0.98	0.04	0.53
Total	36.97	51.69	5.25	0.09	1.07

	Annual Onroad Emissions (tons)				
	CO	NOx	PM	SOx	VOC
SSAB					
Passenger	0.19	0.02	0.02	0.00	0.00
Delivery	0.16	0.24	0.03	0.00	0.00
Heavy Duty	0.05	0.30	0.01	0.00	0.01
Total	0.40	0.57	0.06	0.00	0.01

		Emission Factors - Road Dust			
		Maximum Daily		Annual	
		PM10	PM2.5	PM10	PM2.5
Paved	SCAB	0.0075	0.0016	0.0073	0.0016
Paved	SSAB	0.0074	0.0016	0.0073	0.0016
Unpaved	SCAB	2.0793	0.3188	1.8856	0.2891
Unpaved	SSAB	2.0154	0.3090	1.9160	0.2938

		Road Dust Emissions			
		Maximum Daily (lbs)		Annual (tons)	
		PM10	PM2.5	PM10	PM2.5
Paved	SCAB	60.25	13.11	2.15	0.47
Paved	SSAB	25.65	5.57	0.28	0.06
Unpaved	SCAB	146.16	22.41	4.85	0.74
Unpaved	SSAB	38.60	5.92	0.40	0.06

### Offroad Emission Calculations

	Days	SCAB Days	SSAB Days
Marshalling Yards	95	95	0
Road Work	36	28	8
Foundation Installation	72	55	17
Tower Assembly/Erection	72	55	17
Conductor Operations	70	54	16
Final Cleanup	28	22	6
Miscellaneous Substation, etc.	80	60	20

	Offroad Emissions (lbs/day)				
	CO	NOx	PM	SOx	VOC
SSAB Worst Day					
Marshalling Yards	20.73	23.95	2.39	0.03	4.32
Road Work	27.45	43.95	3.45	0.05	6.86
Foundation Installation	45.97	62.61	4.44	0.09	8.11
Tower Assembly/Erection	45.38	27.67	2.16	0.05	3.48
Conductor Operations	32.14	57.86	4.04	0.07	6.93
Final Cleanup	14.36	23.89	1.89	0.03	3.19
Miscellaneous Substation, etc.	20.28	22.24	2.29	0.03	6.13
Total	206.29	262.16	20.67	0.35	39.03

## Alternative 8 - Devers Valley No. 2

SSAB Worst Day	Offroad Emissions (lbs/day)				
	CO	NOx	PM	SOx	VOC
Marshalling Yards	0.00	0.00	0.00	0.00	0.00
Road Work	0.00	0.00	0.00	0.00	0.00
Foundation Installation	45.97	62.61	4.44	0.09	8.11
Tower Assembly/Erection	45.38	27.67	2.16	0.05	3.48
Conductor Operations	32.14	57.86	4.04	0.07	6.93
Final Cleanup	14.36	23.89	1.89	0.03	3.19
Miscellaneous Substation, etc.	20.28	22.24	2.29	0.03	6.13
Total	158.12	194.26	14.82	0.26	27.84

SCAB 2009	Offroad Emissions (tons)				
	CO	NOx	PM	SOx	VOC
Marshalling Yards	0.98	1.14	0.11	0.00	0.21
Road Work	0.38	0.62	0.05	0.00	0.10
Foundation Installation	1.26	1.72	0.12	0.00	0.22
Tower Assembly/Erection	1.25	0.76	0.06	0.00	0.10
Conductor Operations	0.87	1.56	0.11	0.00	0.19
Final Cleanup	0.16	0.26	0.02	0.00	0.04
Miscellaneous Substation, etc.	0.61	0.67	0.07	0.00	0.18
Total	5.51	6.73	0.54	0.01	1.03

SSAB 2009	Offroad Emissions (tons)				
	CO	NOx	PM	SOx	VOC
Marshalling Yards	0.00	0.00	0.00	0.00	0.00
Road Work	0.11	0.18	0.01	0.00	0.03
Foundation Installation	0.39	0.53	0.04	0.00	0.07
Tower Assembly/Erection	0.39	0.24	0.02	0.00	0.03
Conductor Operations	0.26	0.46	0.03	0.00	0.06
Final Cleanup	0.04	0.07	0.01	0.00	0.01
Miscellaneous Substation, etc.	0.24	0.31	0.02	0.00	0.05
Total	1.43	1.79	0.13	0.00	0.24

### Construction Site Fugitive Dust Emissions

Assumptions	Maximum Day	SCAB 2009	SSAB 2009
Dozer (Hours)	12.5	320	90
Grader (Hours)	15	375	105
Earth Moving (tons)	850	46,750	14,450

Emissions	Maximum Day (lbs)		SCAB 2009 (tons)		SSAB 2009 (tons)	
	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Dozer	7.17	3.86	0.092	0.049	0.026	0.014
Grader	4.13	0.29	0.052	0.004	0.014	0.001
Earthmoving	1.32	0.41	0.008	0.003	0.002	0.001
Totals	12.62	4.56	0.151	0.056	0.042	0.015

### Emission Totals

	CO	NOx	PM10	PM2.5	SOx	VOC
SCAB Maximum Day	536.86	699.47	269.27	90.33	0.56	78.79
SSAB Maximum Day	441.65	570.23	114.88	54.07	0.36	66.28

## Alternative 8 - Devers Valley No. 2

SCAB 2009 Annual	8.99	11.48	8.15	2.27	0.02	1.21
SSAB 2009 Annual	2.33	3.03	0.95	0.36	0.00	0.34

Note: Includes Helicopter Emissions Calculated Separately