

Appendix 3.
Air Quality Calculations

Emission Calculation Assumptions

General Assumptions

1) The project emissions have been recalculated as the calculations provided in the PEA are significantly flawed as follows:

Offroad Equipment Emission Calculations:

- The emission factors are from the dated 1993 SCAQMD CEQA Handbook Factors, while SCAQMD has provided updated factors on their website.
- The calculations using the 1993 factors are incorrect and do not follow the procedures outlined in the 1993 CEQA Handbook (for example hourly specific are multiplied by load factors, but these factors already consider load factor).

Helicopter Emission Calculations:

- Helicopter emissions were not provided

Onroad Equipment Emission Calculations:

- The onroad equipment calculations use dated 1993 SCAQMD CEQA Handbook Factors, while SCAQMD has provided updated factors on their website.
- The onroad equipment calculations convert an emission factor based on VMT to one based on hours/day without providing the intermediate assumptions and calculations.
- The onroad equipment calculations only include calculations of equipment that is directly involved in the construction activities. Vehicle emissions such as construction employee vehicle and heavy duty truck hauling of supplies are not included.

Fugitive Dust Emission Calculations:

- Fugitive dust emissions, similar to onroad vehicle emission do not include all direct project traffic.
- Fugitive dust emissions do not assume realistic unpaved road travel lengths based on worst case day or annual average unpaved road distances to tower sites.
- Fugitive dust emissions use outdated calculation methods from the 1993 SCAQMD CEQA Handbook rather than much more recent USEPA calculation methods.

2) The project equipment emission assumptions are problematic as they are not consistent between Segment 2 and the two different subsegments of Segment 3; therefore, the equipment number and productivity data has been standardized based on equipment number and productivity assumptions for transmission line construction provided by SCE for the Devers 2 and Antelope Pardee projects; which are as follows:

General Construction Productivity Assumptions

Segment 2 T/L Const.	Original Est.	Noted Basis	Revised Est.	Rationale for change
Steel	77/135 days	2 structures/day	60 days	At 2 structures per day steel work would be well less than 77 or 135 work days. So estimate for foundations (60 days with same 2 structure/day basis) is used.
Conductor	46 to 63 days	0.3 miles/day	72 days	At 0.3 miles per day the conductor work should require 21.5/0.3 or approximately 72 days to complete. Variation in equipment days shown for this segment is inconsistent.
Cleanup & Guard Poles	15 days	1 mile/day	22 days	Based on 21.5 miles of transmission line
Segment 2 66kV Relo.	Original Est.	Noted Basis	Revised Est.	Rationale for change
Road Work	30 days	1 mile/day	5 days	Based on 4.4 mile segment length
Foundations	60 days	2 structures/day	48 days	Based on 96 structures
Steel	60 days	2 structures/day	48 days	Based on 96 structures
Conductor	65 days	0.5 miles/day	9 days	Based on 4.4 mile segment length
Cleanup	65 days	0.5 miles/day	9 days	Based on 4.4 mile segment length
Wreck-Out	30 days	0.75 miles/day	6 days	Based on 4.4 mile segment length
Bypass Removal (shu-fly)	20 days	1 mile/day	5 days	Based on 4.4 mile segment length
Segment 3a T/L Const.	Original Est.	Noted Basis	Revised Est.	Rationale for change
Foundations	90 days	1 structure/day	90 days	44 towers and 79 poles, so schedule seems to assume one tower structure per day and approximately 1.7 pole structures per day, otherwise would require 122 days for foundations.
Steel	134 days	2 structures/day	62 days	At 2 structures per day steel work should require 123 structures/2 structures/day = 62 days.
Conductor	172 days	0.5 miles/day	52 days	Based on 25.6 mile segment length
Cleanup	24 days	1.5 miles/day	18 days	Based on 25.6 mile segment length
Segment 3b T/L Const.	Original Est.	Noted Basis	Revised Est.	Rationale for change
Foundations	55 days	1 structure/day	63 days	Basis assumes 62 towers including towers A through E, shown on the road story, as well as towers 1-56 and new tower 57 added due to change in Substation two location.
Steel	81 days	2 structures/day	32 days	At 2 structures per day steel work should require 63 structures/2 structures/day = 32 days.
Conductor	83 days	0.5 miles/day	20 days	Based on 9.6 mile segment length
Cleanup	69 days	1.5 miles/day	7 days	Based on 9.6 mile segment length

Emission Calculation Assumptions

- 3) The 66-kV pole/line removal and replacement activities just south of the Antelope substation were not included in the PEA emission calculations. This activity has been included in the AVAQMD portion of the emission calculations.

Emission Calculation Assumptions

Offroad Equipment Emission Calculation Assumptions

- 1) Emission factors are the latest available from the SCAQMD website, where the nearest horsepower sized equipment given in the SCAQMD emission factor database are used with a ratio of actual assumed equipment horsepower to derive hourly emission factors.
- 2) 2008 and 2009 emission factors are used to calculate the emissions.
- 3) Equipment type, number, and usage estimates are used as given in the PEA, with the exceptions noted above in the general assumptions.

Onroad Equipment Emission Calculations Assumptions

- 1) Emission factors are the latest available from the SCAQMD website, where the vehicles have been assigned three classes, passenger (i.e. employee vehicles and pickups), delivery (all nonpassenger vehicles smaller than Heavy-Heavy Duty), and heavy-heavy duty vehicles.
- 2) 2008 and 2009 emission factors are used to calculate the emissions.
- 3) Waste hauling trips were added based on waste estimates in Table 3.4 in the PEA.

Helicopter Emission Calculations Assumptions

- 1) Helicopter emission factors are derived from FAA emissions factors, where the engine HP is used to ratio the emission factors from the engine data available in the FAAED database.
- 2) This emission factors source is somewhat dated, but no newer sources are available as FAA/ICAO no longer require helicopter engines to undergo the same emission determination scrutiny as large turbofan engines.
- 3) The helicopter use is limited to a small helicopter (Hughes 500) stringing sock line for 6 hours per day during conductor installation. No helicopter based construction will be performed.

Fugitive Dust Emission Calculations Assumptions

- 1) Unpaved road distances were determined for each tower location shown on the SCE "road story", worst-case daily emissions are based on working in the most remote areas and the annual emissions are based on average unpaved road lengths to each tower site.
- 2) Unpaved road emission factors are calculated using the most current version of USEPA AP-42 Section 13.2.1 and use the following assumptions: a) Silt content is assumed to be 12% on average (SCAQMD mountain road, note farm road and city and county roads are assumed to be 16 and 28% by SCAQMD); b) Average vehicle weight is calculated based on VMT average basis.
- 3) Unpaved road emission factors are calculated using the most current version of USEPA AP-42 Section 13.2.1 and use the following assumptions: a) Silt loading is average for 500 - 5000 ADT road; b) average vehicle weight is calculated based on VMT average basis.
- 4) Earthmoving emission factors are calculated using the recent version of USEPA AP-42 Section 11.9 for Dozing and Grading, and Section 13.2.4 for soil handling (drop emissions).

Construction Schedule Assumptions (see construction schedule on following sheet)

- 1) Overall construction schedule is from March 2008 to June 2009, per PEA
- 2) Segment 2 is completed before Segment 3 is completed.
- 3) Due to requirement to move the 66 kV line before installing the 500 kV line logic dictates that segment 2 is built south to north starting at Vincent and ending at Antelope.
- 4) The 66 kV line removal replacement is started and finished first among all activities.
- 5) Segment 3a is started and completed before Segment 3b even though it has a longer overall construction duration.
- 6) South to north construction is also completed for Segment 3a to allow for no overlap of substation preparation work.
- 7) Construction overlaps will be minimized to the extent possible given the schedule limitations to reduce maximum construction staff.
- 8) Substation work overlaps completion of conductor work leading to/from each substation location.
- 9) The very last work completed would be the Segment 3b Guard Poles/Cleanup and Substation Two electrical construction.
- 10) The schedules for the T/L segments remain as listed in the PEA (Segment 2 66 kV – 7 months, Segment 2 T/L – 11 months, Segment 3a – 13 months, Segment 3b – 8 months, existing substation improvements 3 months (no overlap at Antelope), Substation One construction – 6 month, but Substation Two construction is revised to 4 months based on equipment schedule.

Antelope Segments 2 & 3 - Proposed Project Construction Emission Totals

Worst-Case Day (AVAQMD)

	Emissions (lbs/day)					
	CO	NOx	PM10	SOx	VOC	PM2.5
Onroad Vehicles	77.93	96.95	1.91	0.16	10.96	1.91
Offroad Vehicles/Equipment	198.12	276.88	18.55	0.33	33.99	18.55
Helicopters	5.63	11.50	0.63	0.10	2.51	0.63
Fugitive Dust	---	---	534.59	---	---	101.31
Totals	281.68	385.33	555.67	0.58	47.46	122.40

Worst-Case Day (KCAPCD)

	Emissions (lbs/day)					
	CO	NOx	PM10	SOx	VOC	PM2.5
Onroad Vehicles	59.81	66.39	1.34	0.11	8.17	1.34
Offroad Vehicles/Equipment	177.37	269.83	17.77	0.33	30.90	17.77
Helicopters	---	---	---	---	---	---
Fugitive Dust	---	---	228.97	---	---	49.22
Totals	237.17	336.22	248.08	0.44	39.07	68.33

Project Total AVAQMD

	Emissions (tons)					
	CO	NOx	PM10	SOx	VOC	PM2.5
Onroad Vehicles	4.87	6.03	0.12	0.01	0.67	0.12
Offroad Vehicles/Equipment	14.21	18.26	1.34	0.02	2.57	1.34
Helicopters	0.28	0.58	0.03	0.00	0.13	0.03
Fugitive Dust	---	---	17.66	---	---	3.90
Totals	19.37	24.88	19.15	0.04	3.36	5.39

Project Total KCAPCD

	Emissions (tons)					
	CO	NOx	PM10	SOx	VOC	PM2.5
Onroad Vehicles	3.24	3.20	0.07	0.01	0.44	0.07
Offroad Vehicles/Equipment	10.02	13.93	0.97	0.02	1.82	0.97
Helicopters	0.15	0.30	0.02	0.00	0.07	0.02
Fugitive Dust	---	---	11.89	---	---	2.80
Totals	13.40	17.43	12.95	0.03	2.32	3.86

Project Totals

	Emissions (tons)					
	CO	NOx	PM10	SOx	VOC	PM2.5
Onroad Vehicles	8.11	9.23	0.19	0.02	1.10	0.19
Offroad Vehicles/Equipment	24.23	32.19	2.31	0.04	4.38	2.31
Helicopters	0.43	0.88	0.05	0.01	0.19	0.05
Fugitive Dust	---	---	29.55	---	---	6.70
Totals	32.77	42.31	32.10	0.06	5.68	9.25

Onroad Trip Assumptions

SCE Defined Traffic - Segment 2

SCE Totals	2008											2009				
	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	
G.O. Staff	900	101	101	101	101	101	101	101	39	39	39	38	38			
Site Construction Management	300	34	34	34	34	34	34	34	13	13	12	12	12			
Inspection Services	215		5	25	25	25	25	25	25	25	25	5	5			
Division Personnel	215	5	15	20	20	20	20	20	20	20	20	15	15	5		
Construction Workers	9,030	157	300	455	1290	1261	1564	1656	1005	744	144	288	150	18		
Mobilization (Equipment)	125	15	50	60												
Mobilization (Yard)	15	15														
Material Receiving	60	20	20	20												
Material Delivery	130	40	45	45												
Road Construction	1,206			41	254	254	152	101	101	101	101	101				
Foundation Materials (conc/rebar)	420			62	67	121	121	49								
Foundation Construction	960			142	154	277	277	110								
Steel Construction (Assembly)	1,771				253	253	527	527	211							
Steel Construction (Erection)	540				77	77	161	161	64							
Guard Pole	30						5					25				
Conductor	1,197						133	369	369	325						
Cleanup and Demob	105											105				
Equipment Returns	125								10	20	40	40	15			
Waste Disposal	56			4	4	4	37	4	2	1						
Monthly Totals		387	570	1009	2279	2427	3157	3157	1859	1288	381	629	235	23	0	0

SCE Defined Traffic - Segment 3

SCE Totals	2008											2009				
	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	
G.O. Staff	1,005	47	47	47	47	47	47	47	96	96	96	98	96	96	49	
Site Construction Management	335	16	16	16	16	16	16	16	32	32	32	33	32	32	15	
Inspection Services	270		5	15	25	25	25	25	25	25	25	25	25	15	10	
Division Personnel	270	5	15	15	20	20	20	25	25	25	20	20	20	15	5	
Construction Workers	11,340	71	71	71	250	536	514	397	1029	1235	1755	1593	1681	1341	163	
Mobilization (Equipment)	136	15	25	45	46											
Mobilization (Yard)	15	15														
Material Receiving	60	20	20	20												
Material Delivery	260	40	40	45	45	45										
Road Construction	1,464				157	220	201	98	90	63	220	186	110	63	56	
Foundation Materials (conc/rebar)	931					153	153	153	92	0	153	153	74			
Foundation Construction	2,128					350	350	350	210	0	350	350	168			
Steel Construction (Assembly)	3,328								651	904	651	0	579	543		
Steel Construction (Erection)	928								182	252	182	0	161	151		
Guard Pole	104												60		44	
Conductor	1,672										236	589	377	235	235	
Cleanup and Demob	105														105	
Equipment Returns	136										10	20	45	45	16	
Waste Disposal	34					4	4	4	1		6	7	6	1	1	
Monthly Totals		229	239	274	606	1416	1375	1115	2433	2632	3736	3074	3374	2602	1135	276
Project Totals	44,633	616	809	1283	2885	3843	4532	4272	4292	3920	4117	3703	3609	2625	1135	276

Heavy construction equipment (cranes, dozers, etc.) shuttling trips have been added to these totals at the rate of 8 shuttling trips per Segment 2 and 3 500/220 kV tower/pole and 4 shuttling trips per 66 kV pole. Waste Disposal Trips have been added per the waste disposal values provided in Table 3-4 of the PEA.

Onroad Trip Assumptions

On Vehicle Assumptions	Unpaved	Vehicle Type	Paved Trip Length
G.O. Staff	Yes	Passenger	30
Site Construction Management	Yes	Passenger	90
Inspection Services	Yes	Passenger	120
Division Personnel	Yes	Passenger	60
Construction Workers		Passenger	30
Mobilization (Equipment)		Heavy-Duty	120
Mobilization (Yard)		Heavy-Duty	120
Material Receiving		Heavy-Duty	120
Material Delivery		Heavy-Duty	30
Road Construction	Yes	Delivery	30
Foundation Materials (conc/rebar)	Yes	Heavy-Duty	30
Foundation Construction	Yes	Delivery	30
Steel Construction (Assembly)	Yes	Delivery	30
Steel Construction (Erection)	Yes	Heavy-Duty	30
Guard Pole	Yes	Delivery	30
Conductor	Yes	75% D, 25% H	30
Cleanup and Demob	Yes	Heavy-Duty	30
Equipment Returns		Heavy-Duty	120
Waste Disposal	Yes	Heavy-Duty	120
Equipment Shuttling	Yes	Heavy-Duty	0.25

	Unpaved Round Trip Length (miles)	
	Worst Day	Average
	AVAQMD	8
KCAPCD	3	1.47

Vehicle Trip Assumptions

Passenger Vehicles

Construction Workers
Professionals

Mid-Size Vehicles - "Delivery Trucks"

Road Construction
Foundation Construction
Steel Construction

Conductor/Guard Pole

Heavy-Heavy Duty Vehicles

Equipment Delivery/Demob
Equipment Shuttling
Waste Disposal
Materials Delivery (yards)
Materials Delivery (sites)

Total	Project Vehicles		AVAQMD			KCAPCD			Differentials		
	2008	2009	Total	2008	2009	Total	2008	2009	Option A	Option B	Option B
20,370	14,505	5865	12,059	11,223	836	8311	3282	5029	66	-2525	1130
3,510	2695	815	2,200	2110	90	1310	585	725	11	-435	195
2,670	2,154	516	1,641	1542	99	1,029	612	417	9	-331	148
3,088	2,570	518	1,450	1450	0	1638	1120	518	10	-383	171
5,099	3,977	1122	2,639	2639	0	2,460	1338	1122	17	-632	283
2,286	1079	1207	1,311	1079	232	975	0	975	7	-283	127
732	336	396	491	326	165	241	10	231	0	0	0
2712	2000	712	1640	1556	84	1,072	444	628	9	-336	150
90	75	15	60	60	0	30	15	15	0	-2	1
540	540	0	540	540	0	0	0	0	2	-67	30
3536	2638	898	1,833	1775	58	1,703	863	840	12	-438	196
										(-38)	(+17)

Worst-case day

Passenger Vehicles
Construction Workers
Professionals

Mid-Size Vehicles - "Delivery Trucks"

Road Construction
Foundation Construction
Steel Construction
Conductor/Guard Pole

Heavy-Heavy Duty Vehicles

Equipment Delivery
Equipment Shuttling
Waste Disposal
Materials Delivery (yards)
Materials Delivery (sites)

	AVAQMD	Paved RT Miles	Unpaved RT Miles	KCAPCD	Paved RT Miles	Unpaved RT Miles	Option B Unpaved RT Miles	Option B Unpaved RT Miles	Option B Unpaved RT Miles
Passenger Vehicles	72	30	0	70	30	0	0	0	0
Construction Workers	9	30	8	7	30	3	5	6.19	2.2
Professionals									
Mid-Size Vehicles - "Delivery Trucks"									
Road Construction	14	30	8	15	30	3	5	6.19	2.2
Foundation Construction	25	30	8	14	30	3	5	6.19	2.2
Steel Construction	21	30	8	26	30	3	5	6.19	2.2
Conductor/Guard Pole	12	30	8	0	30	3	5	6.19	2.2
Heavy-Heavy Duty Vehicles									
Equipment Delivery	0	120	0	0	120	0	0	0	0
Equipment Shuttling	20	0.25	0.25	16	0.25	0.25	0.25	0.25	0.25
Waste Disposal	1	120	8	1	120	3	5	6.19	2.2
Materials Delivery (yards)	0	120	0	0	120	0	0	0	0
Materials Delivery (sites)	21	30	8	16	30	3	5	6.19	2.2
	Aug '08			Dec '08			Worst Case Day	(-38)	(+17)

Onroad Emission Calculations

ONROAD EMISSIONS: SCAQMD EMISSION FACTORS FOR 2008

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

Passenger Vehicles		Delivery Trucks		Heavy-Heavy Duty Trucks	
CO	0.011798	CO	0.015942	CO	0.00511695
NOx	0.001245	NOx	0.023199	NOx	0.03244248
ROG	0.001277	ROG	0.00245	ROG	0.00113305
SOx	0.000009	SOx	0.000033	SOx	4.6012E-05
PM10	0.000080	PM10	0.000419	PM10	0.00059816
	lb/mile		lb/mile		lb/mile

ONROAD EMISSIONS: SCAQMD EMISSION FACTORS FOR 2009

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	0.02945485
ROG	0.001179	ROG	0.002295	ROG	0.00104234
SOx	0.000009	SOx	0.000033	SOx	4.6121E-05
PM10	0.000081	PM10	0.000400	PM10	0.00055899
	lb/mile		lb/mile		lb/mile

Onroad Equipment Maximum Daily Emissions

AVAQMD Region

Passenger Vehicles	Miles/Round Trip			Miles		Total	Emissions lbs/day				
	Trips	Paved	Unpaved	Paved	Unpaved		CO	NOx	PM	SOx	VOC
Construction Workers	72	30	0	2160	0	2160	25.48	2.69	0.17	0.02	2.76
Professionals	9	30	8	270	72	342	4.03	0.43	0.03	0.00	0.44
Mid-Size Vehicles - "Delivery Trucks"											
Road Construction	14	30	8	420	112	532	8.48	12.34	0.22	0.02	1.30
Foundation Construction	25	30	8	750	200	950	15.14	22.04	0.40	0.03	2.33
Steel Construction	21	30	8	630	168	798	12.72	18.51	0.33	0.03	1.96
Conductor/Guard Pole	12	30	8	360	96	456	7.27	10.58	0.19	0.02	1.12
Heavy-Heavy Duty Vehicles											
Equipment Delivery	0	120	0	0	0	0	0.00	0.00	0.00	0.00	0.00
Equipment Shuttling	20	0.25	0.25	5	5	10	0.05	0.32	0.01	0.00	0.01
Waste Disposal	1	120	8	120	8	128	0.65	4.15	0.08	0.01	0.15
Materials Delivery (yards)	0	120	0	0	0	0	0.00	0.00	0.00	0.00	0.00
Materials Delivery (sites)	21	30	8	630	168	798	4.08	25.89	0.48	0.04	0.90

Note: maximum unpaved road segment length based estimate using SCE "road story".

Worst case day based on overall worst case day which may not be worst case for onroad emissions

Totals	77.93	96.95	1.91	0.16	10.96
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Onroad Emission Calculations

KCAPCD Region

	Miles/Round Trip			Miles		Total	Emissions lbs/day					
	Trips	Paved	Unpaved	Paved	Unpaved		CO	NOx	PM	SOx	VOC	
Passenger Vehicles												
Construction Workers	70	30	0	2100	0	2100	24.78	2.61	0.17	0.02	2.68	
Professionals	7	30	3	210	21	231	2.73	0.29	0.02	0.00	0.29	
Mid-Size Vehicles - "Delivery Trucks"												
Road Construction	15	30	3	450	45	495	7.89	11.48	0.21	0.02	1.21	
Foundation Construction	14	30	3	420	42	462	7.37	10.72	0.19	0.02	1.13	
Steel Construction	26	30	3	780	78	858	13.68	19.90	0.36	0.03	2.10	
Conductor/Guard Pole	0	30	3	0	0	0	0.00	0.00	0.00	0.00	0.00	
Heavy-Heavy Duty Vehicles												
Equipment Delivery	0	120	0	0	0	0	0.00	0.00	0.00	0.00	0.00	
Equipment Shuttling	16	0.25	0.25	4	4	8	0.04	0.26	0.00	0.00	0.01	
Waste Disposal	1	120	3	120	3	123	0.63	3.99	0.07	0.01	0.14	
Materials Delivery (yards)	0	120	0	0	0	0	0.00	0.00	0.00	0.00	0.00	
Materials Delivery (sites)	16	30	3	480	48	528	2.70	17.13	0.32	0.02	0.60	

Note: maximum unpaved road segment length based estimate using SCE "road story".

Worst case day based on overall worst case day which may not be worst case for onroad emissions

Totals	59.81	66.39	1.34	0.11	8.17
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Onroad Equipment Maximum Annual Emissions

Proposed Project - AVAQMD Region 2008 Emissions

	Trips	Miles/Round Trip		Miles		Total	Emissions lbs/year					
	Paved	Paved	Unpaved	Paved	Unpaved		CO	NOx	PM	SOx	VOC	
Passenger Vehicles												
Construction Workers	11223	30	0	336,690	0	336,690	3972.27	419.18	27.06	3.03	429.95	
Professionals	2110	30	2.91	63,300	6,140	69,440	819.25	86.45	5.58	0.62	88.68	
Mid-Size Vehicles - "Delivery Trucks"												
Road Construction	1542	30	2.91	46,260	4,487	50,747	809.01	1177.28	21.28	1.67	124.33	
Foundation Construction	1450	30	2.91	43,500	4,220	47,720	760.74	1107.04	20.01	1.57	116.91	
Steel Construction	2639	30	2.91	79,170	7,679	86,849	1384.55	2014.82	36.41	2.87	212.78	
Conductor/Guard Pole	1079	30	2.91	32,370	3,140	35,510	566.10	823.79	14.89	1.17	87.00	
Heavy-Heavy Duty Vehicles												
Equipment Delivery	326	120	0	39,120	0	39,120	200.18	1269.15	23.40	1.80	44.33	
Equipment Shuttling	1556	0.25	0.25	389	389	778	3.98	25.24	0.47	0.04	0.88	
Waste Disposal	60	120	2.91	7,200	175	7,375	37.74	239.25	4.41	0.34	8.36	
Materials Delivery (yards)	540	120	0	64,800	0	64,800	331.58	2102.27	38.76	2.98	73.42	
Materials Delivery (sites)	1775	30	2.91	53,250	5,165	58,415	298.91	1895.14	34.94	2.69	66.19	

Note: Annual average unpaved road segment length based estimate using SCE "road story".

Assumes 77.5% of 2008 trips are SCAQMD trips

Totals	9184.31	11159.63	227.21	18.79	1252.82
Ton/year	4.59	5.58	0.11	0.01	0.63

Onroad Emission Calculations

Proposed Project - KCAPCD Region 2008 Emissions

	Trips	Miles/Round Trip		Miles		Total	Emissions lbs/year					
	Paved	Paved	Unpaved	Paved	Unpaved		CO	NOx	PM	SOx	VOC	
Passenger Vehicles												
Construction Workers	3282	30	0	98,460	0	98,460	1161.63	122.58	7.91	0.89	125.73	
Professionals	585	30	1.47	17,550	860	18,410	217.20	22.92	1.48	0.17	23.51	
Mid-Size Vehicles - "Delivery Trucks"												
Road Construction	612	30	1.47	18,360	900	19,260	307.04	446.80	8.08	0.64	47.19	
Foundation Construction	1120	30	1.47	33,600	1,646	35,246	561.90	817.68	14.78	1.16	86.35	
Steel Construction	1338	30	1.47	40,140	1,967	42,107	671.27	976.84	17.65	1.39	103.16	
Conductor/Guard Pole	0	30	1.47	0	0	0	0.00	0.00	0.00	0.00	0.00	
Heavy-Heavy Duty Vehicles												
Equipment Delivery	10	120	0	1,200	0	1,200	6.14	38.93	0.72	0.06	1.36	
Equipment Shuttling	444	0.25	0.25	111	111	222	1.14	7.20	0.13	0.01	0.25	
Waste Disposal	15	120	1.47	1,800	22	1,822	9.32	59.11	1.09	0.08	2.06	
Materials Delivery (yards)	0	120	0	0	0	0	0.00	0.00	0.00	0.00	0.00	
Materials Delivery (sites)	863	30	1.47	25,890	1,269	27,159	138.97	881.09	16.25	1.25	30.77	

Totals	2935.63	2492.07	51.84	4.39	389.62
Ton/year	1.47	1.25	0.03	0.00	0.19

Note: Annual average unpaved road segment length based estimate using SCE "road story".

Proposed Project - AVAQMD Region 2009 Emissions

	Trips	Miles/Round Trip		Miles		Total	Emissions lbs/year					
	Paved	Paved	Unpaved	Paved	Unpaved		CO	NOx	PM	SOx	VOC	
Passenger Vehicles												
Construction Workers	836	30	0	25,080	0	25,080	272.09	28.54	2.03	0.23	29.57	
Professionals	90	30	2.91	2,700	262	2,962	32.13	3.37	0.24	0.03	3.49	
Mid-Size Vehicles - "Delivery Trucks"												
Road Construction	99	30	2.91	2,970	288	3,258	47.37	70.05	1.30	0.11	7.48	
Foundation Construction	0	30	2.91	0	0	0	0.00	0.00	0.00	0.00	0.00	
Steel Construction	0	30	2.91	0	0	0	0.00	0.00	0.00	0.00	0.00	
Conductor/Guard Pole	232	30	2.91	6,953	674	7,627	110.90	163.99	3.05	0.25	17.50	
Heavy-Heavy Duty Vehicles												
Equipment Delivery	165	120	0	19,800	0	19,800	93.80	583.21	11.07	0.91	20.64	
Equipment Shuttling	84	0.25	0.25	21	21	42	0.20	1.24	0.02	0.00	0.04	
Waste Disposal	0	120	2.91	0	0	0	0.00	0.00	0.00	0.00	0.00	
Materials Delivery (yards)	0	120	0	0	0	0	0.00	0.00	0.00	0.00	0.00	
Materials Delivery (sites)	58	30	2.91	1,740	169	1,909	9.04	56.22	1.07	0.09	1.99	

Totals	565.54	906.62	18.77	1.61	80.71
Ton/year	0.28	0.45	0.01	0.00	0.04

Onroad Emission Calculations

Proposed Project - KCAPCD Region 2009 Emissions

Passenger Vehicles	Miles/Round Trip			Miles			Emissions lbs/year				
	Trips	Paved	Unpaved	Paved	Unpaved	Total	CO	NOx	PM	SOx	VOC
Construction Workers	5029	30	0	150,870	0	150,870	1636.79	171.69	12.18	1.36	177.88
Professionals	725	30	1.47	21,750	1,066	22,816	247.53	25.96	1.84	0.21	26.90
Mid-Size Vehicles - "Delivery Trucks"											
Road Construction	417	30	1.47	12,510	613	13,123	190.81	282.16	5.25	0.43	30.12
Foundation Construction	518	30	1.47	15,540	761	16,301	237.02	350.50	6.52	0.54	37.41
Steel Construction	1122	30	1.47	33,660	1,649	35,309	513.40	759.19	14.12	1.17	81.03
Conductor/Guard Pole	975	30	1.47	29,250	1,433	30,683	446.13	659.72	12.27	1.01	70.42
Heavy-Heavy Duty Vehicles											
Equipment Delivery	231	120	0	27,720	0	27,720	131.33	816.49	15.50	1.28	28.89
Equipment Shuttling	628	0.25	0.25	157	157	314	1.49	9.25	0.18	0.01	0.33
Waste Disposal	15	120	1.47	1,800	22	1,822	8.63	53.67	1.02	0.08	1.90
Materials Delivery (yards)	0	120	0	0	0	0	0.00	0.00	0.00	0.00	0.00
Materials Delivery (sites)	840	30	1.47	25,200	1,235	26,435	125.24	778.63	14.78	1.22	27.55
Totals							3538.36	3907.25	83.64	7.31	482.43
Ton/year							1.77	1.95	0.04	0.00	0.24

Option A - 2008 AVAQMD Incremental Emissions

Assumptions:

One Additional Tower Needed for Reroute

Unpaved road round trip miles for moved towers are approximately equivalent to existing mileage

Passenger Vehicles	Miles/Round Trip			Miles			Emissions lbs/year				
	Trips	Paved	Unpaved	Paved	Unpaved	Total	CO	NOx	PM	SOx	VOC
Construction Workers	66	30	0	1,980	0	1,980	23.36	2.47	0.16	0.02	2.53
Professionals	11	30	3.73	330	41	371	4.38	0.46	0.03	0.00	0.47
Mid-Size Vehicles - "Delivery Trucks"											
Road Construction	9	30	3.73	270	34	304	4.84	7.04	0.13	0.01	0.74
Foundation Construction	10	30	3.73	300	37	337	5.38	7.83	0.14	0.01	0.83
Steel Construction	17	30	3.73	510	63	573	9.14	13.30	0.24	0.02	1.40
Conductor/Guard Pole	7	30	3.73	210	26	236	3.76	5.48	0.10	0.01	0.58
Heavy-Heavy Duty Vehicles											
Equipment Delivery	0	120	3.73	0	0	0	0.00	0.00	0.00	0.00	0.00
Equipment Shuttling	9	0.25	0.25	2	2	5	0.02	0.15	0.00	0.00	0.01
Waste Disposal	0	120	3.73	0	0	0	0.00	0.00	0.00	0.00	0.00
Materials Delivery (yards)	2	120	3.73	240	7	247	1.27	8.03	0.15	0.01	0.28
Materials Delivery (sites)	12	30	3.73	360	45	405	2.07	13.13	0.24	0.02	0.46
Totals							54.22	57.88	1.19	0.10	7.30
Ton/year							0.03	0.03	0.00	0.00	0.00

Unpaved road mileage based on average determined for that area of the route (towers 22-31)

Onroad Emission Calculations

Option B - 2008 AVAQMD Incremental Emissions (Addition)

Assumptions:

Seventeen new towers for Reroute

Unpaved road mileage for the 17 new towers is considerably less on average that for the 38 towers they replace

Passenger Vehicles	Trips		Miles/Round Trip		Miles		Total	Emissions lbs/year				
	Paved	Unpaved	Paved	Unpaved	Paved	Unpaved		CO	NOx	PM	SOx	VOC
Construction Workers	1130	0	30	0	33,900	0	33,900	399.95	42.21	2.72	0.31	43.29
Professionals	195	0	30	2.2	5,850	429	6,279	74.08	7.82	0.50	0.06	8.02
Mid-Size Vehicles - "Delivery Trucks"												
Road Construction	148	0	30	2.2	4,440	326	4,766	75.97	110.56	2.00	0.16	11.68
Foundation Construction	171	0	30	2.2	5,130	376	5,506	87.78	127.74	2.31	0.18	13.49
Steel Construction	283	0	30	2.2	8,490	623	9,113	145.27	211.40	3.82	0.30	22.33
Conductor/Guard Pole	127	0	30	2.2	3,810	279	4,089	65.19	94.87	1.71	0.13	10.02
Heavy-Heavy Duty Vehicles												
Equipment Delivery	0	0	120	0	0	0	0	0.00	0.00	0.00	0.00	0.00
Equipment Shuttling	150	0	0.25	0.25	38	38	75	0.38	2.43	0.04	0.00	0.08
Waste Disposal	1	0	120	2.2	120	2	122	0.63	3.96	0.07	0.01	0.14
Materials Delivery (yards)	30	0	120	0	3,600	0	3,600	18.42	116.79	2.15	0.17	4.08
Materials Delivery (sites)	196	0	30	2.2	5,880	431	6,311	32.29	204.75	3.78	0.29	7.15

Totals	899.98	922.53	19.12	1.60	120.27
Ton/year	0.45	0.46	0.01	0.00	0.06

Option B - 2008 AVAQMD Incremental Emissions (Reduction)

Assumptions:

Thirty-eight replaced towers

Unpaved road mileage for the 17 new towers is considerably less on average that for the 38 towers they replace

Passenger Vehicles	Trips		Miles/Round Trip		Miles		Total	Emissions lbs/year				
	Paved	Unpaved	Paved	Unpaved	Paved	Unpaved		CO	NOx	PM	SOx	VOC
Construction Workers	-2525	0	30	0	-75,750	0	-75,750	-893.70	-94.31	-6.09	-0.68	-96.73
Professionals	-435	0	30	6.19	-13,050	-2,693	-15,743	-185.73	-19.60	-1.27	-0.14	-20.10
Mid-Size Vehicles - "Delivery Trucks"												
Road Construction	-331	0	30	6.19	-9,930	-2,049	-11,979	-190.97	-277.90	-5.02	-0.40	-29.35
Foundation Construction	-383	0	30	6.19	-11,490	-2,371	-13,861	-220.97	-321.56	-5.81	-0.46	-33.96
Steel Construction	-632	0	30	6.19	-18,960	-3,912	-22,872	-364.63	-530.61	-9.59	-0.75	-56.04
Conductor/Guard Pole	-283	0	30	6.19	-8,490	-1,752	-10,242	-163.27	-237.60	-4.29	-0.34	-25.09
Heavy-Heavy Duty Vehicles												
Equipment Delivery	0	0	120	0	0	0	0	0.00	0.00	0.00	0.00	0.00
Equipment Shuttling	-336	0	0.25	0.25	-84	-84	-168	-0.86	-5.45	-0.10	-0.01	-0.19
Waste Disposal	-2	0	120	6.19	-240	-12	-252	-1.29	-8.19	-0.15	-0.01	-0.29
Materials Delivery (yards)	-67	0	120	0	-8,040	0	-8,040	-41.14	-260.84	-4.81	-0.37	-9.11
Materials Delivery (sites)	-438	0	30	6.19	-13,140	-2,711	-15,851	-81.11	-514.25	-9.48	-0.73	-17.96

Totals	-2143.67	-2270.30	-46.61	-3.89	-288.82
Ton/year	-1.07	-1.14	-0.02	0.00	-0.14

Onroad Emission Calculations

Option B - 2008 AVAQMD Emissions (Worst Case Day)

Assumptions:

Thirty-eight replaced towers

Unpaved road mileage for the 17 new towers is considerably less on average than for the 38 towers they replace

Passenger Vehicles	Trips		Miles/Round Trip		Miles		Total	Emissions lbs/day				
	Paved	Unpaved	Paved	Unpaved	Paved	Unpaved		CO	NOx	PM	SOx	VOC
Construction Workers	72	0	30	0	2,160	0	2,160	25.48	2.69	0.17	0.02	2.76
Professionals	9	0	30	5	270	45	315	3.72	0.39	0.03	0.00	0.40
Mid-Size Vehicles - "Delivery Trucks"												
Road Construction	14	0	30	5	420	70	490	7.81	11.37	0.21	0.02	1.20
Foundation Construction	25	0	30	5	750	125	875	13.95	20.30	0.37	0.03	2.14
Steel Construction	21	0	30	5	630	105	735	11.72	17.05	0.31	0.02	1.80
Conductor/Guard Pole	12	0	30	5	360	60	420	6.70	9.74	0.18	0.01	1.03
Heavy-Heavy Duty Vehicles												
Equipment Delivery	0	0	120	0	0	0	0	0.00	0.00	0.00	0.00	0.00
Equipment Shuttling	20	0	0.25	0.25	5	5	10	0.05	0.32	0.01	0.00	0.01
Waste Disposal	1	0	120	5	120	5	125	0.64	4.06	0.07	0.01	0.14
Materials Delivery (yards)	0	0	120	0	0	0	0	0.00	0.00	0.00	0.00	0.00
Materials Delivery (sites)	21	0	30	5	630	105	735	3.76	23.85	0.44	0.03	0.83
Totals								73.83	89.77	1.78	0.15	10.32

Offroad Equipment Emission Calculations

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	305	250
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
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

Gasoline engines assume 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
0.39	1.798	0.054	0.00276	0.077
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
0.598	1.004	0.058	0.001398	0.088
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

Correction SOx @ 15 ppm
0.00043
0.00134
0.00140
0.00100
0.00100
0.00065
0.00276
0.00179
0.00047
0.00151
0.00207
0.00207
0.00140
0.00049
0.00049
0.00076
0.00185
0.00040
0.00097
0.00105
0.00155

SCAQMD SOx
0.072
0.224
0.233
0.167
0.167
0.108
0.46
0.299
0.079
0.251
0.345
0.345
0.233
0.081
0.081
0.127
0.309
0.066
0.162
0.175
0.258

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	305	250
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

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
0.477	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
0.388	1.604	0.053	0.00276	0.076
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	0.00097	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

1.94	0.010	0.00033	0.00006	0.034
0.99	0.057	0.00496	0.00054	0.022

Correction SOx @ 15 ppm
0.00043
0.00134
0.00140
0.00100
0.00100
0.00065
0.00276
0.00179
0.00047
0.00151
0.00207
0.00207
0.00197
0.00049
0.00049
0.00076
0.00185
0.00040
0.00097
0.00261
0.00105
0.00155

SCAQMD SOx
0.072
0.224
0.233
0.167
0.167
0.108
0.46
0.299
0.079
0.251
0.345
0.345
0.329
0.081
0.081
0.127
0.309
0.066
0.162
0.435
0.175
0.258

Emission Calculations (equipment use basis SCE PEA Table 3-2)

Notes:

- 1) 35 Ton Rough Terrain Cranes, in the PEA, are noted to have horsepower ratings equivalent to 25 Ton Cranes or smaller, so 25 Ton Cranes are assumed.
- 2) Emissions for removal/replacement of 96-66kV poles has been added to the AVAQMD emission totals assuming four removal/replacements per day and equipment needs of 2-25 ton rough terrain cranes one backhoe, and one water truck.
- 3) In lieu of specific schedule assumptions, such as direction, start/stop dates for each activity type, etc, 2008 emission factors will be used for the entire duration of the construction.
- 4) AVAQMD emissions for Segment 3 tower construction are based on a ratio of 48 of 122 towers for Antelope Sub to Substation being within AVAQMD Territory
- 5) Segment 3 from Substation One to Substation Two has 57 towers, plus 5 towers located on Substation One, so the duration of activities have been changed from the 49 towers assumed in the PEA calculations to 62 towers.

Offroad Equipment Emission Calculations

Conductor Installation Mar '09 to Apr '09	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Total Emissions lbs				
				CO	NOx	PM	SOx	VOC		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	20	50.31	80.21	8.31	0.09	10.35
Digger, Truck Mount	190	175	1	0.727	1.08	0.056	0.001794	0.081	1	0.79	1.17	0.06	0.00	0.09	20	15.79	23.45	1.22	0.04	1.76
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	20	30.07	121.57	4.82	0.13	9.15
Dozer/Driller, D8	305	250	2	0.493	1.993	0.079	0.00207	0.15	5	6.01	24.31	0.96	0.03	1.83	20	120.29	486.29	19.28	0.51	36.60
Backhoe	85	50	1	0.477	0.35	0.052	0.000432	0.176	3.5	2.84	2.08	0.31	0.00	1.05	20	56.76	41.65	6.19	0.05	20.94
Tension Machine	135	120	1	0.564	1.079	0.102	0.00105	0.14	5	3.17	6.07	0.57	0.01	0.79	20	63.45	121.39	11.48	0.12	15.75
Water Truck	175	175	1	0.734	1.269	0.088	0.001548	0.13	9	6.61	11.42	0.79	0.01	1.17	20	132.12	228.42	15.84	0.28	23.40
Aux Power - Gasoline	5	na	4	1.94	0.010	0.00033	0.00006	0.034	4	30.97	0.16	0.01	0.00	0.54	20	619.34	3.23	0.11	0.02	10.81
										54.41	55.31	3.36	0.06	6.44		1088.14	1106.21	67.23	1.23	128.77

Cleanup and Guard Poles Duration May '09	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Total Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
Motor Grader	110	120	1	0.494	0.806	0.078	0.00097	0.1	9	4.08	6.65	0.64	0.01	0.83	7	28.53	46.55	4.50	0.06	5.78
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	7	28.38	20.83	3.09	0.03	10.47
Water Truck	175	175	1	0.734	1.269	0.088	0.001548	0.13	9	6.61	11.42	0.79	0.01	1.17	7	46.24	79.95	5.54	0.10	8.19
										14.74	21.05	1.88	0.03	3.49		103.15	147.32	13.14	0.18	24.44

Segment 3b Emissions

KCAPCD Work Area Substation Two 2009

Grading (Substation Two) Duration Feb '09	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Total Emissions lbs				
				CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC		CO	NOx	PM	SOx	VOC
Loader - 980	305	250	2	0.285	1.236	0.039	0.001854	0.076	7.5	5.22	22.62	0.71	0.03	1.39	15	78.23	339.28	10.71	0.51	20.86
Motor Grader	110	120	1	0.494	0.806	0.078	0.00097	0.1	5	2.26	3.69	0.36	0.00	0.46	15	33.96	55.41	5.36	0.07	6.88
Compactor	165	175	1	0.559	0.892	0.049	0.001344	0.073	5	2.64	4.21	0.23	0.01	0.34	15	39.53	63.08	3.47	0.10	5.16
Water Truck	175	175	3	0.734	1.269	0.088	0.001548	0.13	7.5	16.52	28.55	1.98	0.03	2.93	15	247.73	428.29	29.70	0.52	43.88
										26.63	59.07	3.28	0.08	5.12		399.45	886.06	49.23	1.19	76.77

Civil (Substation Two) Duration Mar '09	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Total Emissions lbs				
				CO	NOx	PM	SOx	VOC		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	7.5	4.51	18.24	0.72	0.02	1.37	10	45.11	182.36	7.23	0.19	13.73
Crane	180	175	1	0.455	0.755	0.049	0.001002	0.075	5	2.34	3.88	0.25	0.01	0.39	15	35.10	58.24	3.78	0.08	5.79
Forklift - 5 ton	75	50	1	0.327	0.321	0.036	0.000486	0.083	5	2.45	2.41	0.27	0.00	0.62	15	36.79	36.11	4.05	0.05	9.34
Backhoe	85	50	2	0.477	0.35	0.052	0.000432	0.176	7	11.35	8.33	1.24	0.01	4.19	15	170.29	124.95	18.56	0.15	62.83
Ditch Digger	75	50	1	0.242	0.292	0.027	0.000474	0.054	7.5	2.72	3.29	0.30	0.01	0.61	10	27.23	32.85	3.04	0.05	6.08
										23.38	36.14	2.79	0.04	7.18		314.51	434.51	36.66	0.53	97.76

Electrical (Sub One) Duration Apr '09 to May '09	HP	SCAQMD HP	Number	SCAQMD Emission Factor lbs/hour					Hours/day	Daily Emissions lbs					Days	Total Emissions lbs				
				CO	NOx	PM	SOx	VOC		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	7.5	1.71	7.46	0.25	0.01	0.48	20	34.20	149.10	4.95	0.21	9.60
Forklift - 5 ton	75	50	1	0.327	0.321	0.036	0.000486	0.083	5	2.45	2.41	0.27	0.00	0.62	20	49.05	48.15	5.40	0.07	12.45
Manlift	85	50	2	0.329	0.299	0.04	0.000396	0.1	7.5	8.39	7.62	1.02	0.01	2.55	30	251.69	228.74	30.60	0.30	76.50
										12.55	17.49	1.54	0.02	3.65		334.94	425.99	40.95	0.59	98.55

Dec '08	CO	NOx	PM	SOx	VOC
	177.37	269.83	17.77	0.33	30.90

2008	CO	NOx	PM	SOx	VOC
	4.51	7.02	0.47	0.01	0.85
2009	5.51	6.92	0.51	0.01	0.97

Worst-Case Daily Overlapping Operations:
 Marshalling Yards (Ant to Sub One and Sub One to Sub Two)
 Road Work (Ant to Sub One upkeep and Sub One to Sub Two)
 Foundations (Ant to Sub One and Sub One to Sub Two)
 Substation One Grading

Offroad Equipment Emission Calculations

Construction Route Option Incremental Emissions

Option A - Incremental Emissions	Total Emissions lbs				
	CO	NOx	PM	SOx	VOC
Marshalling Yards	18.10	20.07	2.23	0.03	4.86
Road Work	20.14	43.53	2.87	0.05	4.81
Foundations	20.46	30.57	1.75	0.03	3.43
Steel Assembly	33.78	30.86	2.39	0.04	3.69
Conductor Installation	34.91	37.00	2.25	0.04	4.39
Cleanup and Guard Poles	1.96	2.79	0.25	0.00	0.46
Totals	129.35	164.84	11.73	0.20	21.65
	0.06	0.08	0.01	0.00	0.01

l/yr

Assumption - One more tower with 112 tower and two pole basis for Segment 2 T/L construction
Cleanup and Guard Pole work occurs in 2009 all other work in 2008

Option B - Incremental Emissions	Total Emissions lbs				
	CO	NOx	PM	SOx	VOC
Marshalling Yards	-380.11	-421.55	-46.86	-0.58	-102.08
Road Work	-845.92	-1828.21	-120.38	-1.94	-202.20
Foundations	-429.61	-642.06	-36.70	-0.73	-72.08
Steel Assembly	-709.40	-648.11	-50.15	-0.92	-77.54
Conductor Installation	-733.20	-777.08	-47.23	-0.82	-92.14
Cleanup and Guard Poles	-41.08	-58.67	-5.23	-0.07	-9.73
Totals	-3139.32	-4375.68	-306.56	-5.06	-555.78
	-1.57	-2.19	-0.15	0.00	-0.28

l/yr

Assumption - Twenty-one fewer towers with 112 tower and two pole basis for Segment 2 T/L construction
Road work will decrease proportionally by an additional factor of two due to relative remoteness of the towers being replaced
Cleanup and Guard Pole work occurs in 2009 all other work in 2008

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

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

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

Source: FAEED database, 2001

FAEED - FAA Aircraft Engine Emission Database

Relating Factors to Potential Construction/Operating Helicopters

Approach/Climbout			Emissions lbs/hour				
Engine HP	Number	HC	CO	NOx	SOx	PM	
Hughes 500	420	1	0.08	0.78	1.91	0.02	0.10

Idle			Emissions lbs/hour				
Engine HP	Number	HC	CO	NOx	SOx	PM	
Hughes 500	420	1	3.44	1.61	0.08	0.00	0.01

Construction Assumptions:

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

One Hughes helicopter is in operation during line stringing for each Segment for 6 hours per day

No other helicopter use is currently assumed for remote area construction

Segment 2 500 kV has 72 days of line stringing, Segment 2 66 kV has 9 days of line stringing, Segment 3 to Substation

One has 52 days, and Segment 3 Substation One to Substation Two has 20 days of line stringing

Segment 3a includes 48 towers inside AVAQMD territory and 74 in KCAPCD territory, so of the 72 days stringing for

Segment 3 up to Substation One, 20 days are inside AVAQMD territory and 32 days are inside of KCAPCD territory

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

Assumes helicopters stay within 3000 feet of the ground.

Total Proposed Project Emissions

Peak Day (any Jurisdiction or Air Basin)			Emissions lbs/day				
Working hours	Idle hr/hr	CO	NOx	PM	SOx	VOC	
Hughes 500	6	0.1	5.63	11.50	0.63	0.10	2.51
Totals			5.63	11.50	0.63	0.10	2.51

It should be noted that conductor stringing does not occur during the worst case day for KCAPCD

Proposed Project Annual Emissions

Total Emissions

Hours Total			Emissions tons/year				
Idle hr/hr	CO	NOx	PM	SOx	VOC		
Hughes	918	0.1	0.43	0.88	0.05	0.01	0.19
Totals			0.43	0.88	0.05	0.01	0.19

AVAQMD	0.28	0.58	0.03	0.00	0.13
KCAPCD	0.15	0.30	0.02	0.00	0.07

Option A Incremental Emissions

One Additional Tower

Working hours			Emissions lbs/year				
Idle hr/hr	CO	NOx	PM	SOx	VOC		
Hughes 500	3	0.1	2.82	5.75	0.31	0.05	1.26
Totals			2.82	5.75	0.31	0.05	1.26

Option B Incremental Emissions

Twenty-one Less Towers

Working hours			Emissions lbs/year				
Idle hr/hr	CO	NOx	PM	SOx	VOC		
Hughes 500	-63	0.1	-59.14	-120.76	-6.57	-1.00	-26.40
Totals			-59.14	-120.76	-6.57	-1.00	-26.40

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)

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

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

k = Scaling Constant (0.75 for PM10 and 0.105 for PM2.5)

s = Silt Content (assumed to be 12% - Surface Materials)

M = Moisture Content = 12% (assumes watering when necessary for mitigation)

PM10 Emission Factor 0.96156664 lb/hr	Road Work Foundations	Daily Dozer		Annual Dozer 2008		Annual Dozer 2009	
		AVAQMD	KCAPCD	AVAQMD	KCAPCD	AVAQMD	KCAPCD
		18	18	1749	1242	0	288
		8	4	476	320	0	152
PM2.5 Emission Factor 0.46681632 lb/hr	Steel Work	4	4	432	148	0	124
	Conductor	0	0	227.5	0	25	130
	Clean up	0	0	37.5	0	0	0
	Wreckout	0	0	45	0	0	0
Maximum Day Dozer Use	Shu-Fly	0	0	62.5	0	0	0
AVAQMD	Substations	0	0	0	0	0	337.5
KCAPCD	Totals	30	26	3029.5	1710	25	1031.5

Annual Dozer 2008 2009

AVAQMD 3029.5 25 hrs/year

KCAPCD 1710 1031.5 hrs/year

(note large loader assumed as dozer)

Dozer Emissions

	Lbs/Day		Tons/year - 2008		Tons/year - 2009	
	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
AVAQMD	28.85	14.00	1.46	0.71	0.01	0.01
KCAPCD	25.00	12.14	0.82	0.40	0.50	0.24

B) Grading

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

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

k = Scaling Constant (0.60 for PM10 and 0.031 for PM2.5)

S = Mean Vehicle Speed assumed to be 3 mph

Assumes VMT = 3 x hours in use

PM10 Emission Factor 0.2754 lb/VMT	Road Work Cleanup	Daily Grader Use		Annual Grader 2008		Annual Grader 2008	
		AVAQMD	KCAPCD	AVAQMD	KCAPCD	AVAQMD	KCAPCD
		10	10	1042.5	445	680	710
		0	0	37.5	0	198	162
PM2.5 Emission Factor 0.01932969 lb/VMT	Substations	0	5	0	150	0	75
	Totals	10	15	1080	595	878	947

Fugitive Dust Emissions

Maximum Daily Grader VMT

AVAQMD 30 VMT/day
 KCAPCD 45 VMT/day

Annual Grade 2008 2009
 AVAQMD 3240 2634 VMT/year
 KCAPCD 1785 2841 VMT/year

Grading Emissions

	Lbs/Day		Tons/year - 2008		Tons/year - 2008	
	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
AVAQMD	8.26	0.58	0.45	0.03	0.36	0.03
KCAPCD	12.39	0.87	0.25	0.02	0.39	0.03

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 = MDAB - 27.2 MPH worst day, 6.8 MPH avg from Lancaster Met File

M = moisture content = 8% first drop dry second wetted

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

Earth movement = 500 cy/tower site and 100 cy/pole site where AVAQMD has 129 towers 129 poles and KCAPCD has 89 towers and 48 poles

Substation One has 6,000 cy of earth moved over 30 days and Substation Two has 3,000 cy of earth moved over 15 days.

Material is assumed to be 1.7 tons/cy

AVAQMD 2550 Daily tons
 KCAPCD 1530 Daily tons
 AVAQMD 135450 Annual 2008
 KCAPCD 69870 Annual 2008
 AVAQMD 0 Annual 2009
 KCAPCD 37400 Annual 2009

Emission Factors and Emissions

Emission Factors

PM10 Daily PM2.5 Daily PM10 Annual PM2.5 Annual
 0.00145 0.00046 0.00024 0.00008

	Emissions lbs/day		2008 Emissions tons/year		2009 Emissions tons/year	
	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
AVAQMD	3.71	1.17	0.02	0.01	0.00	0.00
KCAPCD	2.22	0.70	0.01	0.00	0.01	0.00

Fugitive Dust Emissions

2) Road Dust

Emission Types

A) Paved Road Dust

B) Unpaved Road Dust

A) Paved Road Dust

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

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

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

sL = Silt Loading (assumed to be 0.22 g/m² - assumes 1/4 each ADT profile of 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

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

Average Vehicle Weight Calculation

Assumptions

Passenger Vehicles = 2 tons average

Midsize "Delivery" Vehicles = 8 ton average

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

Worst Case Day VMT (Based on AVAQMD)

AVAQMD KCAPCD

2502	2331 Passenger Vehicles
2736	1815 Delivery/Work Vehicles
936	659 Heavy-Heavy Duty Vehicles
6174	4805 Total Paved VMT

	AVAQMD	KCAPCD
Average Weight (tons)=	8.9	8.1

Average Case VMT AVAQMD Region

427,770	Passenger Vehicles
211,223	Delivery/Work Vehicles
186,320	Heavy-Heavy Duty Vehicles
825,313	Total Paved VMT

Average Weight = 9.9 Tons

Average Case VMT KCAPCD Region

288,630	Passenger Vehicles
183,060	Delivery/Work Vehicles
83,878	Heavy-Heavy Duty Vehicles
555,568	Total Paved VMT

Average Weight = 8.2 Tons

Emission Factors and Emissions

	Emission Factors (lbs/VMT)				Emissions lbs/day		Emissions tons/year	
	PM10 Daily	PM2.5 Daily	PM10 Annual	PM2.5 Annual	PM10	PM2.5	PM10	PM2.5
AVAQMD	0.0190	0.0045	0.0217	0.0052	117.40	27.85	8.96	2.14
KCAPCD	0.0165	0.0039	0.0164	0.0039	79.08	18.60	4.55	1.07
							2008	
							8.31	1.99
							1.94	0.46
							2009	
							0.64	0.15
							2.61	0.61

Fugitive Dust Emissions

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 = 12% (assumed from SCAQMD CEQA Handbook for Mountain Roads)

W = avg. vehicle weight = calculated below

P = Number of wet days over 0.01 in precipitation for averaging period (assume 20 days/year average for MDAB)

(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 AVAQMD

72 Professional/inspection Vehicles

576 Delivery/Work Vehicles

181 Heavy-Heavy Duty Vehicles

829 Total Unpaved VMT

Average Weight = 12.4 Tons

Worst Case Day VMT KCAPCD

21 Professional/inspection Vehicles

165 Delivery/Work Vehicles

55 Heavy-Heavy Duty Vehicles

241 Total Unpaved VMT

Average Weight = 12.6 Tons

Average Case VMT AVAQMD Region

6402 Professional/inspection Vehicles

20489 Delivery/Work Vehicles

5919 Heavy-Heavy Duty Vehicles

32809 Total Unpaved VMT

Average Weight = 11.0 Tons

Average Case VMT KCAPCD Region

1926 Professional/inspection Vehicles

8970 Delivery/Work Vehicles

2816 Heavy-Heavy Duty Vehicles

13711 Total Unpaved VMT

Average Weight = 11.8 Tons

Uncontrolled Emission Factors and Emissions

	Emission Factors (lb/VMT)				Emissions lbs/day		Emissions tons	
	PM10 Daily	PM2.5 Daily	PM10 Annual	PM2.5 Annual	PM10	PM2.5	PM10	PM2.5
AVAQMD	2.84	0.44	2.44	0.37	2352.31	360.69	40.03	6.14
KCAPCD	2.86	0.44	2.52	0.39	689.19	105.68	17.28	2.65
							2008	
					AVAQMD		38.31	5.87
					KCAPCD		8.54	1.31
							2009	
					AVAQMD		1.73	0.26
					KCAPCD		8.74	1.34

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

Emissions lbs/day		Emissions t/yr - 2008		Emissions t/yr - 2009		Emission Control 84%
PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	
376.37	57.71	6.13	0.94	0.28	0.04	

Fugitive Dust Emissions

110.27	16.91	1.37	0.21	1.40	0.21
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Fugitive Dust Emissions

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
AVAQMD	Dozer	28.85	14.00	1.46	0.71	0.01	0.01
	Grading	8.26	0.58	0.45	0.03	0.36	0.03
	Soil Handling	3.71	1.17	0.02	0.01	0.00	0.00
	Paved Road Dust	117.40	27.85	8.31	1.99	0.64	0.15
	Unpaved Road Dust	376.37	57.71	6.13	0.94	0.28	0.04
	Totals	534.59	101.31	16.36	3.67	1.29	0.23

				2008		2009	
		PM10 lb/day	PM2.5 lb/day	PM10 t/yr	PM2.5 t/yr	PM10 t/yr	PM2.5 t/yr
KCAPCD	Dozer	25.00	12.14	0.82	0.40	0.50	0.24
	Grading	12.39	0.87	0.25	0.02	0.39	0.03
	Soil Handling	2.22	0.70	0.01	0.00	0.01	0.00
	Paved Road Dust	79.08	18.60	4.55	1.07	2.61	0.61
	Unpaved Road Dust	110.27	16.91	1.37	0.21	1.40	0.21
	Totals	228.97	49.22	6.99	1.70	4.90	1.10

Alternatives Incremental Fugitive Dust Calculations

Option A - Incremental Factors

One Tower	15 Hours of Dozer Use
One Tower	10 Hours of Grader Use
Material Handling	Negligible Difference
Paved Road Travel	4202 VMT
Unpaved Road Travel	256 VMT

	PM10 t/yr	PM2.5 t/yr
Dozer	0.01	0.00
Grading	0.00	0.00
Soil Handling	0.00	0.00
Paved Road Dust	0.05	0.01
Unpaved Road Dust	0.05	0.01
Total	0.11	0.02

Option B - Incremental Factors

Twenty One Fewer Towers	-315 Hours of Dozer Use
Twenty One Fewer Towers	-218 Hours of Grader Use
Material Handling	Negligible Difference
Paved Road Travel	-87917 VMT
Unpaved Road Travel	-13080 VMT

	PM10 t/yr	PM2.5 t/yr
Dozer	-0.15	-0.07
Grading	-0.09	-0.01
Soil Handling	0.00	0.00
Paved Road Dust	-0.95	-0.23
Unpaved Road Dust	-2.55	-0.39
Total	-3.75	-0.70

Option B - Incremental Factors (worst case day)

Unpaved Road Travel	-309 VMT
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	PM10 lb/day	PM2.5 lb/day
Unpaved Road Dust	-120.64	-18.50
Total	-120.64	-18.50

Option A - Emissions

Assumptions:

There is one additional tower required for the Segment 2 T/L construction for this route option.

This option is wholly within the AVAQMD and does not effect KCAPCD emissions. Additionally, effected emissions, other than cleanup, would be in 2008

The onroad vehicle trips are based on a ratio of the trips required for the entire project that has a total construction of 218 towers and 177 poles.

The incremental offroad vehicle/equipment use are based on a ratio of the Segment 2 T/L construction estimate for 112 towers and two poles.

The incremental helicopter use is assumed to be three hours to string one additional tower.

Fugitive dust incremental emissions are caculated based on the incremental onroad vehicle and offroad vehicle/equipment use.

Project Total AVAQMD

	Emissions (tons)					
	CO	NOx	PM10	SOx	VOC	PM2.5
Onroad Vehicles	4.90	6.06	0.12	0.01	0.67	0.12
Offroad Vehicles/Equipment	14.27	18.35	1.35	0.02	2.58	1.35
Helicopters	0.29	0.58	0.03	0.00	0.13	0.03
Fugitive Dust	---	---	17.76	---	---	3.92
Totals	19.46	24.99	19.26	0.04	3.38	5.42
Total Increase	0.09	0.11	0.11	0.00	0.02	0.03

More detailed emission estimates for Option A are provided along with the onroad vehicle, offroad vehicle, helicopter and fugitive dust emission estimates

Option B - Emissions

Assumptions

There are 17 new and 38 removed towers (net 21 fewer towers) required for the Segment 2 T/L construction for this route option.

This option is wholly within the AVAQMD and does not effect KCAPCD emissions. Additionally, effected emissions, other than cleanup, would be in 2008.

The onroad vehicle trips are based on a ratio of the trips required for the entire project that has a total construction of 218 towers and 177 poles.

Further the onroad vehile unpaved road VMT is calculated based on the differential in unpaved road length to reach the respective tower sites.

Maximum daily emissions, most specifically particulate emissions, are reduced with this option due to the decrease in unpaved road trip length.

The incremental offroad vehicle/equipment use are based on a ratio of the Segment 2 T/L construction estimate for 112 towers and two poles.

The incremental helicopter use is assumed to be three hours to string each additional tower (-21 towers x 3 = -63 hours).

Fugitive dust incremental emissions are caculated based on the incremental onroad vehicle and offroad vehicle/equipment use.

Incremental Maximum Day Emissions

	Emissions (lbs/day)					
	CO	NOx	PM10	SOx	VOC	PM2.5
Onroad Vehicles	73.83	89.77	1.78	0.15	10.32	0.00
Offroad Vehicles/Equipment	198.12	276.88	18.55	0.33	33.99	18.55
Helicopters	5.63	11.50	0.63	0.10	2.51	0.63
Fugitive Dust	---	---	413.94	---	---	82.81
Totals	277.58	378.15	434.89	0.57	46.82	101.99

Total Reduction	-4.10	-7.19	-120.78	-0.01	-0.64	-20.41
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Project Total AVAQMD

	Emissions (tons)					
	CO	NOx	PM10	SOx	VOC	PM2.5
Onroad Vehicles	4.25	5.36	0.11	0.01	0.58	0.11
Offroad Vehicles/Equipment	12.64	16.08	1.19	0.02	2.29	1.19
Helicopters	0.25	0.52	0.03	0.00	0.11	0.00
Fugitive Dust	---	---	13.91	---	---	3.20
Totals	17.15	21.95	15.23	0.03	2.99	4.49

Total Reduction	-2.22	-2.92	-3.92	0.00	-0.38	-0.90
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More detailed emission estimates for Option B are provided along with the onroad vehicle, offroad vehicle, helicopter and fugitive dust emission estimates.

Operating Emissions

Assumptions:

There are no stationary sources associated with the project

There are no regularly scheduled operation and maintenance activities other than annual inspection

Annual inspection will be performed by a crew in a truck on the ground and by helicopter

Inspection emissions

Assumptions:

- 1) Proposed project will increase helicopter and/or truck inspection surveys by 4 hours and one work week, respectively.
- 2) The helicopter is assumed to be a Hughes 500
- 3) Helicopter Emission Factor is developed from ratio of engine size from FAEED data.
- 4) 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 (2009 emission factors)
- 5) Road dust calculated assuming 75% paved and 25% unpaved during the inspection and a loaded truck weight of 4 tons.
- 6) No fugitive dust control is assumed for the single truck trip inspection.
- 7) A total of one inspection occurs per year either by Helicopter or by truck; however, emissions conservatively assume both occur.
- 8) As a worst case assumption it is assumed that the worst case daily and total annual emission would occur in either the AVAQMD or KCAPCD jurisdictions

Helicopter emission increase

CO	NOx	PM	SOx	VOC	
3.76	7.67	0.42	0.06	1.68	lbs/day
0.00	0.00	0.00	0.00	0.00	tons/year

Truck emissions increase

CO	NOx	PM10	PM2.5	SOx	VOC	
1.45	2.15	43.32	6.86	0.00	0.04	lbs/day
0.00	0.01	0.11	0.02	0.00	0.00	tons/year

Maximum Inspection Emissions - Provided in AQ Section

CO	NOx	PM10	PM2.5	SOx	VOC	
5.21	9.82	43.73	7.27	0.07	1.72	lbs/day
0.01	0.01	0.11	0.02	0.00	0.00	tons/year

These maximum inspection emissions overestimate the emissions by jurisdiction which are more accurately estimated as:

- 1) The maximum of either the helicopter or truck inspections emissions for worst case day in AVAQMD or KCAPCD
- 2) The maximum of the 1/2 of the maximum annual inspection emissions whether by helicopter or truck in AVAQMD
- 3) for KCAPCD annual 2) above plus 200 miles of pickup emissions (passenger vehicle) for substation telecommunications maintenance.

Actual Worst-Case Inspection Emissions AVAQMD

CO	NOx	PM10	PM2.5	SOx	VOC	
1.88	3.83	43.32	6.86	0.03	0.84	lbs/day
0.00	0.00	0.05	0.01	0.00	0.00	tons/year

Pickup emissions increase - telecommunications maintenance (KCAPCD only)

CO	NOx	PM10	PM2.5	SOx	VOC	
1.08	0.11	0.65	0.12	0.12	0.00	lbs/day
0.00	0.00	0.00	0.00	0.00	0.00	tons/year

Actual Worst-Case Inspection Emissions KCAPCD

CO	NOx	PM10	PM2.5	SOx	VOC	
1.88	3.83	43.32	6.86	0.03	0.84	lbs/day
0.00	0.00	0.05	0.01	0.00	0.00	tons/year