Appendix D
Air Quality and Greenhouse Gases

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Ivanpah Substation
Emission Summary

Activity		Total Activity Emissions(lbs)							
		ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
Phase 1 Grading									
	On-Site	818	2798	7385	8	512	274	740794	52
	On-Road	9	83	9	0.1	2329	471	10957	0.8
Phase 2 Civil									
	On-Site	682	2232	6113	7	340	214	667830	47
	On-Road	19	174	19	0.2	1992	412	23009	1.7
Phase 3 Electrical									
	On-Site	676	2093	6017	7	278	192	634213	44
	On-Road	22	198	22	0.3	2522	516	26296	2.0
Total All Activities (lbs)		2226	7577	19566	22	7972	2079	2103100	147
Total All Activities (tons)		1.1	3.8	10	0.011	4.0	1.0	1052	0.074
Total Construction Days		160	160	160	160	160	160	160	160
Average Daily Emissions (lbs)		13.9	47.4	122	0.14	49.8	13.0	13144	0.92

Assumed that on site combustion PM2.5 is 75% of PM10
Assumed that on site combustion CH4 is 0.00007 of CO2

Ivanpah Substation
Workforce Estimate

Work Activity						Activity Production	
Primary Equipment Description	**Estimated Horse-Power**	**Probable Fuel Type**	**Primary Equipment Quantity**	**Estimated Workforce**	**Estimated Schedule (Days)**	**Estimated Average Duration of Use (Hrs/Day)**	**Estimated Production Per Day**
Survey Crew				2	15	10	
3/4 ton pick-up truck, 4X4	300	Diesel	2	2	15	4	Vehicle for transportation to and from work
John Deere Gator	20	Gas	2	2	40	6	Transport personnel around site
Grading Crew				5	40	10	
3/4 ton pick-up truck, 4X4	300	Diesel	5	5	40	4	
Bulldozer	350	Diesel	1		40	4	
Dump truck	350	Diesel	1		40	6	
Paddle graders	350	Diesel	3		40	8	
Water truck	300	Diesel	1		40	4	
Front end loader	350	Diesel	1		40	8	
Maintenance truck	350	Diesel	1	1	40	4	
Compactor	350	Diesel	1		40	8	
Generator	20	Gas	1		40	4	
Fuel truck	350	Diesel	1		40	2	Depending on soil conditions
Civil Crew				7	60	10	
3/4 ton pick-up truck, 4X4	300	Diesel	7	7	60	4	
Bobcat	200	Diesel	1		60	8	
Backhoe	200	Diesel	1		60	8	
Drilling rig	350	Diesel	1		60	6	
Water truck	350	Diesel	1		60	4	
Compactor	200	Diesel	1		60	4	
John Deere Gator	20	Gas	2		60	4	
Generator	20	Gas	1		60	4	Depending on soil conditions
Electrical Crew				8	60	10	
3/4 ton pick-up truck, 4X4	300	Diesel	8	8	60	4	
45ft Manlift	150	Diesel	1		60	6	
60ft Manlift	150	Diesel	1		60	6	
80 ton crane	300	Diesel	1		45	8	
10k Reach-all forklift	150	Diesel	1		60	6	
Generator	20	Gas	1		60	4	
John Deere Gator	20	Gas	2		60	4	

Ivanpah Substation
On-Site Fugitive Dust Estimate

Used an uncontrolled emission factor of 10 lbs PM10/day/acre for each acre of land being di
Assumed 50% control for watering.
Assumed PM2.5 is approximately 20% of the PM10 for fugitive dust sources.

Activity	Average Daily Disturbed Land (acres)	Duration (days)	Total Activity Fugitive Dust (lbs)	
			PM10	PM2.5
Phase 1 Grading	1	40	200	40
Phase 2 Civil	0.25	60	75	15
Phase 3 Electrical	0.1	60	30	6

Ivanpah Substation

Grading and Survey Phase (Off-Road Construction Equipment Exhaust Emissions)

Description	Number	Hours per Day	Days of Activity	2010 Emission Factor (lbs/hr)						Emissions (lbs/day)						Total Activity Emissions (lbs)					
				ROG	CO	NOX	SOX	PM	CO2	ROG	CO	NOX	SOX	PM	CO2	ROG	CO	NOX	SOX	PM	CO2
Survey																					
3/4 ton pick-up truck, 4X4	2	4	15	0.248	0.743	2.388	0.003	0.088	260	1.984	5.943	19.108	0.0213	0.7001	2081	29.76	89.145	286.62	0.3191	10.501	31213
John Deere Gator	2	6	40	0.0961	0.3293	0.644	0.0007	0.0396	61	1.1536	3.9515	7.7284	0.0084	0.4755	732	46.142	158.06	309.13	0.335	19.021	29276
Grading																					
Pick-up trucks	5	4	40	0.248	0.743	2.388	0.003	0.088	260	4.96	14.858	47.77	0.0532	1.7502	5202	198.4	594.3	1910.8	2.127	70.008	208083
Bulldozer	1	4	40	0.172	0.631	1.434	0.001	0.075	133	0.6893	2.5255	5.735	0.006	0.3014	531	27.571	101.02	229.4	0.2394	12.055	21239
Dump truck	1	6	40	0.248	0.743	2.388	0.003	0.088	260	1.488	4.4573	14.331	0.016	0.5251	1561	59.52	178.29	573.24	0.6381	21.002	62425
Paddle graders	3	8	40	0.320	1.242	2.908	0.003	0.126	262	7.6845	29.818	69.788	0.0645	3.0133	6300	307.38	1192.7	2791.5	2.5797	120.53	251999
Water truck	1	4	40	0.248	0.743	2.388	0.003	0.088	260	0.992	2.9715	9.554	0.0106	0.35	1040	39.68	118.86	382.16	0.4254	14.002	41617
Front end loader	1	8	40	0.102	0.393	0.675	0.001	0.052	67	0.8164	3.1437	5.3979	0.0062	0.4164	534	32.658	125.75	215.91	0.248	16.657	21378
Maintenance truck	1	4	40	0.248	0.743	2.388	0.003	0.088	260	0.992	2.9715	9.554	0.0106	0.35	1040	39.68	118.86	382.16	0.4254	14.002	41617
Compactor	1	8	40	0.005	0.026	0.032	0.000	0.002	4	0.0404	0.2107	0.2537	0.0005	0.0121	35	1.6152	8.4287	10.149	0.0215	0.483	1380
Generator	1	4	40	0.096	0.329	0.644	0.001	0.040	61	0.3845	1.3172	2.5761	0.0028	0.1585	244	15.381	52.687	103.04	0.1117	6.3405	9759
Fuel truck	1	2	40	0.248	0.743	2.388	0.003	0.088	260	0.496	1.4858	4.777	0.0053	0.175	520	19.84	59.43	191.08	0.2127	7.0008	20808
														Total Activity Emissions (lbs)		818	2798	7385	8	312	740794

From SCAQMD offroad emission factors file name "offroadEF07_25.xls"
Used composite generator
emission factors for golf
cart

Ivanpah Substation

Civil Phase (Off-Road Construction Equipment Exhaust Emissions)

Description	Number	Hours per Day	Days of Activity	2010 Emission Factor (lbs/hr)						Emissions (lbs/day)						Total Activity Emissions (lbs)					
				ROG	CO	NOX	SOX	PM	CO2	ROG	CO	NOX	SOX	PM	CO2	ROG	CO	NOX	SOX	PM	CO2
3/4 ton pick-up truck, 4X4	7	4	60	0.248	0.743	2.388	0.003	0.088	260	6.944	20.801	66.878	0.074	2.450	7283	417	1248	4013	4	147	436975
Bobcat	1	8	60	0.102	0.393	0.675	0.001	0.052	67	0.816	3.144	5.398	0.006	0.416	534	49	189	324	0.4	25	32066
Backhoe	1	8	60	0.102	0.393	0.675	0.001	0.052	67	0.816	3.144	5.398	0.006	0.416	534	49	189	324	0.4	25	32066
Drilling rig	1	6	60	0.105	0.515	1.133	0.002	0.050	165	0.631	3.088	6.799	0.010	0.299	989	38	185	408	0.6	18	59347
Water truck	1	4	60	0.248	0.743	2.388	0.003	0.088	260	0.992	2.972	9.554	0.011	0.350	1040	60	178	573	0.6	21	62425
Compactor	1	4	60	0.005	0.026	0.032	0.0001	0.002	4	0.020	0.105	0.127	0.0003	0.006	17	1.2	6	8	0.02	0.4	1035
John Deere Gator	2	4	60	0.096	0.329	0.644	0.001	0.040	61	0.769	2.634	5.152	0.006	0.317	488	46	158	309	0.3	19	29276
Generator	1	4	60	0.096	0.329	0.644	0.001	0.040	61	0.385	1.317	2.576	0.003	0.159	244	23	79	155	0.2	10	14638
														Total Activity Emissions (lbs)		682	2232	6113	7	265	667830

From SCAQMD offroad emission factors file name "offroadEF07_25.xls"
Used composite generator
emission factors for golf cart

Ivanpah Substation

Electrical Phase (Off-Road Construction Equipment Exhaust Emissions)

Description	Number	Hours per Day	Days of Activity	2010 Emission Factor (lbs/hr)						Emissions (lbs/day)						Total Activity Emissions (lbs)					
				ROG	CO	NOX	SOX	PM	CO2	ROG	CO	NOX	SOX	PM	CO2	ROG	CO	NOX	SOX	PM	CO2
3/4 ton pick-up truck, 4X4	8	4	60	0.248	0.743	2.388	0.003	0.088	260	7.936	23.8	76.432	0.085	2.800	8323	476	1426	4586	5.1	168	499400
45ft Manlift	1	6	60	0.067	0.2093	0.36	0.0004	0.0248	35	0.402	1.3	2.160	0.002	0.149	208	24	75	130	0.14	9	12500
60ft Manlift	1	6	60	0.067	0.2093	0.36	0.0004	0.0248	35	0.402	1.3	2.160	0.002	0.149	208	24	75	130	0.14	9	12500
80 ton crane	1	8	45	0.1594	0.5431	1.4515	0.0014	0.0642	129	1.275	4.3	11.612	0.011	0.514	1029	57	196	523	0.50	23	46316
10k Reach-all forklift	1	6	60	0.0686	0.2319	0.5161	0.0006	0.0281	54	0.411	1.4	3.097	0.004	0.169	326	25	83	186	0.22	10	19582
Generator	1	4	60	0.096	0.329	0.644	0.001	0.040	61	0.385	1.3	2.576	0.003	0.159	244	23	79	155	0.17	10	14638
John Deere Gator	2	4	60	0.096	0.329	0.644	0.001	0.040	61	0.769	2.6	5.152	0.006	0.317	488	46	158	309	0.34	19	29276

	ROG	CO	NOX	SOX	PM	CO2
Total Activity Emissions (lbs)	676	2093	6017	7	248	634213

From SCAQMD offroad emission factors file name "offroadEF07_25.xls"
Used composite generator
emission factors for golf cart

Ivanpah Substation
Grading Phase (Mobile Source Emissions)

Exhaust, Tire and Brake Emissions
From SCAQMD file "onroadEF07_26.xls" as of January 2009
Used 2008 Table
Passenger vehicles
Assumed 1 passenger vehicle per crew member
Assumed 50 vmt per day per passenger vehicle
5 crew member
250 Total passenger VMT per work day
40 Work days
See site exhaust calculations, used offroad combustion EF

Passenger Vehicles <8500 lbs		Emissions (lbs/day)	Total Activity Emissions (lbs)
CO	0.00826	2.1	83
NOx	0.00092	0.2	9
ROG	0.00091	0.2	9
SOx	0.00001	0.003	0.1
PM10	0.00009	0.022	0.9
PM2.5	0.00005	0.014	0.5
CO2	1.095682348	274	10957
CH4	8.14608E-05	0.020	0.8

Paved Road Fugitive Dust Emissions
From SCAQMD CEQA AQ Handbook
Table A9-9-B
Passenger Vehicles on paved road fugitive dust

E=VxG (PM10 with street cleaning)

V= vehicle miles travelled
G=EF from table A9-9-9-B1

Road Type	G(PM10 lb/VMT)
Local Streets	0.018
Collector Streets	0.013
Major Streets/Highways	0.0064
Freeways	0.00065

Crew Personal vehicles

250 Total passenger VMT on paved roads per day
12.5 Local Streets (assumed 5%)
12.5 Collector Streets (assumed 5%)
25 Major Streets/Highways (10%)
200 Freeways (assumed 80%)
40 Work days

Road Type	PM10 (lbs/day)	Activity PM10 (lbs)
Local Streets	0.2	9
Collector Streets	0.2	7
Major Streets/Highways	0.2	6
Freeways	0.1	5
Crew Personal (PM10)	0.7	27

0.169 PM2.5 fraction of PM10 from SCAQMD Table A - Updated CEIDARS Table with PM2.5 Fractions

Crew Personal (PM2.5)	0.1	5

Dump Trucks and other heavy vehicles on paved roads
200 Total VMT on paved roads per day
20 Local Streets (assumed 10%)
20 Collector Streets (assumed 10%)
160 Major Streets/Highways (80%)
0 Freeways (assumed 0%)
40 Work days

Heavy Vehicles on paved road fugitive dust
Use SCAQMD CEQA Table A9-9-C
E=VxF (PM10 without street cleaning)
V= vehicle miles travelled
G from table A9-9-C1
F=0.77*((G*0.35)^0.3) lbs/VMT
Assume 60 percent reduction for street sweeping per Table A9-9

Road Type	G(PM10 oz/sq yd)	F(PM10 lb/VMT)	F with sweeping
Local Streets	0.04	0.2139583	0.085583
Collector Streets	0.03	0.1962671	0.078507
Major Streets/Highways	0.012	0.1490958	0.059638
Freeways	0.00065	0.0621706	0.024868

Road Type	PM10 (lbs/day)	Total Activity PM10 (lbs)
Local Streets	1.7	68
Collector Streets	1.6	63
Major Streets/Highways	9.5	382
Freeways	0.0	0
Heavy Delivery (PM10)	12.8	513

0.169 PM2.5 fraction of PM10 from SCAQMD Table A -

Heavy Delivery (PM2.5)	2.17	87

	PM10 (lbs/day)	Total Activity PM10 (lbs)	PM2.5 (lbs/day)	Total Activity PM2.5 (lbs)
Total Activity Paved Road Fugitive Dust	13.5	540	2.3	91

Unpaved Road Fugitive Dust Emissions
From SCAQMD CEQA AQ Handbook
Table A9-9-D

E=V*F
V= vehicle miles travelled on unpaved roads
F=2.1*(G/12)*(H/30)*((J/3)^.7)*((I/4)^.5)*((365-K)/365)
G= surface silt
H= mean vehicle speed
I= number of wheels

J=vehicle wt
K= days of precip per year at least 0.01 in

Crew Transport
Assumed
3 Miles of unpaved road leading to substation
2 Trips per day per vehicle

10 vehicles to transport crew to site

60 VMT on unpaved roads per day

Assumed
G= 11
H= 15

I= 4 wheels

J= 3 tons
k= 18 precip days

0.9 F PM10 (lbs/VMT)

55 PM10 (lbs per day) Uncontrolled
2196 Total Activity PM10 (lbs) Uncontrolled

0.212 PM2.5 fraction of PM10 from SCAQMD Table A -

12 PM2.5 (lbs per day) Uncontrolled
466 Total Activity PM2.5 (lbs) Uncontrolled

Heavy vehicles
Assumed
3 Miles of unpaved road leading to substation
1 Trips on dirt road per day per heavy vehicle
4 Number of heavy vehicles

12 VMT on unpaved roads per day for heavy vehicles

Assumed
G= 11
H= 15
I= 10 wheels
J= 8 tons

k= 18 precip days

2.9 F PM10 (lbs/VMT)

34 PM10 (lbs per day) Uncontrolled
1380 Total Activity PM10 (lbs) Uncontrolled

0.212 PM2.5 fraction of PM10 from SCAQMD Table A - Updated CEIDARS Table with PM2.5 Fractions

7 PM2.5 (lbs per day) Uncontrolled
293 Total Activity PM2.5 (lbs) Uncontrolled

Assumed
50 Percent reduction in fug em due to using water trucks
45 PM10 (lbs per day) Controlled
1788 Total Activity PM10 (lbs) Controlled

9 PM2.5 (lbs per day) Controlled

379 Total Activity PM2.5 (lbs) Controlled

All On-Road Vehicles for Activity	Emissions (lbs/day)	Total Activity Emissions (lbs)	Notes
CO	2	83	
NOx	0.23	9	
ROG	0.23	9	
SOx	0.003	0.11	
CO2	274	10957	
CH4	0.020	0.81	
PM10 (includes fugitive dust)	103	4117	Uncontrolled
PM2.5 (includes fugitive dust)	21	850	Uncontrolled

All On-Road Vehicles for Activity	Emissions (lbs/day)	Total Activity Emissions (lbs)	Notes
CO	2	83	
NOx	0.23	9	
ROG	0.23	9	
SOx	0.003	0.11	
CO2	274	10957	
CH4	0.020	0.81	
PM10 (includes fugitive dust)	58	2329	Controlled
PM2.5 (includes fugitive dust)	12	471	Controlled

Ivanpah Substation
Civil Phase (Mobile Source Emissions)

Exhaust, Tire and Brake Emissions
From SCAQMD file "onroadEF07_26.xls" as of January 2009
Used 2008 Table
Passenger vehicles
Assumed 1 passenger vehicle per crew member
Assumed 50 vmt per day per passenger vehicle
7 crew member
350 Total passenger VMT per work day

60 Work days
See site exhaust estimates

	<8500 lbs (pounds/mile)	Emissions (lbs/day)	Emissions (lbs)
CO	0.00826	2.9	174
NOx	0.00092	0.3	19
ROG	0.00091	0.3	19
SOx	0.00001	0.004	0.2
PM10	0.00009	0.030	1.8
PM2.5	0.00005	0.019	1.2
CO2	1.095682348	383.489	23009.3
CH4	8.14608E-05	0.029	1.7

Paved Road Fugitive Dust Emissions
From SCAQMD CEQA AQ Handbook
Table A9-9-B
Passenger Vehicles on paved road fugitive dust
E=VxG (PM10 with street cleaning)
V= vehicle miles travelled
G=EF from table A9-9-9-B1

Road Type	G(PM10 lb/VMT)
Local Streets	0.018
Collector Streets	0.013
Major Streets/Highways	0.0064
Freeways	0.00065

Crew Personal vehicles
350 Total passenger VMT on paved roads per day
17.5 Local Streets (assumed 5%)

17.5 Collector Streets (assumed 5%)
35 Major Streets/Highways (10%)
280 Freeways (assumed 80%)
60 Work days

Road Type	PM10 (lbs/day)	Total Activity
Local Streets	0.3	19
Collector Streets	0.2	14
Major Streets/Highways	0.2	13
Freeways	0.2	11
Crew Personal (PM10)	0.9	57

0.169 PM2.5 fraction of PM10 from SCAQMD Table A - Updated CEIDARS Table with PM2.5 Fractions

Crew Personal (PM2.5)	0.2	10

Dump Trucks and other heavy vehicles on paved roads
50 Total VMT on paved roads per day
5 Local Streets (assumed 10%)
5 Collector Streets (assumed 10%)
40 Major Streets/Highways (80%)
0 Freeways (assumed 0%)
60 Work days

Heavy Vehicles on paved road fugitive dust
Use SCAQMD CEQA Table A9-9-C
E=VxF (PM10 without street cleaning)
V= vehicle miles travelled
G from table A9-9-C1
F=0.77*((G*0.35)^0.3) lbs/VMT

Assume 60 percent reduction for street sweeping per Table A9-9

Road Type	G(PM10 oz/sq yd)	F(PM10 lb/VMT)	F with sweeping
Local Streets	0.04	0.2139583	0.085583
Collector Streets	0.03	0.1962671	0.078507
Major Streets/Highways	0.012	0.14909584	0.059638
Freeways	0.00065	0.06217061	0.024868

Road Type	PM10 (lbs/day)	Total Activity PM10 (lbs)
Local Streets	0.4	26
Collector Streets	0.4	24
Major Streets/Highways	2.4	143
Freeways	0.0	0
Heavy Delivery (PM10)	3.2	192

0.169 PM2.5 fraction of PM10 from SCAQMD Table A - Updated

Heavy Delivery (PM2.5)	0.54	33

	PM10 (lbs/day)	Total Activity	PM2.5 (lbs/day)	Total Activity
Total Activity Paved Road Fugitive Dust	4.2	249	0.7	42

Unpaved Road Fugitive Dust Emissions
From SCAQMD CEQA AQ Handbook
Table A9-9-D

E=V*F
V= vehicle miles travelled on unpaved roads
F=2.1*(G/12)*(H/30)*((J/3)^.7)*((I/4)^.5)*((365-K)/365)
G= surface silt

H= mean vehicle speed
I= number of wheels

J=vehicle wt
K= days of precip per year at least 0.01 in

Crew Transport
Assumed
3 Miles of unpaved road leading to substation
2 Trips per day per vehicle

9 vehicles to transport crew to site
54 VMT on unpaved roads per day

Assumed
G= 11

H= 15
I= 4 wheels
J= 3 tons
k= 18 precip days

0.9 F PM10 (lbs/VMT)
49 PM10 (lbs per day) Uncontrolled
2965 Total Activity PM10 (lbs) Uncontrolled

0.212 PM2.5 fraction of PM10 from SCAQMD Table A -

10 PM2.5 (lbs per day) Uncontrolled
629 Total Activity PM2.5 (lbs) Uncontrolled

Heavy vehicles
Assumed
3 Miles of unpaved road leading to substation
1 Trips on dirt road per day per heavy vehicle
1 Number of heavy vehicles

3 VMT on unpaved roads per day for heavy vehicles

Assumed
G= 11
H= 15
I= 10 wheels
J= 8 tons
k= 18 precip days

2.9 F PM10 (lbs/VMT)

9 PM10 (lbs per day) Uncontrolled
517 Total Activity PM10 (lbs) Uncontrolled

0.212 PM2.5 fraction of PM10 from SCAQMD Table A - Updated CEIDARS Table with PM2.5 Fractions

2 PM2.5 (lbs per day) Uncontrolled
110 Total Activity PM2.5 (lbs) Uncontrolled

Assumed
50 Percent reduction in fug em due to using water trucks
29 PM10 (lbs per day) Controlled

1741 Total Activity PM10 (lbs) Controlled

6 PM2.5 (lbs per day) Controlled
369 Total Activity PM2.5 (lbs) Controlled

All On-Road Vehicles for Activity	Emissions (lbs/day)	Total Activity Emissions (lbs)	Notes
CO	3	174	
NOx	0.32	19	
ROG	0.32	19	
SOx	0.004	0.23	
CO2	383	23009	
CH4	0.03	2	
PM10 (includes fugitive dust)	62	3733	Uncontrolled
PM2.5 (includes fugitive dust)	13	781	Uncontrolled

All On-Road Vehicles for Activity	Emissions (lbs/day)	Total Activity Emissions (lbs)	Notes
CO	3	174	
NOx	0.32	19	
ROG	0.32	19	
SOx	0.004	0.23	
CO2	383	23009	
CH4	0.03	2	
PM10 (includes fugitive dust)	33	1992	Controlled
PM2.5 (includes fugitive dust)	7	412	Controlled

Ivanpah Substation
Electrical Phase (Mobile Source Emissions)

Exhaust, Tire and Brake Emissions
From SCAQMD file "onroadEF07_26.xls" as of January 2009
Used 2008 Table

Passenger vehicles

Assumed	1	passenger vehicle per crew member
Assumed	50	vmt per day per passenger vehicle
	8	crew member
	400	Total passenger VMT per work day
	60	Work days

See site exhaust estimates

Passenger Vehicles <8500 lbs	(pounds/mile)	Emissions (lbs/day)	Total Activity Emissions
CO	0.00826	3.3	198
NOx	0.00092	0.4	22
ROG	0.00091	0.4	22
SOx	0.00001	0.004	0.3
PM10	0.00009	0.035	2.1
PM2.5	0.00005	0.022	1.3
CO2	1.095682348	438.273	26296.4
CH4	8.14608E-05	0.033	2.0

Paved Road Fugitive Dust Emissions
From SCAQMD CEQA AQ Handbook
Table A9-9-B
Passenger Vehicles on paved road fugitive dust
E=VxG (PM10 with street cleaning)
V= vehicle miles travelled
G=EF from table A9-9-9-B1

Road Type	G(PM10 lb/VMT)
Local Streets	0.018
Collector Streets	0.013
Major Streets/Highways	0.0064
Freeways	0.00065

Crew Personal vehicles

	400	Total passenger VMT on paved roads per day
	20	Local Streets (assumed 5%)
	20	Collector Streets (assumed 5%)
	40	Major Streets/Highways (10%)
	320	Freeways (assumed 80%)
	60	Work days

Road Type	PM10 (lbs/day)	Activity PM10 (lbs)
Local Streets	0.4	22
Collector Streets	0.3	16
Major Streets/Highways	0.3	15
Freeways	0.2	12
Crew Personal (PM10)	1.1	65

0.169 PM2.5 fraction of PM10 from SCAQMD Table A - Updated CEIDARS Table with PM2.5 Fractions

Crew Personal (PM2.5)	0.2	11

Dump Trucks and other heavy vehicles on paved roads

100	Total VMT on paved roads per day
10	Local Streets (assumed 10%)
10	Collector Streets (assumed 10%)
80	Major Streets/Highways (80%)
0	Freeways (assumed 0%)
60	Work days

Heavy Vehicles on paved road fugitive dust
Use SCAQMD CEQA Table A9-9-C
E=VxF (PM10 without street cleaning)
V= vehicle miles travelled
G from table A9-9-C1
F=0.77*((G*0.35)^0.3) lbs/VMT

Assume 60 percent reduction for street sweeping per Table A9-9

Road Type	G(PM10 oz/sq yd)	F(PM10 lb/VMT)	F with sweeping
Local Streets	0.04	0.2139583	0.085583
Collector Streets	0.03	0.1962671	0.078507
Major Streets/Highways	0.012	0.14909584	0.059638
Freeways	0.00065	0.06217061	0.024868

Road Type	PM10 (lbs/day)	Total Activity PM10 (lbs)
Local Streets	0.9	51
Collector Streets	0.8	47
Major Streets/Highways	4.8	286
Freeways	0.0	0
Heavy Delivery (PM10)	6.4	385

0.169 PM2.5 fraction of PM10 from SCAQMD Table A -

Heavy Delivery (PM2.5)	1.08	65

	PM10 (lbs/day)	Activity PM10 (lbs)	PM2.5 (lbs/day)	Activity PM2.5 (lbs)
Total Activity Paved Road Fugitive Dust	7.5	450	1.3	76

Unpaved Road Fugitive Dust Emissions
From SCAQMD CEQA AQ Handbook
Table A9-9-D
E=V*F
V= vehicle miles travelled on unpaved roads
F=2.1*(G/12)*(H/30)*((J/3)^.7)*((I/4)^.5)*((365-K)/365)
G= surface silt
H= mean vehicle speed

I= number of wheels
J=vehicle wt

K= days of precip per year at least 0.01 in

Crew Transport
Assumed

	3	Miles of unpaved road leading to substation
	2	Trips per day per vehicle
	11	vehicles to transport crew to site
	66	VMT on unpaved roads per day

Assumed

G=	11	
H=	15	
I=	4	wheels
J=	3	tons
k=	18	precip days

0.9 F PM10 (lbs/VMT)

60	PM10 (lbs per day) Uncontrolled
3624	Total Activity PM10 (lbs) Uncontrolled

0.212 PM2.5 fraction of PM10 from SCAQMD Table A -

13	PM2.5 (lbs per day) Uncontrolled
768	Total Activity PM2.5 (lbs) Uncontrolled

Heavy vehicles
Assumed

	3	Miles of unpaved road leading to substation
	1	Trips on dirt road per day per heavy vehicle
	1	Number of heavy vehicles
	3	VMT on unpaved roads per day for heavy vehicles

Assumed

G=	11	
H=	15	
I=	10	wheels
J=	8	tons
k=	18	precip days

2.9 F PM10 (lbs/VMT)

9	PM10 (lbs per day) Uncontrolled
517	Total Activity PM10 (lbs) Uncontrolled

0.212 PM2.5 fraction of PM10 from SCAQMD Table A - Updated CEIDARS Table with PM2.5 Fractions

2	PM2.5 (lbs per day) Uncontrolled
110	Total Activity PM2.5 (lbs) Uncontrolled

Assumed

50	Percent reduction in fug em due to using water trucks
35	PM10 (lbs per day) Controlled
2070	Total Activity PM10 (lbs) Controlled
7	PM2.5 (lbs per day) Controlled
439	Total Activity PM2.5 (lbs) Controlled

All On-Road Vehicles for Activity	Emissions (lbs/day)	Emissions (lbs)	Notes
CO	3	198	
NOx	0.37	22	
ROG	0.37	22	
SOx	0.004	0.26	
CO2	438	26296	
CH4	0.033	2	
PM10 (includes fugitive dust)	77	4593	Uncontrolled
PM2.5 (includes fugitive dust)	16	955	Uncontrolled

All On-Road Vehicles for Activity	Emissions (lbs/day)	Emissions (lbs)	Notes
CO	3	198	
NOx	0.37	22	
ROG	0.37	22	
SOx	0.004	0.26	
CO2	438	26296	
CH4	0.033	2	
PM10 (includes fugitive dust)	42	2522	Controlled
PM2.5 (includes fugitive dust)	9	516	Controlled

Eldorado-Ivanpah 220kV Construction
Emission Summary

Activity	Emissions (lbs) CO	NOx	ROG	SOx	PM10	PM2.5	CO2
Combustion Related Emissions							
Survey							
On-Road Vehicles	119	13	13	0.2	1.3	0.8	15778
Marshalling Yards							
On-Road Vehicles	2003	770	238	3	37	29	274071
Off-Road Vehicles and Equipment	1382	3089	364	3	155	131	297203
Roads and Landing Work							
On-Road Vehicles	2595	2524	353	4	94	80	378622
Off-Road Vehicles and Equipment	926	3403	326	4	123	105	339755
Guard Structure Installation							
On-Road Vehicles	22	6	3	0.03	0.3	0.2	2957
Off-Road Vehicles and Equipment	42	126	12	0.16	5	4	15593
Remove Existing Conductor & OHGW							
On-Road Vehicles	664	133	75	0.9	9	6	88947
Off-Road Vehicles and Equipment	1415	4545	382	5	152	129	495678
Remove Existing Towers							
On-Road Vehicles	374	107	43	0.5	6	4	50651
Off-Road Vehicles and Equipment	683	1969	227	2	97	82	174730
Remove Existing Foundations							
On-Road Vehicles	524	307	65	1	13	10	73317
Off-Road Vehicles and Equipment	792	2302	261	3	115	97	234433
Remove Existing Wood Poles							
On-Road Vehicles	66	33	8	0.09	1	1	9194
Off-Road Vehicles and Equipment	39	139	14	0.14	5	4	12562
Install LST Foundaions							
On-Road Vehicles	2622	2688	388	5	125	106	473512
Off-Road Vehicles and Equipment	3136	7933	802	11	339	288	1112359
LST Steel Haul							
On-Road Vehicles	1112	525	135	2	24	19	153683
Off-Road Vehicles and Equipment	428	718	96	1	44	37	72646
LST Assembly							
On-Road Vehicles	1309	145	145	2	14	9	173556
Off-Road Vehicles and Equipment	4163	15801	1494	16	564	480	1455486
LST Erection							
On-Road Vehicles	1428	159	158	2	15	9	440267
Off-Road Vehicles and Equipment	883	2378	292	2	132	112	206205
Install Tubular Steel Foundations							
On-Road Vehicles	556	761	90	1	34	29	110497
Off-Road Vehicles and Equipment	457	1157	117	2	49	42	162219
Tubular Steel H-Frame Haul							
On-Road Vehicles	147	94	19	0.2	4	3	20679
Off-Road Vehicles and Equipment	44	156	16	0.2	6	5	14132
Tubular Steel H-Frame Assembly							
On-Road Vehicles	278	31	31	0.4	3	2	36815
Off-Road Vehicles and Equipment	158	437	53	0.4	23	20	38124
Tubular Steel H-Frame Erection							
On-Road Vehicles	278	31	31	0.4	3	2	36815
Off-Road Vehicles and Equipment	158	437	53	0.4	23	20	38124
Install Conductor & OPGW							
On-Road Vehicles	6511	2676	778	9	127	98	893617
Off-Road Vehicles and Equipment	8857	23200	2294	320	1218	1035	2891524
Guard Structure Removal							
On-Road Vehicles	38	19	5	0.1	1	1	5254
Off-Road Vehicles and Equipment	36	99	11	0.1	5	4	9248
Restoration							
On-Road Vehicles	263	130	32	0.4	6	5	36449
Off-Road Vehicles and Equipment	486	1793	171	2	64	55	181611
Fugitive Dust Emissions							
Paved Roads	-	-	-	-	23581	3985	-
Unpaved Roads	-	-	-	-	48659	10316	-
Construction Activities	-	-	-	-	4251	2126	-
Total Activity Emissions (tons)	22	40	4.8	0.20	40	10	5513
Total California Activity Emissions (tons)	4.5	8.1	1.0	0.040	8.0	1.9	1103
Construction Days	586	586	586	586	586	586	586
Average Daily Emissions (lbs)	77	138	16	0.7	137	33	18816

Eldorado-Ivanpah 220kV Construction
Workforce Estimate

Work Activity							Activity Production
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Estimated Average Duration of Use (Hrs/Day)	Estimated Production Per Day
Survey (1)				**4**	**36**		**35.5 miles**
1/2-ton pick-up truck, 4x4	200	Gas	2		36	8	1 mile/day
Marshalling Yard (2)				**4**			
1-ton crew cab, 4x4	300	Diesel	1			2	
30-ton crane truck	300	Diesel	1			2	
10,000 lb rough terrain fork lift	200	Diesel	1			5	
truck, semi, tractor	350	Diesel	1		Duration of project	1	
Roads and Landing Work (3)				**5**	**101**		**18.0 Miles and 258 Pads**
1-ton crew cab, 4x4	300	Diesel	2		101	2	
Road grader	350	Diesel	1		101	4	
Track type dozer	350	Diesel	1		101	6	
Drum type compactor	250	Diesel	1		101	4	
Water truck	350	Diesel	2		Duration	8	
Lowboy truck/trailer	500	Diesel	1		51	2	
Backhoe/front loader	350	Diesel	1		101	6	0.5 mile/day and 4 structure pads/day
Guard Structure Installation (4)				**6**	**4**		**16 Structures**
3/4-ton pick-up truck, 4x4	300	Diesel	2		4	6	
1-ton crew cab flat bed, 4x4	300	Diesel	1		4	6	
Compressor trailer	120	Diesel	1		4	6	
Auger truck	500	Diesel	1		4	6	
Pole truck/trailer	350	Diesel	1		4	6	
80-foot hydraulic man-lift/bucket truck	350	Diesel	1		4	4	
30-ton crane truck	500	Diesel	1		4	8	4 structures/day
Remove Existing Conductor and OHGW (5)				**14**	**71**		**35.5 Circuit Miles**
1-ton crew cab, 4x4	300	Diesel	4		71	8	
80-foot hydraulic man-lift/bucket truck	350	Diesel	3		71	8	
Sleeving truck	300	Diesel	1		71	4	
30-ton crane truck	300	Diesel	1		71	4	
Flat bed trailer	N/A	N/A	3		64	2	
Truck, semi, tractor	350	Diesel	1		64	1	
Bull wheel puller	500	Diesel	1		48	4	
Hydraulic rewind puller	300	Diesel	1		48	4	0.50 mile/day
Remove Existing Structures (6)				**6**	**75**		**221 Structures**
1-ton crew cab, 4x4	300	Diesel	2		75	5	
80-ton rough terrain crane	350	Diesel	1		40	8	
30-ton crane truck	300	Diesel	2		75	6	
Compressor trailer	120	Diesel	2		40	8	
Flat bed truck/trailer	350	Diesel	1		35	8	
10,000-lb rough terrain forklift	200	Diesel	1		35	4	3 structures/day
							208 LSH-Frames
Remove Existing Foundations (7)				**8**	**67**		**13 LSTs**
1-ton crew cab flat bed, 4x4	300	Diesel	2		67	8	8 grillage
10-cubic yard dump truck	350	Diesel	2		67	8	foundations/day
Backhoe/front loader	350	Diesel	2		67	8	or
Compressor trailer	120	Diesel	2		67	8	4 concrete foundations/day
Remove Existing Wood Poles (8)				**6**	**7**		**23 H-Frames** **6 Poles**
3/4-ton pick-up truck, 4x4	300	Diesel	2		7	5	
1-ton crew cab flat bed, 4x4	300	Diesel	1		7	5	
30-ton crane truck	300	Diesel	1		7	6	
Pole truck/trailer	350	Diesel	2		7	8	8 poles/day
Install LST Foundations (9)				**18**	**144**		**216 LSTs**
1-ton crew cab flat bed, 4x4	300	Diesel	4		144	2	
30-ton crane truck	300	Diesel	2		144	5	
Backhoe/front loader	200	Diesel	2		144	8	
Auger truck	500	Diesel	2		144	8	
10-cubic yard dump truck	350	Diesel	4		144	8	
4,000-gallon water truck	350	Diesel	2		144	8	
10-cubic yard concrete mixer truck	425	Diesel	6		144	5	1.5 LSTs/day
LST Steel Haul (10)				**8**	**108**		**216 LSTs**
1-ton crew cab flat bed, 4x4	300	Diesel	4		108	2	
Flat bed truck/trailer	350	Diesel	2		108	8	
10,000 lb Rough Terrain Fork Lift	200	Diesel	2		108	6	2 LSTs/day
LST Steel Assembly (11)				**42**	**144**		**216 LSTs**
3/4-ton pick-up truck, 4x4	300	Diesel	6		144	4	
1-ton crew cab flat bed, 4x4	300	Diesel	9		144	4	
30-ton crane truck	300	Diesel	6		144	8	
Compressor trailer	120	Diesel	6		144	6	1.5 LSTs/day
LST Erection (12)				**16**	**108**		**216 LSTs**
3/4-ton pick-up truck, 4x4	300	Diesel	4		108	5	
1-ton crew cab flat bed, 4x4	300	Diesel	4		108	5	
Compressor trailer	120	Diesel	2		108	6	
80-ton rough terrain crane	350	Diesel	2		108	6	2 LSTs/day
Install Tubular Steel H-Frame Foundations (13)				**7**	**42**		**42 H-Frames**
1-ton crew cab flat bed, 4x4	300	Diesel	3		42	2	
30-ton crane truck	300	Diesel	1		42	5	
Backhoe/front loader	200	Diesel	1		42	8	
Auger truck	500	Diesel	1		42	8	
10-cubic yard dump truck	350	Diesel	2		42	8	
4,000-gallon water truck	350	Diesel	1		42	8	
10-cubic yard concrete mixer truck	425	Diesel	3		42	3	1 H-frame/day

Eldorado-Ivanpah 220kV Construction
Workforce Estimate

Work Activity							Activity Production
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Estimated Average Duration of Use (Hrs/Day)	Estimated Production Per Day
Tubular Steel H-Frame Haul (14)				**4**	**21**		**42 H-Frames**
3/4-ton pick-up truck, 4x4	300	Diesel	2		21	5	
Flat bed truck/trailer	350	Diesel	2		21	8	
80-ton rough terrain crane	350	Diesel	1		21	6	2 H-frames/day
Tubular Steel H-Frame Assembly (15)				**8**	**42**		**42 H-Frames**
3/4-ton pick-up truck, 4x4	300	Diesel	2		42	5	
1-ton crew cab flat bed, 4x4	300	Diesel	2		42	5	
Compressor trailer	120	Diesel	1		42	5	
80-ton rough terrain crane	350	Diesel	1		42	6	1 H-frame/day
Tubular Steel H-Frame Erection (16)				**8**	**42**		**42 H-Frames**
3/4-ton pick-up truck, 4x4	300	Diesel	2		42	5	
1-ton crew cab flat bed, 4x4	300	Diesel	2		42	5	
Compressor trailer	120	Diesel	1		42	5	
80-ton rough terrain crane	350	Diesel	1		42	6	1 H-frame/day
Install Conductor and OPGW (17)				**32**	**205**		**71.0 Circuit Miles**
1-ton crew cab flat bed, 4x4	300	Diesel	5		205	8	
Wire truck/trailer	350	Diesel	6		205	2	
Dump truck (trash)	350	Diesel	1		205	2	
3/4-ton pick-up truck, 4x4	300	Diesel	6		205	8	
22-ton Manitex	350	Diesel	1		205	8	
30-ton Manitex	350	Diesel	4		205	6	
Splicing rig	350	Diesel	2		205	2	
Splicing lab	300	Diesel	2		48	2	
20,000-lb rough terrain fork lift	350	Diesel	1		205	2	
580 Case Backhoe	120	Diesel	1		205	2	
Spacing cart	10	Diesel	3		51	8	
Static truck/ tensioner	350	Diesel	1		205	2	
3 drum straw line puller	300	Diesel	2		205	4	
30-ton puller	525	Diesel	1		205	3	
Sag Cat w2 winch	350	Diesel	2		205	2	
D8 Cat	300	Diesel	4		205	1	
Hughes 500 E Helicopter		Jet A	1		52	6	
Fuel, helicopter support truck	300	Diesel	1		52	2	
Lowboy truck/trailer	500	Diesel	1		205	2	0.35 mile/day
Guard Structure Removal (18)				**6**	**4**		**16 Structures**
3/4-ton pick-up truck, 4x4	300	Diesel	2		4	6	
1-ton crew cab flat bed, 4x4	300	Diesel	2		4	6	
Compressor trailer	120	Diesel	2		4	6	
Pole truck/trailer	350	Diesel	2		4	6	
80-foot hydraulic man-lift/bucket truck	350	Diesel	1		4	4	
30-ton crane truck	500	Diesel	1		4	8	4 structures/day
Restoration (19)				**7**	**36**		**35.5 Miles**
1-ton crew cab, 4x4	300	Diesel	2		36	2	
Road grader	350	Diesel	1		36	6	
Backhoe	350	Diesel	1		36	6	
Front end loader	350	Diesel	1		36	6	
Track type dozer	350	Diesel	1		36	6	
Drum type compactor	250	Diesel	1		36	6	
Water truck	350	Diesel	1		36	8	
Lowboy truck/trailer	500	Diesel	1		36	3	1 mile/day

Crew Size Assumptions:
#1 Survey = one 4-man crew
#2 Marshalling Yards = one 4-man crew
#3 Roads and Landing Work = one 5-man crew
#4 Guard Structure Installation = one 6-man crew
#5 Remove Existing Conductor and OHGW = one 14-man crew
#6 Remove Existing LSTs and Lattice Steel H (LSH Frames = one 6-man crew
#7 Remove Existing Foundations = two 4-man crews
#8 Remove Existing Wood Poles = one 6-man crew
#9 Install Foundations for LSTs = two 9-man crews
#10 LST Steel Haul = two 4-man crews
#11 LST Steel Assembly = six 7-man crews
#12 LST Erection = two 8-man crews
#13 Install Foundations for Tubular Steel H-Frames = one 7-man crew
#14 Tubular Steel H-Frame Haul = one 4-man crew
#15 Tubular Steel H-Frame Assembly = one 8-man crew
#16 Tubular Steel H-Frame Erection = one 8-man crew
#17 Conductor and OPGW Installation = four 8-man crews
#18 Guard Structure Removal = one 6-man crew
#19 Restoration = one 7-man crew

Eldorado-Ivanpah 220kV Construction
On site fugitive dust during active construction activities

425.1	Distrubed acreage from Proj Discription Table 3.2
589	Project duration (days)
0.7	Average Disturbed acres per day
1.4	Assumed twice the average disturbance for emission calculation
	Assume uncontrolled fugitive dust emission factor of 10 lbs/acre/day for PM10
14.4	Uncontrolled PM10 (lbs/day)
	Assume PM2.5 is 50% of PM10 for fugitive dust
7.2	Uncontrolled PM2.5 (lbs/day)
	Assume 50% controls from watering twice per day
7.2	Controlled PM10 (lbs/day)
3.6	Controlled PM2.5 (lbs/day)
4251.0	Total Controlled PM10 (lbs)
2125.5	Total Controlled PM2.5 (lbs)

Eldorado-Ivanpah 220kV Construction

Unpaved Road Fugitive Dust Emissions

Unpaved Road Fugitive Dust Emissions
From SCAQMD CEQA AQ Handbook
Table A9-9-D

E=V*F
V= vehicle miles travelled on unpaved roads
F=2.1*(G/12)*(H/30)*((J/3)^.7)*((I/4)^.5)*((365-K)/365)
G= surface silt
H= mean vehicle speed
I= number of wheels
J=vehicle wt
K= days of precip per year at least 0.01 in

0.212 PM2.5 fraction of PM10 from SCAQMD Table A - Updated CEIDARS Table with PM2.5 Fractions

Light Vehicles Factor
G= 11 Assumed
H= 15 Assumed
I= 4 wheels
J= 3 tons
k= 18 precip days

0.9 F PM10 (lbs/VMT)
0.19 F PM2.5 (lbs/VMT)

Heavy Vehicles Factor
G= 11 Assumed
H= 15 Assumed
I= 10 wheels
J= 8 tons
k= 18 precip days

2.9 F PM10 (lbs/VMT)
0.61 F PM2.5 (lbs/VMT)

Assumed 50% control for watering
Assumed 95% control of the water truck emissions

							Uncontrolled Emissions				Controlled Emissions (50%)			
							PM10		PM2.5		PM10		PM2.5	
Activity	Equipment	Number	Days	Max VMT/day	F PM10 (lbs/VMT)	F PM2.5 (lbs/VMT)	(lbs/day)	lbs activity	(lbs/day)	lbs activity	(lbs/day)	lbs activity	(lbs/day)	lbs activity
Survey	1/2 Ton Pick-up Truck, 4X4	2	36	20	0.9	0.19	36.6	1317.6	7.8	279.3	18.3	658.8	3.9	139.7
	Personal Vehicles	4	36	2	0.9	0.19	7.3	263.5	1.6	55.9	3.7	131.8	0.8	27.9
											22.0	*790.6*	*4.7*	*167.6*
Marshalling Yards	1 Ton Crew Cab 4X4	1	589	3	0.9	0.19	2.7	1616.9	0.6	342.8	1.4	808.4	0.3	171.4
	Truck, Semi, Tractor	1	589	3	2.9	0.61	8.6	5079.5	1.8	1076.9	4.3	2539.8	0.9	538.4
	Personal Vehicles	4	589	2	0.9	0.19	7.3	4311.6	1.6	914.1	3.7	2155.8	0.8	457.0
											9.3	*5504.0*	*2.0*	*1166.9*
Roads and Landing Work	1 Ton Crew Cab 4X4	2	101	3	0.9	0.19	5.5	554.5	1.2	117.6	2.7	277.3	0.6	58.8
	Water Trucks	2	589	20	2.9	0.61	115.0	67726.8	24.4	14358.1	5.7	3386.3	1.2	717.9
	Lowboy Trk/Trlr	1	51	3	2.9	0.61	8.6	439.8	1.8	93.2	4.3	219.9	0.9	46.6
	Personal Vehicles	5	101	2	0.9	0.19	9.2	924.2	1.9	195.9	4.6	462.1	1.0	98.0
											17.4	*4345.6*	*3.7*	*921.3*
Guard Structure Installation	3/4 Ton Pick-up Truck, 4X4	2	4	3	0.9	0.19	5.5	22.0	1.2	4.7	2.7	11.0	0.6	2.3
	1 Ton Crew Cab Flat Bed, 4X4	1	4	3	0.9	0.19	2.7	11.0	0.6	2.3	1.4	5.5	0.3	1.2
	Extendable Flat Bed Pole Truck	1	4	3	2.9	0.61	8.6	34.5	1.8	7.3	4.3	17.2	0.9	3.7
	Personal Vehicles	6	4	2	0.9	0.19	11.0	43.9	2.3	9.3	5.5	22.0	1.2	4.7
											13.9	*55.7*	*3.0*	*11.8*
Remove Existing Conductor & OHGW	1 Ton Crew Cab 4X4	4	71	3	0.9	0.19	11.0	779.6	2.3	165.3	5.5	389.8	1.2	82.6
	Truck, Semi, Tractor	1	64	3	2.9	0.61	8.6	551.9	1.8	117.0	4.3	276.0	0.9	58.5
	Personal Vehicles	14	64	2	0.9	0.19	25.6	1639.7	5.4	347.6	12.8	819.9	2.7	173.8
											22.6	*1485.6*	*4.8*	*315.0*
Remove Existing Towers	1 Ton Crew Cab, 4X4	2	75	3	0.9	0.19	5.5	411.8	1.2	87.3	2.7	205.9	0.6	43.6
	Flat Bed Truck & Trailer	1	35	3	2.9	0.61	8.6	301.8	1.8	64.0	4.3	150.9	0.9	32.0
	Personal Vehicles	6	75	2	0.9	0.19	11.0	823.5	2.3	174.6	5.5	411.8	1.2	87.3
											12.5	*768.6*	*2.7*	*162.9*
Remove Existing Foundations	Dump Truck	2	67	3	2.9	0.61	17.2	1155.6	3.7	245.0	8.6	577.8	1.8	122.5
	1 Ton Crew Cab Flat Bed, 4X4	1	67	3	0.9	0.19	2.7	183.9	0.6	39.0	1.4	92.0	0.3	19.5
	Personal Vehicles	8	67	2	0.9	0.19	14.6	980.9	3.1	208.0	7.3	490.5	1.6	104.0
											17.3	*1160.2*	*3.7*	*246.0*
Remove Existing Wood Poles	3/4 Ton Pick-up Truck, 4X4	2	7	3	0.9	0.19	5.5	38.4	1.2	8.1	2.7	19.2	0.6	4.1
	1 Ton Crew Cab Flat Bed, 4X4	2	7	3	0.9	0.19	5.5	38.4	1.2	8.1	2.7	19.2	0.6	4.1
	Extendable Flat Bed Pole Truck	2	7	3	2.9	0.61	17.2	120.7	3.7	25.6	8.6	60.4	1.8	12.8
	Personal Vehicles	6	7	2	0.9	0.19	11.0	76.9	2.3	16.3	5.5	38.4	1.2	8.1
											19.6	*137.2*	*4.2*	*29.1*
Install LST Foundaions	1 Ton Crew Cab Flat Bed, 4X4	2	144	3	0.9	0.19	5.5	790.6	1.2	167.6	2.7	395.3	0.6	83.8
	Dump Truck	2	144	3	2.9	0.61	17.2	2483.7	3.7	526.5	8.6	1241.9	1.8	263.3
	4000 gallon Water Trucks	1	144	20	2.9	0.61	57.5	8279.0	12.2	1755.1	2.9	414.0	0.6	87.8
	10 cu.yd. Concrete Mixer Trucks	3	144	3	2.9	0.61	25.9	3725.6	5.5	789.8	12.9	1862.8	2.7	394.9
	Personal Vehicles	18	144	2	0.9	0.19	32.9	4743.5	7.0	1005.6	16.5	2371.8	3.5	502.8
											43.7	*6285.6*	*9.3*	*1332.6*
LST Steel Haul	1 Ton Crew Cab Flat Bed, 4X4	4	108	3	0.9	0.19	11.0	1185.9	2.3	251.4	5.5	592.9	1.2	125.7
	40' Flat Bed Truck & Trailer	2	108	3	2.9	0.61	17.2	1862.8	3.7	394.9	8.6	931.4	1.8	197.5
	Personal Vehicles	8	108	2	0.9	0.19	14.6	1581.2	3.1	335.2	7.3	790.6	1.6	167.6
											21.4	*2314.9*	*4.5*	*490.8*
LST Assembly	3/4 Ton Pick-up Truck, 4X4	4	144	3	0.9	0.19	11.0	1581.2	2.3	335.2	5.5	790.6	1.2	167.6
	1 Ton Crew Cab Flat Bed, 4X4	6	144	3	0.9	0.19	16.5	2371.8	3.5	502.8	8.2	1185.9	1.7	251.4
	Personal Vehicles	2	144	2	0.9	0.19	3.7	527.1	0.8	111.7	1.8	263.5	0.4	55.9
											15.6	*2240.0*	*3.3*	*474.9*
LST Erection	3/4 Ton Pick-up Truck, 4X4	4	108	3	0.9	0.19	11.0	1185.9	2.3	251.4	5.5	592.9	1.2	125.7
	1 Ton Crew Cab Flat Bed, 4X4	4	108	3	0.9	0.19	11.0	1185.9	2.3	251.4	5.5	592.9	1.2	125.7
	Personal Vehicles	16	108	2	0.9	0.19	29.3	3162.4	6.2	670.4	14.6	1581.2	3.1	335.2
											25.6	*2767.1*	*5.4*	*586.6*
Install Tubular Steel Foundations	1 Ton Crew Cab Flat Bed, 4X4	3	42	3	0.9	0.19	8.2	345.9	1.7	73.3	4.1	172.9	0.9	36.7
	10-cu. Yd. Dump Truck	2	42	3	2.9	0.61	17.2	724.4	3.7	153.6	8.6	362.2	1.8	76.8
	4000 gallon Water Truck	1	42	20	2.9	0.61	57.5	2414.7	12.2	511.9	2.9	120.7	0.6	25.6
	10 cu. Yd. Concrete Mixer Truck	3	42	3	2.9	0.61	25.9	1086.6	5.5	230.4	12.9	543.3	2.7	115.2
	Personal Vehicles	7	42	2	0.9	0.19	12.8	538.0	2.7	114.1	6.4	269.0	1.4	57.0
											35.0	*1468.2*	*7.4*	*311.3*
Tubular Steel H-Frame Haul	3/4 Ton Pick-up Truck, 4X4	2	21	3	0.9	0.19	5.5	115.3	1.2	24.4	2.7	57.6	0.6	12.2
	40' Flat Bed Truck & Trailer	2	21	3	2.9	0.61	17.2	362.2	3.7	76.8	8.6	181.1	1.8	38.4
	Personal Vehicles	4	21	2	0.9	0.19	7.3	153.7	1.6	32.6	3.7	76.9	0.8	16.3
											15.0	*315.6*	*3.2*	*66.9*
Tubular Steel H-Frame Assembly	3/4 Ton Pick-up Truck, 4X4	2	42	3	0.9	0.19	5.5	230.6	1.2	48.9	2.7	115.3	0.6	24.4
	1 Ton Crew Cab Flat Bed, 4X4	2	42	3	0.9	0.19	5.5	230.6	1.2	48.9	2.7	115.3	0.6	24.4
	Personal Vehicles	8	42	2	0.9	0.19	14.6	614.9	3.1	130.4	7.3	307.5	1.6	65.2
											12.8	*538.0*	*2.7*	*114.1*
Tubular Steel H-Frame Erection	3/4 Ton Pick-up Truck, 4X4	2	42	3	0.9	0.19	5.5	230.6	1.2	48.9	2.7	115.3	0.6	24.4
	1 Ton Crew Cab Flat Bed, 4X4	2	42	3	0.9	0.19	5.5	230.6	1.2	48.9	2.7	115.3	0.6	24.4
	Personal Vehicles	8	42	2	0.9	0.19	14.6	614.9	3.1	130.4	7.3	307.5	1.6	65.2
											12.8	*538.0*	*2.7*	*114.1*
Install Conductor & OPGW	1 Ton Crew Cab Flat Bed, 4X4	5	205	3	0.9	0.19	13.7	2813.7	2.9	596.5	6.9	1406.9	1.5	298.3
	Wire Truck & Trailer	6	205	3	2.9	0.61	51.7	10607.5	11.0	2248.8	25.9	5303.7	5.5	1124.4
	Dump Truck (Trash)	1	205	3	2.9	0.61	8.6	1767.9	1.8	374.8	4.3	884.0	0.9	187.4
	3/4 Ton Pick-up Truck, 4X4	6	205	3	0.9	0.19	16.5	3376.5	3.5	715.8	8.2	1688.2	1.7	357.9
	Pole Truck & Trailer	0	0	3	2.9	0.61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Static Truck	1	205	3	2.9	0.61	8.6	1767.9	1.8	374.8	4.3	884.0	0.9	187.4
	Fuel, Helicopter Support Truck	1	52	3	2.9	0.61	8.6	448.4	1.8	95.1	4.3	224.2	0.9	47.5
	Low Boy Truck & Trailer	1	205	3	2.9	0.61	8.6	1767.9	1.8	374.8	4.3	884.0	0.9	187.4
	Personal Vehicles	32	205	2	0.9	0.19	58.6	12005.2	12.4	2545.1	29.3	6002.6	6.2	1272.6
											87.5	*17277.6*	*18.5*	*3662.8*
Guard Structure Removal	3/4 Ton Pick-up Truck, 4X4	2	4	3	0.9	0.19	5.5	22.0	1.2	4.7	2.7	11.0	0.6	2.3
	1 Ton Crew Cab Flat Bed, 4X4	2	4	3	0.9	0.19	5.5	22.0	1.2	4.7	2.7	11.0	0.6	2.3
	Extendable Flat Bed Pole Truck	2	4	3	2.9	0.61	17.2	69.0	3.7	14.6	8.6	34.5	1.8	7.3
	Personal Vehicles	6	4	2	0.9	0.19	11.0	43.9	2.3	9.3	5.5	22.0	1.2	4.7
											19.6	*78.4*	*4.2*	*16.6*
Restoration	1 Ton Crew Cab 4X4	2	36	3	0.9	0.19	5.5	197.6	1.2	41.9	2.7	98.8	0.6	21.0
	Water Truck	1	36	20	2.9	0.61	57.5	2069.8	12.2	438.8	2.9	103.5	0.6	21.9
	Lowboy Truck/Trailer	1	36	3	2.9	0.61	8.6	310.5	1.8	65.8	4.3	155.2	0.9	32.9
	Personal Vehicles	7	36	2	0.9	0.19	12.8	461.2	2.7	97.8	6.4	230.6	1.4	48.9
											16.3	*588.1*	*3.5*	*124.7*
										Total	**440**	**48659**	**93**	**10316**

Eldorado-Ivanpah 220kV Construction
Paved Road Fugitive Dust Emissions

Light Weight Vehicles on paved road fugitive dust
From SCAQMD CEQA AQ Handbook
Table A9-9-B

E=VxG (PM10 with street cleaning)

V= vehicle miles travelled
G=EF from table A9-9-9-B1

G(PM10 lb/VMT)	Road Type
0.018	Local Streets
0.013	Collector Streets
0.0064	Major Streets/Highways
0.00065	Freeways

Assumed Mix of Roads
0.10 Local Streets (assumed 10%)
0.10 Collector Streets (assumed 10%)
0.10 Major Streets/Highways (10%)
0.70 Freeways (assumed 70%)

Composite light vehicle Emission Factor
0.0042 PM10 per VMT

0.169 PM2.5 fraction of PM10 from SCAQMD Table A - Updated CEIDARS Table with PM2.5 Fractions

0.00071 PM2.5 per VMT

Heavy Vehicles on paved road fugitive dust
Use SCAQMD CEQA Table A9-9-C
E=VxF (PM10 without street cleaning)
V= vehicle miles travelled
G from table A9-9-C1
F=0.77*((G*0.35)^0.3) lbs/VMT

Assume 60 percent reduction for street sweeping per Table A9-9

Road Type	G(PM10 oz/sq yd)	F(PM10 lb/VMT)	F with sweeping
Local Streets	0.04	0.2139583	0.0855833
Collector Streets	0.03	0.1962671	0.0785068
Major Streets/Highways	0.012	0.1490958	0.0596383
Freeways	0.00065	0.0621706	0.0248682

Assumed Mix of Roads
0.10 Local Streets (assumed 10%)
0.10 Collector Streets (assumed 10%)
0.10 Major Streets/Highways (10%)
0.70 Freeways (assumed 70%)

Composite heavy vehicle Emission Factor
0.040 PM10 per VMT

0.169 PM2.5 fraction of PM10 from SCAQMD Table A - Updated CEIDARS Table with PM2.5 Fractions

0.0067 PM2.5 per VMT

							Emissions Assuming Street Cleaning			
							PM10		PM2.5	
Activity	Equipment	Number	Days	VMT/day	F PM10 (lbs/VMT)	F PM2.5 (lbs/VMT)	(lbs/day)	lbs activity	(lbs/day)	lbs activity
Survey	1/2 Ton Pick-up Truck, 4X4	2	36	100	0.0042	0.00071	0.8	30.2	0.1	5.1
	Personal Vehicles	4	36	50	0.0042	0.00071	0.8	30.2	0.1	5.1
							1.7	*60.4*	*0.3*	*10.2*
Marshalling Yards	1 Ton Crew Cab 4X4	1	589	100	0.0042	0.00071	0.4	247.1	0.1	41.8
	Truck, Semi, Tractor	1	589	50	0.0398	0.00672	2.0	1171.5	0.3	198.0
	Personal Vehicles	4	589	50	0.0042	0.00071	0.8	494.2	0.1	83.5
							3.2	*1912.8*	*0.5*	*323.3*
Roads and Landing Work	1 Ton Crew Cab 4X4	2	101	100	0.0042	0.00071	0.8	84.7	0.1	14.3
	Water Trucks	2	589	100	0.0398	0.00672	8.0	4686.2	1.3	792.0
	Lowboy Trk/Trlr	1	51	50	0.0398	0.00672	2.0	101.4	0.3	17.1
	Personal Vehicles	5	101	50	0.0042	0.00071	1.0	105.9	0.2	17.9
							11.8	*4978.3*	*2.0*	*841.3*
Guard Structure Installation	3/4 Ton Pick-up Truck, 4X4	2	4	100	0.0042	0.00071	0.8	3.4	0.1	0.6
	1 Ton Crew Cab Flat Bed, 4X4	1	4	50	0.0042	0.00071	0.2	0.8	0.0	0.1
	Extendable Flat Bed Pole Truck	1	4	50	0.0398	0.00672	2.0	8.0	0.3	1.3
	Personal Vehicles	6	4	50	0.0042	0.00071	1.3	5.0	0.2	0.9
							4.3	*17.2*	*0.7*	*2.9*
Remove Existing Conductor & OHGW	1 Ton Crew Cab 4X4	4	71	100	0.0042	0.00071	1.7	119.1	0.3	20.1
	Truck, Semi, Tractor	1	64	50	0.0398	0.00672	2.0	127.3	0.3	21.5
	Personal Vehicles	14	64	50	0.0042	0.00071	2.9	187.9	0.5	31.8
							6.6	*434.4*	*1.1*	*73.4*
Remove Existing Towers	1 Ton Crew Cab, 4X4	2	75	100	0.0042	0.00071	0.8	62.9	0.1	10.6
	Flat Bed Truck & Trailer	1	35	100	0.0398	0.00672	4.0	139.2	0.7	23.5
	Personal Vehicles	6	75	50	0.0042	0.00071	1.3	94.4	0.2	16.0
							6.1	*296.5*	*1.0*	*50.1*
Remove Existing Foundations	Dump Truck	2	67	100	0.0398	0.00672	8.0	533.1	1.3	90.1
	1 Ton Crew Cab Flat Bed, 4X4	1	67	100	0.0042	0.00071	0.4	28.1	0.1	4.7
	Personal Vehicles	8	67	50	0.0042	0.00071	1.7	112.4	0.3	19.0
							10.1	*673.6*	*1.7*	*113.8*
Remove Existing Wood Poles	3/4 Ton Pick-up Truck, 4X4	2	7	100	0.0042	0.00071	0.8	5.9	0.1	1.0
	1 Ton Crew Cab Flat Bed, 4X4	2	7	100	0.0042	0.00071	0.8	5.9	0.1	1.0
	Extendable Flat Bed Pole Truck	2	7	100	0.0398	0.00672	8.0	55.7	1.3	9.4
	Personal Vehicles	6	7	50	0.0042	0.00071	1.3	8.8	0.2	1.5
							10.9	*76.2*	*1.8*	*12.9*
Install LST Foundaions	1 Ton Crew Cab Flat Bed, 4X4	2	144	100	0.0042	0.00071	0.8	120.8	0.1	20.4
	Dump Truck	2	144	100	0.0398	0.00672	8.0	1145.7	1.3	193.6
	4000 gallon Water Trucks	1	144	100	0.0398	0.00672	4.0	572.8	0.7	96.8
	10 cu.yd. Concrete Mixer Trucks	3	144	100	0.0398	0.00672	11.9	1718.5	2.0	290.4
	Personal Vehicles	18	144	50	0.0042	0.00071	3.8	543.7	0.6	91.9
							28.5	*4101.5*	*4.8*	*693.2*
LST Steel Haul	1 Ton Crew Cab Flat Bed, 4X4	4	108	100	0.0042	0.00071	1.7	181.2	0.3	30.6
	40' Flat Bed Truck & Trailer	2	108	100	0.0398	0.00672	8.0	859.3	1.3	145.2
	Personal Vehicles	8	108	50	0.0042	0.00071	1.7	181.2	0.3	30.6
							11.3	*1221.7*	*1.9*	*206.5*
LST Assembly	3/4 Ton Pick-up Truck, 4X4	4	144	100	0.0042	0.00071	1.7	241.6	0.3	40.8
	1 Ton Crew Cab Flat Bed, 4X4	6	144	100	0.0042	0.00071	2.5	362.4	0.4	61.3
	Personal Vehicles	2	144	50	0.0042	0.00071	0.4	60.4	0.1	10.2
							4.6	*664.5*	*0.8*	*112.3*
LST Erection	3/4 Ton Pick-up Truck, 4X4	4	108	100	0.0042	0.00071	1.7	181.2	0.3	30.6
	1 Ton Crew Cab Flat Bed, 4X4	4	108	100	0.0042	0.00071	1.7	181.2	0.3	30.6
	Personal Vehicles	16	108	50	0.0042	0.00071	3.4	362.4	0.6	61.3
							6.7	*724.9*	*1.1*	*122.5*
Install Tubular Steel Foundations	1 Ton Crew Cab Flat Bed, 4X4	3	42	50	0.0042	0.00071	0.6	26.4	0.1	4.5
	10-cu. Yd. Dump Truck	2	42	100	0.0398	0.00672	8.0	334.2	1.3	56.5
	4000 gallon Water Truck	1	42	100	0.0398	0.00672	4.0	167.1	0.7	28.2
	10 cu. Yd. Concrete Mixer Truck	3	42	100	0.0398	0.00672	11.9	501.2	2.0	84.7
	Personal Vehicles	7	42	50	0.0042	0.00071	1.5	61.7	0.2	10.4
							26.0	*1090.6*	*4.4*	*184.3*
Tubular Steel H-Frame Haul	3/4 Ton Pick-up Truck, 4X4	2	21	100	0.0042	0.00071	0.8	17.6	0.1	3.0
	40' Flat Bed Truck & Trailer	2	21	100	0.0398	0.00672	8.0	167.1	1.3	28.2
	Personal Vehicles	4	21	50	0.0042	0.00071	0.8	17.6	0.1	3.0
							9.6	*202.3*	*1.6*	*34.2*
Tubular Steel H-Frame Assembly	3/4 Ton Pick-up Truck, 4X4	2	42	100	0.0042	0.00071	0.8	35.2	0.1	6.0
	1 Ton Crew Cab Flat Bed, 4X4	2	42	100	0.0042	0.00071	0.8	35.2	0.1	6.0
	Personal Vehicles	8	42	50	0.0042	0.00071	1.7	70.5	0.3	11.9
							3.4	*141.0*	*0.6*	*23.8*
Tubular Steel H-Frame Erection	3/4 Ton Pick-up Truck, 4X4	2	42	100	0.0042	0.00071	0.8	35.2	0.1	6.0
	1 Ton Crew Cab Flat Bed, 4X4	2	42	100	0.0042	0.00071	0.8	35.2	0.1	6.0
	Personal Vehicles	8	42	50	0.0042	0.00071	1.7	70.5	0.3	11.9
							3.4	*141.0*	*0.6*	*23.8*
Install Conductor & OPGW	1 Ton Crew Cab Flat Bed, 4X4	5	205	100	0.0042	0.00071	2.1	430.0	0.4	72.7
	Wire Truck & Trailer	6	205	50	0.0398	0.00672	11.9	2446.5	2.0	413.5
	Dump Truck (Trash)	1	205	100	0.0398	0.00672	4.0	815.5	0.7	137.8
	3/4 Ton Pick-up Truck, 4X4	6	205	100	0.0042	0.00071	2.5	516.0	0.4	87.2
	Pole Truck & Trailer	0	0	50	0.0398	0.00672	0.0	0.0	0.0	0.0
	Static Truck	1	205	50	0.0398	0.00672	2.0	407.8	0.3	68.9
	Fuel, Helicopter Support Truck	1	52	50	0.0398	0.00672	2.0	103.4	0.3	17.5
	Low Boy Truck & Trailer	1	205	50	0.0398	0.00672	2.0	407.8	0.3	68.9
	Personal Vehicles	32	205	50	0.0042	0.00071	6.7	1376.0	1.1	232.5
							33.2	*6502.9*	*5.6*	*1099.0*
Guard Structure Removal	3/4 Ton Pick-up Truck, 4X4	2	4	100	0.0042	0.00071	0.8	3.4	0.1	0.6
	1 Ton Crew Cab Flat Bed, 4X4	2	4	100	0.0042	0.00071	0.8	3.4	0.1	0.6
	Extendable Flat Bed Pole Truck	2	4	100	0.0398	0.00672	8.0	31.8	1.3	5.4
	Personal Vehicles	6	4	50	0.0042	0.00071	1.3	5.0	0.2	0.9
							10.9	*43.6*	*1.8*	*7.4*
Restoration	1 Ton Crew Cab 4X4	2	36	100	0.0042	0.00071	0.8	30.2	0.1	5.1
	Water Truck	1	36	100	0.0398	0.00672	4.0	143.2	0.7	24.2
	Lowboy Truck/Trailer	1	36	50	0.0398	0.00672	2.0	71.6	0.3	12.1
	Personal Vehicles	7	36	50	0.0042	0.00071	1.5	52.9	0.2	8.9
							8.3	*297.9*	*1.4*	*50.3*
						Total	**200.5**	**23581.1**	**33.9**	**3985.2**

Eldorado-Ivanpah 220kV Construction

Helicopter Emission Factors

Emissions lbs/hour					
ROG	CO	NOX	SOX	PM	CO2
1.400	9.994	12.794	0.957	1.595	2831.000

***Assumed a helicopter with 2 GE T58-S engines, used Table 5-7 in
"Procedures for Emission Inventory Preparation, Volume IV: Mobile Sources,
EPA420-R-92-009, December 1992"
***Assumed 50% power usage for entire period of operation, 14.77 lb/min fuel flow (886 lbs/hr)
***Assumed all of the helicopter emissions were released within the mixing layer

CO2 from: Energy Information Administration, Documentation for
Emissions of Greenhouse Gases in the United States 2005, DOE/EIA-
0638 (2005), October 2007, Tables 6-1, 6-2, 6-4, and 6-5.
http://www.eia.doe.gov/oiaf/1605/excel/Fuel%20Emission%20Factors.xls

21.09	lb/gal	Jet fuel CO2 emission factor
6.5	lb/gal	assumed density of jet fuel
134.2424	gal/hr	
2831.173	lbs/hr	CO2 emission rate

Eldorado-Ivanpah 220kV Construction

On Site Equipment Exhaust Emissions

From SCAQMD offroad emission factors file name "offroadEF_07_25.xls" 2010

Activity	Equipment	Number	Hours per Day	Days of Activity	2010 Emission Factor (lbs/hr)												Total Activity Emissions (lbs)					
					ROG	CO	NOX	SOX	PM	CO2	CO	NOX	ROG	SOX	PM	CO2	ROG	CO	NOX	SOX	PM	CO2
Marshalling Yards	30 Ton Crane Truck	1	2	589	0.124	0.346	1.237	0.001	0.047	112	0.7	2.5	0.2	0.0	0.1	224	146	408	1457	1	55	132123
	10,000 lb Rough Terrain Fork Lift	1	5	589	0.074	0.331	0.554	0.001	0.034	56	1.7	2.8	0.4	0.0	0.2	280	217	974	1632	2	99	165080
											2.3	*5.2*	*0.6*	*0.0*	*0.3*	*505*	*364*	*1382*	*3089*	*3*	*155*	*297203*
Roads and Landing Work	Road Grader	1	4	101	0.176	0.493	1.790	0.002	0.066	172	2.0	7.2	0.7	0.0	0.3	688	71	199	723	1	27	69534
	Track Type Dozer	1	6	101	0.176	0.493	1.790	0.002	0.066	172	3.0	10.7	1.1	0.0	0.4	1033	107	299	1085	1	40	104301
	Drum Type Compactor	1	4	101	0.154	0.454	1.623	0.002	0.060	153	1.8	6.5	0.6	0.0	0.2	612	62	183	656	1	24	61848
	Backhoe	1	6	101	0.142	0.404	1.549	0.002	0.052	172	2.4	9.3	0.9	0.0	0.3	1030	86	245	939	1	32	104073
											9.2	*33.7*	*3.2*	*0.0*	*1.2*	*3364*	*326*	*926*	*3403*	*4*	*123*	*339755*
Guard Structure Installation	Compressor Trailer	1	6	4	0.101	0.335	0.598	0.001	0.055	47	2.0	3.6	0.6	0.0	0.3	282	2	8	14	0	1	1127
	Auger Truck	1	6	4	0.149	0.557	1.705	0.003	0.061	311	3.3	10.2	0.9	0.0	0.4	1868	4	13	41	0	1	7471
	80ft. Hydraulic Man-lift	1	4	4	0.151	0.580	1.920	0.002	0.060	213	2.3	7.7	0.6	0.0	0.2	851	2	9	31	0	1	3406
	30 Ton Crane Truck	1	8	4	0.124	0.346	1.237	0.001	0.047	112	2.8	9.9	1.0	0.0	0.4	897	4	11	40	0	2	3589
											10.4	*31.4*	*3.1*	*0.0*	*1.3*	*3898*	*12*	*42*	*126*	*0*	*5*	*15593*
Remove Existing Conductor & OHGW	80ft. Hydraulic Man-lift	3	8	71	0.151	0.580	1.920	0.002	0.060	213	13.9	46.1	3.6	0.1	1.4	5109	257	988	3271	4	102	362707
	Sleeving Truck	1	4	71	0.124	0.346	1.237	0.001	0.047	112	1.4	4.9	0.5	0.0	0.2	449	35	98	351	0	13	31853
	30 Ton Crane Truck	1	4	71	0.124	0.346	1.237	0.001	0.047	112	1.4	4.9	0.5	0.0	0.2	449	35	98	351	0	13	31853
	Bull Wheel Puller	1	4	48	0.171	0.607	1.982	0.002	0.068	254	2.4	7.9	0.7	0.0	0.3	1017	33	116	381	0	13	48814
	Hydraulic Rewind Puller	1	4	48	0.117	0.590	0.993	0.001	0.054	107	2.4	4.0	0.5	0.0	0.2	426	22	113	191	0	10	20451
											21.5	*67.9*	*5.8*	*0.1*	*2.3*	*7449*	*382*	*1415*	*4545*	*5*	*152*	*495678*
Remove Existing Structures	80 Ton Rough Terrain Crane	1	8	40	0.124	0.346	1.237	0.001	0.047	112	2.8	9.9	1.0	0.0	0.4	897	40	111	396	0	15	35891
	30 Ton Crane Truck	2	6	75	0.124	0.346	1.237	0.001	0.047	112	4.2	14.8	1.5	0.0	0.6	1346	112	312	1114	1	42	100943
	Compressor Trailer	2	8	40	0.101	0.335	0.598	0.001	0.055	47	5.4	9.6	1.6	0.0	0.9	751	65	214	383	0	35	30048
	Rough Terrain Forklift	1	4	35	0.074	0.331	0.554	0.001	0.034	56	1.3	2.2	0.3	0.0	0.1	224	10	46	78	0	5	7848
											13.6	*36.5*	*4.4*	*0.0*	*1.9*	*3219*	*227*	*683*	*1969*	*2*	*97*	*174730*
Remove Existing Foundations	Backhoe	2	8	67	0.142	0.404	1.549	0.002	0.052	172	6.5	24.8	2.3	0.0	0.8	2748	152	433	1661	2	56	184102
	Compressor Trailer	2	8	67	0.101	0.335	0.598	0.001	0.055	47	5.4	9.6	1.6	0.0	0.9	751	109	359	641	1	58	50331
											11.8	*34.4*	*3.9*	*0.0*	*1.7*	*3499*	*261*	*792*	*2302*	*3*	*115*	*234433*
Remove Existing Wood Poles	30 Ton Crane Truck	2	8	7	0.124	0.346	1.237	0.001	0.047	112	5.5	19.8	2.0	0.0	0.8	1795	14	39	139	0	5	12562
Install LST Foundaions	30 Ton Crane Truck	2	5	144	0.124	0.346	1.237	0.001	0.047	112	3.5	12.4	1.2	0.0	0.5	1122	179	499	1782	2	68	161509
	Backhoe	2	8	144	0.122	0.588	0.965	0.001	0.056	101	9.4	15.4	1.9	0.0	0.9	1622	280	1355	*2222*	3	129	233595
	Auger Truck	2	8	144	0.149	0.557	1.705	0.003	0.061	311	8.9	27.3	2.4	0.0	1.0	4981	343	1282	3929	*7*	141	717255
											21.8	*55.1*	*5.6*	*0.1*	*2.4*	*7725*	*802*	*3136*	*7933*	*11*	*339*	*1112359*
LST Steel Haul	10,000 lb Rough Terrain Fork Lift	2	6	108	0.074	0.331	0.554	0.001	0.034	56	4.0	6.6	0.9	0.0	0.4	673	96	428	718	1	44	72646
LST Assembly	30 Ton Crane Truck	6	8	144	0.124	0.346	1.237	0.001	0.047	112	16.6	59.4	6.0	0.1	2.3	5384	859	2394	8552	9	325	775242
	Compressor Trailer	6	6	144	0.123	0.341	1.398	0.001	0.046	131	12.3	50.3	4.4	0.1	1.7	4724	635	1769	7249	8	239	680244
											28.9	*109.7*	*10.4*	*0.1*	*3.9*	*10108*	*1494*	*4163*	*15801*	*16*	*564*	*1455486*
LST Erection	Compressor Trailer	2	6	108	0.101	0.335	0.598	0.001	0.055	47	4.0	7.2	1.2	0.0	0.7	563	131	434	775	1	71	60847
	80 Ton Rough Terrain Crane	2	6	108	0.124	0.346	1.237	0.001	0.047	112	4.2	14.8	1.5	0.0	0.6	1346	161	449	1603	2	61	145358
											8.2	*22.0*	*2.7*	*0.0*	*1.2*	*1909*	*292*	*883*	*2378*	*2*	*132*	*206205*
Install Tubular Steel Foundations	30 Ton Crane Truck	1	5	42	0.124	0.346	1.237	0.001	0.047	112	1.7	6.2	0.6	0.0	0.2	561	26	73	260	0	10	23553
	Backhoe/Front Loader	1	8	42	0.122	0.588	0.965	0.001	0.056	101	4.7	7.7	1.0	0.0	0.4	811	41	198	324	0	19	34066
	Auger Truck	1	8	42	0.149	0.557	1.705	0.003	0.061	311	4.5	13.6	1.2	0.0	0.5	2490	50	187	573	1	21	104600
											10.9	*27.5*	*2.8*	*0.0*	*1.2*	*3862*	*117*	*457*	*1157*	*2*	*49*	*162219*
Tubular Steel H-Frame Haul	80 Ton Rough Terrain Crane	1	6	21	0.124	0.346	1.237	0.001	0.047	112	2.1	7.4	0.7	0.0	0.3	673	16	44	156	0	6	14132
Tubular Steel H-Frame Assembly	Compressor Trailer	1	5	42	0.101	0.335	0.598	0.001	0.055	47	1.7	3.0	0.5	0.0	0.3	235	21	70	126	0	11	9860
	80 Ton Rough Terrain Crane	1	6	42	0.124	0.346	1.237	0.001	0.047	112	2.1	7.4	0.7	0.0	0.3	673	31	87	312	0	12	28264
											3.8	*10.4*	*1.3*	*0.0*	*0.6*	*908*	*53*	*158*	*437*	*0*	*23*	*38124*
Tubular Steel H-Frame Erection	Compressor Trailer	1	5	42	0.101	0.335	0.598	0.001	0.055	47	1.7	3.0	0.5	0.0	0.3	235	21	70	126	0	11	9860
	80 Ton Rough Terrain Crane	1	6	42	0.124	0.346	1.237	0.001	0.047	112	2.1	7.4	0.7	0.0	0.3	673	31	87	312	0	12	28264
											3.8	*10.4*	*1.3*	*0.0*	*0.6*	*908*	*53*	*158*	*437*	*0*	*23*	*38124*
Install Conductor & OPGW	30 Ton Manitex	4	6	205	0.124	0.346	1.237	0.001	0.047	112	8.3	29.7	3.0	0.0	1.1	2692	612	1704	6087	6	231	551822
	22 Ton Manitex	1	8	205	0.124	0.346	1.237	0.001	0.047	112	2.8	9.9	1.0	0.0	0.4	897	204	568	2029	2	77	183941
	Splicing Rig	2	2	205	0.171	0.607	1.982	0.002	0.068	254	2.4	7.9	0.7	0.0	0.3	1017	140	498	1625	2	56	208476
	Splicing Lab	2	2	48	0.171	0.607	1.982	0.002	0.068	254	2.4	7.9	0.7	0.0	0.3	1017	33	116	381	0	13	48814
	20,000 lb. Rough Terrain Fork Lift	1	2	205	0.065	0.171	0.716	0.001	0.023	77	0.3	1.4	0.1	0.0	0.0	154	27	70	294	0	9	31620
	580 Case Backhoe	1	2	205	0.091	0.362	0.566	0.001	0.052	52	0.7	1.1	0.2	0.0	0.1	103	37	149	232	0	21	21208
	Spacing Cart	3	8	51	0.012	0.062	0.074	0.000	0.003	10	1.5	1.8	0.3	0.0	0.1	243	14	76	90	0	4	12371
	Static Tensioner	1	2	205	0.171	0.607	1.982	0.002	0.068	254	1.2	4.0	0.3	0.0	0.1	508	70	249	813	1	28	104238
	3 Drum Straw line Puller	2	4	205	0.171	0.607	1.982	0.002	0.068	254	4.9	15.9	1.4	0.0	0.5	2034	280	995	3251	4	111	416951
	30-ton puller	1	3	205	0.171	0.607	1.982	0.002	0.068	254	1.8	5.9	0.5	0.0	0.2	763	105	373	1219	2	42	156357
	Sag Cat w2 winch	2	2	205	0.205	0.574	1.944	0.002	0.078	166	2.3	7.8	0.8	0.0	0.3	665	168	471	1594	2	64	136228
	D8 Cat	4	1	205	0.205	0.574	1.944	0.002	0.078	166	2.3	7.8	0.8	0.0	0.3	665	168	471	1594	2	64	136228
	Hughes 500 E Helicopter	1	6	52	1.400	9.994	12.794	0.957	1.595	2831	60.0	76.8	8.4	5.7	9.6	16986	437	3118	3992	299	498	883272
											90.9	*177.9*	*18.2*	*5.9*	*13.3*	*27743*	*2294*	*8857*	*23200*	*320*	*1218*	*2891524*
Guard Structure Removal	Compressor Trailer	2	6	4	0.101	0.335	0.598	0.001	0.055	47	4.0	7.2	1.2	0.0	0.7	563	5	16	29	0	3	2254
	80ft. Hydraulic Man-lift	1	4	4	0.151	0.580	1.920	0.002	0.060	213	2.3	7.7	0.6	0.0	0.2	851	2	9	31	0	1	3406
	30 Ton Crane Truck	1	8	4	0.124	0.346	1.237	0.001	0.047	112	2.8	9.9	1.0	0.0	0.4	897	4	11	40	0	2	3589
											9.1	*24.7*	*2.8*	*0.0*	*1.3*	*2312*	*11*	*36*	*99*	*0*	*5*	*9248*
Restoration	Road Grader	1	6	36	0.176	0.493	1.790	0.002	0.066	172	3.0	10.7	1.1	0.0	0.4	1033	38	107	387	0	14	37176
	Backhoe	1	6	36	0.142	0.404	1.549	0.002	0.052	172	2.4	9.3	0.9	0.0	0.3	1030	31	87	335	0	11	37095
	Front End Loader	1	6	36	0.142	0.404	1.549	0.002	0.052	172	2.4	9.3	0.9	0.0	0.3	1030	31	87	335	0	11	37095
	Track Type Dozer	1	6	36	0.176	0.493	1.790	0.002	0.066	172	3.0	10.7	1.1	0.0	0.4	1033	38	107	387	0	14	37176
	Drum Type Compactor	1	6	36	0.154	0.454	1.623	0.002	0.060	153	2.7	9.7	0.9	0.0	0.4	919	33	98	351	0	13	33067
											13.5	*49.8*	*4.7*	*0.1*	*1.8*	*5045*	*171*	*486*	*1793*	*2*	*64*	*181611*

Eldorado-Ivanpah 220kV Construction
Exhaust, Tire and Brake Emissions

From SCAQMD file "onroadEF07_26.xls"
Used 2010 Table

	Vehicles <8500 lbs (lbs/mile)	Vehicles >8500 lbs (lbs/mile)	Vehicles >33000 lbs (lbs/mile)
CO	0.00826	0.01844	0.01195
NOx	0.00092	0.02062	0.03822
ROG	0.00091	0.00259	0.00304
SOx	0.00001	0.00003	0.00004
PM10	0.00009	0.00075	0.00183
PM2.5	0.00005	0.00064	0.00160
CO2	1.0957	2.7322	4.2112

					Emission Factor (lb/VMT)							Emissions (lbs/day)							Activity Emissions (lbs)						
Activity	Equipment	Number	Days	VMT/day	CO	NOx	ROG	SOx	PM10	PM2.5	CO2	CO	NOx	ROG	SOx	PM10	PM2.5	CO2	CO	NOx	ROG	SOx	PM10	PM2.5	CO2
Survey	1/2 Ton Pick-up Truck, 4X5	2	36	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	59.49	6.61	6.58	0.08	0.63	0.39	7889
	Personal Vehicles	4	36	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	59.49	6.61	6.58	0.08	0.63	0.39	7889
												3.31	*0.37*	*0.37*	*0.00*	*0.03*	*0.02*	*438*	*118.98*	*13.22*	*13.16*	*0.16*	*1.25*	*0.79*	*15778*
Marshalling Yards	2 Ton Crew Cab 4X4	1	589	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.83	0.09	0.09	0.00	0.01	0.01	110	486.68	54.08	53.83	0.63	5.12	3.23	64536
	Truck, Semi, Tractor	1	589	50	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	0.92	1.03	0.13	0.00	0.04	0.03	137	542.99	607.39	76.26	0.80	22.12	18.92	80464
	Personal Vehicles	4	589	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	973.35	108.16	107.67	1.27	10.25	6.45	129071
												3.40	*1.31*	*0.40*	*0.00*	*0.06*	*0.05*	*465*	*2003.02*	*769.63*	*237.76*	*2.70*	*37.49*	*28.60*	*274071*
Roads and Landing Work	2 Ton Crew Cab 4X4	2	101	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	166.91	18.55	18.46	0.22	1.76	1.11	22133
	Water Trucks	2	589	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	3.69	4.12	0.52	0.01	0.15	0.13	546	2171.95	2429.58	305.05	3.18	88.49	*75.67*	321856
	Lowboy Trk/Trlr	1	51	50	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	0.92	1.03	0.13	0.00	0.04	0.03	137	47.02	52.59	6.60	0.07	1.92	1.64	6967
	Personal Vehicles	5	101	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	2.07	0.23	0.23	0.00	0.02	0.01	274	208.63	23.18	23.08	0.27	2.20	1.38	27666
												8.33	*5.57*	*1.06*	*0.01*	*0.23*	*0.19*	*1176*	*2594.51*	*2523.90*	*353.20*	*3.74*	*94.36*	*79.79*	*378622*
Guard Structure Installation	3/4 Ton Pick-up Truck, 4X5	2	4	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	6.61	0.73	0.73	0.01	0.07	0.04	877
	2 Ton Crew Cab Flat Bed, 4X4	1	4	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.41	0.05	0.05	0.00	0.00	0.00	55	1.65	0.18	0.18	0.00	0.02	0.01	219
	Extendable Flat Bed Pole Truck	1	4	50	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	0.92	1.03	0.13	0.00	0.04	0.03	137	3.69	4.12	0.52	0.01	0.15	0.13	546
	Personal Vehicles	6	4	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	2.48	0.28	0.27	0.00	0.03	0.02	329	9.92	1.10	1.10	0.01	0.10	0.07	1315
												5.47	*1.54*	*0.63*	*0.01*	*0.09*	*0.06*	*739*	*21.87*	*6.14*	*2.53*	*0.03*	*0.34*	*0.25*	*2957*
Remove Existing Conductor & OHGW	2 Ton Crew Cab 4X4	4	71	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	3.31	0.37	0.37	0.00	0.03	0.02	438	234.66	26.08	25.96	0.31	2.47	1.56	31117
	Truck, Semi, Tractor	1	64	50	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	0.92	1.03	0.13	0.00	0.04	0.03	137	59.00	66.00	8.29	0.09	2.40	2.06	8743
	Personal Vehicles	14	64	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	5.78	0.64	0.64	0.01	0.06	0.04	767	370.17	41.13	40.95	0.48	3.90	2.45	49087
												10.01	*2.04*	*1.13*	*0.01*	*0.13*	*0.09*	*1342*	*663.83*	*133.21*	*75.19*	*0.88*	*8.77*	*6.07*	*88947*
Remove Existing Towers	2 Ton Crew Cab, 4X4	2	75	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	123.94	13.77	13.71	0.16	1.30	0.82	16435
	Flat Bed Truck & Trailer	1	35	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	1.84	2.06	0.26	0.00	0.08	0.06	273	64.53	72.19	9.06	0.09	2.63	2.25	9563
	Personal Vehicles	6	75	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	2.48	0.28	0.27	0.00	0.03	0.02	329	185.91	20.66	20.56	0.24	1.96	1.23	24653
												5.98	*2.52*	*0.72*	*0.01*	*0.12*	*0.09*	*821*	*374.39*	*106.62*	*43.34*	*0.50*	*5.89*	*4.30*	*50651*
Remove Existing Foundations	Dump Truck	2	67	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	3.69	4.12	0.52	0.01	0.15	0.13	546	247.06	276.37	34.70	0.36	10.07	8.61	36612
	2 Ton Crew Cab Flat Bed, 4X4	1	67	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.83	0.09	0.09	0.00	0.01	0.01	110	55.36	6.15	6.12	0.07	0.58	0.37	7341
	Personal Vehicles	8	67	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	3.31	0.37	0.37	0.00	0.03	0.02	438	221.44	24.61	24.49	0.29	2.33	1.47	29364
												7.82	*4.58*	*0.97*	*0.01*	*0.19*	*0.16*	*1094*	*523.87*	*307.13*	*65.32*	*0.72*	*12.98*	*10.44*	*73317*
Remove Existing Wood Poles	3/4 Ton Pick-up Truck, 4X5	2	7	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	11.57	1.29	1.28	0.02	0.12	0.08	1534
	2 Ton Crew Cab Flat Bed, 4X4	2	7	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	11.57	1.29	1.28	0.02	0.12	0.08	1534
	Extendable Flat Bed Pole Truck	2	7	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	3.69	4.12	0.52	0.01	0.15	0.13	546	25.81	28.87	3.63	0.04	1.05	0.90	3825
	Personal Vehicles	6	7	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	2.48	0.28	0.27	0.00	0.03	0.02	329	17.35	1.93	1.92	0.02	0.18	0.12	2301
												9.47	*4.77*	*1.16*	*0.01*	*0.21*	*0.17*	*1313*	*66.30*	*33.37*	*8.10*	*0.09*	*1.48*	*1.17*	*9194*
Install LST Foundaions	2 Ton Crew Cab Flat Bed, 4X4	2	144	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	237.97	26.44	26.32	0.31	2.50	1.58	31556
	Dump Truck	2	144	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	3.69	4.12	0.52	0.01	0.15	0.13	546	531.00	593.99	74.58	0.78	21.63	18.50	78688
	4001 gallon Water Trucks	1	144	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	1.84	2.06	0.26	0.00	0.08	0.06	273	265.50	296.99	37.29	0.39	10.82	9.25	39344
	11 cu.yd. Concrete Mixer Trucks	3	144	100	0.01195	0.03822	0.00304	0.00004	0.00183	0.00160	4.21121	3.59	11.47	0.91	0.01	0.55	0.48	1263	516.44	1651.15	131.40	1.78	79.08	69.16	181924
	Personal Vehicles	18	144	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	7.44	0.83	0.82	0.01	0.08	0.05	986	1070.85	118.99	118.45	1.40	11.27	7.10	142000
												18.21	*18.66*	*2.69*	*0.03*	*0.87*	*0.73*	*3288*	*2621.76*	*2687.56*	*388.04*	*4.66*	*125.31*	*105.58*	*473512*
LST Steel Haul	2 Ton Crew Cab Flat Bed, 4X4	4	108	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	3.31	0.37	0.37	0.00	0.03	0.02	438	356.95	39.66	39.48	0.47	3.76	2.37	47333
	40' Flat Bed Truck & Trailer	2	108	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	3.69	4.12	0.52	0.01	0.15	0.13	546	398.25	445.49	55.93	0.58	16.23	13.87	59016
	Personal Vehicles	8	108	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	3.31	0.37	0.37	0.00	0.03	0.02	438	356.95	39.66	39.48	0.47	3.76	2.37	47333
												10.30	*4.86*	*1.25*	*0.01*	*0.22*	*0.17*	*1423*	*1112.16*	*524.82*	*134.90*	*1.51*	*23.74*	*18.61*	*153683*
LST Assembly	3/4 Ton Pick-up Truck, 4X5	4	144	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	3.31	0.37	0.37	0.00	0.03	0.02	438	475.93	52.88	52.65	0.62	5.01	3.16	63111
	2 Ton Crew Cab Flat Bed, 4X	6	144	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	4.96	0.55	0.55	0.01	0.05	0.03	657	713.90	79.33	78.97	0.93	7.51	4.73	94667
	Personal Vehicles	2	144	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.83	0.09	0.09	0.00	0.01	0.01	110	118.98	13.22	13.16	0.16	1.25	0.79	15778
												9.09	*1.01*	*1.01*	*0.01*	*0.10*	*0.06*	*1205*	*1308.82*	*145.43*	*144.78*	*1.71*	*13.78*	*8.68*	*173556*
LST Erection	3/4 Ton Pick-up Truck, 4X5	4	108	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	3.31	0.37	0.37	0.00	0.03	0.02	438	356.95	39.66	39.48	0.47	3.76	2.37	47333
	2 Ton Crew Cab Flat Bed, 4X	4	108	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	3.31	0.37	0.37	0.00	0.03	0.02	438	356.95	39.66	39.48	0.47	3.76	2.37	47333
	Personal Vehicles	16	108	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	4.00000	6.61	0.73	0.73	0.01	0.07	0.04	3200	713.90	79.33	78.97	0.93	7.51	4.73	345600
												13.22	*1.47*	*1.46*	*0.02*	*0.14*	*0.09*	*4077*	*1427.80*	*158.65*	*157.94*	*1.86*	*15.03*	*9.47*	*440267*
Install Tubular Steel Foundations	2 Ton Crew Cab Flat Bed, 4X	3	42	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.24	0.14	0.14	0.00	0.01	0.01	164	52.06	5.78	5.76	0.07	0.55	0.35	6903
	10-cu. Yd. Dump Truck	2	42	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	3.69	4.12	0.52	0.01	0.15	0.13	546	154.88	173.25	21.75	0.23	6.31	5.40	22951
	4001 gallon Water Truck	1	42	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	1.84	2.06	0.26	0.00	0.08	0.06	273	77.44	86.62	10.88	0.11	3.16	2.70	11475
	11 cu. Yd. Concrete Mixer Tr	3	42	100	0.01195	0.03822	0.00304	0.00004	0.00183	0.00160	4.21121	3.59	11.47	0.91	0.01	0.55	0.48	1263	150.63	481.58	38.32	0.52	23.07	20.17	53061
	Personal Vehicles	7	42	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	2.89	0.32	0.32	0.00	0.03	0.02	383	121.46	13.50	13.44	0.16	1.28	0.81	16107
												13.25	*18.11*	*2.15*	*0.03*	*0.82*	*0.70*	*2631*	*556.46*	*760.74*	*90.15*	*1.09*	*34.36*	*29.41*	*110497*
Tubular Steel H-Frame Haul	3/4 Ton Pick-up Truck, 4X5	2	21	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	34.70	3.86	3.84	0.05	0.37	0.23	4602
	40' Flat Bed Truck & Trailer	2	21	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	3.69	4.12	0.52	0.01	0.15	0.13	546	77.44	86.62	10.88	0.11	3.16	2.70	11475
	Personal Vehicles	4	21	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	34.70	3.86	3.84	0.05	0.37	0.23	4602
												6.99	*4.49*	*0.88*	*0.01*	*0.19*	*0.15*	*985*	*146.85*	*94.34*	*18.55*	*0.20*	*3.89*	*3.16*	*20679*
Tubular Steel H-Frame Assembly	3/4 Ton Pick-up Truck, 4X5	2	42	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	69.41	7.71	7.68	0.09	0.73	0.46	9204
	2 Ton Crew Cab Flat Bed, 4X	2	42	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	69.41	7.71	7.68	0.09	0.73	0.46	9204
	Personal Vehicles	8	42	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	3.31	0.37	0.37	0.00	0.03	0.02	438	138.81	15.42	15.36	0.18	1.46	0.92	18407
												6.61	*0.73*	*0.73*	*0.01*	*0.07*	*0.04*	*877*	*277.63*	*30.85*	*30.71*	*0.36*	*2.92*	*1.84*	*36815*
Tubular Steel H-Frame Erection	3/4 Ton Pick-up Truck, 4X5	2	42	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	69.41	7.71	7.68	0.09	0.73	0.46	9204
	2 Ton Crew Cab Flat Bed, 4X	2	42	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	69.41	7.71	7.68	0.09	0.73	0.46	9204
	Personal Vehicles	8	42	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	3.31	0.37	0.37	0.00	0.03	0.02	438	138.81	15.42	15.36	0.18	1.46	0.92	18407
												6.61	*0.73*	*0.73*	*0.01*	*0.07*	*0.04*	*877*	*277.63*	*30.85*	*30.71*	*0.36*	*2.92*	*1.84*	*36815*
Install Conductor & OPGW	2 Ton Crew Cab Flat Bed, 4X	5	205	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	4.13	0.46	0.46	0.01	0.04	0.03	548	846.93	94.11	93.68	1.10	8.92	5.62	112307
	Wire Truck & Trailer	6	205	50	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	5.53	6.19	0.78	0.01	0.23	0.19	820	1133.92	1268.41	159.26	1.66	46.20	39.50	168032
	Dump Truck (Trash)	1	205	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	1.84	2.06	0.26	0.00	0.08	0.06	273	377.97	422.80	53.09	0.55	15.40	13.17	56011
	3/4 Ton Pick-up Truck, 4X5	6	205	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	4.96	0.55	0.55	0.01	0.05	0.03	657	1016.32	112.93	112.42	1.33	10.70	6.74	134769
	Pole Truck & Trailer	0	0	50	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0
	Static Truck	1	205	50	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	0.92	1.03	0.13	0.00	0.04	0.03	137	188.99	211.40	26.54	0.28	7.70	6.58	28005
	Fuel, Helicopter Support Tru	1	52	50	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	0.92	1.03	0.13	0.00	0.04	0.03	137	47.94	53.62	6.73	0.07	1.95	1.67	7104
	Low Boy Truck & Trailer	1	205	50	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	0.92	1.03	0.13	0.00	0.04	0.03	137	188.99	211.40	26.54	0.28	7.70	6.58	28005
	Personal Vehicles	32	205	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	13.22	1.47	1.46	0.02	0.14	0.09	1753	2710.18	301.15	299.79	3.53	28.53	17.97	359384
												32.45	*13.82*	*3.89*	*0.04*	*0.65*	*0.50*	*4461*	*6511.23*	*2675.84*	*778.06*	*8.80*	*127.10*	*97.83*	*893617*
Guard Structure Removal	3/4 Ton Pick-up Truck, 4X5	2	4	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	6.61	0.73	0.73	0.01	0.07	0.04	877
	2 Ton Crew Cab Flat Bed, 4X	2	4	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	6.61	0.73	0.73	0.01	0.07	0.04	877
	Extendable Flat Bed Pole Tru	2	4	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	3.69	4.12	0.52	0.01	0.15	0.13	546	14.75	16.50	2.07	0.02	0.60	0.51	2186
	Personal Vehicles	6	4	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	2.48	0.28	0.27	0.00	0.03	0.02	329	9.92	1.10	1.10	0.01	0.10	0.07	1315
												9.47	*4.77*	*1.16*	*0.01*	*0.21*	*0.17*	*1313*	*37.89*	*19.07*	*4.63*	*0.05*	*0.84*	*0.67*	*5254*
Restoration	2 Ton Crew Cab 4X4	2	36	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	59.49	6.61	6.58	0.08	0.63	0.39	7889
	Water Truck	1	36	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	1.84	2.06	0.26	0.00	0.08	0.06	273	66.38	74.25	9.32	0.10	2.70	2.31	9836
	Lowboy Truck/Trailer	1	36	50	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	0.92	1.03	0.13	0.00	0.04	0.03	137	33.19	37.12	4.66	0.05	1.35	1.16	4918
	Personal Vehicles	7	36	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	2.89	0.32	0.32	0.00	0.03	0.02	383	104.11	11.57	11.52	0.14	1.10	0.69	13806
												7.31	*3.60*	*0.89*	*0.01*	*0.16*	*0.13*	*1012*	*263.17*	*129.55*	*32.08*	*0.36*	*5.78*	*4.55*	*36449*

Eldorado-Ivanpah 115kV Construction
Emission Summary

Activity Emissions	Emissions (lbs)						
	CO	NOx	ROG	SOx	PM10	PM2.5	CO2
Combustion Related Emissions							
Survey							
On-Road Vehicles	2	0.3	0.3	0.003	0.026	0.016	329
Roads and Landing Work							
On-Road Vehicles	149	147	20	0.2	5	5	21727
Off-Road Vehicles and Equipment	41	151	14	0.2	5	5	15098
Remove Existing Conductor							
On-Road Vehicles	18	8	2	0.02	0.4	0.3	2463
Off-Road Vehicles and Equipment	33	80	10	0.08	5	4	6964
Remove Existing Foundations							
On-Road Vehicles	9	5	1	0.01	0.20	0.16	1204
Off-Road Vehicles and Equipment	18	59	6	0.1	3	2	6247
Install TSP Foundaions							
On-Road Vehicles	26	36	4	0.1	2	1	5262
Off-Road Vehicles and Equipment	22	55	6	0.1	2	2	7725
TSP Steel Haul							
On-Road Vehicles	28	18	4	0.04	0.7	0.6	3939
Off-Road Vehicles and Equipment	8	30	3	0.03	1	1	2692
TSP Assembly							
On-Road Vehicles	53	6	6	0.07	1	0.4	7012
Off-Road Vehicles and Equipment	30	115	11	0.12	4	3	10632
TSP Erection							
On-Road Vehicles	53	6	6	0.07	1	0.4	9906
Off-Road Vehicles and Equipment	30	83	10	0.08	4	4	7262
Install Conductor							
On-Road Vehicles	15	6	2	0.02	0.3	0.2	2107
Off-Road Vehicles and Equipment	6	22	2	0.03	0.8	0.7	2423
Restoration							
On-Road Vehicles	7	5	1	0.01	0.2	0.2	1040
Off-Road Vehicles and Equipment	13	50	5	0.06	2	2	5045
Fugitive Dust Emissions							
Paved Roads	-	-	-	-	489	83	-
Unpaved Roads	-	-	-	-	4594	974	-
Construction Activities	-	-	-	-	73	37	-
Total Activity Emissions (tons)	0.28	0.44	0.057	0.0006	2.6	0.56	60
Total California Activity Emissions (tons)	0.28	0.44	0.057	0.0006	2.6	0.56	60
Construction Days	34	34	34	34	34	34	34
Average Daily Emissions (lbs)	17	26	3.3	0.036	153	33	3502

Eldorado-Ivanpah 115kV Construction
Workforce Estimate

Work Activity						Activity Production	
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Estimated Average Duration of Use (Hrs/Day)	Estimated Production Per Day
Survey (1)				**4**	**1**		**1.0 Mile**
1/2-ton pick-up truck, 4x4	200	Gas	2		1	8	1 mile/day
Roads and Landing Work (2)				**5**	**5**		**0. 5 Miles / 16 Pads**
1-ton crew cab, 4x4	300	Diesel	2		5	2	0.5 mile/day
Road grader	350	Diesel	1		5	4	and
Track type dozer	350	Diesel	1		5	6	4 structure pads/day
Drum type compactor	250	Diesel	1		5	4	
Water truck	350	Diesel	2		Duration	8	
Lowboy truck/trailer	500	Diesel	1		5	2	
Backhoe/front loader	350	Diesel	1		5	6	
Remove Existing H-Frame Poles (3)				**6**	**3**		**7 Steel Poles**
1-ton crew cab, 4x4	300	Diesel	2		3	5	
30-ton crane truck	300	Diesel	2		3	6	
Compressor trailer	120	Diesel	2		3	8	
Flat bed truck/trailer	350	Diesel	1		3	8	
10,000-lb rough terrain forklift	200	Diesel	1		3	4	3 poles/day
Remove Existing H-Frame Foundations (4)				**4**	**2**		**7 Steel Poles**
1-ton crew cab flat bed, 4x4	300	Diesel	1		2	8	4 grillage
10-cubic yard dump truck	350	Diesel	1		2	8	foundations/ day
Compressor trailer	120	Diesel	1		2	8	
Backhoe/front loader	350	Diesel	1		2	8	
Install Tubular Steel Pole Foundations (5)				**7**	**2**		**4 TSPs**
1-ton crew cab flat bed, 4x4	300	Diesel	3		2	2	
30-ton crane truck	300	Diesel	1		2	5	
Backhoe/front loader	200	Diesel	1		2	8	
Auger truck	500	Diesel	1		2	8	
10-cubic yard dump truck	350	Diesel	2		2	8	
Water truck	350	Diesel	1		2	8	
10-cubic yard concrete mixer truck	425	Diesel	3		2	3	2 TSPs/day
Tubular Steel Pole/ Light Weight Steel H-Frame Haul (6)				**4**	**4**		**16 Steel Poles**
3/4-ton pick-up truck, 4x4	300	Diesel	2		4	5	
40-foot flat bed truck/trailer	350	Diesel	2		4	8	
80-ton rough terrain crane	350	Diesel	1		4	6	4 steel poles/day
Tubular Steel Pole/ Light Weight Steel H-Frame Assembly (7)				**8**	**8**		**16 Steel Poles**
3/4-ton pick-up truck, 4x4	300	Diesel	2		8	5	
1-ton crew cab flat bed, 4x4	300	Diesel	2		8	5	
Compressor trailer	120	Diesel	1		8	5	
80-ton rough terrain crane	350	Diesel	1		8	6	2 steel poles/day
Tubular Steel Pole/ Light Weight Steel H-Frame Erection (8)				**8**	**8**		**16 Steel Poles**
3/4-ton pick-up truck, 4x4	300	Diesel	2		8	5	
1-ton crew cab flat bed, 4x4	300	Diesel	2		8	5	
Compressor trailer	120	Diesel	1		8	5	
80-Ton Rough Terrain Crane	350	Diesel	1		8	6	2 steel poles/day
Install Conductor (9)				**16**	**1**		**0.15 Circuit Mile**
3/4-ton pick-up truck, 4x4	300	Diesel	3		1	8	
1-ton crew cab flat bed, 4x4	300	Diesel	2		1	8	
Wire truck/trailer	350	Diesel	2		1	2	
Dump truck (trash)	350	Diesel	1		1	2	
22-ton Manitex	350	Diesel	1		1	8	
Splicing rig	350	Diesel	1		1	2	
3 drum straw line puller	300	Diesel	1		1	4	
Lowboy truck/trailer	500	Diesel	1		1	2	0.35 mile/day
Restoration (10)				**7**	**1**		**1.0 Mile**
1-ton crew cab, 4x4	300	Diesel	2		1	2	
Road grader	350	Diesel	1		1	6	
Backhoe	350	Diesel	1		1	6	
Front end loader	350	Diesel	1		1	6	
Track type dozer	350	Diesel	1		1	6	
Drum type compactor	250	Diesel	1		1	6	
Water truck	350	Diesel	1		1	8	
Lowboy truck/trailer	500	Diesel	1		1	3	1 mile/day

Crew Size Assumptions:
#1 Survey = one 4-man crew
#2 Roads and Landing Work = one 5-man crew
#3 Remove Existing Lattice Steel H-Frame = one 6-man crew
#4 Remove Existing H-Frame Foundations = one 4-man crew
#5 Install Foundations for Tubular Steel Poles = one 7-man crew
#6 TSP/LWS H-Frame Haul = one 4-man crew
#7 TSP/LWS H-Frame Assembly = one 8-man crew
#8 TSP/LWS H-Frame Erection = one 8-man crew
#9 Conductor Installation = two 8-man crews
#10 Restoration = one 7-man crew

Eldorado-Ivanpah 115kV Construction

On Site Equipment Exhaust Emissions

From SCAQMD offroad emission factors file name "offroadEF_07_25.xls" 2010

Description	Number	Hours per Day	Days of Activity	2010 Emission Factor (lbs/hr)						Emissions (lbs/day)						Total Activity Emissions (lbs)					
				ROG	CO	NOX	SOX	PM	CO2	CO	NOX	ROG	SOX	PM	CO2	ROG	CO	NOX	SOX	PM	CO2
Roads and Landing Work																					
Road Grader	1	2	5	0.176	0.493	1.790	0.002	0.066	172	1.0	3.6	0.4	0.0	0.1	344	2	5	18	0	1	1721
Track Type Dozer	1	6	5	0.176	0.493	1.790	0.002	0.066	172	3.0	10.7	1.1	0.0	0.4	1033	5	15	54	0	2	5163
Drum Type Compactor	1	4	5	0.154	0.454	1.623	0.002	0.060	153	1.8	6.5	0.6	0.0	0.2	612	3	9	32	0	1	3062
Backhoe	1	6	5	0.142	0.404	1.549	0.002	0.052	172	2.4	9.3	0.9	0.0	0.3	1030	4	12	46	0	2	5152
										8.2	*30.1*	*2.9*	*0.0*	*1.1*	*3020*	*14*	*41*	*151*	*0*	*5*	*15098*
Remove Existing H Frame Poles																					
80 Ton Rough Terrain Crane	0	0	3	0.124	0.346	1.237	0.001	0.047	112	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0
30 Ton Crane Truck	2	6	3	0.124	0.346	1.237	0.001	0.047	112	4.2	14.8	1.5	0.0	0.6	1346	4	12	45	0	2	4038
Compressor Trailer	2	8	3	0.101	0.335	0.598	0.001	0.055	47	5.4	9.6	1.6	0.0	0.9	751	5	16	29	0	3	2254
Rough Terrain Forklift	1	4	3	0.074	0.331	0.554	0.001	0.034	56	1.3	2.2	0.3	0.0	0.1	224	1	4	7	0	0	673
										10.8	*26.6*	*3.4*	*0.0*	*1.6*	*2321*	*10*	*33*	*80*	*0*	*5*	*6964*
Remove Existing Foundations																					
Compressor Trailer	1	8	2	0.101	0.335	0.598	0.001	0.055	47	2.7	4.8	0.8	0.0	0.4	376	2	5	10	0	1	751
Backhoe	2	8	2	0.142	0.404	1.549	0.002	0.052	172	6.5	24.8	2.3	0.0	0.8	2748	5	13	50	0	2	5496
										9.1	*29.6*	*3.1*	*0.0*	*1.3*	*3123*	*6*	*18*	*59*	*0*	*3*	*6247*
Install TSP Foundaions																					
30 Ton Crane Truck	1	5	2	0.124	0.346	1.237	0.001	0.047	112	1.7	6.2	0.6	0.0	0.2	561	1	3	12	0	0	1122
Backhoe	1	8	2	0.122	0.588	0.965	0.001	0.056	101	4.7	7.7	1.0	0.0	0.4	811	2	9	15	0	1	1622
Auger Truck	1	8	2	0.149	0.557	1.705	0.003	0.061	311	4.5	13.6	1.2	0.0	0.5	2490	2	9	27	0	1	4981
										10.9	*27.5*	*2.8*	*0.0*	*1.2*	*3862*	*6*	*22*	*55*	*0*	*2*	*7725*
TSP Steel Haul																					
80 Ton Rough Terrain Crane	1	6	4	0.124	0.346	1.237	0.001	0.047	112	2.1	7.4	0.7	0.0	0.3	673	3	8	30	0	1	2692
TSP Assembly																					
80 Ton Rough Terrain Crane	1	6	8	0.124	0.346	1.237	0.001	0.047	112	2.1	7.4	0.7	0.0	0.3	673	6	17	59	0	2	5384
Compressor Trailer	1	5	8	0.123	0.341	1.398	0.001	0.046	131	1.7	7.0	0.6	0.0	0.2	656	5	14	56	0	2	5249
										3.8	*14.4*	*1.4*	*0.0*	*0.5*	*1329*	*11*	*30*	*115*	*0*	*4*	*10632*
TSP Erection																					
Compressor Trailer	1	5	8	0.101	0.335	0.598	0.001	0.055	47	1.7	3.0	0.5	0.0	0.3	235	4	13	24	0	2	1878
80 Ton Rough Terrain Crane	1	6	8	0.124	0.346	1.237	0.001	0.047	112	2.1	7.4	0.7	0.0	0.3	673	6	17	59	0	2	5384
										3.8	*10.4*	*1.3*	*0.0*	*0.6*	*908*	*10*	*30*	*83*	*0*	*4*	*7262*
Install Conductor																					
22 Ton Manitex	1	8	1	0.124	0.346	1.237	0.001	0.047	112	2.8	9.9	1.0	0.0	0.4	897	1	3	10	0	0	897
Splicing Rig	1	2	1	0.171	0.607	1.982	0.002	0.068	254	1.2	4.0	0.3	0.0	0.1	508	0	1	4	0	0	508
3 Drum Straw line Puller	1	4	1	0.171	0.607	1.982	0.002	0.068	254	2.4	7.9	0.7	0.0	0.3	1017	1	2	8	0	0	1017
										6.4	*21.8*	*2.0*	*0.0*	*0.8*	*2423*	*2*	*6*	*22*	*0*	*1*	*2423*
Restoration																					
Road Grader	1	6	1	0.176	0.493	1.790	0.002	0.066	172	3.0	10.7	1.1	0.0	0.4	1033	1	3	11	0	0	1033
Backhoe	1	6	1	0.142	0.404	1.549	0.002	0.052	172	2.4	9.3	0.9	0.0	0.3	1030	1	2	9	0	0	1030
Front End Loader	1	6	1	0.142	0.404	1.549	0.002	0.052	172	2.4	9.3	0.9	0.0	0.3	1030	1	2	9	0	0	1030
Track Type Dozer	1	6	1	0.176	0.493	1.790	0.002	0.066	172	3.0	10.7	1.1	0.0	0.4	1033	1	3	11	0	0	1033
Drum Type Compactor	1	6	1	0.154	0.454	1.623	0.002	0.060	153	2.7	9.7	0.9	0.0	0.4	919	1	3	10	0	0	919
										13.5	*49.8*	*4.7*	*0.1*	*1.8*	*5045*	*5*	*13*	*50*	*0*	*2*	*5045*

Eldorado-Ivanpah 115kV Construction
Exhaust, Tire and Brake Emissions

From SCAQMD file "onroadEF07_26.xls"
Used 2010 Table

	Vehicles <8500 lbs (lbs/mile)	Vehicles >8500 lbs (lbs/mile)	Vehicles >33000 lbs (lbs/mile)
CO	0.00826	0.01844	0.01195
NOx	0.00092	0.02062	0.03822
ROG	0.00091	0.00259	0.00304
SOx	0.00001	0.00003	0.00004
PM10	0.00009	0.00075	0.00183
PM2.5	0.00005	0.00064	0.00160
CO2	1.0956823	2.732222	4.21120578

				Emission Factor (lb/VMT)							Emissions (lbs/day)							Activity Emissions (lbs)						
Activity	Number	Days	VMT/day	CO	NOx	ROG	SOx	PM10	PM2.5	CO2	CO	NOx	ROG	SOx	PM10	PM2.5	CO2	CO	NOx	ROG	SOx	PM10	PM2.5	CO2
Survey																								
1/2 Ton Pick-up Truck, 4X4	2	1	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.83	0.09	0.09	0.00	0.01	0.01	110	0.83	0.09	0.09	0.00	0.01	0.01	110
Personal Vehicles	4	1	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	1.65	0.18	0.18	0.00	0.02	0.01	219
											2.48	*0.28*	*0.27*	*0.00*	*0.03*	*0.02*	*329*	*2.48*	*0.28*	*0.27*	*0.00*	*0.03*	*0.02*	*329*
Roads and Landing Work																								
1 Ton Crew Cab 4X4	2	5	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	8.26	0.92	0.91	0.01	0.09	0.05	1096
Water Trucks	2	34	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	3.69	4.12	0.52	0.01	0.15	0.13	546	125.38	140.25	17.61	0.18	5.11	4.37	18579
Lowboy Trk/Trlr	1	5	50	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	0.92	1.03	0.13	0.00	0.04	0.03	137	4.61	5.16	0.65	0.01	0.19	0.16	683
Personal Vehicles	5	5	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	2.07	0.23	0.23	0.00	0.02	0.01	274	10.33	1.15	1.14	0.01	0.11	0.07	1370
											8.33	*5.57*	*1.06*	*0.01*	*0.23*	*0.19*	*1176*	*148.58*	*147.47*	*20.31*	*0.21*	*5.49*	*4.65*	*21727*
Remove Existing H Frame Poles																								
1 Ton Crew Cab 4X4	2	3	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	4.96	0.55	0.55	0.01	0.05	0.03	657
Truck, Semi, Tractor	1	3	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	1.84	2.06	0.26	0.00	0.08	0.06	273	5.53	6.19	0.78	0.01	0.23	0.19	820
Personal Vehicles	6	3	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	2.48	0.28	0.27	0.00	0.03	0.02	329	7.44	0.83	0.82	0.01	0.08	0.05	986
											5.98	*2.52*	*0.72*	*0.01*	*0.12*	*0.09*	*821*	*17.93*	*7.56*	*2.15*	*0.02*	*0.36*	*0.27*	*2463*
Remove Existing Foundations																								
Dump Truck	1	2	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	1.84	2.06	0.26	0.00	0.08	0.06	273	3.69	4.12	0.52	0.01	0.15	0.13	546
1 Ton Crew Cab Flat Bed, 4X4	1	2	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.83	0.09	0.09	0.00	0.01	0.01	110	1.65	0.18	0.18	0.00	0.02	0.01	219
Personal Vehicles	4	2	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	3.31	0.37	0.37	0.00	0.03	0.02	438
											4.32	*2.34*	*0.53*	*0.01*	*0.10*	*0.08*	*602*	*8.65*	*4.68*	*1.07*	*0.01*	*0.20*	*0.16*	*1204*
Install TSP Foundaions																								
1 Ton Crew Cab Flat Bed, 4X4	3	2	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.24	0.14	0.14	0.00	0.01	0.01	164	2.48	0.28	0.27	0.00	0.03	0.02	329
Dump Truck	2	2	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	3.69	4.12	0.52	0.01	0.15	0.13	546	7.38	8.25	1.04	0.01	0.30	0.26	1093
4000 gallon Water Trucks	1	2	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	1.84	2.06	0.26	0.00	0.08	0.06	273	3.69	4.12	0.52	0.01	0.15	0.13	546
10 cu.yd. Concrete Mixer Trucks	3	2	100	0.01195	0.03822	0.00304	0.00004	0.00183	0.00160	4.21121	3.59	11.47	0.91	0.01	0.55	0.48	1263	7.17	22.93	1.82	0.02	1.10	0.96	2527
Personal Vehicles	7	2	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	2.89	0.32	0.32	0.00	0.03	0.02	383	5.78	0.64	0.64	0.01	0.06	0.04	767
											13.25	*18.11*	*2.15*	*0.03*	*0.82*	*0.70*	*2631*	*26.50*	*36.23*	*4.29*	*0.05*	*1.64*	*1.40*	*5262*
TSP Steel Haul																								
3/4 Ton Crew Cab Flat Bed, 4X4	2	4	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	6.61	0.73	0.73	0.01	0.07	0.04	877
40' Flat Bed Truck & Trailer	2	4	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	3.69	4.12	0.52	0.01	0.15	0.13	546	14.75	16.50	2.07	0.02	0.60	0.51	2186
Personal Vehicles	4	4	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	6.61	0.73	0.73	0.01	0.07	0.04	877
											6.99	*4.49*	*0.88*	*0.01*	*0.19*	*0.15*	*985*	*27.97*	*17.97*	*3.53*	*0.04*	*0.74*	*0.60*	*3939*
TSP Assembly																								
3/4 Ton Pick-up Truck, 4X4	2	8	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	13.22	1.47	1.46	0.02	0.14	0.09	1753
1 Ton Crew Cab Flat Bed, 4X4	2	8	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	13.22	1.47	1.46	0.02	0.14	0.09	1753
Personal Vehicles	8	8	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	3.31	0.37	0.37	0.00	0.03	0.02	438	26.44	2.94	2.92	0.03	0.28	0.18	3506
											6.61	*0.73*	*0.73*	*0.01*	*0.07*	*0.04*	*877*	*52.88*	*5.88*	*5.85*	*0.07*	*0.56*	*0.35*	*7012*
TSP Erection																								
3/4 Ton Pick-up Truck, 4X4	2	8	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	13.22	1.47	1.46	0.02	0.14	0.09	1753
1 Ton Crew Cab Flat Bed, 4X4	2	8	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	13.22	1.47	1.46	0.02	0.14	0.09	1753
Personal Vehicles	8	8	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	2.00000	3.31	0.37	0.37	0.00	0.03	0.02	800	26.44	2.94	2.92	0.03	0.28	0.18	6400
											6.61	*0.73*	*0.73*	*0.01*	*0.07*	*0.04*	*1238*	*52.88*	*5.88*	*5.85*	*0.07*	*0.56*	*0.35*	*9906*
Install Conductor																								
1 Ton Crew Cab Flat Bed, 4X4	2	1	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	1.65	0.18	0.18	0.00	0.02	0.01	219
Wire Truck & Trailer	2	1	50	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	1.84	2.06	0.26	0.00	0.08	0.06	273	1.84	2.06	0.26	0.00	0.08	0.06	273
Dump Truck (Trash)	1	1	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	1.84	2.06	0.26	0.00	0.08	0.06	273	1.84	2.06	0.26	0.00	0.08	0.06	273
3/4 Ton Pick-up Truck, 4X4	3	1	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	2.48	0.28	0.27	0.00	0.03	0.02	329	2.48	0.28	0.27	0.00	0.03	0.02	329
Low Boy Truck & Trailer	1	1	50	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	0.92	1.03	0.13	0.00	0.04	0.03	137	0.92	1.03	0.13	0.00	0.04	0.03	137
Personal Vehicles	16	1	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	6.61	0.73	0.73	0.01	0.07	0.04	877	6.61	0.73	0.73	0.01	0.07	0.04	877
											15.35	*6.35*	*1.84*	*0.02*	*0.30*	*0.23*	*2107*	*15.35*	*6.35*	*1.84*	*0.02*	*0.30*	*0.23*	*2107*
Restoration																								
1 Ton Crew Cab 4X4	2	1	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.83	0.09	0.09	0.00	0.01	0.01	110	0.83	0.09	0.09	0.00	0.01	0.01	110
Water Truck	1	1	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	1.84	2.06	0.26	0.00	0.08	0.06	273	1.84	2.06	0.26	0.00	0.08	0.06	273
Lowboy Truck/Trailer	1	1	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	1.84	2.06	0.26	0.00	0.08	0.06	273	1.84	2.06	0.26	0.00	0.08	0.06	273
Personal Vehicles	7	1	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	2.89	0.32	0.32	0.00	0.03	0.02	383	2.89	0.32	0.32	0.00	0.03	0.02	383
											7.41	*4.54*	*0.93*	*0.01*	*0.19*	*0.15*	*1040*	*7.41*	*4.54*	*0.93*	*0.01*	*0.19*	*0.15*	*1040*

Eldorado-Ivanpah 115kV Construction
On site fugitive dust during active construction activities

7.3	Distrubed acreage from Proj Discription Table 3-11
34	Project duration (days)
0.2	Average Disturbed acres per day
0.4	Assumed twice the average disturbance for emission calculation
	Assume uncontrolled fugitive dust emission factor of 10 lbs/acre/day for PM10
4.3	Uncontrolled PM10 (lbs/day)
	Assume PM2.5 is 50% of PM10 for fugitive dust
2.1	Uncontrolled PM2.5 (lbs/day)
	Assume 50% controls from watering twice per day
2.1	Controlled PM10 (lbs/day)
1.1	Controlled PM2.5 (lbs/day)
73.0	Total Controlled PM10 (lbs)
36.5	Total Controlled PM2.5 (lbs)

Eldorado-Ivanpah 115kV Construction
Unpaved Road Fugitive Dust Emissions

Unpaved Road Fugitive Dust Emissions
From SCAQMD CEQA AQ Handbook
Table A9-9-D

E=V*F
V= vehicle miles travelled on unpaved roads
F=2.1*(G/12)*(H/30)*((J/3)^.7)*((I/4)^.5)*((365-K)/365)
G= surface silt
H= mean vehicle speed
I= number of wheels
J=vehicle wt
K= days of precip per year at least 0.01 in

0.212 PM2.5 fraction of PM10 from SCAQMD Table A - Updated CEIDARS Table with PM2.5 Fractions

Light Vehicles Factor
G= 11 Assumed
H= 15 Assumed
I= 4 wheels
J= 3 tons
k= 18 precip days

0.9 F PM10 (lbs/VMT)
0.19 F PM2.5 (lbs/VMT)

Heavy Vehicles Factor
G= 11 Assumed
H= 15 Assumed
I= 10 wheels
J= 8 tons
k= 18 precip days

2.9 F PM10 (lbs/VMT)
0.61 F PM2.5 (lbs/VMT)

Assumed 50% control for watering
Assumed 95% control of the water truck emissions

						Uncontrolled Emissions				Controlled Emissions (50%)			
						PM10		PM2.5		PM10		PM2.5	
Activity	Number	Days	Max VMT/day	F PM10 (lbs/VMT)	F PM2.5 (lbs/VMT)	(lbs/day)	lbs activity	(lbs/day)	lbs activity	(lbs/day)	lbs activity	(lbs/day)	lbs activity
Survey													
1/2 Ton Pick-up Truck, 4X4	2	1	3	0.9	0.19	5.5	5.5	1.2	1.2	2.7	2.7	0.6	0.6
Personal Vehicles	4	1	2	0.9	0.19	7.3	7.3	1.6	1.6	3.7	3.7	0.8	0.8
Roads and Landing Work													
1 Ton Crew Cab 4X4	2	5	3	0.9	0.19	5.5	27.5	1.2	5.8	2.7	13.7	0.6	2.9
Water Trucks	2	34	40	2.9	0.61	230.0	7819.1	48.8	1657.6	115.0	3909.5	24.4	828.8
Lowboy Trk/Trlr	1	5	3	2.9	0.61	8.6	43.1	1.8	9.1	4.3	21.6	0.9	4.6
Personal Vehicles	5	5	2	0.9	0.19	9.2	45.8	1.9	9.7	4.6	22.9	1.0	4.8
Remove Existing H Frame Poles													
1 Ton Crew Cab 4X4	2	3	3	0.9	0.19	5.5	16.5	1.2	3.5	2.7	8.2	0.6	1.7
Truck, Semi, Tractor	1	3	3	2.9	0.61	8.6	25.9	1.8	5.5	4.3	12.9	0.9	2.7
Personal Vehicles	6	3	2	0.9	0.19	11.0	32.9	2.3	7.0	5.5	16.5	1.2	3.5
Remove Existing Foundations													
Dump Truck	2	2	3	2.9	0.61	17.2	34.5	3.7	7.3	8.6	17.2	1.8	3.7
1 Ton Crew Cab Flat Bed, 4X4	1	2	3	0.9	0.19	2.7	5.5	0.6	1.2	1.4	2.7	0.3	0.6
Personal Vehicles	4	2	2	0.9	0.19	7.3	14.6	1.6	3.1	3.7	7.3	0.8	1.6
Install TSP Foundaions													
1 Ton Crew Cab Flat Bed, 4X4	3	2	3	0.9	0.19	8.2	16.5	1.7	3.5	4.1	8.2	0.9	1.7
Dump Truck	2	2	3	2.9	0.61	17.2	34.5	3.7	7.3	8.6	17.2	1.8	3.7
4000 gallon Water Trucks	1	2	40	2.9	0.61	115.0	230.0	24.4	48.8	57.5	115.0	12.2	24.4
10 cu.yd. Concrete Mixer Trucks	3	2	3	2.9	0.61	25.9	51.7	5.5	11.0	12.9	25.9	2.7	5.5
Personal Vehicles	7	2	2	0.9	0.19	12.8	25.6	2.7	5.4	6.4	12.8	1.4	2.7
TSP Steel Haul													
3/4 Ton Crew Cab Flat Bed, 4X4	2	4	3	0.9	0.19	5.5	22.0	1.2	4.7	2.7	11.0	0.6	2.3
40' Flat Bed Truck & Trailer	2	4	3	2.9	0.61	17.2	69.0	3.7	14.6	8.6	34.5	1.8	7.3
Personal Vehicles	4	4	2	0.9	0.19	7.3	29.3	1.6	6.2	3.7	14.6	0.8	3.1
TSP Assembly													
3/4 Ton Pick-up Truck, 4X4	2	8	3	0.9	0.19	5.5	43.9	1.2	9.3	2.7	22.0	0.6	4.7
1 Ton Crew Cab Flat Bed, 4X4	2	8	3	0.9	0.19	5.5	43.9	1.2	9.3	2.7	22.0	0.6	4.7
Personal Vehicles	8	8	2	0.9	0.19	14.6	117.1	3.1	24.8	7.3	58.6	1.6	12.4
TSP Erection													
3/4 Ton Pick-up Truck, 4X4	2	8	3	0.9	0.19	5.5	43.9	1.2	9.3	2.7	22.0	0.6	4.7
1 Ton Crew Cab Flat Bed, 4X4	2	8	3	0.9	0.19	5.5	43.9	1.2	9.3	2.7	22.0	0.6	4.7
Personal Vehicles	8	8	2	0.9	0.19	14.6	117.1	3.1	24.8	7.3	58.6	1.6	12.4
Install Conductor													
1 Ton Crew Cab Flat Bed, 4X4	3	1	3	0.9	0.19	8.2	8.2	1.7	1.7	4.1	4.1	0.9	0.9
Wire Truck & Trailer	2	1	3	2.9	0.61	17.2	17.2	3.7	3.7	8.6	8.6	1.8	1.8
Dump Truck (Trash)	1	1	3	2.9	0.61	8.6	8.6	1.8	1.8	4.3	4.3	0.9	0.9
3/4 Ton Pick-up Truck, 4X4	3	1	3	0.9	0.19	8.2	8.2	1.7	1.7	4.1	4.1	0.9	0.9
Low Boy Truck & Trailer	1	1	3	2.9	0.61	8.6	8.6	1.8	1.8	4.3	4.3	0.9	0.9
Personal Vehicles	16	1	2	0.9	0.19	29.3	29.3	6.2	6.2	14.6	14.6	3.1	3.1
Restoration													
1 Ton Crew Cab 4X4	2	1	3	0.9	0.19	5.5	5.5	1.2	1.2	2.7	2.7	0.6	0.6
Water Truck	1	1	40	2.9	0.61	115.0	115.0	24.4	24.4	57.5	57.5	12.2	12.2
Lowboy Truck/Trailer	1	1	3	2.9	0.61	8.6	8.6	1.8	1.8	4.3	4.3	0.9	0.9
Personal Vehicles	7	1	2	0.9	0.19	12.8	12.8	2.7	2.7	6.4	6.4	1.4	1.4
									Total	401	4594	85	974

Eldorado-Ivanpah 115kV Construction
Paved Road Fugitive Dust Emissions

Light Weight Vehicles on paved road fugitive dust
From SCAQMD CEQA AQ Handbook
Table A9-9-B

E=VxG (PM10 with street cleaning)

V= vehicle miles travelled
G=EF from table A9-9-9-B1

G(PM10 lb/VMT)	Road Type
0.018	Local Streets
0.013	Collector Streets
0.0064	Major Streets/Highways
0.00065	Freeways

Assumed Mix of Roads
0.10 Local Streets (assumed 10%)
0.10 Collector Streets (assumed 10%)
0.10 Major Streets/Highways (10%)
0.70 Freeways (assumed 70%)

Composite light vehicle Emission Factor
0.0042 PM10 per VMT

0.169 PM2.5 fraction of PM10 from SCAQMD Table A - Updated CEIDARS Table with PM2.5 Fractions

0.00071 PM2.5 per VMT

Heavy Vehicles on paved road fugitive dust
Use SCAQMD CEQA Table A9-9-C
E=VxF (PM10 without street cleaning)
V= vehicle miles travelled
G from table A9-9-C1
F=0.77*((G*0.35)^0.3) lbs/VMT

Assume 60 percent reduction for street sweeping per Table A9-9

Road Type	G(PM10 oz/sq yd)	F(PM10 lb/VMT)	F with sweeping
Local Streets	0.04	0.213958	0.085583
Collector Streets	0.03	0.196267	0.078507
Major Streets/Highw	0.012	0.149096	0.059638
Freeways	0.00065	0.062171	0.024868

Assumed Mix of Roads
0.10 Local Streets (assumed 10%)
0.10 Collector Streets (assumed 10%)
0.10 Major Streets/Highways (10%)
0.70 Freeways (assumed 70%)

Composite heavy vehicle Emission Factor
0.040 PM10 per VMT

0.169 PM2.5 fraction of PM10 from SCAQMD Table A - Updated CEIDARS Table with PM2.5 Fractions

0.0067 PM2.5 per VMT

Activity	Number	Days	VMT/day	F PM10 (lbs/VMT)	F PM2.5 (lbs/VMT)	Emissions Assuming Street Cleaning PM10 (lbs/day)	PM10 lbs activity	PM2.5 (lbs/day)	PM2.5 lbs activity
Survey									
1/2 Ton Pick-up Truck, 4X4	2	1	50	0.0042	0.00071	0.4	0.4	0.1	0.1
Personal Vehicles	4	1	50	0.0042	0.00071	0.8	0.8	0.1	0.1
Roads and Landing Work									
1 Ton Crew Cab 4X4	2	5	100	0.0042	0.00071	0.8	4.2	0.1	0.7
Water Trucks	2	34	100	0.0398	0.00672	8.0	270.5	1.3	45.7
Lowboy Trk/Trlr	1	5	50	0.0398	0.00672	2.0	9.9	0.3	1.7
Personal Vehicles	5	5	50	0.0042	0.00071	1.0	5.2	0.2	0.9
Remove Existing H Frame Poles									
1 Ton Crew Cab 4X4	2	3	100	0.0042	0.00071	0.8	2.5	0.1	0.4
Truck, Semi, Tractor	1	3	100	0.0398	0.00672	4.0	11.9	0.7	2.0
Personal Vehicles	6	3	50	0.0042	0.00071	1.3	3.8	0.2	0.6
Remove Existing Foundations									
Dump Truck	1	2	100	0.0398	0.00672	4.0	8.0	0.7	1.3
1 Ton Crew Cab Flat Bed, 4X4	1	2	100	0.0042	0.00071	0.4	0.8	0.1	0.1
Personal Vehicles	4	2	50	0.0042	0.00071	0.8	1.7	0.1	0.3
Install TSP Foundaions									
1 Ton Crew Cab Flat Bed, 4X4	3	2	50	0.0042	0.00071	0.6	1.3	0.1	0.2
Dump Truck	2	2	100	0.0398	0.00672	8.0	15.9	1.3	2.7
4000 gallon Water Trucks	1	2	100	0.0398	0.00672	4.0	8.0	0.7	1.3
10 cu.yd. Concrete Mixer Trucks	3	2	100	0.0398	0.00672	11.9	23.9	2.0	4.0
Personal Vehicles	7	2	50	0.0042	0.00071	1.5	2.9	0.2	0.5
TSP Steel Haul									
3/4 Ton Crew Cab Flat Bed, 4X4	2	4	100	0.0042	0.00071	0.8	3.4	0.1	0.6
40' Flat Bed Truck & Trailer	2	4	100	0.0398	0.00672	8.0	31.8	1.3	5.4
Personal Vehicles	4	4	50	0.0042	0.00071	0.8	3.4	0.1	0.6
TSP Assembly									
3/4 Ton Pick-up Truck, 4X4	2	8	100	0.0042	0.00071	0.8	6.7	0.1	1.1
1 Ton Crew Cab Flat Bed, 4X4	2	8	100	0.0042	0.00071	0.8	6.7	0.1	1.1
Personal Vehicles	8	8	50	0.0042	0.00071	1.7	13.4	0.3	2.3
TSP Erection									
3/4 Ton Pick-up Truck, 4X4	2	8	100	0.0042	0.00071	0.8	6.7	0.1	1.1
1 Ton Crew Cab Flat Bed, 4X4	2	8	100	0.0042	0.00071	0.8	6.7	0.1	1.1
Personal Vehicles	8	8	50	0.0042	0.00071	1.7	13.4	0.3	2.3
Install Conductor									
1 Ton Crew Cab Flat Bed, 4X4	2	1	100	0.0042	0.00071	0.8	0.8	0.1	0.1
Wire Truck & Trailer	2	1	50	0.0398	0.00672	4.0	4.0	0.7	0.7
Dump Truck (Trash)	1	1	100	0.0398	0.00672	4.0	4.0	0.7	0.7
3/4 Ton Pick-up Truck, 4X4	3	1	100	0.0042	0.00071	1.3	1.3	0.2	0.2
Low Boy Truck & Trailer	1	1	50	0.0398	0.00672	2.0	2.0	0.3	0.3
Personal Vehicles	16	1	50	0.0042	0.00071	3.4	3.4	0.6	0.6
Restoration									
1 Ton Crew Cab 4X4	2	1	50	0.0042	0.00071	0.4	0.4	0.1	0.1
Water Truck	1	1	100	0.0398	0.00672	4.0	4.0	0.7	0.7
Lowboy Truck/Trailer	1	1	100	0.0398	0.00672	4.0	4.0	0.7	0.7
Personal Vehicles	7	1	50	0.0042	0.00071	1.5	1.5	0.2	0.2
Total						92.0	489.3	15.5	82.7

Eldorado-Ivanpah 500kV Construction
Emission Summary

Activity Emissions	Emissions (lbs)						
	CO	NOx	ROG	SOx	PM10	PM2.5	CO2
Combustion Related Emissions							
Marshalling Yards							
On-Road Vehicles	598	252	72	1	12	9	82106
Off-Road Vehicles and Equipment	469	1049	124	1	53	45	100918
Roads and Landing Work							
On-Road Vehicles	91	64	12	0.1	3	2	12909
Off-Road Vehicles and Equipment	119	438	42	0.5	16	13	43731
LST Steel Haul							
On-Road Vehicles	195	105	24	0.3	5	4	27087
Off-Road Vehicles and Equipment	89	150	20	0.2	9	8	15135
LST Retrofit							
On-Road Vehicles	446	50	49	1	5	3	59167
Off-Road Vehicles and Equipment	715	2610	241	3	92	78	249461
Remove/Install OPGW							
On-Road Vehicles	445	139	52	1	7	5	60448
Off-Road Vehicles and Equipment	1304	2378	234	93	192	163	417119
Restoration							
On-Road Vehicles	206	116	26	0	5	4	28727
Off-Road Vehicles and Equipment	337	1245	118	1	45	38	126119
Fugitive Dust Emissions							
Paved Roads	-	-	-	-	1833	310	-
Unpaved Roads	-	-	-	-	7176	1521	-
Total Activity Emissions (tons)	2.5	4.3	0.51	0.05	4.7	1.1	611
Total California Activity Emissions (tons)	0	0	0	0	0	0	0
Construction Days	200	200	200	200	200	200	200
Average Daily Emissions (lbs)	25	43	5	0.5	47	11	6115

Eldorado-Ivanpah 500kV Construction
Workforce Estimate

Work Activity						Activity Production	
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Estimated Average Duration of Use (Hrs/Day)	Estimated Production Per Day
Marshalling Yard (1)				**4**			
1-ton crew cab 4x4	300	Diesel	1			2	
30-ton crane truck	300	Diesel	1			2	
10,000-lb rough terrain fork lift	200	Diesel	1			5	
Truck, semi, tractor	350	Diesel	1		Duration of project	1	
Roads and Landing Work (2)				**5**	**13**		**25 miles**
1-ton crew cab, 4x4	300	Diesel	2		13	2	
Road grader	350	Diesel	1		13	4	
Track type dozer	350	Diesel	1		13	6	
Drum type compactor	250	Diesel	1		13	4	
Water truck	350	Diesel	2		Duration	8	
Lowboy truck/trailer	500	Diesel	1		6	2	0.5 mile/day and 4
Backhoe/front loader	350	Diesel	1		13	6	structure pads/day
LST Steel Haul (3)				**4**	**45**		**45 LSTs**
1-ton crew cab flat bed, 4x4	300	Diesel	2		45	2	
40-foot flat bed truck/trailer	350	Diesel	1		45	8	
10,000-lb rough terrain fork lift	200	Diesel	1		45	6	1 LST/day
LST Retrofit (4)				**14**	**45**		**45 LSTs**
¾-ton pick-up truck, 4X4	300	Diesel	3		45	4	
1-ton crew cab flat bed, 4x4	300	Diesel	2		45	4	
30-ton crane truck	300	Diesel	2		45	8	
80-Ton Rough Terrain Crane	350	Diesel	1		45	8	
80-foot hydraulic man-lift/bucket truck	350	Diesel	1		45	6	
Compressor trailer	350	Diesel	2		45	6	1 LST/day
Remove Existing OHGW and Install OPGW (5)				**15**	**72**		**25 circuit miles**
1-ton crew cab flat bed, 4x4	300	Diesel	2		72	8	
¾-ton pick-up truck, 4x4	300	Diesel	4		72	8	
Dump truck (trash)	350	Diesel	1		72	2	
20,000-lb. rough terrain fork lift	350	Diesel	1		72	2	
30-ton crane truck	300	Diesel	1		72	4	
Bull wheel puller	500	Diesel	1		24	4	
Splicing lab	300	Diesel	4		9	8	
80-foot hydraulic man-lift/bucket truck	350	Diesel	1		36	6	
Static truck/ tensioner	350	Diesel	1		72	2	
Hydraulic rewind puller	300	Diesel	1		24	4	
Hughes 500 E Helicopter		Jet A	1		24	4	
Fuel, helicopter support truck	300	Diesel	1		24	2	0.35 mile/day
Restoration (6)				**7**	**25**		**25 miles**
1-ton crew cab, 4x4	300	Diesel	2		25	2	
Road grader	350	Diesel	1		25	6	
Backhoe	350	Diesel	1		25	6	
Front end loader	350	Diesel	1		25	6	
Track Type Dozer	350	Diesel	1		25	6	
Drum type compactor	250	Diesel	1		25	6	
Water truck	350	Diesel	1		25	8	
Lowboy truck/trailer	300	Diesel	1		25	3	1 mile/day

Crew Size Assumptions:
#1 Marshalling Yards = one 4-man crew
#2 Roads and Landing Work = one 5-man crew
#3 LST Steel Haul = one 4-man crew
#4 LST Steel Assembly = two 7-man crews
#5 Remove Existing OHGW and Install OPGW = one 15-man crew
#6 Restoration = one 7-man crew

Eldorado-Ivanpah 500kV Construction

On Site Equipment Exhaust Emissions

From SCAQMD offroad emission factors file name "offroadEF_07_25.xls" 2010

Description	Number	Hours per Day	Days of Activity	2010 Emission Factor (lbs/hr)						Emissions (lbs/day)						Total Activity Emissions (lbs)					
				ROG	CO	NOX	SOX	PM	CO2	CO	NOX	ROG	SOX	PM	CO2	ROG	CO	NOX	SOX	PM	CO2
Marshalling Yards																					
30 Ton Crane Truck	1	2	200	0.124	0.346	1.237	0.001	0.047	112	0.7	2.5	0.2	0.0	0.1	224	50	139	495	1	19	44864
10,000 lb Rough Terrain Fork Lift	1	5	200	0.074	0.331	0.554	0.001	0.034	56	1.7	2.8	0.4	0.0	0.2	280	74	331	554	1	34	56054
										2.3	*5.2*	*0.6*	*0.0*	*0.3*	*505*	*124*	*469*	*1049*	*1*	*53*	*100918*
Roads and Landing Work																					
Road Grader	1	4	13	0.176	0.493	1.790	0.002	0.066	172	2.0	7.2	0.7	0.0	0.3	688	9	26	93	0	3	8950
Track Type Dozer	1	6	13	0.176	0.493	1.790	0.002	0.066	172	3.0	10.7	1.1	0.0	0.4	1033	14	38	140	0	5	13425
Drum Type Compactor	1	4	13	0.154	0.454	1.623	0.002	0.060	153	1.8	6.5	0.6	0.0	0.2	612	8	24	84	0	3	7961
Backhoe	1	6	13	0.142	0.404	1.549	0.002	0.052	172	2.4	9.3	0.9	0.0	0.3	1030	11	31	121	0	4	13395
										9.2	*33.7*	*3.2*	*0.0*	*1.2*	*3364*	*42*	*119*	*438*	*0*	*16*	*43731*
LST Steel Haul																					
10,000 lb Rough Terrain Fork Lift	1	6	45	0.074	0.331	0.554	0.001	0.034	56	2.0	3.3	0.4	0.0	0.2	336	20	89	150	0	9	15135
LST Retrofit																					
30 Ton Crane Truck	2	8	45	0.124	0.346	1.237	0.001	0.047	112	5.5	19.8	2.0	0.0	0.8	1795	89	249	891	1	34	80754
80 Ton Rough Terrain Crane	1	8	45	0.124	0.346	1.237	0.001	0.047	112	2.8	9.9	1.0	0.0	0.4	897	45	125	445	0	17	40377
80ft. Hydraulic Man-lift	1	6	45	0.151	0.580	1.920	0.002	0.060	213	3.5	11.5	0.9	0.0	0.4	1277	41	157	518	1	16	57471
Compressor Trailer	2	6	45	0.123	0.341	1.398	0.001	0.046	131	4.1	16.8	1.5	0.0	0.6	1575	66	184	755	1	25	70859
										15.9	*58.0*	*5.4*	*0.1*	*2.0*	*5544*	*241*	*715*	*2610*	*3*	*92*	*249461*
Remove/Install OPGW																					
30 Ton Manitex	0	0	0	0.124	0.346	1.237	0.001	0.047	112	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0
22 Ton Manitex	0	0	0	0.124	0.346	1.237	0.001	0.047	112	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0
Splicing Rig	0	0	0	0.171	0.607	1.982	0.002	0.068	254	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0
Splicing Lab	4	8	9	0.171	0.607	1.982	0.002	0.068	254	19.4	63.4	5.5	0.1	2.2	8136	49	175	571	1	20	73221
20,000 lb. Rough Terrain Fork Lift	1	2	72	0.065	0.171	0.716	0.001	0.023	77	0.3	1.4	0.1	0.0	0.0	154	9	25	103	0	3	11106
580 Case Backhoe	0	0	0	0.091	0.362	0.566	0.001	0.052	52	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0
Spacing Cart	0	0	0	0.012	0.062	0.074	0.000	0.003	10	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0
Static Tensioner	1	2	72	0.171	0.607	1.982	0.002	0.068	254	1.2	4.0	0.3	0.0	0.1	508	25	87	285	0	10	36610
Bull wheel Puller	1	4	24	0.171	0.607	1.982	0.002	0.068	254	2.4	7.9	0.7	0.0	0.3	1017	16	58	190	0	7	24407
60lk Puller	0	0	0	0.171	0.607	1.982	0.002	0.068	254	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0
Sag Cat w2 winch	0	0	0	0.205	0.574	1.944	0.002	0.078	166	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0
D8 Cat	0	0	0	0.205	0.574	1.944	0.002	0.078	166	0.0	0.0	0.0	0.0	0.0	0	0	0	0	0	0	0
Hughes 500 E Helicopter	1	4	24	1.400	9.994	12.794	0.957	1.595	2831	40.0	51.2	5.6	3.8	6.4	11324	134	959	1228	92	153	271776
30 Ton Crane Truck	1	4	72	0.124	0.346	1.237	0.001	0.047	112	1.4	4.9	0.5	0.0	0.2	449	36	100	356	0	14	32302
80ft. Hydraulic Man-lift	1	6	36	0.151	0.580	1.920	0.002	0.060	213	3.5	11.5	0.9	0.0	0.4	1277	33	125	415	0	13	45977
Hydraulic Rewind Puller	1	4	24	0.117	0.590	0.993	0.001	0.054	107	2.4	4.0	0.5	0.0	0.2	426	22	113	191	0	10	20451
										63.4	*127.9*	*12.2*	*3.9*	*9.0*	*21139*	*234*	*1304*	*2378*	*93*	*192*	*417119*
Restoration																					
Road Grader	1	6	25	0.176	0.493	1.790	0.002	0.066	172	3.0	10.7	1.1	0.0	0.4	1033	26	74	269	0	10	25817
Backhoe	1	6	25	0.142	0.404	1.549	0.002	0.052	172	2.4	9.3	0.9	0.0	0.3	1030	21	61	232	0	8	25761
Front End Loader	1	6	25	0.142	0.404	1.549	0.002	0.052	172	2.4	9.3	0.9	0.0	0.3	1030	21	61	232	0	8	25761
Track Type Dozer	1	6	25	0.176	0.493	1.790	0.002	0.066	172	3.0	10.7	1.1	0.0	0.4	1033	26	74	269	0	10	25817
Drum Type Compactor	1	6	25	0.154	0.454	1.623	0.002	0.060	153	2.7	9.7	0.9	0.0	0.4	919	23	68	243	0	9	22963
										13.5	*49.8*	*4.7*	*0.1*	*1.8*	*5045*	*118*	*337*	*1245*	*1*	*45*	*126119*

Eldorado-Ivanpah 500kV Construction
Exhaust, Tire and Brake Emissions

From SCAQMD file "onroadEF07_26.xls"
Used 2010 Table

	Vehicles <8500 lbs (lbs/mile)	Vehicles >8500 lbs (lbs/mile)	Vehicles >33000 lbs (lbs/mile)
CO	0.00826	0.01844	0.01195
NOx	0.00092	0.02062	0.03822
ROG	0.00091	0.00259	0.00304
SOx	0.00001	0.00003	0.00004
PM10	0.00009	0.00075	0.00183
PM2.5	0.00005	0.00064	0.00160
CO2	1.0956823	2.732222	4.21120578

				Emission Factor (lb/VMT)							Emissions (lbs/day)							Activity Emissions (lbs)						
Activity	Number	Days	VMT/day	CO	NOx	ROG	SOx	PM10	PM2.5	CO2	CO	NOx	ROG	SOx	PM10	PM2.5	CO2	CO	NOx	ROG	SOx	PM10	PM2.5	CO2
Marshalling Yards																								
1 Ton Crew Cab 4X4	1	200	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.41	0.05	0.05	0.00	0.00	0.00	55	82.63	9.18	9.14	0.11	0.87	0.55	10957
Truck, Semi, Tractor	1	200	50	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	0.92	1.03	0.13	0.00	0.04	0.03	137	184.38	206.25	25.90	0.27	7.51	6.42	27322
Personal Vehicles	4	200	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	330.51	36.73	36.56	0.43	3.48	2.19	43827
											2.99	*1.26*	*0.36*	*0.00*	*0.06*	*0.05*	*411*	*597.51*	*252.15*	*71.60*	*0.81*	*11.86*	*9.16*	*82106*
Roads and Landing Work																								
1 Ton Crew Cab 4X4	2	13	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.83	0.09	0.09	0.00	0.01	0.01	110	10.74	1.19	1.19	0.01	0.11	0.07	1424
Water Trucks	2	13	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	3.69	4.12	0.52	0.01	0.15	0.13	546	47.94	53.62	6.73	0.07	1.95	1.67	7104
Lowboy Trk/Trlr	1	6	50	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	0.92	1.03	0.13	0.00	0.04	0.03	137	5.53	6.19	0.78	0.01	0.23	0.19	820
Personal Vehicles	5	13	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	2.07	0.23	0.23	0.00	0.02	0.01	274	26.85	2.98	2.97	0.04	0.28	0.18	3561
											7.50	*5.48*	*0.97*	*0.01*	*0.22*	*0.18*	*1067*	*91.06*	*63.99*	*11.67*	*0.13*	*2.57*	*2.11*	*12909*
LST Steel Haul																								
1 Ton Crew Cab Flat Bed, 4X4	2	45	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.83	0.09	0.09	0.00	0.01	0.01	110	37.18	4.13	4.11	0.05	0.39	0.25	4931
40' Flat Bed Truck & Trailer	1	45	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	1.84	2.06	0.26	0.00	0.08	0.06	273	82.97	92.81	11.65	0.12	3.38	2.89	12295
Personal Vehicles	4	45	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	74.36	8.26	8.23	0.10	0.78	0.49	9861
											4.32	*2.34*	*0.53*	*0.01*	*0.10*	*0.08*	*602*	*194.52*	*105.21*	*23.99*	*0.27*	*4.55*	*3.63*	*27087*
LST Retrofit																								
3/4 Ton Pick-up Truck, 4X4	3	45	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	2.48	0.28	0.27	0.00	0.03	0.02	329	111.55	12.39	12.34	0.15	1.17	0.74	14792
1 Ton Crew Cab Flat Bed, 4X4	2	45	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	74.36	8.26	8.23	0.10	0.78	0.49	9861
Personal Vehicles	14	45	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	5.78	0.64	0.64	0.01	0.06	0.04	767	260.28	28.92	28.79	0.34	2.74	1.73	34514
											9.92	*1.10*	*1.10*	*0.01*	*0.10*	*0.07*	*1315*	*446.19*	*49.58*	*49.36*	*0.58*	*4.70*	*2.96*	*59167*
Remove/Install OPGW																								
1 Ton Crew Cab Flat Bed, 4X4	2	72	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	118.98	13.22	13.16	0.16	1.25	0.79	15778
Wire Truck & Trailer	0	0	0	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0
Dump Truck (Trash)	1	72	50	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	0.92	1.03	0.13	0.00	0.04	0.03	137	66.38	74.25	9.32	0.10	2.70	2.31	9836
3/4 Ton Pick-up Truck, 4X4	4	72	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	3.31	0.37	0.37	0.00	0.03	0.02	438	237.97	26.44	26.32	0.31	2.50	1.58	31556
Pole Truck & Trailer	0	0	0	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0
Static Truck	0	0	0	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0
Fuel, Helicopter Support Truck	1	24	50	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	0.92	1.03	0.13	0.00	0.04	0.03	137	22.13	24.75	3.11	0.03	0.90	0.77	3279
Low Boy Truck & Trailer	0	0	0	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0
Personal Vehicles	15	0	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	6.20	0.69	0.69	0.01	0.07	0.04	822	0.00	0.00	0.00	0.00	0.00	0.00	0
											13.00	*3.30*	*1.49*	*0.02*	*0.19*	*0.14*	*1752*	*445.45*	*138.66*	*51.91*	*0.60*	*7.36*	*5.45*	*60448*
Restoration																								
1 Ton Crew Cab 4X4	2	25	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	41.31	4.59	4.57	0.05	0.43	0.27	5478
Water Truck	1	25	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	1.84	2.06	0.26	0.00	0.08	0.06	273	46.09	51.56	6.47	0.07	1.88	1.61	6831
Lowboy Truck/Trailer	1	25	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	1.84	2.06	0.26	0.00	0.08	0.06	273	46.09	51.56	6.47	0.07	1.88	1.61	6831
Personal Vehicles	7	25	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	2.89	0.32	0.32	0.00	0.03	0.02	383	72.30	8.03	8.00	0.09	0.76	0.48	9587
											8.23	*4.63*	*1.02*	*0.01*	*0.20*	*0.16*	*1149*	*205.80*	*115.75*	*25.52*	*0.28*	*4.95*	*3.96*	*28727*

Eldorado-Ivanpah 500kV Construction
Paved Road Fugitive Dust Emissions

Light Weight Vehicles on paved road fugitive dust
From SCAQMD CEQA AQ Handbook
Table A9-9-B

E=VxG (PM10 with street cleaning)

V= vehicle miles travelled
G=EF from table A9-9-9-B1

G(PM10 lb/VMT)	Road Type
0.018	Local Streets
0.013	Collector Streets
0.0064	Major Streets/Highways
0.00065	Freeways

Assumed Mix of Roads
0.10 Local Streets (assumed 10%)
0.10 Collector Streets (assumed 10%)
0.10 Major Streets/Highways (10%)
0.70 Freeways (assumed 70%)

Composite light vehicle Emission Factor
0.0042 PM10 per VMT

0.169 PM2.5 fraction of PM10 from SCAQMD Table A - Updated CEIDARS Table with PM2.5 Fractions

0.00071 PM2.5 per VMT

Heavy Vehicles on paved road fugitive dust
Use SCAQMD CEQA Table A9-9-C
E=VxF (PM10 without street cleaning)
V= vehicle miles travelled
G from table A9-9-C1
F=0.77*((G*0.35)^0.3) lbs/VMT

Assume 60 percent reduction for street sweeping per Table A9-9

Road Type	G(PM10 oz/sq yd)	F(PM10 lb/VMT)	F with sweeping
Local Streets	0.04	0.213958	0.085583
Collector Streets	0.03	0.196267	0.078507
Major Streets/Highwa	0.012	0.149096	0.059638
Freeways	0.00065	0.062171	0.024868

Assumed Mix of Roads
0.10 Local Streets (assumed 10%)
0.10 Collector Streets (assumed 10%)
0.10 Major Streets/Highways (10%)
0.70 Freeways (assumed 70%)

Composite heavy vehicle Emission Factor
0.040 PM10 per VMT

0.169 PM2.5 fraction of PM10 from SCAQMD Table A - Updated CEIDARS Table with PM2.5 Fractions

0.0067 PM2.5 per VMT

Activity	Number	Days	VMT/day	F PM10 (lbs/VMT)	F PM2.5 (lbs/VMT)	Emissions Assuming Street Cleaning PM10 (lbs/day)	PM10 lbs activity	PM2.5 (lbs/day)	PM2.5 lbs activity
Marshalling Yards									
1 Ton Crew Cab 4X4	1	200	50	0.0042	0.00071	0.2	42.0	0.0	7.1
Truck, Semi, Tractor	1	200	50	0.0398	0.00672	2.0	397.8	0.3	67.2
Personal Vehicles	4	200	50	0.0042	0.00071	0.8	167.8	0.1	28.4
						3.0	*607.6*	*0.5*	*102.7*
Roads and Landing Work									
1 Ton Crew Cab 4X4	2	13	50	0.0042	0.00071	0.4	5.5	0.1	0.9
Water Trucks	2	13	100	0.0398	0.00672	8.0	103.4	1.3	17.5
Lowboy Trk/Trlr	1	6	50	0.0398	0.00672	2.0	11.9	0.3	2.0
Personal Vehicles	5	13	50	0.0042	0.00071	1.0	13.6	0.2	2.3
						11.4	*134.5*	*1.9*	*22.7*
LST Steel Haul									
1 Ton Crew Cab Flat Bed, 4X4	2	45	50	0.0042	0.00071	0.4	18.9	0.1	3.2
40' Flat Bed Truck & Trailer	1	45	100	0.0398	0.00672	4.0	179.0	0.7	30.3
Personal Vehicles	4	45	50	0.0042	0.00071	0.8	37.8	0.1	6.4
						5.2	*235.6*	*0.9*	*39.8*
LST Retrofit									
3/4 Ton Pick-up Truck, 4X4	3	45	100	0.0042	0.00071	1.3	56.6	0.2	9.6
1 Ton Crew Cab Flat Bed, 4X4	2	45	100	0.0042	0.00071	0.8	37.8	0.1	6.4
Personal Vehicles	14	45	50	0.0042	0.00071	2.9	132.1	0.5	22.3
						5.0	*226.5*	*0.9*	*38.3*
Remove/Install OPGW									
1 Ton Crew Cab Flat Bed, 4X4	2	72	100	0.0042	0.00071	0.8	60.4	0.1	10.2
Wire Truck & Trailer	0	0	0	0.0398	0.00672	0.0	0.0	0.0	0.0
Dump Truck (Trash)	1	72	50	0.0398	0.00672	2.0	143.2	0.3	24.2
3/4 Ton Pick-up Truck, 4X4	4	72	100	0.0042	0.00071	1.7	120.8	0.3	20.4
Pole Truck & Trailer	0	0	0	0.0398	0.00672	0.0	0.0	0.0	0.0
Static Truck	0	0	0	0.0398	0.00672	0.0	0.0	0.0	0.0
Fuel, Helicopter Support Truck	1	24	50	0.0398	0.00672	2.0	47.7	0.3	8.1
Low Boy Truck & Trailer	0	0	0	0.0398	0.00672	0.0	0.0	0.0	0.0
Personal Vehicles	15	0	50	0.0042	0.00071	3.1	0.0	0.5	0.0
						9.6	*372.2*	*1.6*	*62.9*
Restoration									
1 Ton Crew Cab 4X4	2	25	100	0.0042	0.00071	0.8	21.0	0.1	3.5
Water Truck	1	25	100	0.0398	0.00672	4.0	99.5	0.7	16.8
Lowboy Truck/Trailer	1	25	100	0.0398	0.00672	4.0	99.5	0.7	16.8
Personal Vehicles	7	25	50	0.0042	0.00071	1.5	36.7	0.2	6.2
						10.3	*256.6*	*1.7*	*43.4*

Total	44.6	1832.9	7.5	309.8

Eldorado-Ivanpah 500kV Construction
Unpaved Road Fugitive Dust Emissions

Unpaved Road Fugitive Dust Emissions
From SCAQMD CEQA AQ Handbook
Table A9-9-D

E=V*F
V= vehicle miles travelled on unpaved roads
F=2.1*(G/12)*(H/30)*((J/3)^.7)*((I/4)^.5)*((365-K)/365)
G= surface silt
H= mean vehicle speed
I= number of wheels
J=vehicle wt
K= days of precip per year at least 0.01 in

0.212 PM2.5 fraction of PM10 from SCAQMD Table A - Updated CEIDARS Table with PM2.5 Fractions

Light Vehicles Factor
G= 11 Assumed
H= 15 Assumed
I= 4 wheels
J= 3 tons
k= 18 precip days

0.9 F PM10 (lbs/VMT)
0.19 F PM2.5 (lbs/VMT)

Heavy Vehicles Factor
G= 11 Assumed
H= 15 Assumed
I= 10 wheels
J= 8 tons
k= 18 precip days

2.9 F PM10 (lbs/VMT)
0.61 F PM2.5 (lbs/VMT)

Assumed 50% control for watering
Assumed 95% control of the water truck emissions

						Uncontrolled Emissions				Controlled Emissions (50%)			
						PM10		PM2.5		PM10		PM2.5	
Activity	Number	Days	Max VMT/day	F PM10 (lbs/VMT)	F PM2.5 (lbs/VMT)	(lbs/day)	lbs activity	(lbs/day)	lbs activity	(lbs/day)	lbs activity	(lbs/day)	lbs activity
Marshalling Yards													
1 Ton Crew Cab 4X4	1	200	3	0.9	0.19	2.7	549.0	0.6	116.4	1.4	274.5	0.3	58.2
Truck, Semi, Tractor	1	200	3	2.9	0.61	8.6	1724.8	1.8	365.7	4.3	862.4	0.9	182.8
Personal Vehicles	4	200	2	0.9	0.19	7.3	1464.1	1.6	310.4	3.7	732.0	0.8	155.2
30 Ton Crane Truck	1	200	3	2.9	0.61	8.6	1724.8	1.8	365.7	4.3	862.4	0.9	182.8
										13.7	*2731.3*	*2.9*	*579.0*
Roads and Landing Work													
1 Ton Crew Cab 4X4	2	13	3	0.9	0.19	5.5	71.4	1.2	15.1	2.7	35.7	0.6	7.6
Water Trucks	2	13	40	2.9	0.61	230.0	2989.6	48.8	633.8	11.5	149.5	2.4	31.7
Lowboy Trk/Trlr	1	6	3	2.9	0.61	8.6	51.7	1.8	11.0	4.3	25.9	0.9	5.5
Personal Vehicles	5	13	2	0.9	0.19	9.2	119.0	1.9	25.2	4.6	59.5	1.0	12.6
										23.1	*270.5*	*4.9*	*57.3*
LST Steel Haul													
1 Ton Crew Cab Flat Bed, 4X4	2	45	3	0.9	0.19	5.5	247.1	1.2	52.4	2.7	123.5	0.6	26.2
40' Flat Bed Truck & Trailer	1	45	3	2.9	0.61	8.6	388.1	1.8	82.3	4.3	194.0	0.9	41.1
Personal Vehicles	4	45	2	0.9	0.19	7.3	329.4	1.6	69.8	3.7	164.7	0.8	34.9
										10.7	*482.3*	*2.3*	*102.2*
LST Retrofit													
3/4 Ton Pick-up Truck, 4X4	3	45	3	0.9	0.19	8.2	370.6	1.7	78.6	4.1	185.3	0.9	39.3
1 Ton Crew Cab Flat Bed, 4X4	2	45	3	0.9	0.19	5.5	247.1	1.2	52.4	2.7	123.5	0.6	26.2
Personal Vehicles	14	45	2	0.9	0.19	25.6	1152.9	5.4	244.4	12.8	576.5	2.7	122.2
30 Ton Crane Truck	2	45	3	2.9	0.61	17.2	776.2	3.7	164.5	8.6	388.1	1.8	82.3
80 Ton Rough Terrain Crane	1	45	3	2.9	0.61	8.6	388.1	1.8	82.3	4.3	194.0	0.9	41.1
80ft. Hydraulic Man-lift	1	45	3	2.9	0.61	8.6	388.1	1.8	82.3	4.3	194.0	0.9	41.1
Compressor Trailer	2	45	3	2.9	0.61	17.2	776.2	3.7	164.5	8.6	388.1	1.8	82.3
										45.5	*2049.5*	*9.7*	*434.5*
Remove/Install OPGW													
1 Ton Crew Cab Flat Bed, 4X4	2	72	3	0.9	0.19	5.5	395.3	1.2	83.8	2.7	197.6	0.6	41.9
Wire Truck & Trailer	0	0	3	2.9	0.61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dump Truck (Trash)	1	72	3	2.9	0.61	8.6	620.9	1.8	131.6	4.3	310.5	0.9	65.8
3/4 Ton Pick-up Truck, 4X4	4	72	3	0.9	0.19	11.0	790.6	2.3	167.6	5.5	395.3	1.2	83.8
Pole Truck & Trailer	0	0	3	2.9	0.61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Static Truck	0	0	3	2.9	0.61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel, Helicopter Support Truck	1	24	3	2.9	0.61	8.6	207.0	1.8	43.9	4.3	103.5	0.9	21.9
Low Boy Truck & Trailer	0	0	3	2.9	0.61	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Personal Vehicles	15	0	2	0.9	0.19	27.5	0.0	5.8	0.0	13.7	0.0	2.9	0.0
80ft. Hydraulic Man-lift	1	36	3	2.9	0.61	8.6	310.5	1.8	65.8	4.3	155.2	0.9	32.9
										34.9	*1162.1*	*7.4*	*246.4*
Restoration													
1 Ton Crew Cab 4X4	2	25	3	0.9	0.19	5.5	137.3	1.2	29.1	2.7	68.6	0.6	14.5
Water Truck	1	25	40	2.9	0.61	115.0	2874.7	24.4	609.4	5.7	143.7	1.2	30.5
Lowboy Truck/Trailer	1	25	3	2.9	0.61	8.6	215.6	1.8	45.7	4.3	107.8	0.9	22.9
Personal Vehicles	7	25	2	0.9	0.19	12.8	320.3	2.7	67.9	6.4	160.1	1.4	33.9
										19.2	*480.3*	*4.1*	*101.8*

Total	7176	1521

Eldorado-Ivanpah 500kV Construction
Helicopter Emission Factors

Emissions lbs/hour					
ROG	CO	NOX	SOX	PM	CO2
1.400	9.994	12.794	0.957	1.595	2831.000

***Assumed a helicopter with 2 GE T58-S engines, used Table 5-7 in "Procedures for Emission Inventory Preparation, Volume IV: Mobile Sources, EPA420-R-92-009, December 1992"
***Assumed 50% power usage for entire period of operation, 14.77 lb/min fuel flow (886 lbs/hr)
***Assumed all of the helicopter emissions were released within the mixing layer

CO2 from: Energy Information Administration, Documentation for Emissions of Greenhouse Gases in the United States 2005, DOE/EIA-0638 (2005), October 2007, Tables 6-1, 6-2, 6-4, and 6-5.
http://www.eia.doe.gov/oiaf/1605/excel/Fuel%20Emission%20Factors.xls

21.09	lb/gal	Jet fuel CO2 emission factor
6.5	lb/gal	assumed density of jet fuel
134.2424242	gal/hr	
2831.172727	lbs/hr	CO2 emission rate

Eldorado-Ivanpah 33kV Loop Construction
Emission Summary

Activity Emissions	Emissions (lbs)						
	CO	NOx	ROG	SOx	PM10	PM2.5	CO2
Combustion Related Emissions							
On-Road Vehicles	43	5	5	0.06	0.5	0.4	5698
Off-Road Vehicles and Equipment	54	198	19	0.23	7	6	20884
Fugitive Dust Emissions							
Paved Roads	-	-	-	-	52	9	-
Unpaved Roads	-	-	-	-	153	32	-
Construction Activities	-	-	-	-	2	1	-
Total Activity Emissions (tons)	0.05	0.10	0.012	0.00014	0.11	0.02	13.29
Total California Activity Emissions (tons)	0.05	0.10	0.012	0.00014	0.11	0.02	13.29
Construction Days	8	8	8	8	8	8	8
Average Daily Emissions (lbs)	12	25	2.9	0.036	27	6.1	3323

Eldorado-Ivanpah 33kV Loop Construction
Workforce Estimate

Work Activity						Activity Production	
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Estimated Average Duration of Use (Hrs/Day)	Estimated Production Per Day
Trenching, Structure Excavation (1)				4	8		
1-ton crew cab	300	Diesel	1			2	
Backhoe front loader	300	Diesel	1			8	
Overhead Line (2)				4	3		
1- ton crew cab, 4X4	300	Diesel	1	5	3	2	
55-foot double-bucket truck	350	Diesel	1		3	7	
50-foot digger derrick	350	Diesel	1		3	4	
Underground Cable Pulling (3)				4	2		
1-ton crew cab, 4X4	300	Diesel	1		2	2	
Router placer truck	350	Diesel	1		2	6	
Hydraulic rewind puller	300	Diesel	1		2	6	
Underground Cable Makeup (4)				8	60	10	
1-ton crew cab, 4X4	300	Diesel	1		4	2	
55-foot double-bucket truck	350	Diesel	1		4	4	

1. Trenching and Conduit Installation = one 4-man crew
2. Overhead Line Work = one 4-man crew
3. Underground Cable Pulling = one 4-man crew
4. Underground Cable Makeup

Eldorado-Ivanpah 33kV Loop Construction

On Site Equipment Exhaust Emissions

From SCAQMD offroad emission factors file name "offroadEF_07_25.xls" 2010

Description	Number	Hours per Day	Days of Activity	2010 Emission Factor (lbs/hr)						Emissions (lbs/day)						Total Activity Emissions (lbs)					
				ROG	CO	NOX	SOX	PM	CO2	ROG	CO	NOX	SOX	PM	CO2	ROG	CO	NOX	SOX	PM	CO2
Backhoe	1	8	8	0.142	0.404	1.549	0.002	0.052	172	1.1	3.2	12.4	0.0	0.4	1374	9	26	99	0.12	3	10991
55 ft double bucket truck	1	7	3	0.124	0.346	1.237	0.001	0.047	112	0.9	2.4	8.7	0.0	0.3	785	3	7	26	0.03	1.0	2355
50 ft digger	1	4	3	0.124	0.346	1.237	0.001	0.047	112	0.5	1.4	4.9	0.0	0.2	449	1	4	15	0.02	0.6	1346
Router placer truck	1	6	2	0.124	0.346	1.237	0.001	0.047	112	0.7	2.1	7.4	0.0	0.3	673	1	4	15	0.02	0.6	1346
Hydraulic puller	1	6	2	0.171	0.607	1.982	0.002	0.068	254	1.0	3.6	11.9	0.0	0.4	1525	2	7	24	0.03	0.8	3051
55 ft double bucket truck	1	4	4	0.124	0.346	1.237	0.001	0.047	112	0.5	1.4	4.9	0.0	0.2	449	2	6	20	0.02	0.8	1795
															TOTAL	**19**	**54**	**198**	**0.23**	**7.0**	**20884**

Eldorado-Ivanpah 33kV Loop Construction
Exhaust, Tire and Brake Emissions

From SCAQMD file "onroadEF07_26.xls"
Used 2010 Table

	Vehicles <8500 lbs (lbs/mile)	Vehicles >8500 lbs (lbs/mile)	Vehicles >33000 lbs (lbs/mile)
CO	0.00826	0.01844	0.01195
NOx	0.00092	0.02062	0.03822
ROG	0.00091	0.00259	0.00304
SOx	0.00001	0.00003	0.00004
PM10	0.00009	0.00075	0.00183
PM2.5	0.00005	0.00064	0.00160
CO2	1.09568	2.732222	4.21121

				Emission Factor (lb/VMT)							Emissions (lbs/day)							Activity Emissions (lbs)						
Activity	Number	Days	VMT/day	CO	NOx	ROG	SOx	PM10	PM2.5	CO2	CO	NOx	ROG	SOx	PM10	PM2.5	CO2	CO	NOx	ROG	SOx	PM10	PM2.5	CO2
Personal Vehicles	4	8	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	13.22	1.47	1.46	0.017	0.14	0.09	1753
Personal Vehicles	5	3	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	2.07	0.23	0.23	0.00	0.02	0.01	274	6.20	0.69	0.69	0.008	0.07	0.04	822
Personal Vehicles	4	2	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	3.31	0.37	0.37	0.004	0.03	0.02	438
Personal Vehicles	8	4	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	3.31	0.37	0.37	0.00	0.03	0.02	438	13.22	1.47	1.46	0.017	0.14	0.09	1753
1 Ton Crew Cab 4X4	1	8	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.41	0.05	0.05	0.00	0.00	0.00	55	3.31	0.37	0.37	0.004	0.03	0.02	438
1 Ton Crew Cab 4X4	1	3	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.41	0.05	0.05	0.00	0.00	0.00	55	1.24	0.14	0.14	0.002	0.01	0.01	164
1 Ton Crew Cab 4X4	1	2	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.41	0.05	0.05	0.00	0.00	0.00	55	0.83	0.09	0.09	0.001	0.01	0.01	110
1 Ton Crew Cab 4X4	1	4	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.41	0.05	0.05	0.00	0.00	0.00	55	1.65	0.18	0.18	0.002	0.02	0.01	219
																TOTAL		**43**	**4.8**	**4.8**	**0.056**	**0.45**	**0.28**	**5698**

Eldorado-Ivanpah 33kV Loop Construction

On site fugitive dust during active construction activities

Distrubed acreage from Proj Discription Table 3-13

Assumes uncontrolled fugitive dust emission factor of 10 lbs/acre/day for PM10
Assumes PM2.5 is 50% of PM10 for fugitive dust
Assumes 50% controls from watering twice per day

Project Feature	Site Quantity	Disturbed Acreage Calculation (L x W)	Acres Disturbed During Construction	Assumed Days of Activity	Assumed Active Construction Activity (acres/day)	PM10 (lbs/day)	PM2.5 (lbs/day)	Total Activity PM10 (lbs)	Total Activity PM2.5 (lbs)
Underground Trench	1	2600 x 1.5	0.09	8	0.01125	0.05625	0.028125	0.45	0.225
Underground Manhole	2	10 x 15	0.01	1	0.01	0.05	0.025	0.05	0.025
Work area manholes	2	40 x 60	0.12	1	0.12	0.6	0.3	0.6	0.3
Work area pulling	3	40 x 60	0.12	2	0.06	0.3	0.15	0.6	0.3
Total Active Construction Area			0.34					1.7	0.85

Eldorado-Ivanpah 33kV Loop Construction
Unpaved Road Fugitive Dust Emissions

Unpaved Road Fugitive Dust Emissions
From SCAQMD CEQA AQ Handbook
Table A9-9-D

E=V*F
V= vehicle miles travelled on unpaved roads
F=2.1*(G/12)*(H/30)*((J/3)^.7)*((I/4)^.5)*((365-K)/365)
G= surface silt
H= mean vehicle speed
I= number of wheels
J=vehicle wt
K= days of precip per year at least 0.01 in

0.212 PM2.5 fraction of PM10 from SCAQMD Table A - Updated CEIDARS Table with PM2.5 Fractions

Light Vehicles Factor
G= 11 Assumed
H= 15 Assumed
I= 4 wheels
J= 3 tons
k= 18 precip days

0.9 F PM10 (lbs/VMT)
0.19 F PM2.5 (lbs/VMT)

Heavy Vehicles Factor
G= 11 Assumed
H= 15 Assumed
I= 10 wheels
J= 8 tons
k= 18 precip days

2.9 F PM10 (lbs/VMT)
0.61 F PM2.5 (lbs/VMT)

Assumed 50% control for watering
Assumed 95% control of the water truck emissions

						Uncontrolled Emissions				Controlled Emissions (50%)			
						PM10		PM2.5		PM10		PM2.5	
Activity	Number	Days	Max VMT/day	F PM10 (lbs/VMT)	F PM2.5 (lbs/VMT)	(lbs/day)	lbs activity	(lbs/day)	lbs activity	(lbs/day)	lbs activity	(lbs/day)	lbs activity
Personal Vehicles	4	8	2	0.9	0.19	7.3	58.6	1.6	12.4	3.7	29.3	0.8	6.2
Personal Vehicles	5	3	2	0.9	0.19	9.2	27.5	1.9	5.8	4.6	13.7	1.0	2.9
Personal Vehicles	4	2	2	0.9	0.19	7.3	14.6	1.6	3.1	3.7	7.3	0.8	1.6
Personal Vehicles	8	4	2	0.9	0.19	14.6	58.6	3.1	12.4	7.3	29.3	1.6	6.2
1 Ton Crew Cab 4X4	1	8	3	2.9	0.61	8.6	69.0	1.8	14.6	4.3	34.5	0.9	7.3
1 Ton Crew Cab 4X4	1	3	3	2.9	0.61	8.6	25.9	1.8	5.5	4.3	12.9	0.9	2.7
1 Ton Crew Cab 4X4	1	2	3	2.9	0.61	8.6	17.2	1.8	3.7	4.3	8.6	0.9	1.8
1 Ton Crew Cab 4X4	1	4	3	2.9	0.61	8.6	34.5	1.8	7.3	4.3	17.2	0.9	3.7
								Total		153		32	

Eldorado-Ivanpah 33kV Loop Construction
Paved Road Fugitive Dust Emissions

Light Weight Vehicles on paved road fugitive dust
From SCAQMD CEQA AQ Handbook
Table A9-9-B

E=VxG (PM10 with street cleaning)

V= vehicle miles travelled
G=EF from table A9-9-9-B1

G(PM10 lb/VMT)	Road Type
0.018	Local Streets
0.013	Collector Streets
0.0064	Major Streets/Highways
0.00065	Freeways

Assumed Mix of Roads
0.10 Local Streets (assumed 10%)
0.10 Collector Streets (assumed 10%)
0.10 Major Streets/Highways (10%)
0.70 Freeways (assumed 70%)

Composite light vehicle Emission Factor
0.0042 PM10 per VMT

0.169 PM2.5 fraction of PM10 from SCAQMD Table A - Updated CEIDARS Table with PM2.5 Fractions

0.00071 PM2.5 per VMT

Heavy Vehicles on paved road fugitive dust
Use SCAQMD CEQA Table A9-9-C
E=VxF (PM10 without street cleaning)
V= vehicle miles travelled
G from table A9-9-C1
F=0.77*((G*0.35)^0.3) lbs/VMT

Assume 60 percent reduction for street sweeping per Table A9-9

Road Type	G(PM10 oz/sq yd)	F(PM10 lb/VMT)	F with sweeping
Local Streets	0.04	0.213958	0.085583
Collector Streets	0.03	0.196267	0.078507
Major Streets/Highwa	0.012	0.149096	0.059638
Freeways	0.00065	0.062171	0.024868

Assumed Mix of Roads
0.10 Local Streets (assumed 10%)
0.10 Collector Streets (assumed 10%)
0.10 Major Streets/Highways (10%)
0.70 Freeways (assumed 70%)

Composite heavy vehicle Emission Factor
0.040 PM10 per VMT

0.169 PM2.5 fraction of PM10 from SCAQMD Table A - Updated CEIDARS Table with PM2.5 Fractions

0.0067 PM2.5 per VMT

Activity	Number	Days	VMT/day	F PM10 (lbs/VMT)	F PM2.5 (lbs/VMT)	Emissions Assuming Street Cleaning PM10 (lbs/day)	PM10 lbs activity	PM2.5 (lbs/day)	PM2.5 lbs activity
Personal Vehicles	4	8	50	0.0042	0.00071	0.8	6.7	0.1	1.1
Personal Vehicles	5	3	50	0.0042	0.00071	1.0	3.1	0.2	0.5
Personal Vehicles	4	2	50	0.0042	0.00071	0.8	1.7	0.1	0.3
Personal Vehicles	8	4	50	0.0042	0.00071	1.7	6.7	0.3	1.1
1 Ton Crew Cab 4X4	1	8	50	0.0398	0.00672	2.0	15.9	0.3	2.7
1 Ton Crew Cab 4X4	1	3	50	0.0398	0.00672	2.0	6.0	0.3	1.0
1 Ton Crew Cab 4X4	1	2	50	0.0398	0.00672	2.0	4.0	0.3	0.7
1 Ton Crew Cab 4X4	1	4	50	0.0398	0.00672	2.0	8.0	0.3	1.3
					Total		**52.1**		**8.8**

Eldorado-Ivanpah Telecommunications System Construction
Emission Summary

Activity Emissions	Emissions (lbs)						
	CO	NOx	ROG	SOx	PM10	PM2.5	CO2
Combustion Related Emissions							
On-Road Vehicles	1868	864	226	3	39	33	257814
Off-Road Vehicles and Equipment	1380	5204	484	6	180	153	563837
Fugitive Dust Emissions							
Paved Roads	-	-	-	-	3541	598	-
Unpaved Roads	-	-	-	-	6258	1624	-
Construction Activities	-	-	-	-	292	146	-
Total Activity Emissions (tons)	1.6	3.0	0.36	0.0044	5.2	1.3	410.8
Total California Activity Emissions (tons)	0.32	0.61	0.071	0.0009	1.0	0.26	82.2
Construction Days	300	300	300	300	300	300	300
Average Daily Emissions (lbs)	11	20	2.4	0.030	34	8.5	2739

Eldorado-Ivanpah Telecommunications System Construction

On Site Equipment Exhaust Emissions From SCAQMD offroad emission factors file name "offroadEF_07_25.xls" 2010

Description	Number	Hours per Day	Days of Activity	2010 Emission Factor (lbs/hr)						Emissions (lbs/day)						Total Activity Emissions (lbs)					
				ROG	CO	NOX	SOX	PM	CO2	ROG	CO	NOX	SOX	PM	CO2	ROG	CO	NOX	SOX	PM	CO2
Splicing lab vehicle	1	6	30	0.124	0.346	1.237	0.001	0.047	112	0.7	2.1	7.4	0.0	0.3	673	22	62	223	0	8	20189
Telsa Cable truck	1	8	5	0.124	0.346	1.237	0.001	0.047	112	1.0	2.8	9.9	0.0	0.4	897	5	14	49	0	2	4486
Splicing van	1	8	5	0.124	0.346	1.237	0.001	0.047	112	1.0	2.8	9.9	0.0	0.4	897	5	14	49	0	2	4486
Backhoe	1	8	66	0.142	0.404	1.549	0.002	0.052	172	1.1	3.2	12.4	0.0	0.4	1374	75	213	818	1	28	90677
Telsa Cable truck	1	6	8	0.124	0.346	1.237	0.001	0.047	112	0.7	2.1	7.4	0.0	0.3	673	6	17	59	0	2	5384
Splicing van	1	8	4	0.124	0.346	1.237	0.001	0.047	112	1.0	2.8	9.9	0.0	0.4	897	4	11	40	0	2	3589
Backhoe	1	8	119	0.142	0.404	1.549	0.002	0.052	172	1.1	3.2	12.4	0.0	0.4	1374	135	384	1475	2	50	163494
Telsa Cable truck	2	8	7	0.124	0.346	1.237	0.001	0.047	112	2.0	5.5	19.8	0.0	0.8	1795	14	39	139	0	5	12562
Telsa Cable truck	2	8	4	0.124	0.346	1.237	0.001	0.047	112	2.0	5.5	19.8	0.0	0.8	1795	8	22	79	0	3	7178
Telsa Cable truck	1	8	9	0.124	0.346	1.237	0.001	0.047	112	1.0	2.8	9.9	0.0	0.4	897	9	25	89	0	3	8075
Splicing van	1	8	4	0.124	0.346	1.237	0.001	0.047	112	1.0	2.8	9.9	0.0	0.4	897	4	11	40	0	2	3589
Backhoe	1	8	132	0.142	0.404	1.549	0.002	0.052	172	1.1	3.2	12.4	0.0	0.4	1374	150	426	1636	2	55	181354
Telsa Cable truck	1	8	5	0.124	0.346	1.237	0.001	0.047	112	1.0	2.8	9.9	0.0	0.4	897	5	14	49	0	2	4486
Splicing van	1	8	2	0.124	0.346	1.237	0.001	0.047	112	1.0	2.8	9.9	0.0	0.4	897	2	6	20	0	1	1795
Crane	1	4	8	0.124	0.346	1.237	0.001	0.047	112	0.5	1.4	4.9	0.0	0.2	449	4	11	40	0	2	3589
Drill rig	1	6	7	0.149	0.557	1.705	0.003	0.061	311	0.9	3.3	10.2	0.0	0.4	1868	6	23	72	0	3	13075
Concrete pump	1	6	2	0.248	0.743	2.388	0.003	0.088	260	1.5	4.5	14.3	0.0	0.5	1561	3	9	29	0	1	3121
Fork Lift	1	4	10	0.142	0.404	1.549	0.002	0.052	172	0.6	1.6	6.2	0.0	0.2	687	6	16	62	0	2	6869
Backhoe	1	6	10	0.142	0.404	1.549	0.002	0.052	172	0.9	2.4	9.3	0.0	0.3	1030	9	24	93	0	3	10304
Telsa Cable truck	1	8	1	0.124	0.346	1.237	0.001	0.047	112	1.0	2.8	9.9	0.0	0.4	897	1	3	10	0	0	897
Splicing van	1	8	1	0.124	0.346	1.237	0.001	0.047	112	1.0	2.8	9.9	0.0	0.4	897	1	3	10	0	0	897
Backhoe	1	8	10	0.142	0.404	1.549	0.002	0.052	172	1.1	3.2	12.4	0.0	0.4	1374	11	32	124	0	4	13739
															TOTAL	**484**	**1380**	**5204**	**6**	**180**	**563837**

Eldorado-Ivanpah Telecommunications System Construction
Exhaust, Tire and Brake Emissions

From SCAQMD file "onroadEF07_26.xls"
Used 2010 Table

	Vehicles <8500 lbs (lbs/mile)	Vehicles >8500 lbs (lbs/mile)	Vehicles >33000 lbs (lbs/mile)
CO	0.00826	0.01844	0.01195
NOx	0.00092	0.02062	0.03822
ROG	0.00091	0.00259	0.00304
SOx	0.00001	0.00003	0.00004
PM10	0.00009	0.00075	0.00183
PM2.5	0.00005	0.00064	0.00160
CO2	1.0957	2.7322	4.2112

				Emission Factor (lb/VMT)							Emissions (lbs/day)							Activity Emissions (lbs)						
Activity	Number	Days	VMT/day	CO	NOx	ROG	SOx	PM10	PM2.5	CO2	CO	NOx	ROG	SOx	PM10	PM2.5	CO2	CO	NOx	ROG	SOx	PM10	PM2.5	CO2
Personal Vehicles	3	30	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.24	0.14	0.14	0.00	0.01	0.01	164	37.18	4.13	4.11	0.05	0.39	0.25	4931
Personal Vehicles	4	5	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	8.26	0.92	0.91	0.01	0.09	0.05	1096
Personal Vehicles	4	66	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	109.07	12.12	12.06	0.14	1.15	0.72	14463
Personal Vehicles	4	8	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	13.22	1.47	1.46	0.02	0.14	0.09	1753
Personal Vehicles	4	119	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	196.65	21.85	21.75	0.26	2.07	1.30	26077
Personal Vehicles	4	7	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	11.57	1.29	1.28	0.02	0.12	0.08	1534
Personal Vehicles	4	4	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	6.61	0.73	0.73	0.01	0.07	0.04	877
Personal Vehicles	4	9	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	14.87	1.65	1.65	0.02	0.16	0.10	1972
Personal Vehicles	4	132	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	218.14	24.24	24.13	0.28	2.30	1.45	28926
Personal Vehicles	4	8	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	13.22	1.47	1.46	0.02	0.14	0.09	1753
Personal Vehicles	4	5	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	8.26	0.92	0.91	0.01	0.09	0.05	1096
Personal Vehicles	8	68	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	3.31	0.37	0.37	0.00	0.03	0.02	438	224.75	24.97	24.86	0.29	2.37	1.49	29803
Personal Vehicles	4	1	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	1.65	0.18	0.18	0.00	0.02	0.01	219	1.65	0.18	0.18	0.00	0.02	0.01	219
Half Ton Pickup	1	30	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.83	0.09	0.09	0.00	0.01	0.01	110	24.79	2.75	2.74	0.03	0.26	0.16	3287
Half Ton Pickup	1	5	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.83	0.09	0.09	0.00	0.01	0.01	110	4.13	0.46	0.46	0.01	0.04	0.03	548
Half Ton Pickup	1	66	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.83	0.09	0.09	0.00	0.01	0.01	110	54.53	6.06	6.03	0.07	0.57	0.36	7232
Half Ton Pickup	1	8	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.83	0.09	0.09	0.00	0.01	0.01	110	6.61	0.73	0.73	0.01	0.07	0.04	877
Half Ton Pickup	1	119	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.83	0.09	0.09	0.00	0.01	0.01	110	98.33	10.93	10.88	0.13	1.04	0.65	13039
Half Ton Pickup	1	7	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.83	0.09	0.09	0.00	0.01	0.01	110	5.78	0.64	0.64	0.01	0.06	0.04	767
Half Ton Pickup	1	4	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.83	0.09	0.09	0.00	0.01	0.01	110	3.31	0.37	0.37	0.00	0.03	0.02	438
Half Ton Pickup	1	9	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.83	0.09	0.09	0.00	0.01	0.01	110	7.44	0.83	0.82	0.01	0.08	0.05	986
Half Ton Pickup	1	132	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.83	0.09	0.09	0.00	0.01	0.01	110	109.07	12.12	12.06	0.14	1.15	0.72	14463
Half Ton Pickup	1	8	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.83	0.09	0.09	0.00	0.01	0.01	110	6.61	0.73	0.73	0.01	0.07	0.04	877
Half Ton Pickup	1	5	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.83	0.09	0.09	0.00	0.01	0.01	110	4.13	0.46	0.46	0.01	0.04	0.03	548
Half Ton Pickup	1	1	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.83	0.09	0.09	0.00	0.01	0.01	110	0.83	0.09	0.09	0.00	0.01	0.01	110
Half Ton Pickup	1	10	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.83	0.09	0.09	0.00	0.01	0.01	110	8.26	0.92	0.91	0.01	0.09	0.05	1096
1 Ton crew cab	1	15	50	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.41	0.05	0.05	0.00	0.00	0.00	55	6.20	0.69	0.69	0.01	0.07	0.04	822
Dump Truck	1	66	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	1.84	2.06	0.26	0.00	0.08	0.06	273	121.69	136.12	17.09	0.18	4.96	4.24	18033
Dump Truck	1	119	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	1.84	2.06	0.26	0.00	0.08	0.06	273	219.41	245.43	30.82	0.32	8.94	7.64	32513
Dump Truck	1	132	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	1.84	2.06	0.26	0.00	0.08	0.06	273	243.38	272.24	34.18	0.36	9.92	8.48	36065
Dump Truck	1	7	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	1.84	2.06	0.26	0.00	0.08	0.06	273	12.91	14.44	1.81	0.02	0.53	0.45	1913
Dump Truck	1	10	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	1.84	2.06	0.26	0.00	0.08	0.06	273	18.44	20.62	2.59	0.03	0.75	0.64	2732
Flat bed truck	1	3	50	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	0.92	1.03	0.13	0.00	0.04	0.03	137	2.77	3.09	0.39	0.00	0.11	0.10	410
2 ton truck	1	15	100	0.00826	0.00092	0.00091	0.00001	0.00009	0.00005	1.09568	0.83	0.09	0.09	0.00	0.01	0.01	110	12.39	1.38	1.37	0.02	0.13	0.08	1644
Concrete truck	1	2	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	1.84	2.06	0.26	0.00	0.08	0.06	273	3.69	4.12	0.52	0.01	0.15	0.13	546
Bucket Truck	2	8	100	0.01844	0.02062	0.00259	0.00003	0.00075	0.00064	2.73222	3.69	4.12	0.52	0.01	0.15	0.13	546	29.50	33.00	4.14	0.04	1.20	1.03	4372
																	TOTAL	**1868**	**864**	**226**	**3**	**39**	**31**	**257814**

Eldorado-Ivanpah Telecommunications System Construction
On site fugitive dust during active construction activities

Distrubed acreage from Proj Discription Table 3-16,17 and 18

Assumes uncontrolled fugitive dust emission factor of 10 lbs/acre/day for PM10
Assumes PM2.5 is 50% of PM10 for fugitive dust
Assumes 50% controls from watering twice per day
Assumes two times daily average acerage is actively disturbed

Project Feature	Acres Disturbed During Construction	Assumed Days of Activity	Assumed Active Construction Activity (acres/day)	PM10 (lbs/day)	PM2.5 (lbs/day)	Total Activity PM10 (lbs)	Total Activity PM2.5 (lbs)
Path 1	0.16	30	0.01	0.05	0.03	1.6	0.8
Path 2 Sec 1	27.8	200	0.28	1.39	0.70	278.0	139.0
Path 2 Sec 2	1.21	71	0.03	0.17	0.09	12.1	6.1
Total Active Construction Area	29.17					291.7	145.9

Eldorado-Ivanpah Telecommunications System Construction
Unpaved Road Fugitive Dust Emissions

Unpaved Road Fugitive Dust Emissions
From SCAQMD CEQA AQ Handbook
Table A9-9-D

E=V*F
V= vehicle miles travelled on unpaved roads
F=2.1*(G/12)*(H/30)*((J/3)^.7)*((I/4)^.5)*((365-K)/365)
G= surface silt
H= mean vehicle speed
I= number of wheels
J=vehicle wt
K= days of precip per year at least 0.01 in

0.212 PM2.5 fraction of PM10 from SCAQMD Table A - Updated CEIDARS Table with PM2.5 Fractions

Light Vehicles Factor
G= 11 Assumed
H= 15 Assumed
I= 4 wheels
J= 3 tons
k= 18 precip days

0.9 F PM10 (lbs/VMT)
0.19 F PM2.5 (lbs/VMT)

Heavy Vehicles Factor
G= 11 Assumed
H= 15 Assumed
I= 10 wheels
J= 8 tons
k= 18 precip days

2.9 F PM10 (lbs/VMT)
0.61 F PM2.5 (lbs/VMT)

Assumed 50% control for watering
Assumed 95% control of the water truck emissions

						Uncontrolled Emissions				Controlled Emissions (50%)			
						PM10		PM2.5		PM10		PM2.5	
Activity	Number	Days	Max VMT/day	F PM10 (lbs/VMT)	F PM2.5 (lbs/VMT)	(lbs/day)	lbs activity	(lbs/day)	lbs activity	(lbs/day)	lbs activity	(lbs/day)	lbs activity
Personal Vehicles	3	30	2	0.9	0.19	5.5	164.7	1.2	34.9	2.7	82.4	0.6	17.5
Personal Vehicles	4	5	2	0.9	0.19	7.3	36.6	1.6	7.8	3.7	18.3	0.8	3.9
Personal Vehicles	4	66	2	0.9	0.19	7.3	483.1	1.6	102.4	3.7	241.6	0.8	51.2
Personal Vehicles	4	8	2	0.9	0.19	7.3	58.6	1.6	12.4	3.7	29.3	0.8	6.2
Personal Vehicles	4	119	2	0.9	0.19	7.3	871.1	1.6	184.7	3.7	435.6	0.8	92.3
Personal Vehicles	4	7	2	0.9	0.19	7.3	51.2	1.6	10.9	3.7	25.6	0.8	5.4
Personal Vehicles	4	4	2	0.9	0.19	7.3	29.3	1.6	6.2	3.7	14.6	0.8	3.1
Personal Vehicles	4	9	2	0.9	0.19	7.3	65.9	1.6	14.0	3.7	32.9	0.8	7.0
Personal Vehicles	4	132	2	0.9	0.19	7.3	966.3	1.6	204.9	3.7	483.1	0.8	102.4
Personal Vehicles	4	8	2	0.9	0.19	7.3	58.6	1.6	12.4	3.7	29.3	0.8	6.2
Personal Vehicles	4	5	2	0.9	0.19	7.3	36.6	1.6	7.8	3.7	18.3	0.8	3.9
Personal Vehicles	8	68	2	0.9	0.19	14.6	995.6	3.1	211.1	7.3	497.8	1.6	105.5
Personal Vehicles	4	1	2	0.9	0.19	7.3	7.3	1.6	1.6	3.7	3.7	0.8	0.8
						0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Half Ton Pickup	1	30	3	2	0.9	6.0	180.0	2.7	82.4	3.0	90.0	1.4	41.2
Half Ton Pickup	1	5	3	2	0.9	6.0	30.0	2.7	13.7	3.0	15.0	1.4	6.9
Half Ton Pickup	1	66	3	2	0.9	6.0	396.0	2.7	181.2	3.0	198.0	1.4	90.6
Half Ton Pickup	1	8	3	2	0.9	6.0	48.0	2.7	22.0	3.0	24.0	1.4	11.0
Half Ton Pickup	1	119	3	2	0.9	6.0	714.0	2.7	326.7	3.0	357.0	1.4	163.3
Half Ton Pickup	1	7	3	2	0.9	6.0	42.0	2.7	19.2	3.0	21.0	1.4	9.6
Half Ton Pickup	1	4	3	2	0.9	6.0	24.0	2.7	11.0	3.0	12.0	1.4	5.5
Half Ton Pickup	1	9	3	2	0.9	6.0	54.0	2.7	24.7	3.0	27.0	1.4	12.4
Half Ton Pickup	1	132	3	2	0.9	6.0	792.0	2.7	362.4	3.0	396.0	1.4	181.2
Half Ton Pickup	1	8	3	2	0.9	6.0	48.0	2.7	22.0	3.0	24.0	1.4	11.0
Half Ton Pickup	1	5	3	2	0.9	6.0	30.0	2.7	13.7	3.0	15.0	1.4	6.9
Half Ton Pickup	1	1	3	2	0.9	6.0	6.0	2.7	2.7	3.0	3.0	1.4	1.4
Half Ton Pickup	1	10	3	2	0.9	6.0	60.0	2.7	27.5	3.0	30.0	1.4	13.7
1 Ton crew cab	1	15	3	2.9	0.61	8.6	129.4	1.8	27.4	4.3	64.7	0.9	13.7
Dump Truck	1	66	3	2.9	0.61	8.6	569.2	1.8	120.7	4.3	284.6	0.9	60.3
Dump Truck	1	119	3	2.9	0.61	8.6	1026.3	1.8	217.6	4.3	513.1	0.9	108.8
Dump Truck	1	132	3	2.9	0.61	8.6	1138.4	1.8	241.3	4.3	569.2	0.9	120.7
Dump Truck	1	7	3	2.9	0.61	8.6	60.4	1.8	12.8	4.3	30.2	0.9	6.4
Dump Truck	1	10	3	2.9	0.61	8.6	86.2	1.8	18.3	4.3	43.1	0.9	9.1
Flat bed truck	1	3	3	2.9	0.61	8.6	25.9	1.8	5.5	4.3	12.9	0.9	2.7
2 ton truck	1	15	3	2.9	0.61	8.6	129.4	1.8	27.4	4.3	64.7	0.9	13.7
Concrete truck	1	2	3	2.9	0.61	8.6	17.2	1.8	3.7	4.3	8.6	0.9	1.8
Bucket Truck	2	8	3	2.9	0.61	17.2	138.0	3.7	29.3	8.6	69.0	1.8	14.6
Splicing lab vehicle	1	30	3	2.9	0.61	8.6	258.7	1.8	54.8	4.3	129.4	0.9	27.4
Telsa Cable truck	1	5	3	2.9	0.61	8.6	43.1	1.8	9.1	4.3	21.6	0.9	4.6
Splicing van	1	5	3	2.9	0.61	8.6	43.1	1.8	9.1	4.3	21.6	0.9	4.6
Backhoe	1	66	2	2.9	0.61	5.7	379.5	1.2	80.4	2.9	189.7	0.6	40.2
Telsa Cable truck	1	8	3	2.9	0.61	8.6	69.0	1.8	14.6	4.3	34.5	0.9	7.3
Splicing van	1	4	3	2.9	0.61	8.6	34.5	1.8	7.3	4.3	17.2	0.9	3.7
Backhoe	1	119	2	2.9	0.61	5.7	684.2	1.2	145.0	2.9	342.1	0.6	72.5
Telsa Cable truck	2	7	3	2.9	0.61	17.2	120.7	3.7	25.6	8.6	60.4	1.8	12.8
Telsa Cable truck	2	4	3	2.9	0.61	17.2	69.0	3.7	14.6	8.6	34.5	1.8	7.3
Telsa Cable truck	1	9	3	2.9	0.61	8.6	77.6	1.8	16.5	4.3	38.8	0.9	8.2
Splicing van	1	4	3	2.9	0.61	8.6	34.5	1.8	7.3	4.3	17.2	0.9	3.7
Backhoe	1	132	2	2.9	0.61	5.7	758.9	1.2	160.9	2.9	379.5	0.6	80.4
Telsa Cable truck	1	5	3	2.9	0.61	8.6	43.1	1.8	9.1	4.3	21.6	0.9	4.6
Splicing van	1	2	3	2.9	0.61	8.6	17.2	1.8	3.7	4.3	8.6	0.9	1.8
Crane	1	8	2	2.9	0.61	5.7	46.0	1.2	9.8	2.9	23.0	0.6	4.9
Drill rig	1	7	3	2.9	0.61	8.6	60.4	1.8	12.8	4.3	30.2	0.9	6.4
Concrete pump	1	2	3	2.9	0.61	8.6	17.2	1.8	3.7	4.3	8.6	0.9	1.8
Fork Lift	1	10	2	2.9	0.61	5.7	57.5	1.2	12.2	2.9	28.7	0.6	6.1
Backhoe	1	10	2	2.9	0.61	5.7	57.5	1.2	12.2	2.9	28.7	0.6	6.1
Telsa Cable truck	1	1	3	2.9	0.61	8.6	8.6	1.8	1.8	4.3	4.3	0.9	0.9
Splicing van	1	1	3	2.9	0.61	8.6	8.6	1.8	1.8	4.3	4.3	0.9	0.9
Backhoe	1	10	2	2.9	0.61	5.7	57.5	1.2	12.2	2.9	28.7	0.6	6.1
									Total		**6258**		**1624**

Eldorado-Ivanpah Telecommunications System Construction
Paved Road Fugitive Dust Emissions

Light Weight Vehicles on paved road fugitive dust
From SCAQMD CEQA AQ Handbook
Table A9-9-B

E=VxG (PM10 with street cleaning)

V= vehicle miles travelled
G=EF from table A9-9-9-B1

G(PM10 lb/VMT)	Road Type
0.018	Local Streets
0.013	Collector Streets
0.0064	Major Streets/Highways
0.00065	Freeways

Assumed Mix of Roads
0.10 Local Streets (assumed 10%)
0.10 Collector Streets (assumed 10%)
0.10 Major Streets/Highways (10%)
0.70 Freeways (assumed 70%)

Composite light vehicle Emission Factor
0.0042 PM10 per VMT

0.169 PM2.5 fraction of PM10 from SCAQMD Table A - Updated CEIDARS Table with PM2.5 Fractions

0.00071 PM2.5 per VMT

Heavy Vehicles on paved road fugitive dust
Use SCAQMD CEQA Table A9-9-C
E=VxF (PM10 without street cleaning)
V= vehicle miles travelled
G from table A9-9-C1
F=0.77*((G*0.35)^0.3) lbs/VMT

Assume 60 percent reduction for street sweeping per Table A9-9

Road Type	G(PM10 oz/sq yd)	F(PM10 lb/VMT)	F with sweeping
Local Streets	0.04	0.213958	0.085583
Collector Streets	0.03	0.196267	0.078507
Major Streets/Highwa	0.012	0.149096	0.059638
Freeways	0.00065	0.062171	0.024868

Assumed Mix of Roads
0.10 Local Streets (assumed 10%)
0.10 Collector Streets (assumed 10%)
0.10 Major Streets/Highways (10%)
0.70 Freeways (assumed 70%)

Composite heavy vehicle Emission Factor
0.040 PM10 per VMT

0.169 PM2.5 fraction of PM10 from SCAQMD Table A - Updated CEIDARS Table with PM2.5 Fractions

0.0067 PM2.5 per VMT

						Emissions Assuming Street Cleaning			
						PM10		PM2.5	
Activity	Number	Days	VMT/day	F PM10 (lbs/VMT)	F PM2.5 (lbs/VMT)	(lbs/day)	lbs activity	(lbs/day)	lbs activity
Personal Vehicles	3	30	50	0.0042	0.00071	0.6	18.9	0.1	3.2
Personal Vehicles	4	5	50	0.0042	0.00071	0.8	4.2	0.1	0.7
Personal Vehicles	4	66	50	0.0042	0.00071	0.8	55.4	0.1	9.4
Personal Vehicles	4	8	50	0.0042	0.00071	0.8	6.7	0.1	1.1
Personal Vehicles	4	119	50	0.0042	0.00071	0.8	99.8	0.1	16.9
Personal Vehicles	4	7	50	0.0042	0.00071	0.8	5.9	0.1	1.0
Personal Vehicles	4	4	50	0.0042	0.00071	0.8	3.4	0.1	0.6
Personal Vehicles	4	9	50	0.0042	0.00071	0.8	7.6	0.1	1.3
Personal Vehicles	4	132	50	0.0042	0.00071	0.8	110.7	0.1	18.7
Personal Vehicles	4	8	50	0.0042	0.00071	0.8	6.7	0.1	1.1
Personal Vehicles	4	5	50	0.0042	0.00071	0.8	4.2	0.1	0.7
Personal Vehicles	8	68	50	0.0042	0.00071	1.7	114.1	0.3	19.3
Personal Vehicles	4	1	50	0.0042	0.00071	0.8	0.8	0.1	0.1
Half Ton Pickup	1	30	100	0.0398	0.00672	4.0	119.3	0.7	20.2
Half Ton Pickup	1	5	100	0.0398	0.00672	4.0	19.9	0.7	3.4
Half Ton Pickup	1	66	100	0.0398	0.00672	4.0	262.6	0.7	44.4
Half Ton Pickup	1	8	100	0.0398	0.00672	4.0	31.8	0.7	5.4
Half Ton Pickup	1	119	100	0.0398	0.00672	4.0	473.4	0.7	80.0
Half Ton Pickup	1	7	100	0.0398	0.00672	4.0	27.8	0.7	4.7
Half Ton Pickup	1	4	100	0.0398	0.00672	4.0	15.9	0.7	2.7
Half Ton Pickup	1	9	100	0.0398	0.00672	4.0	35.8	0.7	6.1
Half Ton Pickup	1	132	100	0.0398	0.00672	4.0	525.1	0.7	88.7
Half Ton Pickup	1	8	100	0.0398	0.00672	4.0	31.8	0.7	5.4
Half Ton Pickup	1	5	100	0.0398	0.00672	4.0	19.9	0.7	3.4
Half Ton Pickup	1	1	100	0.0398	0.00672	4.0	4.0	0.7	0.7
Half Ton Pickup	1	10	100	0.0398	0.00672	4.0	39.8	0.7	6.7
1 Ton crew cab	1	15	50	0.0398	0.00672	2.0	29.8	0.3	5.0
Dump Truck	1	66	100	0.0398	0.00672	4.0	262.6	0.7	44.4
Dump Truck	1	119	100	0.0398	0.00672	4.0	473.4	0.7	80.0
Dump Truck	1	132	100	0.0398	0.00672	4.0	525.1	0.7	88.7
Dump Truck	1	7	100	0.0398	0.00672	4.0	27.8	0.7	4.7
Dump Truck	1	10	100	0.0398	0.00672	4.0	39.8	0.7	6.7
Flat bed truck	1	3	50	0.0398	0.00672	2.0	6.0	0.3	1.0
2 ton truck	1	15	100	0.0398	0.00672	4.0	59.7	0.7	10.1
Concrete truck	1	2	100	0.0398	0.00672	4.0	8.0	0.7	1.3
Bucket Truck	2	8	100	0.0398	0.00672	8.0	63.6	1.3	10.8
					Total		**3541.3**		**598.5**

Eldorado-Ivanpah System Construction
Total Emissions from All Activities

Location	Construction Activity	Total Activity Emissions (tons)							
		CO	NOx	ROG	SOx	PM10	PM2.5	CO2	CH4
California	Ivanpah Sub	3.8	10	1.1	0.01	4.0	1.0	1,052	0.074
	220 kV	4.5	8.1	0.96	0.04	8.0	1.9	1,103	-
	115 kV	0.28	0.44	0.06	0.0006	2.6	0.56	60	-
	33 Loop	0.05	0.10	0.01	0.0001	0.11	0.02	13	-
	Telecomm	0.32	0.61	0.07	0.0009	0.95	0.21	82	-
	Total	**9.0**	**19**	**2.2**	**0.05**	**16**	**3.7**	**2,310**	**0.074**
	1st 12-month Period	***5.7***	***12***	***1.4***	***0.03***	***10***	***2.4***	***1,459***	***0.047***
	2nd 12-month Period	***3.3***	***7.1***	***0.8***	***0.02***	***5.8***	***1.4***	***851***	***0.027***
Nevada	220 kV	18	32	3.8	0.16	32	7.8	4,411	-
	Telecomm	1.3	2.4	0.28	0.004	3.8	0.83	329	-
	500 kV	2.5	4.3	0.51	0.05	4.7	1.1	611	-
	Total	**22**	**39**	**4.6**	**0.22**	**41**	**10**	**5,351**	**-**
	1st 12-month Period	***14***	***25***	***2.9***	***0.14***	***26***	***6.1***	***3,379***	***-***
	2nd 12-month Period	***8.0***	***14***	***1.7***	***0.08***	***15***	***3.6***	***1,971***	***-***
TOTAL	Ivanpah Sub	3.8	10.0	1.1	0.01	4.0	1.0	1,052	0.074
	220 kV	22	40	4.8	0.20	40	9.7	5,513	-
	115 kV	0.28	0.44	0.06	0.001	2.6	0.56	60	-
	33 Loop	0.05	0.10	0.01	0.0001	0.11	0.02	13	-
	Telecomm	1.6	3.0	0.36	0.004	4.7	1.0	411	-
	500 kV	2.5	4.3	0.51	0.05	4.7	1.1	611	-
	Total	**31**	**58**	**6.8**	**0.27**	**56**	**13**	**7,660**	**0.074**
	1st 12-month Period	**19**	**37**	**4.3**	**0.17**	**36**	**8.5**	**4,838**	**0.047**
	2nd 12-month Period	**11**	**21**	**2.5**	**0.10**	**21**	**5.0**	**2,822**	**0.027**

Eldorado-Ivanpah System Construction
Average Daily Emissions from All Activities

Construction Activity	Average Daily Activity Emissions (lb/day)							
	CO	NOx	ROG	SOx	PM10	PM2.5	CO2	CH4
Ivanpah Sub	47	122	14	0.14	50	13	13,144	0.92
220 kV	77	138	16	0.69	137	33	18,816	-
115 kV	17	26	3.3	0.036	153	33	3,502	-
33 Loop	12	25	2.9	0.036	27	6.1	3323	
Telecomm	11	20	2.4	0.030	34	8.5	2,739	
500 kV	25	43	5.1	0.51	47	11	6,115	

Eldorado-Ivanpah System Construction
Regulated Greenhouse Gas Emissions from All Activities

Construction Combustion Related		
CO2 project total	7662	tpy
CO2 project total	6949	metric tpy
Amortized proj total construction	232	metric tpy/30 yrs CO2
Operational SF6 Leakage		
SF6 Installed capacity	1620	lbs (estimated)
Annual Leakage rate	1	% (estimated)
Annual emissions	16	lbs
Annual emissions	387180	lbs CO2 eq
Annual emissions	176	metric tpy/30 yrs CO2
Operational Vehicle Exhaust		
Vehicle Exhaust (see note)	110	lbs CO2 eq/day
Annual emissions	39992	lbs CO2 eq
Annual emissions	18	metric tons
Total Annual 30 yr Amortized	**425**	**metric tpy/30 yrs CO2**

Note:
Assumed 100 vmt per day of light duty pickup truck (CO2=1.0957 lb/vmt) for routine inspection of substation and transmission lines