

Table 5.1-26
San Joaquin Valley Air Basin Net Emission Difference

Operation Emissions tons/year	CO	CO₂	CH₄	N₂O	NO_x	PM₁₀	PM_{2.5}	SO_x	ROG
Current Scenario									
Route 1 (California Petcoke, Santa Maria Area)	–	–	–	–	–	–	–	–	–
Route 2 (California Petcoke, Carson Area)	–	–	–	–	–	–	–	–	–
Route 3 (California Petcoke, Bakersfield Area)	0.55	313.95	0.01	7.98E-04	1.61	0.07	0.06	3.05E-03	0.13
Route 4 (California Petcoke, Bakersfield Area)	3.01	1,729.77	0.03	4.40E-03	8.86	0.38	0.31	0.02	0.72
Misc. Trucks	–	–	–	–	–	–	–	–	–
Coal	–	–	–	–	–	–	–	–	–
Basin Total	3.56	2,043.71	0.04	0.01	10.47	0.45	0.37	0.02	0.85
Project Site Scenario									
Route 1 (California Petcoke, Santa Maria Area)	2.81	3,497.74	0.02	0.01	5.93	0.30	0.21	0.04	0.60
Route 2 (California Petcoke, Carson Area)	2.34	2,918.15	0.02	0.01	4.95	0.25	0.17	0.03	0.50
Route 3 (California Petcoke, Bakersfield Area)	0.12	155.70	8.33E-04	3.99E-04	0.26	0.01	0.01	1.67E-03	0.03
Route 4 (California Petcoke, Bakersfield Area)	0.12	155.70	8.33E-04	3.99E-04	0.26	0.01	0.01	1.67E-03	0.03
Misc. Trucks	0.83	1,032.17	0.01	2.65E-03	1.75	0.09	0.06	0.01	0.18
Coal	1.03	823.09	0.01	3.47E-03	3.86	0.15	0.13	0.28	0.28
Basin Total	7.25	8,582.56	0.05	0.02	17.01	0.82	0.58	0.36	1.61
Difference	3.69	6,538.85	0.01	0.02	6.54	0.37	0.21	0.34	0.76

Annual Fugitive Dust Emissions

Maximum annual fugitive dust activity occurs in months 1-12.

- 7 months of soil disturbance
- 10 total construction hours per work day
- 22 construction days per month
- 60% average load factor for equipment listed (CEQA)

Grading Emissions Factor

To be used for all scraping and grading activities (except material handling)

$E = 0.051(S)^{2.0}$ multiply by 0.60 for PM₁₀ USEPA AP42 Chapter 13.2.3 (Heavy Construction Operations), Table 13.2.3-1 - refers to
 assumed to be 4 mph S = mean vehicle speed (mph) USEPA AP42 Chapter 11.9 (Western Surface Coal Mining), Table 11.9-1

$E = 0.040(S)^{2.5}$ multiply by 0.031 for PM_{2.5}
 assumed to be 4 mph S = mean vehicle speed (mph)

S = 4.0 mph
 1.28 lb ≤ 30 μm/VMT
 0.82 lb ≤ 15 μm/VMT
 PM₁₀ = 0.49 lb PM₁₀/VMT
 PM_{2.5} = 0.04 lb PM_{2.5}/VMT

Equipment	Quantity	Hours/Day	Annual VMT	Watering Control Efficiency	PM10 Emissions (lb/yr)	PM10 Emissions (ton/yr)	PM2.5 Emissions (lb/yr)	PM2.5 Emissions (ton/yr)
Scraper	24	6	634	67%	102	0.05	8.3	0.00
Grader	24	6	3,696	67%	597	0.30	48.4	0.02
Total					700	0.35	56.7	0.03

Bulldozing/Earth clearing

$E = 1.0(s)^{1.5}/(M)^{1.4}$ multiply by 0.75 for PM₁₀ USEPA AP42 Chapter 13.2.3 (Heavy Construction Operations), Table 13.2.3-1 - refers to
 $E = 5.7(s)^{1.2}/(M)^{1.3}$ multiply by 0.105 for PM_{2.5} USEPA AP42 Chapter 11.9 (Western Surface Coal Mining), Table 11.9-1, 11.9-3

50 s = Silt content (%) (from soil boring B-4)
 19 M = Moisture content of surface material (%) (average of soil borings taken onsite at 5 ft)
 4.30 lb/hr of PM₁₀
 1.42 lb/hr of PM_{2.5}

Equipment	Quantity	Hours/Day	Watering Control Efficiency	PM10 Emissions (ton/yr)	PM2.5 Emissions (ton/yr)
Dozer	50	6	67%	4.68	1.55
Total				4.68	1.55

Water efficiency from CEQA Table 11-4 watering 3 times daily or using chemical suppressants (South Coast Air Quality Management District, 1993, CEQA Air Quality Handbook, Table 11-4: Mitigation for PM10 Emissions - Construction.)

Dirt Piling or Material Handling

$E = k * 0.0032 * (U/5)^{1.3} / (M/2)^{1.4}$ USEPA AP42 Chapter 13.2.4 (Aggregate Handling And Storage Piles)

0.35 k for PM₁₀
 0.053 k for PM_{2.5}
 6.25 U = Mean Wind speed (mph) average for Bakersfield Airport 2000-2004
 19 M = Moisture content of surface material (%) (average of soil borings taken onsite at 5 ft)
 0.00006 lb/ton of PM₁₀
 0.00001 lb/ton of PM_{2.5}

Equipment	Annual Material Handled (ton)	Watering Control Efficiency	PM10 Emissions (tons/yr)	PM2.5 Emissions (tons/yr)
Scraper	1,691,750	67%	0.0179	0.0027
Loader	1,522,575	67%	0.0161	0.0024
Backhoe	169,175	67%	0.0018	0.0003
Total			0.0357	0.0054

Water efficiency from CEQA Table 11-4 watering 3 times daily or using chemical suppressants (South Coast Air Quality Management District, 1993, CEQA Air Quality Handbook, Table 11-4: Mitigation for PM10 Emissions - Construction.)

assume scraper handles 50% of dirt, loader 45%, and backhoe 5%

18,619 yd3/day 21,971 ton/day 2360 density of soil (lb/yd3)
 2,867,373 yd3 3,383,500 tons (USDA NRCS Physical Soil Properties from Kern County Lockern-Buttonwillow clay soil)
 354.75 acres = 2,867,373 cubic yds, assume depth of soils moved is 1.67 yd
 (assume 75% of entire site disturbed in 12 month period)

Cover Storage Pile

SCAQMD Table A9-9-E

$E = 1.7 * G/1.5 * (365-H)/235 * I/15 * J$

PM10 Emission factor from wind erosion of storage piles per day per acre

50 G = Silt content (%) (from soil boring B-4)
 37 H = Mean number of days per year with at least 0.01 inches of precipitation (from WRCC for Bakersfield Airport Station)
 0.3 I = Percentage of time that the unobstructed wind speed exceeds 12 mph at mean pile height
 0.5 J = Fraction of TSP that is PM10 = 0.5
 0.791 lb/acre/day

wind speed percentage and average based on 2000-04 (5 yrs) of wind speed data as recorded at Bakersfield Airport station

Source	Quantity	Size of Pile (acre)	Days / year	Watering Control Efficiency	PM10 Emissions (tons/yr)	PM2.5 Emissions (tons/yr)
Cover Storage Pile	40	0.25	365	67%	0.48	0.099

Water efficiency from CEQA Table 11-4 watering 3 times daily or using chemical suppressants (South Coast Air Quality Management District, 1993, CEQA Air Quality Handbook, Table 11-4: Mitigation for PM10 Emissions - Construction.)

pile size and number are assumed

Days per year accounts for weekend days also, not just work days

Travel on unpaved road

$$F = 2.1 * G/12 * H/30 * (J/3)^{0.7} * (I/4)^{0.5} * (365-K)/365$$

SCAQMD Table A9-9-D

Emission factor for vehicle travel on unpaved roads (lb/VMT)

4 G = Surface silt loading (%) (value for gravel road)

4 H = Mean vehicle speed (mph)

value listed in table I = Mean number of wheels on vehicle

value listed in table J = Mean vehicle weight (ton)

37 K = Mean number of days per year with at least 0.01 inches of precipitation (from WRCC for Bakersfield Airport Station)

Vehicle Type	Quantity per year	Round Trips /Day/ Unit	Round Trip Distance (mile)	Annual VMT (all units)	Mean Vehicle Weight (tons)	Number of Wheels on Vehicle	PM10 EF (lbs/VMT)	Watering Control Efficiency	PM10 Emissions (tons/yr)	PM2.5 Emissions (tons/yr)
Concrete Pumper Truck	6	2	0.75	792.0	30	10	0.66	67%	0.087	0.018
Dump Truck	32	8	0.75	50688.0	15	10	0.41	67%	3.422	0.725
Service Truck - 1 ton	0			0.0	15	10	0.41	67%	0.000	0.000
Pile Driver Truck	12	2	0.1	633.6	15	10	0.41	67%	0.043	0.009
Truck - Fuel/Lube	0			0.0	15	10	0.41	67%	0.000	0.000
Tractor Truck 5th Wheel	0			0.0	11	10	0.33	67%	0.000	0.000
Trucks - Pickup 3/4 ton	60	10	0.5	79200.0	3	4	0.08	67%	1.096	0.232
Trucks - 3 ton	15	2	0.5	3960.0	11	10	0.33	67%	0.215	0.046
Truck - Water	28	4	1	29568.0	25	10	0.59	67%	2.854	0.605
Air Compressor 185 CFM	0			0.0	0.5	2	0.02	67%	0.000	0.000
Air Compressor 750 CFM	16	1	0.01	42.2	0.5	2	0.02	67%	0.000	0.000
Articulating Boom Platform	0			0.0	5	10	0.19	67%	0.000	0.000
Bulldozer D10R	24	1	0.1	633.6	35	2	0.33	67%	0.035	0.007
Bulldozer D4C	26	1	0.1	686.4	15	2	0.18	67%	0.021	0.004
Concrete Trowel Machine	8	1	0.25	528.0	15	8	0.37	67%	0.032	0.007
Concrete Vibrators	0			0.0	0.25	0	0.00	67%	0.000	0.000
Cranes - Mobile 35 ton	15	1	0.1	396.0	25	12	0.64	67%	0.042	0.009
Cranes - Mobile 45 ton	0			0.0	35	2	0.33	67%	0.000	0.000
Crane - Mobile 65 ton	0			0.0	45	2	0.39	67%	0.000	0.000
Cranes 100 / 150 ton cap	2	0	0	0.0	50	12	1.04	67%	0.000	0.000
Diesel Powered Welder	8	0	0	0.0	0.5	2	0.02	67%	0.000	0.000
Backhoe/loader	40	4	0.25	10560.0	11	4	0.21	67%	0.363	0.077
Earth Scraper	24	1	0.1	633.6	40	4	0.51	67%	0.054	0.011
Loader	24	2	0.5	6336.0	25	4	0.37	67%	0.387	0.082
Motor Grader	14	2	0.5	3696.0	20	6	0.39	67%	0.236	0.050
Excavator - Trencher	0			0.0	17	4	0.28	67%	0.000	0.000
Fired Heaters	24	0	0	0.0	0.25	0	0.00	67%	0.000	0.000
Forklift	7	5	0.5	4620.0	10	4	0.19	67%	0.149	0.031
Fusion Welder	0			0.0	0.25	2	0.01	67%	0.000	0.000
Heavy Haul / Cranes	0			0.0	75	2	0.56	67%	0.000	0.000
Light Plants	18	0	0	0.0	0.5	4	0.02	67%	0.000	0.000
Portable Compaction Roller	19	0	0	0.0	3	3	0.07	67%	0.000	0.000
Portable Compaction - Plate	15	0	0	0.0	0.1	0	0.00	67%	0.000	0.000
Portable Compaction - Ram	0			0.0	0.25	0	0.00	67%	0.000	0.000
Pumps	35	0	0	0.0	0.1	0	0.00	67%	0.000	0.000
Portable Power Generators	19	0	0	0.0	0.5	4	0.02	67%	0.000	0.000
Truck Crane - Greater than 200 ton	1	1	0.1	26.4	50	12	1.04	67%	0.005	0.001
Truck Crane - Greater than 300 ton	0			0.0	60	12	1.18	67%	0.000	0.000
Vibratory Roller 20 ton	27	2	0.25	3564.0	20	3	0.27	67%	0.161	0.034
Total									9.201	1.951
worker personal vehicles	176	1	0.5	87.9	3	4	0.08	85%	0.001	0.000

worker personal vehicle data from Table 2-26, Estimated Monthly Construction Workforce from AFC, average for months 1-12 divided by 1.25 employees per vehicle

Assumed maximum travel speed is 4 mph

Equipment weight from SCAQMD Table A9-9-D-3 and various websites

Water efficiency from CEQA Table 11-4 watering 3 times daily or using chemical suppressants (South Coast Air Quality Management District, 1993, CEQA Air Quality Handbook, Table 11-4: Mitigation for PM10 Emissions - Construction.)

except for worker vehicles - parking area will be graveled and main road onsite will be paved

PM2.5 emission factors from updated CEIDARS List with PM2.5 fractions.

PM2.5 numbers obtained by multiplying the PM10 values by fraction in CEIDARS list for appropriate fugitive dust sources.

Water trucks operate at least 4 times per day.

Total Annual Fugitive Dust from Onsite Equipment - Months 1 - 12

	PM ₁₀ Emissions (tons/yr)	PM _{2.5} Emissions (tons/yr)
Grading	0.3498	0.0283
Bulldozing	4.6805	1.5505
Dirt Piling	0.0357	0.0054
Storage Piles	0.4763	0.0991
Travel on Unpaved Roads	9.2005	1.9505
TOTAL	14.74	3.63

Annual Fugitive Dust Emissions

Maximum annual fugitive dust activity occurs in months 17-28.

7 months of soil disturbance
 10 total construction hours per work day
 22 construction days per month
 60% average load factor for equipment listed (CEQA)

Dirt Piling or Material Handling

$$E = k * 0.0032 * (U/5)^{1.3} / (M/2)^{1.4}$$

USEPA AP42 Chapter 13.2.4 (Aggregate Handling And Storage Piles)

0.35 k for PM₁₀
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 6.25 U = Mean Wind speed (mph) average for Bakersfield Airport 2000-2004
 19 M = Moisture content of surface material (%) (average of soil borings taken onsite at 5 ft)
 0.00006 lb/ton of PM₁₀
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Equipment	Annual Material Handled (ton)	Watering Control Efficiency	PM10 Emissions (tons/yr)	PM2.5 Emissions (tons/yr)
Scraper	1,691,750	67%	0.018	0.003
Loader	1,522,575	67%	0.016	0.002
Backhoe	169,175	67%	0.002	0.000
	3,383,500	Total	0.036	0.005

Water efficiency from CEQA Table 11-4 watering 3 times daily or using chemical suppressants (South Coast Air Quality Management District, 1993, CEQA Air Quality Handbook, Table 11-4: Mitigation for PM10 Emissions - Construction.)

assume scraper handles 50% of dirt, loader 45%, and backhoe 5%

18,619 yd³/day
 2,867,373 yd³

21,971 ton/day
 3,383,500 tons

2360 density of soil (lb/yd³)
 (USDA NRCS Physical Soil Properties from Kern County
 Lockern-Buttonwillow clay soil)

354.75 acres = 2,867,373 cubic yds, assume depth of soils moved is 1.67 yd
 (assume 75% of entire site in 12 month period)

Cover Storage Pile

SCAQMD Table A9-9-E

$$E = 1.7 * G/1.5 * (365-H)/235 * I/15 * J$$

PM10 Emission factor from wind erosion of storage piles per day per acre

50 G = Silt content (%) (from soil boring B-4)

37 H = Mean number of days per year with at least 0.01 inches of precipitation (from WRCC for Bakersfield Airport Station)

0.3 I = Percentage of time that the unobstructed wind speed exceeds 12 mph at mean pile height

0.5 J = Fraction of TSP that is PM10 = 0.5

0.791 lb/acre/day

wind speed percentage and average based on 2000-04 (5 yrs) of wind speed data as recorded at Bakersfield Airport station

Source	Quantity	Size of Pile (acre)	Days / year	Watering Control Efficiency	PM10 Emissions (tons/yr)	PM2.5 Emissions (tons/yr)
Cover Storage Pile	40	0.25	365	67%	0.48	0.099

Water efficiency from CEQA Table 11-4 watering 3 times daily or using chemical suppressants (South Coast Air Quality Management District, 1993, CEQA Air Quality Handbook, Table 11-4: Mitigation for PM10 Emissions - Construction.)

pile size and number are assumed

Days per year accounts for weekend days also, not just work days

Travel on unpaved road

$$F = 2.1 * G/12 * H/30 * (J/3)^{0.7} * (I/4)^{0.5} * (365-K)/365$$

SCAQMD Table A9-9-D

Emission factor for vehicle travel on unpaved roads (lb/VMT)

4 G = Surface silt loading (%) (value for gravel road)

4 H = Mean vehicle speed (mph)

value listed in table I = Mean number of wheels on vehicle

value listed in table J = Mean vehicle weight (ton)

37 K = Mean number of days per year with at least 0.01 inches of precipitation (from WRCC for Bakersfield Airport Station)

Vehicle Type	Quantity per year	Round Trips /Day/ Unit	Round Trip Distance (mile)	Annual VMT (all units)	Mean Vehicle Weight (tons)	Number of Wheels on Vehicle	PM10 EF (lbs/VMT)	Watering Control Efficiency	PM10 Emissions (tons/yr)	PM2.5 Emissions (tons/yr)
Concrete Pumper Truck	6	2	0.75	990.0	30	10	0.66	67%	0.109	0.023
Dump Truck	0			0.0	15	10	0.41	67%	0.000	0.000
Service Truck - 1 ton	0			0.0	15	10	0.41	67%	0.000	0.000
Pile Driver Truck	0			0.0	15	10	0.41	67%	0.000	0.000
Truck - Fuel/Lube	0			0.0	15	10	0.41	67%	0.000	0.000
Tractor Truck 5th Wheel	0			0.0	11	10	0.33	67%	0.000	0.000
Trucks - Pickup 3/4 ton	60	10	0.5	79200.0	3	4	0.08	67%	1.096	0.232
Trucks - 3 ton	24	2	0.5	6336.0	11	10	0.33	67%	0.344	0.073
Truck - Water	12	4	1	12672.0	25	10	0.59	67%	1.223	0.259
Air Compressor 185 CFM	0			0.0	0.5	2	0.02	67%	0.000	0.000
Air Compressor 750 CFM	48	1	0.01	126.7	0.5	2	0.02	67%	0.000	0.000
Articulating Boom Platform	0			0.0	5	10	0.19	67%	0.000	0.000
Bulldozer D10R	0			0.0	35	2	0.33	67%	0.000	0.000
Bulldozer D4C	0			0.0	15	2	0.18	67%	0.000	0.000
Concrete Trowel Machine	12	1	0.25	396.0	15	8	0.37	67%	0.024	0.005
Concrete Vibrators	0			0.0	0.25	0	0.00	67%	0.000	0.000
Cranes - Mobile 35 ton	80	1	0.1	2112.0	25	12	0.64	67%	0.223	0.047
Cranes - Mobile 45 ton	0			0.0	35	2	0.33	67%	0.000	0.000
Crane - Mobile 65 ton	70	1	0.1	1848.0	45	2	0.39	67%	0.120	0.026
Cranes 100 / 150 ton cap	48	0	0	0.0	50	12	1.04	67%	0.000	0.000
Diesel Powered Welder	41	0	0	0.0	0.5	2	0.02	67%	0.000	0.000
Backhoe/loader	6	4	0.25	792.0	11	4	0.21	67%	0.027	0.006
Earth Scraper	0			0.0	40	4	0.51	67%	0.000	0.000
Loader	0			0.0	25	4	0.37	67%	0.000	0.000
Motor Grader	0			0.0	20	6	0.39	67%	0.000	0.000
Excavator - Trencher	0			0.0	17	4	0.28	67%	0.000	0.000
Fired Heaters	53	0	0	0.0	0.25	0	0.00	67%	0.000	0.000
Forklift	36	5	0.5	23760.0	10	4	0.19	67%	0.764	0.162
Fusion Welder	0			0.0	0.25	2	0.01	67%	0.000	0.000
Heavy Haul / Cranes	32	0	0	0.0	75	2	0.56	67%	0.000	0.000

Light Plants	84	0	0	0.0	0.5	4	0.02	67%	0.000	0.000
Portable Compaction Roller	10	0	0	0.0	3	3	0.07	67%	0.000	0.000
Portable Compaction - Plate	18	0	0	0.0	0.1	0	0.00	67%	0.000	0.000
Portable Compaction - Ram	0			0.0	0.25	0	0.00	67%	0.000	0.000
Pumps	24	0	0	0.0	0.1	0	0.00	67%	0.000	0.000
Portable Power Generators	60	0	0	0.0	0.5	4	0.02	67%	0.000	0.000
Truck Crane - Greater than 200 ton	42	1	0.1	1108.8	50	12	1.04	67%	0.190	0.040
Truck Crane - Greater than 300 ton	27	0	0	0.0	60	12	1.18	67%	0.000	0.000
Vibratory Roller 20 ton	0			0.0	20	3	0.27	67%	0.000	0.000
								Total	4.124	0.874
worker personal vehicles	946	1	0.5	473.2	3	4	0.08	85%	0.003	0.001

worker personal vehicle data from Table 2-26, Estimated Monthly Construction Workforce from AFC, average for months 17-28 divided by 1.25 employees per vehicle

Assumed maximum travel speed is 4 mph

Equipment weight from SCAQMD Table A9-9-D-3 and various websites

Water efficiency from CEQA Table 11-4 watering 3 times daily or using chemical suppressants (South Coast Air Quality Management District, 1993, CEQA Air Quality Handbook, Table 11-4: Mitigation for PM10 Emissions - Construction.)

except for worker vehicles - parking area will be graveled and main road onsite will be paved

PM2.5 emission factors from updated CEIDARS List with PM2.5 fractions.

PM2.5 numbers obtained by multiplying the PM10 values by fraction in CEIDARS list for appropriate fugitive dust sources.

Water trucks operate at least 4 times per day.

Total Annual Fugitive Dust from Onsite Equipment

	PM₁₀ Emissions (tons/yr)	PM_{2.5} Emissions (tons/yr)
Dirt Piling or Material Handling	0.0357	0.0054
Storage Piles	0.4763	0.0991
Travel on unpaved road	4.1244	0.8744
TOTAL	0.137	0.029

Annual Off-Site Linears Fugitive Dust Emissions

Emissions Summary

Hydrogen Energy, Inc
HECA Project

11/4/2009

Travel on unpaved road

$$F = 2.1 * G/12 * H/30 * (J/3)^{0.7} * (I/4)^{0.5} * (365-K)/365$$

SCAQMD Table A9-9-D

Emission factor for vehicle travel on unpaved roads (lb/VMT)

4 G = Surface silt loading (%) (value for gravel road)

5 H = Mean vehicle speed (mph)

value listed in table I = Mean number of wheels on vehicle

value listed in table J = Mean vehicle weight (ton)

37 K = Mean number of days per year with at least 0.01 inches of precipitation (from WRCC for Bakersfield Airport Station)

Vehicle Type	Quantity per year	Round Trips /Day/ Unit	Round Trip Distance on Dirt Surface (mile)	Annual VMT (all units)	Mean Vehicle Weight (tons)	Number of Wheels on Vehicle	PM ₁₀ EF (lbs/VMT)	Watering Control Efficiency	PM ₁₀ Emissions (tons/yr)	PM _{2.5} Emissions (tons/yr)
ON ROAD										
Dump Truck	12	4	0.25	12.0	17	10	0.56	67%	0.0011	0.0002
Service Truck (MHD-DSL)	0	1	0.125	0.0	4	6	0.16	67%	0.0000	0.0000
Pipe Haul Truck and Trailer (HHDT-DSL)	12			0.0	15	10	0.51	67%	0.0000	0.0000
Truck (Pickup 3/4 Ton) - MHD-DSL	17	2	0.25	8.5	1	4	0.05	67%	0.0001	0.0000
Truck - water	12	4	0.25	12.0	25	10	0.73	67%	0.0014	0.0003
OFF ROAD										
Air Compressor	10					4	0.00	67%	0.0000	0.0000
Bore Machine (Hydraulic)	5					10	0.00	67%	0.0000	0.0000
Crane	5					10	0.00	67%	0.0000	0.0000
Backhoe	12					2	0.00	67%	0.0000	0.0000
Excavator	12	1	0.25	3.0	17	4	0.35	67%	0.0002	0.0000
Forklift	4	4	0.25	4.0	10	4	0.24	67%	0.0002	0.0000
Welding Generator	4					3	0.00	67%	0.0000	0.0000
Roller	12	4	0.25	12.0	20	3	0.34	67%	0.0007	0.0001
Pipe Bending Machine	12						0.00	67%	0.0000	0.0000
worker personal vehicles	131	1	0.125	16.4	3	4	0.10	67%	0.0003	0.0001
Total									0.0039	0.0008

offsite worker personal vehicle data from Table 2-26, Estimated Monthly Construction Workforce from AFC, average for months 1-12 divided by 1.25 employees per vehicle

Assumed maximum travel speed is 5 mph

Equipment weight from SCAQMD Table A9-9-D-3 and various websites

Water efficiency from CEQA Table 11-4 watering 3 times daily or using chemical suppressants (South Coast Air Quality Management District, 1993, CEQA Air Quality Handbook, Table 11-4: Mitigation for PM10 Emissions - Construction.)

except for worker vehicles - parking area will be graveled and main road onsite will be paved

PM_{2.5} emission factors from updated CEIDARS List with PM2.5 fractions.

PM_{2.5} numbers obtained by multiplying the PM₁₀ values by fraction in CEIDARS list for appropriate fugitive dust sources.

Water trucks operate at least 4 times per day.

Truck quantity based on monthly maximums

Total Annual Fugitive Dust from Offsite Linears Construction

	PM ₁₀ Emissions (tons/yr)	PM _{2.5} Emissions (tons/yr)
Dirt Piling or Material Handling	0.0379	0.0079
Storage Piles	0.0953	0.0198
Travel on unpaved road	0.0039	0.0008
TOTAL	0.1370	0.0285

Hydrogen Energy California, Kern County Power Project
 Unmitigated Annual Exhaust Emissions For Offsite Construction Equipment
 10/27/2009

Month	CO		CO ₂		CH ₄		N ₂ O		NO _x		PM ₁₀		PM _{2.5}		SO _x		ROG ¹	
	Monthly Emissions (tons)	12-Month Total (tons)	Monthly Emissions (tons)	12-Month Total (tons)	Monthly Emissions (tons)	12-Month Total (tons)	Monthly Emissions (tons)	12-Month Total (tons)	Monthly Emissions (tons)	12-Month Total (tons)	Monthly Emissions (tons)	12-Month Total (tons)	Monthly Emissions (tons)	12-Month Total (tons)	Monthly Emissions (tons)	12-Month Total (tons)	Monthly Emissions (tons)	12-Month Total (tons)
1	0.29	NA	46.40	NA	0.01	NA	0.0009	NA	0.49	NA	0.038	NA	0.035	NA	0.0005	NA	0.11	NA
2	0.29	NA	46.40	NA	0.01	NA	0.0009	NA	0.49	NA	0.038	NA	0.035	NA	0.0005	NA	0.11	NA
3	0.32	NA	48.85	NA	0.01	NA	0.0010	NA	0.51	NA	0.041	NA	0.037	NA	0.0005	NA	0.12	NA
4	0.32	NA	48.85	NA	0.01	NA	0.000968	NA	0.51	NA	0.041	NA	0.037	NA	0.0005	NA	0.120	NA
5	0.32	NA	48.85	NA	0.01	NA	0.0010	NA	0.51	NA	0.041	NA	0.037	NA	0.0005	NA	0.12	NA
6	0.41	NA	68.26	NA	0.01	NA	0.0015	NA	0.72	NA	0.051	NA	0.046	NA	0.0007	NA	0.14	NA
7	0.41	NA	68.26	NA	0.01	NA	0.0015	NA	0.72	NA	0.051	NA	0.046	NA	0.0007	NA	0.14	NA
8	0.41	NA	68.26	NA	0.01	NA	0.0015	NA	0.72	NA	0.051	NA	0.046	NA	0.0007	NA	0.14	NA
9	0.47	NA	75.06	NA	0.01	NA	0.0016	NA	0.80	NA	0.058	NA	0.053	NA	0.0008	NA	0.16	NA
10 max short term	0.47	NA	75.06	NA	0.01	NA	0.001585	NA	0.80	NA	0.058	NA	0.053	NA	0.0008	NA	0.164	NA
11	0.38	NA	55.66	NA	0.01	NA	0.001092	NA	0.59	NA	0.048	NA	0.044	NA	0.0006	NA	0.140	NA
12 max 12 month period	0.38	4.47	55.66	705.58	0.01	0.0991	0.001092	0.0145	0.59	7.45	0.048	0.563	0.044	0.514	0.0006	0.0076	0.140	1.610
13	0.00	4.18	0.00	659.17	0.00	0.0934	0.000000	0.0135	0.00	6.96	0.000	0.526	0.000	0.480	0.0000	0.0071	0.000	1.503
14	0.00	3.89	0.00	612.77	0.00	0.0877	0.00	0.01264	0.00	6.47	0.00	0.488	0.00	0.445	0.00	0.0066	0.00	1.397
15	0.00	3.56	0.00	563.91	0.00	0.0807	0.00	0.01167	0.00	5.96	0.00	0.447	0.00	0.408	0.00	0.0061	0.00	1.277
16	0.00	3.24	0.00	515.06	0.00	0.0737	0.00	0.0107	0.00	5.44	0.00	0.406	0.00	0.371	0.00	0.0056	0.00	1.157
17	0.00	2.92	0.00	466.20	0.00	0.067	0.00	0.0097	0.00	4.93	0.00	0.365	0.00	0.333	0.00	0.005	0.00	1.037
18	0.00	2.51	0.00	397.95	0.00	0.058	0.00	0.0083	0.00	4.21	0.00	0.314	0.00	0.287	0.00	0.004	0.00	0.894
19	0.00	2.10	0.00	329.69	0.00	0.049	0.00	0.0068	0.00	3.49	0.00	0.263	0.00	0.241	0.00	0.004	0.00	0.751
20	0.00	1.69	0.00	261.43	0.00	0.039	0.00	0.0054	0.00	2.77	0.00	0.213	0.00	0.194	0.00	0.003	0.00	0.607
21	0.00	1.23	0.00	186.38	0.00	0.029	0.00	0.0038	0.00	1.97	0.00	0.155	0.00	0.141	0.00	0.002	0.00	0.444
22	0.00	0.76	0.00	111.32	0.00	0.018	0.00	0.0022	0.00	1.18	0.00	0.097	0.00	0.088	0.00	0.001	0.00	0.280
23	0.00	0.38	0.00	55.66	0.00	0.009	0.00	0.0011	0.00	0.59	0.00	0.048	0.00	0.044	0.00	0.001	0.00	0.140
24	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
25	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
26	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
27	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
28	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
29	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
30	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
31	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
32	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
33	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
34	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
35	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
36	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
37	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
38	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
39	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
40	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
41	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
42	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
43	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
44	0.00	0.00	0.00	0.00	0.00	0.000	0.00	0.0000	0.00	0.00	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
Maximum (100 % load)	0.47	4.47	# 75.06	705.58	# 0.01	0.0991	# 0.001585	0.0145	# 0.80	7.45	# 0.058	0.563	# 0.053	0.514	# 0.0008	0.0076	# 0.164	1.610
Average (66 % load)	0.31	2.95	# 49.54	465.68	# 0.01	0.07	# 0.0010	0.0095	# 0.53	4.91	# 0.038	0.372	# 0.035	0.340	# 0.0005	0.01	# 0.11	1.06

Note:
¹ Assuming ROG's are equivalent to VOCs
 - Assuming 75% operational average load