

Attachment C-6

Operational Emission Factors and Emissions

**Table OP-1
Operational Annual Emissions Summary**

Activity/Emission Source	CO (tons/yr)	VOC (tons/yr)	NO_x (tons/yr)	SO_x (tons/yr)	PM₁₀ (tons/yr)
Conveyance Facility Inspection					
Equipment Exhaust	0.00	0.00	0.00	0.00	0.00
Motor Vehicles	0.02	0.00	0.00	0.00	0.00
Fugitive PM ₁₀	--	--	--	--	4.15
Subtotals	0.02	0.00	0.00	0.00	4.15
Power Transmission Facility Maintenance					
Equipment Exhaust	0.00	0.00	0.00	0.00	0.00
Motor Vehicles	0.00	0.00	0.00	0.00	0.00
Fugitive PM ₁₀	--	--	--	--	0.41
Subtotals	0.00	0.00	0.00	0.00	0.41
Spreading Basin Maintenance					
Equipment Exhaust	0.16	0.02	0.31	0.03	0.02
Motor Vehicles	0.04	0.01	0.04	0.00	0.00
Fugitive PM ₁₀	--	--	--	--	4.81
Subtotals	0.20	0.03	0.35	0.03	4.83
TOTAL	0.21	0.03	0.36	0.03	9.39
<i>CEQA Significance Level</i>	<i>548</i>	<i>137</i>	<i>137</i>	<i>137</i>	<i>82</i>
Significant? (Yes/No)	No	No	No	No	No

**Table OP-2
Operations Parameters**

Water Conveyance Facility Inspection

Parameter	Value	Basis
Number of Vehicles	1	Planned operations
Miles/Trip	72	Distance from Cadiz Pumping Facility to Spreading Basins
Number Trips	52	Planned operations
Total Miles	3,744	
Total Starts	104	Two starts per round trip

Transmission Line Maintenance

Parameter	Value	Basis
Miles/Trip/Vehicle	72	Distance from Cadiz Pumping Facility to Spreading Basins
Number Trips/Vehicle	1	Planned operations
Total Miles/Vehicle	72	
Total Starts/Vehicle	2	Two starts per round trip

Spreading Basin Sediment Removal by Scraper

Parameter	Value	Basis
Basin Area (acres)	310	Project design, excluding berms
Basin Area (ft ²)	13,503,600	
Depth of Cut (inches)	0.5	Estimate to remove sediment
Volume Removed (yd ³)	20,839	
Density (tons/yd ³)	1.25	Assumption
Weight Removed (tons)	26,049	
Width/Scraper Pass (feet)	8	Typical scraper dimensions
Scraper Miles	320	
Scraper Speed (miles/hour)	5	Assumption
Scraper Operating Time (hours)	64	

Haul Truck Loading by Front End Loaders

Parameter	Value	Basis
Loader Operating Rate (yd ³ /hour)	80	Typical capacity for 1.5 yd ³ bucket
Loader Operating Time (hours)	260	

Haul Trucks Hauling Sediment

Parameter	Value	Basis
Haul Truck Capacity (yd ³)	18	Assumption
Trips	1,158	Distance from Spreading Basins to Cadiz Ag. lands
Miles/Trip	4	
Total Miles	4,631	

**Table OP-3
Spreading Basin Maintenance Equipment Emission Factors**

Equipment	Horsepower	Load Factor (percent)	CO (lb/bhp-hr)	VOC (lb/bhp-hr)	NO_x (lb/bhp-hr)	SO_x (lb/bhp-hr)	PM₁₀ (lb/bhp-hr)	CO (lb/hr)	VOC (lb/hr)	NO_x (lb/hr)	SO_x (lb/hr)	PM₁₀ (lb/hr)
Front End Loader	147	46.5	0.0110	0.0020	0.0230	0.0020	0.0010	0.752	0.137	1.572	0.137	0.068
Scraper	266.76	66	0.0110	0.0010	0.0190	0.0020	0.0015	1.937	0.176	3.345	0.352	0.264

Source: South Coast Air Quality Management District CEQA Air Quality Handbook, November 1993, Tables A9-8-B, A9-8-C and A9-8-D

**Table OP-4
Operational Motor Vehicle Exhaust, Tire and Brake Wear Emission Factors**

Vehicle Type	Vehicle Class	Speed (mph)	CO		VOC					
			Exhaust (g/mi)	Start-Up ^a (g/start)	Exhaust (g/mi)	Start-Up ^a (g/start)	Hot Soak (g/trip)	Resting (g/hr)	Evap. Running (g/mi)	Diurnal (g/hr)
Inspection Crew	Light Duty Truck	35	3.20	26.10	0.21	3.01	0.51	0.11	0.06	0.58
Maintenance Crew	Light Duty Truck	35	3.20	26.10	0.21	3.01	0.51	0.11	0.06	0.58
Maintenance Water Truck	Heavy Heavy-Duty Truck	35	7.10	0.00	1.07	0.00	0.00	0.00	0.00	0.00
Sediment Haul Truck	Heavy Heavy-Duty Truck	35	7.10	0.00	1.07	0.00	0.00	0.00	0.00	0.00

Vehicle Type	NO _x		SO _x	PM ₁₀		
	Exhaust (g/mi)	Start-Up ^a (g/start)	Exhaust (g/mi)	Exhaust (g/mi)	Brake Wear (g/mi)	Tire Wear (g/mi)
Inspection Crew	0.62	2.04	0.00	0.00	0.01	0.01
Maintenance Crew	0.62	2.04	0.00	0.00	0.01	0.01
Maintenance Water Truck	8.37	0.00	0.08	0.53	0.01	0.04
Sediment Haul Truck	8.37	0.00	0.08	0.53	0.01	0.04

Source: ARB EMFAC7G motor vehicle emission factor model, 2/10/2000 version, for calendar year 2001, summertime

^a Based on 720 minutes engine-off

**Table OP-5
Operational Fugitive PM₁₀ Emission Factors**

Inspection Crew Vehicle on Unpaved Roads		
Parameter	Value	Source
Vehicle Weight (tons)	2.4	Assumption
Surface Silt Content (percent)	11	MDAQMD Default
Moisture Content (percent)	0.2	MDAQMD Default
Control Efficiency (percent)	0	Conservative Assumption
Emission Factor (lb/VMT)*	2.22	
* EF = 2.6 (silt loading/12) ^{0.8} (vehicle weight/3) ^{0.4} (moisture/0.2) ^{-0.3} (1-control efficiency/100)		
Source: AP-42, 13.2.2, Sept. 1998		
Transmission Line Maintenance Vehicles on Unpaved Roads		
Parameter	Value	Source
Vehicle Weight (tons)	25	Assumption
Surface Silt Content (percent)	11	MDAQMD Default
Moisture Content (percent)	0.2	MDAQMD Default
Control Efficiency (percent)	0	Conservative Assumption
Emission Factor (lb/VMT)*	5.66	
* EF = 2.6 (silt loading/12) ^{0.8} (vehicle weight/3) ^{0.4} (moisture/0.2) ^{-0.3} (1-control efficiency/100)		
Source: AP-42, 13.2.2, Sept. 1998		
Haul Trucks on Unpaved Roads		
Parameter	Value	Source
Vehicle Weight (tons)	30	Assumption
Surface Silt Content (percent)	11	MDAQMD Default
Moisture Content (percent)	0.2	MDAQMD Default
Control Efficiency (percent)	72.9	Conservative Assumption
Emission Factor (lb/VMT)*	1.65	
* EF = 2.6 (silt loading/12) ^{0.8} (vehicle weight/3) ^{0.4} (moisture/0.2) ^{-0.3} (1-control efficiency/100)		
Source: AP-42, 13.2.2, Sept. 1998		
Scraping		
Parameter	Value	Source
Control Efficiency (percent)	50	Conservative Assumption
Emission Factor (lb/VMT)*	5.05	
*EF = 10.1 (1-control efficiency/100)		
Source: AP-42, 13.2.3, October 1998 with assumption that 50% of TSP is PM10		
Material Handling		
Parameter	Value	Source
Mean Wind Speed (miles/hour)	7.7	MDAQMD Default
Moisture Content (percent)	0.5	MDAQMD Default
Number Drops	2	Maximum per Load
Control Efficiency (percent)	50	Conservative Assumption
Emission Factor (lb/ton)*	0.0141	
*EF = 0.00115 (number drops) (wind speed/5) ^{1.3} (moisture/2) ^{-1.4} (1-control efficiency/100)		
Source: AP-42, 13.2.4, January 1995		

**Table OP-6
Operational Maintenance Equipment Exhaust Annual Emissions**

Equipment Type	Operating Time (hrs/yr)	CO (tons/yr)	VOC (tons/yr)	NO_x (tons/yr)	SO_x (tons/yr)	PM₁₀ (tons/yr)
Scraper	64	0.06	0.01	0.11	0.01	0.01
Front End Loader	260	0.10	0.02	0.20	0.02	0.01
TOTAL		0.16	0.02	0.31	0.03	0.02

**Table OP-7
Operational Motor Vehicle Exhaust, Tire and Brake Wear Annual Emissions**

Vehicle Type	VMT	Starts	CO (tons/yr)	VOC (tons/yr)	NO_x (tons/yr)	SO_x (tons/yr)	PM₁₀ (tons/yr)
Inspection Crew	3,744	104	0.02	0.00	0.00	0.00	0.00
Maintenance Crew	72	2	0.00	0.00	0.00	0.00	0.00
Maintenance Water Truck	72	N/A	0.00	0.00	0.00	0.00	0.00
Sediment Haul Truck	4,631	N/A	0.04	0.01	0.04	0.00	0.00
TOTAL			0.05	0.01	0.05	0.00	0.00

**Table OP-8
Operational Fugitive PM₁₀ Annual Emissions**

Source	Activity Level	Activity Units	Emission Factor (lb/activity unit)	PM10 Emissions (tons/yr)
Inspection Crew Vehicle on Unpaved Road	3,744	VMT	2.22	4.15
Maintenance Vehicles on Unpaved Roads	144	VMT	5.66	0.41
Scraper Removing Sediment	320	VMT	5.05	0.81
Loader Loading Sediment into Haul Trucks	26,049	Tons	0.0141	0.18
Haul Trucks on Unpaved Roads	4,631	VMT	1.65	3.82
TOTAL				9.37