Emission Calculations

Dicks Creek and Monroe Ditch Remediation Air Emission Calculations

Uncontrolled Unpaved Roadways

Dicks Creek and Monroe Ditch Remediation Project
AP-42 (November 2006) Ch. 13.2.1

E = k * (s/12)^a * (W/3)^b

E = Emissions factor (lb/VMT)
k = Base emission factor (lb/VMT)
s = Surface material silt content (%)
W = Mean vehicle weight (tons)
a = empirical constant
b = empirical constant

Paved Roadways	Number of Round Trips/day [a]	Vehicle Miles Per Trip [b]	k lb/VMT	s [e] (%)	W tons [c]	a	b	E lb/VMT	Control Efficiency %	Miles Traveled Per Day	Emissions (lbs/day) PM	PM10	PM2.5	Emissions (lbs/hr) [d] PM	PM10	PM2.5	Emissions (TPY) [d] PM	PM10	PM2.5
Roadway Segment Staging Area 3 - PM	6.25	0.135	4.9	4.0	17.5	0.7	0.45	5.02	0	0.84	4.23E+00			5.29E-01			7.72E-01		
Roadway Segment Staging Area 3 - PM10	6.25	0.135	1.5	4.0	17.5	0.9	0.45	1.23	0	0.84		1.04E+00			1.30E-01			1.90E-01	
Roadway Segment Staging Area 3 - PM2.5	6.25	0.135	0.15	4.0	17.5	0.9	0.45	0.12	0	0.84			1.04E-01			1.30E-02			1.90E-02
Roadway Segment Staging Area 4 - PM	6.25	0.303	4.9	4.0	17.5	0.7	0.45	5.02	0	1.90	9.52E+00			1.19E+00			1.74E+00		
Roadway Segment Staging Area 4 - PM10	6.25	0.303	1.5	4.0	17.5	0.9	0.45	1.23	0	1.90		2.34E+00			2.93E-01			4.27E-01	
Roadway Segment Staging Area 4 - PM2.5	6.25	0.303	0.15	4.0	17.5	0.9	0.45	0.12	0	1.90			2.34E-01			2.93E-02			4.27E-02
Roadway Segment Staging Area 1 - PM	6.25	0.979	4.9	4.0	17.5	0.7	0.45	5.02	0	6.12	3.07E+01			3.84E+00			5.61E+00		
Roadway Segment Staging Area 1 - PM10	6.25	0.979	1.5	4.0	17.5	0.9	0.45	1.23	0	6.12		7.55E+00			9.44E-01			1.38E+00	
Roadway Segment Staging Area 1 - PM2.5	6.25	0.979	0.15	4.0	17.5	0.9	0.45	0.12	0	6.12			7.55E-01			9.44E-02			1.38E-01
Roadway Segment Staging Area 2 - PM	6.25	0.945	4.9	4.0	17.5	0.7	0.45	5.02	0	5.91	2.97E+01			3.71E+00			5.41E+00		
Roadway Segment Staging Area 2 - PM10	6.25	0.945	1.5	4.0	17.5	0.9	0.45	1.23	0	5.91		7.29E+00			9.11E-01			1.33E+00	
Roadway Segment Staging Area 2 - PM2.5	6.25	0.945	0.15	4.0	17.5	0.9	0.45	0.12	0	5.91			7.29E-01			9.11E-02			1.33E-01
									TOTAL:	**44.29**	**74.14**	**18.22**	**1.82**	**9.27**	**2.28**	**0.23**	**13.53**	**3.32**	**0.33**

Note

a Worst case of 15-25 vehicles per day (25 vehicles per day). Divided 25 vehicles per day by total number of road segments (4) since they would never be traveling on all of them in one day
b Based on Remediation Site Map - Figure 1
c Assumed as the average of empty weight (10 tons) and full weight (25 tons)
d Assumes total project duration of 365 days/year, 8 hours per day.
e Since the road segments will be constructed of gravel, we assumed a silt content of 4% based on California Environmental Quality Act (CEQA) Table A9-9-D-1 (1997) Guidelines

Controlled Unpaved Roadways

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E = k * (s/12)^a * (W/3)^b

E = Emissions factor (lb/VMT)
k = Base emission factor (lb/VMT)
s = Surface material silt content (%)
W = Mean vehicle weight (tons)
a = empirical constant
b = empirical constant

Paved Roadways	Number of Round Trips/day [a]	Vehicle Miles Per Trip [b]	k lb/VMT	s [f] (%)	W tons [c]	a	b	E lb/VMT	Control Efficiency % [d]	Miles Traveled Per Day	Emissions (lbs/day) PM	PM10	PM2.5	Emissions (lbs/hr) [e] PM	PM10	PM2.5	Emissions (TPY) [e] PM	PM10	PM2.5
Roadway Segment Staging Area 3 - PM	6.25	0.135	4.9	4.0	17.5	0.7	0.45	5.02	55	0.84	1.90E+00			2.38E-01			3.48E-01		
Roadway Segment Staging Area 3 - PM10	6.25	0.135	1.5	4.0	17.5	0.9	0.45	1.23	55	0.84		4.68E-01			5.85E-02			8.54E-02	
Roadway Segment Staging Area 3 - PM2.5	6.25	0.135	0.15	4.0	17.5	0.9	0.45	0.12	55	0.84			4.68E-02			5.85E-03			8.54E-03
Roadway Segment Staging Area 4 - PM	6.25	0.303	4.9	4.0	17.5	0.7	0.45	5.02	55	1.90	4.29E+00			5.36E-01			7.82E-01		
Roadway Segment Staging Area 4 - PM10	6.25	0.303	1.5	4.0	17.5	0.9	0.45	1.23	55	1.90		1.05E+00			1.32E-01			1.92E-01	
Roadway Segment Staging Area 4 - PM2.5	6.25	0.303	0.15	4.0	17.5	0.9	0.45	0.12	55	1.90			1.05E-01			1.32E-02			1.92E-02
Roadway Segment Staging Area 1 - PM	6.25	0.979	4.9	4.0	17.5	0.7	0.45	5.02	55	6.12	1.38E+01			1.73E+00			2.52E+00		
Roadway Segment Staging Area 1 - PM10	6.25	0.979	1.5	4.0	17.5	0.9	0.45	1.23	55	6.12		3.40E+00			4.25E-01			6.20E-01	
Roadway Segment Staging Area 1 - PM2.5	6.25	0.979	0.15	4.0	17.5	0.9	0.45	0.12	55	6.12			3.40E-01			4.25E-02			6.20E-02
Roadway Segment Staging Area 2 - PM	6.25	0.945	4.9	4.0	17.5	0.7	0.45	5.02	55	5.91	1.33E+01			1.67E+00			2.44E+00		
Roadway Segment Staging Area 2 - PM10	6.25	0.945	1.5	4.0	17.5	0.9	0.45	1.23	55	5.91		3.28E+00			4.10E-01			5.99E-01	
Roadway Segment Staging Area 2 - PM2.5	6.25	0.945	0.15	4.0	17.5	0.9	0.45	0.12	55	5.91			3.28E-01			4.10E-02			5.99E-02
									TOTAL:	44.29	33.36	8.20	0.82	4.17	1.02	0.10	6.09	1.50	0.15

Note

a Worst case of 15-25 vehicles per day (25 vehicles per day). Divided 25 vehicles per day by total number of road segments (4) since they would never be traveling on all of them in one day
b Based on Remediation Site Map - Figure 1
c Assumed as the average of empty weight (10 tons) and full weight (25 tons)
d Control efficiency of 55% with limiting speed on plant site to 25 miles per hour and watering roadway twice a day, as needed per Table 6-6 of AP-42 background data.
e Assumes total project duration of 365 days/year, 8 hours per day.
f Since the road segments will be constructed of gravel, we assumed a silt content of 4% based on California Environmental Quality Act (CEQA) Table A9-9-D-1 (1997) Guidelines