

Appendix E
Air Quality and Greenhouse Gas Emissions
Technical Appendix

Attachment E-1

Copies of Emission Reports and Input Data for Bore Under Highway 12
Based on the Road Construction Model

Road Construction Emissions Model, Version 6.3.2

Emission Estimates for -> Bouldin/Tyler Bore Under HWY 12											
Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	CO2 (lbs/day)	
Grubbing/Land Clearing	1.4	7.8	11.1	10.5	0.5	10.0	2.6	0.5	2.1	1,664.4	
Grading/Excavation	2.5	13.1	20.0	5.9	0.9	5.0	1.9	0.8	1.0	2,417.9	
Drainage/Utilities/Sub-Grade	-	-	-	-	-	-	-	-	-	-	
Paving	-	-	-	-	-	-	-	-	-	-	
Maximum (pounds/day)	2.5	13.1	20.0	10.5	0.9	10.0	2.6	0.8	2.1	2,417.9	
Total (tons/construction project)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	

Notes: Project Start Year -> 2013
 Project Length (months) -> 0
 Total Project Area (acres) -> 1
 Maximum Area Disturbed/Day (acres) -> 1
 Total Soil Imported/Exported (yd³/day)-> 0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

Emission Estimates for -> Bouldin/Tyler Bore Under HWY 12											
Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	Total PM10 (kgs/day)	Exhaust PM10 (kgs/day)	Fugitive Dust PM10 (kgs/day)	Total PM2.5 (kgs/day)	Exhaust PM2.5 (kgs/day)	Fugitive Dust PM2.5 (kgs/day)	CO2 (kgs/day)	
Grubbing/Land Clearing	0.6	3.5	5.0	4.8	0.2	4.5	1.2	0.2	0.9	756.6	
Grading/Excavation	1.1	6.0	9.1	2.7	0.4	2.3	0.9	0.4	0.5	1,099.1	
Drainage/Utilities/Sub-Grade	-	-	-	-	-	-	-	-	-	-	
Paving	-	-	-	-	-	-	-	-	-	-	
Maximum (kilograms/day)	1.1	6.0	9.1	4.8	0.4	4.5	1.2	0.4	0.9	1,099.1	
Total (megagrams/construction project)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.9	

Notes: Project Start Year -> 2013
 Project Length (months) -> 0
 Total Project Area (hectares) -> 0
 Maximum Area Disturbed/Day (hectares) -> 0
 Total Soil Imported/Exported (meters³/day)-> 0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

Road Construction Emissions Model

Version 6.3.2

Data Entry Worksheet

Note: Required data input sections have a yellow background.

Optional data input sections have a blue background. Only areas with a

yellow or blue background can be modified. Program defaults have a white background.

The user is required to enter information in cells C10 through C25.



Input Type

Project Name	Bouldin/Tyler Bore Under HWY 12	
Construction Start Year	2013	Enter a Year between 2005 and 2025 (inclusive)
Project Type	1	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	0.1	months
Predominant Soil/Site Type: Enter 1, 2, or 3	2	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
Project Length		miles
Total Project Area	0.5	acres
Maximum Area Disturbed/Day	0.5	acres
Water Trucks Used?	1	1. Yes 2. No
Soil Imported	0.0	yd ³ /day
Soil Exported	0.0	yd ³ /day
Average Truck Capacity	20.0	yd ³ (assume 20 if unknown)

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells C34 through C37.

Construction Periods	User Override of		Program
	Construction Months		Calculated
		Months	Months
Grubbing/Land Clearing	0.07		0.01
Grading/Excavation	0.03		0.03
Drainage/Utilities/Sub-Grade			0.02
Paving			0.01
Totals	0.10		0.07

2005	%	2006	%	2007
0.00		0.00		0.00
0.00		0.00		0.00
0.00		0.00		0.00
0.00		0.00		0.00

Please note: You have entered a different number of months than the project length shown in cell C13.

Hauling emission default values can be overridden in cells C45 through C46.

Soil Hauling Emissions		User Override of					
User Input		Soil Hauling Defaults	Default Values				
Miles/round trip		25.00	30				
Round trips/day		1.00	0				
Vehicle miles traveled/day (calculated)				25			
Hauling Emissions		ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate (grams/mile)		0.84	10.25	5.45	0.40	0.33	1874.76
Emission rate (grams/trip)		10.32	7.57	172.85	0.01	0.01	199.87
Pounds per day		0.0	0.6	0.3	0.0	0.0	103.2
Tons per construction period		0.00	0.00	0.00	0.00	0.00	0.04

Worker commute default values can be overridden in cells C60 through C65.

Worker Commute Emissions		User Override of Worker					
Commute Default Values		Default Values					
Miles/ one-way trip		12.50	20				
One-way trips/day		2.00	2				
No. of employees: Grubbing/Land Clearing		8.00	3				
No. of employees: Grading/Excavation			5				
No. of employees: Drainage/Utilities/Sub-Grade			5				
No. of employees: Paving			4				
		ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Grubbing/Land Clearing (grams/mile)		0.118	0.211	2.201	0.033	0.018	426.660
Emission rate - Grading/Excavation (grams/mile)		0.118	0.211	2.201	0.033	0.018	426.660
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)		0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Paving (grams/mile)		0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Grubbing/Land Clearing (grams/trip)		0.746	0.316	7.305	0.130	0.013	192.690
Emission rate - Grading/Excavation (grams/trip)		0.746	0.316	7.305	0.130	0.013	192.690
Emission rate - Draining/Utilities/Sub-Grade (gr/trip)		0.000	0.000	0.000	0.000	0.000	0.000
Emission rate - Paving (grams/trip)		0.000	0.000	0.000	0.000	0.000	0.000
Pounds per day - Grubbing/Land Clearing		0.105	0.115	1.484	0.024	0.009	201.538
Tons per const. Period - Grub/Land Clear		0.000	0.000	0.001	0.000	0.000	0.148
Pounds per day - Grading/Excavation		0.105	0.115	1.484	0.024	0.009	201.538
Tons per const. Period - Grading/Excavation		0.000	0.000	0.001	0.000	0.000	0.074
Pounds per day - Drainage/Utilities/Sub-Grade		0.000	0.000	0.000	0.000	0.000	0.000
Tons per const. Period - Drain/Util/Sub-Grade		0.000	0.000	0.000	0.000	0.000	0.000
Pounds per day - Paving		0.000	0.000	0.000	0.000	0.000	0.000
Tons per const. Period - Paving		0.000	0.000	0.000	0.000	0.000	0.000
tons per construction period		0.000	0.000	0.002	0.000	0.000	0.222

Water truck default values can be overridden in cells C91 through C93 and E91 through E93.

Water Truck Emissions	User Override of	Program Estimate of	User Override of Truck	Default Values		
	Default # Water Trucks	Number of Water Trucks	Miles Traveled/Day	Miles Traveled/Day		
Grubbing/Land Clearing - Exhaust	0.00	1	20.00	40		
Grading/Excavation - Exhaust		1		40		
Drainage/Utilities/Subgrade		1		40		
	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Grubbing/Land Clearing (grams/mile)	0.84	10.25	5.45	0.40	0.33	1874.76
Emission rate - Grading/Excavation (grams/mile)	0.84	10.25	5.45	0.40	0.33	1874.76
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.00	0.00	0.00	0.00	0.00	0.00
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grub/Land Clear	0.00	0.00	0.00	0.00	0.00	0.00
Pound per day - Grading/Excavation	0.07	0.90	0.48	0.04	0.03	165.18
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.06
Pound per day - Drainage/Utilities/Subgrade	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Subgrade	0.00	0.00	0.00	0.00	0.00	0.00

Fugitive dust default values can be overridden in cells C110 through C112.

Fugitive Dust	User Override of Max	Default	PM10	PM10	PM2.5	PM2.5
	Acreage Disturbed/Day	Maximum Acreage/Day	pounds/day	tons/per period	pounds/day	tons/per period
Fugitive Dust - Grubbing/Land Clearing		0.5	10.0	0.0	2.1	0.0
Fugitive Dust - Grading/Excavation		0.5	5.0	0.0	1.0	0.0
Fugitive Dust - Drainage/Utilities/Subgrade		0	0.0	0.0	0.0	0.0

Off-Road Equipment Emissions

Grubbing/Land Clearing		Default Number of Vehicles	ROG	CO	NOx	PM10	PM2.5	
Override of Default Number of Vehicles	Program-estimate	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	
		Air Compressors	0.00	0.00	0.00	0.00	0.00	
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	
		Cranes	0.00	0.00	0.00	0.00	0.00	
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	
		Excavators	0.00	0.00	0.00	0.00	0.00	
		Forklifts	0.00	0.00	0.00	0.00	0.00	
		Generator Sets	0.00	0.00	0.00	0.00	0.00	
		Graders	0.00	0.00	0.00	0.00	0.00	
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	
1.00		Other Construction Equipment	0.45	2.35	3.13	0.25	0.23	
1.00		Other General Industrial Equipment	0.65	1.79	6.69	0.21	0.19	
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	
		Pavers	0.00	0.00	0.00	0.00	0.00	
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	
		Pumps	0.00	0.00	0.00	0.00	0.00	
		Rollers	0.00	0.00	0.00	0.00	0.00	
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	
0.00		1 Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	
0.00		1 Scrapers	0.00	0.00	0.00	0.00	0.00	
		0 Signal Boards	0.00	0.00	0.00	0.00	0.00	
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	
1.00		Tractors/Loaders/Backhoes	0.18	2.14	1.18	0.04	0.04	
		Trenchers	0.00	0.00	0.00	0.00	0.00	
		Welders	0.00	0.00	0.00	0.00	0.00	
		Grubbing/Land Clearing	pounds per day	1.3	6.3	11.0	0.5	0.5
		Grubbing/Land Clearing	tons per phase	0.0	0.0	0.0	0.0	0.0

Grading/Excavation		Default	ROG	CO	NOx	PM10	PM2.5
Override of Default Number of Vehicles	Number of Vehicles <i>Program-estimate</i>	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00
	0	Cranes	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00
	1.00	1 Excavators	0.74	4.07	5.46	0.31	0.29
		Forklifts	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00
	0.00	1 Graders	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00
	0	Other Construction Equipment	0.02	0.12	0.16	0.01	0.01
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00
	0.00	Rollers	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00
	1.00	Rubber Tired Dozers	1.51	6.67	12.84	0.53	0.49
	0.00	1 Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00
	0.00	1 Scrapers	0.00	0.00	0.00	0.00	0.00
		0 Signal Boards	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00
		Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00
	Grading/Excavation	pounds per day	2.3	10.9	18.5	0.9	0.8
	Grading	tons per phase	0.0	0.0	0.0	0.0	0.0

Drainage/Utilities/Subgrade Override of Default Number of Vehicles	Default Number of Vehicles	Equipment	ROG	CO	NOx	PM10	PM2.5
	<i>Program-estimate</i>		pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00
		Excavators	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00
0.00	1	Graders	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00
0.00	1	Plate Compactors	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00
0.00	1	Scrapers	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00
		Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00
0.00	1	Trenchers	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00
	Drainage	pounds per day	0.0	0.0	0.0	0.0	0.0
	Drainage	tons per phase	0.0	0.0	0.0	0.0	0.0

Paving	Default		ROG	CO	NOx	PM10	PM2.5	
	Override of Default Number of Vehicles	Number of Vehicles <i>Program-estimate</i>	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
			Aerial Lifts	0.00	0.00	0.00	0.00	0.00
			Air Compressors	0.00	0.00	0.00	0.00	0.00
			Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00
			Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00
			Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00
			Cranes	0.00	0.00	0.00	0.00	0.00
			Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00
			Excavators	0.00	0.00	0.00	0.00	0.00
			Forklifts	0.00	0.00	0.00	0.00	0.00
			Generator Sets	0.00	0.00	0.00	0.00	0.00
			Graders	0.00	0.00	0.00	0.00	0.00
			Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00
			Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00
			Other Construction Equipment	0.00	0.00	0.00	0.00	0.00
			Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00
			Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00
	0.00	1	Pavers	0.00	0.00	0.00	0.00	0.00
	0.00	1	Paving Equipment	0.00	0.00	0.00	0.00	0.00
			Plate Compactors	0.00	0.00	0.00	0.00	0.00
			Pressure Washers	0.00	0.00	0.00	0.00	0.00
			Pumps	0.00	0.00	0.00	0.00	0.00
	0.00	1	Rollers	0.00	0.00	0.00	0.00	0.00
			Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00
			Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00
			Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00
			Scrapers	0.00	0.00	0.00	0.00	0.00
		0	Signal Boards	0.00	0.00	0.00	0.00	0.00
			Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00
			Surfacing Equipment	0.00	0.00	0.00	0.00	0.00
			Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00
			Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00
			Trenchers	0.00	0.00	0.00	0.00	0.00
			Welders	0.00	0.00	0.00	0.00	0.00
		Paving	pounds per day	0.0	0.0	0.0	0.0	0.0
		Paving	tons per phase	0.0	0.0	0.0	0.0	0.0
Total Emissions all Phases (tons per construction period) =>				0.0	0.0	0.0	0.0	0.0

Equipment default values for horsepower, load factor, and hours/day can be overridden in cells C285 through C317, E285 through E317, and G285 through G317.

Equipment	Default Values Horsepower	Default Values Load Factor	Default Values Hours/day
Aerial Lifts	60	0.46	8
Air Compressors	106	0.48	8
Bore/Drill Rigs	291	0.75	8
Cement and Mortar Mixers	10	0.56	8
Concrete/Industrial Saws	19	0.73	8
Cranes	399	0.43	8
Crushing/Proc. Equipment	142	0.78	8
Excavators	168	0.57	10.00
Forklifts	145	0.30	8
Generator Sets	549	0.74	8
Graders	174	0.61	8
Off-Highway Tractors	267	0.65	8
Off-Highway Trucks	479	0.57	8
Other Construction Equipment	75	0.62	10.00
Other General Industrial Equipment	238	0.51	10.00
Other Material Handling Equipment	191	0.59	8
Pavers	100	0.62	8
Paving Equipment	104	0.53	8
Plate Compactors	8	0.43	8
Pressure Washers	1	0.60	8
Pumps	53	0.74	8
Rollers	95	0.56	8
Rough Terrain Forklifts	93	0.60	8
Rubber Tired Dozers	357	0.59	8
Rubber Tired Loaders	157	0.54	8
Scrapers	313	0.72	8
Signal Boards	20	0.78	8
Skid Steer Loaders	44	0.55	8
Surfacing Equipment	362	0.45	8
Sweepers/Scrubbers	91	0.68	8
Tractors/Loaders/Backhoes	108	0.55	8
Trenchers	63	0.75	8
Welders	45	0.45	8

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END OF DATA ENTRY SHEET

Attachment E-2

Copies of Emission Reports and Input Data for Bore Under Mokelumne River
Based on the Road Construction Model

Road Construction Emissions Model, Version 6.3.2

Emission Estimates for -> Bouldin/Tyler Bore Under River											
Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	CO2 (lbs/day)	
Grubbing/Land Clearing	0.4	5.7	1.7	10.1	0.1	10.0	2.1	0.1	2.1	911.5	
Grading/Excavation	1.7	8.0	15.8	10.6	0.6	10.0	2.6	0.5	2.1	2,498.7	
Drainage/Utilities/Sub-Grade	3.6	19.5	27.2	11.3	1.3	10.0	3.3	1.2	2.1	3,427.9	
Paving	-	-	-	-	-	-	-	-	-	-	
Maximum (pounds/day)	3.6	19.5	27.2	11.3	1.3	10.0	3.3	1.2	2.1	3,427.9	
Total (tons/construction project)	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	18.9	

Notes: Project Start Year -> 2013
 Project Length (months) -> 0
 Total Project Area (acres) -> 1
 Maximum Area Disturbed/Day (acres) -> 1
 Total Soil Imported/Exported (yd³/day)-> 0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

Emission Estimates for -> Bouldin/Tyler Bore Under River											
Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	Total PM10 (kgs/day)	Exhaust PM10 (kgs/day)	Fugitive Dust PM10 (kgs/day)	Total PM2.5 (kgs/day)	Exhaust PM2.5 (kgs/day)	Fugitive Dust PM2.5 (kgs/day)	CO2 (kgs/day)	
Grubbing/Land Clearing	0.2	2.6	0.8	4.6	0.0	4.5	1.0	0.0	0.9	414.3	
Grading/Excavation	0.8	3.7	7.2	4.8	0.3	4.5	1.2	0.2	0.9	1,135.8	
Drainage/Utilities/Sub-Grade	1.6	8.9	12.4	5.1	0.6	4.5	1.5	0.5	0.9	1,558.1	
Paving	-	-	-	-	-	-	-	-	-	-	
Maximum (kilograms/day)	1.6	8.9	12.4	5.1	0.6	4.5	1.5	0.5	0.9	1,558.1	
Total (megagrams/construction project)	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0	17.1	

Notes: Project Start Year -> 2013
 Project Length (months) -> 0
 Total Project Area (hectares) -> 0
 Maximum Area Disturbed/Day (hectares) -> 0
 Total Soil Imported/Exported (meters³/day)-> 0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

Road Construction Emissions Model

Version 6.3.2

Data Entry Worksheet

Note: Required data input sections have a yellow background.

Optional data input sections have a blue background. Only areas with a

yellow or blue background can be modified. Program defaults have a white background.

The user is required to enter information in cells C10 through C25.



Input Type

Project Name	Bouldin/Tyler Bore Under River	
Construction Start Year	2013	Enter a Year between 2005 and 2025 (inclusive)
Project Type	1	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	0.5	months
Predominant Soil/Site Type: Enter 1, 2, or 3	2	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
Project Length		miles
Total Project Area	0.5	acres
Maximum Area Disturbed/Day	0.5	acres
Water Trucks Used?	2	1. Yes No 2.
Soil Imported	0.0	yd ³ /day
Soil Exported	0.0	yd ³ /day
Average Truck Capacity	20.0	yd ³ (assume 20 if unknown)

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells C34 through C37.

Construction Periods	User Override of		Program
	Construction Months		Calculated
		Months	Months
Grubbing/Land Clearing	0.47	0.05	0.05
Grading/Excavation	0.33	0.21	0.21
Drainage/Utilities/Sub-Grade	0.13	0.14	0.14
Paving		0.07	0.07
Totals	0.93	0.47	

2005	%	2006	%	2007
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00
0.00	0.00	0.00	0.00	0.00

Please note: You have entered a different number of months than the project length shown in cell C13.

Hauling emission default values can be overridden in cells C45 through C46.

Soil Hauling Emissions		User Override of					
User Input	Soil Hauling Defaults	Default Values					
Miles/round trip	65.00	30					
Round trips/day	2.00	0					
Vehicle miles traveled/day (calculated)			130				
Hauling Emissions	ROG	NOx	CO	PM10	PM2.5	CO2	
Emission rate (grams/mile)	0.84	10.25	5.45	0.40	0.33	1874.76	
Emission rate (grams/trip)	10.32	7.57	172.85	0.01	0.01	199.87	
Pounds per day	0.2	2.9	1.6	0.1	0.1	536.8	
Tons per construction period	0.00	0.01	0.01	0.00	0.00	1.97	

Worker commute default values can be overridden in cells C60 through C65.

Worker Commute Emissions		User Override of Worker					
	Commute Default Values	Default Values					
Miles/ one-way trip	32.50	20					
One-way trips/day	2.00	2					
No. of employees: Grubbing/Land Clearing	8.00	3					
No. of employees: Grading/Excavation		5					
No. of employees: Drainage/Utilities/Sub-Grade		5					
No. of employees: Paving		4					
	ROG	NOx	CO	PM10	PM2.5	CO2	
Emission rate - Grubbing/Land Clearing (grams/mile)	0.118	0.211	2.201	0.033	0.018	426.660	
Emission rate - Grading/Excavation (grams/mile)	0.118	0.211	2.201	0.033	0.018	426.660	
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.118	0.211	2.201	0.021	0.018	426.660	
Emission rate - Paving (grams/mile)	0.000	0.000	0.000	0.000	0.000	0.000	
Emission rate - Grubbing/Land Clearing (grams/trip)	0.746	0.316	7.305	0.130	0.013	192.690	
Emission rate - Grading/Excavation (grams/trip)	0.746	0.316	7.305	0.130	0.013	192.690	
Emission rate - Draining/Utilities/Sub-Grade (gr/trip)	0.746	0.316	7.305	0.130	0.013	192.690	
Emission rate - Paving (grams/trip)	0.000	0.000	0.000	0.000	0.000	0.000	
Pounds per day - Grubbing/Land Clearing	0.188	0.264	3.036	0.047	0.022	502.267	
Tons per const. Period - Grub/Land Clear	0.001	0.001	0.016	0.000	0.000	2.578	
Pounds per day - Grading/Excavation	0.188	0.264	3.036	0.047	0.022	502.267	
Tons per const. Period - Grading/Excavation	0.001	0.001	0.011	0.000	0.000	1.842	
Pounds per day - Drainage/Utilities/Sub-Grade	0.188	0.264	3.036	0.033	0.022	502.267	
Tons per const. Period - Drain/Util/Sub-Grade	0.000	0.000	0.004	0.000	0.000	0.737	
Pounds per day - Paving	0.000	0.000	0.000	0.000	0.000	0.000	
Tons per const. Period - Paving	0.000	0.000	0.000	0.000	0.000	0.000	
tons per construction period	0.002	0.003	0.031	0.000	0.000	5.157	

Water truck default values can be overridden in cells C91 through C93 and E91 through E93.

Water Truck Emissions	User Override of	Program Estimate of	User Override of Truck	Default Values		
	Default # Water Trucks	Number of Water Trucks	Miles Traveled/Day	Miles Traveled/Day		
Grubbing/Land Clearing - Exhaust	0.00	0	20.00	0		
Grading/Excavation - Exhaust		0		0		
Drainage/Utilities/Subgrade		0		0		
	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Grubbing/Land Clearing (grams/mile)	0.84	10.25	5.45	0.40	0.33	1874.76
Emission rate - Grading/Excavation (grams/mile)	0.84	10.25	5.45	0.40	0.33	1874.76
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.84	10.25	5.45	0.40	0.33	1874.76
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grub/Land Clear	0.00	0.00	0.00	0.00	0.00	0.00
Pound per day - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00
Pound per day - Drainage/Utilities/Subgrade	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Subgrade	0.00	0.00	0.00	0.00	0.00	0.00

Fugitive dust default values can be overridden in cells C110 through C112.

Fugitive Dust	User Override of Max	Default	PM10	PM10	PM2.5	PM2.5
	Acreage Disturbed/Day	Maximum Acreage/Day	pounds/day	tons/per period	pounds/day	tons/per period
Fugitive Dust - Grubbing/Land Clearing		0.5	10.0	0.1	2.1	0.0
Fugitive Dust - Grading/Excavation		0.5	10.0	0.0	2.1	0.0
Fugitive Dust - Drainage/Utilities/Subgrade		0.5	10.0	0.0	2.1	0.0

Off-Road Equipment Emissions

Grubbing/Land Clearing		Default	ROG	CO	NOx	PM10	PM2.5	
Override of Default Number of Vehicles	Number of Vehicles	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	
	<i>Program-estimate</i>							
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	
		Air Compressors	0.00	0.00	0.00	0.00	0.00	
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	
		Cranes	0.00	0.00	0.00	0.00	0.00	
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	
		Excavators	0.00	0.00	0.00	0.00	0.00	
		Forklifts	0.00	0.00	0.00	0.00	0.00	
		Generator Sets	0.00	0.00	0.00	0.00	0.00	
		Graders	0.00	0.00	0.00	0.00	0.00	
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	
0.00		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	
0.00		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	
		Pavers	0.00	0.00	0.00	0.00	0.00	
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	
		Pumps	0.00	0.00	0.00	0.00	0.00	
		Rollers	0.00	0.00	0.00	0.00	0.00	
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	
0.00		1 Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	
0.00		1 Scrapers	0.00	0.00	0.00	0.00	0.00	
		0 Signal Boards	0.00	0.00	0.00	0.00	0.00	
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	
1.00		Tractors/Loaders/Backhoes	0.23	2.68	1.47	0.05	0.05	
		Trenchers	0.00	0.00	0.00	0.00	0.00	
		Welders	0.00	0.00	0.00	0.00	0.00	
		Grubbing/Land Clearing	pounds per day	0.2	2.7	1.5	0.1	0.0
		Grubbing/Land Clearing	tons per phase	0.0	0.0	0.0	0.0	0.0

Grading/Excavation		Default	ROG	CO	NOx	PM10	PM2.5
Override of Default Number of Vehicles	Number of Vehicles <i>Program-estimate</i>	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00
	0	Cranes	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00
	0.00	1 Excavators	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00
	0.00	1 Graders	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00
	0	Other Construction Equipment	0.02	0.12	0.16	0.01	0.01
	1.00	Other General Industrial Equipment	0.65	1.79	6.69	0.21	0.19
	1.00	Other Material Handling Equipment	0.55	1.53	5.73	0.18	0.17
		Pavers	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00
	0.00	Rollers	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00
	0.00	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00
	0.00	1 Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00
	0.00	1 Scrapers	0.00	0.00	0.00	0.00	0.00
		0 Signal Boards	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00
		Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00
	Grading/Excavation	pounds per day	1.2	3.4	12.6	0.4	0.4
	Grading	tons per phase	0.0	0.0	0.0	0.0	0.0

Drainage/Utilities/Subgrade Override of Default Number of Vehicles	Default		ROG	CO	NOx	PM10	PM2.5
	Number of Vehicles <i>Program-estimate</i>		pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
			0.00	0.00	0.00	0.00	0.00
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00
2.00		Excavators	1.48	8.13	10.91	0.63	0.58
		Forklifts	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00
0.00	1	Graders	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00
0.00	1	Plate Compactors	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00
1.00		Rubber Tired Dozers	1.89	8.34	16.05	0.67	0.61
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00
0.00	1	Scrapers	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00
		Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00
0.00	1	Trenchers	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00
	Drainage	pounds per day	3.4	16.5	27.0	1.3	1.2
	Drainage	tons per phase	0.0	0.0	0.0	0.0	0.0

Paving	Default		ROG	CO	NOx	PM10	PM2.5	
	Override of Default Number of Vehicles	Number of Vehicles <i>Program-estimate</i>	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
			Aerial Lifts	0.00	0.00	0.00	0.00	0.00
			Air Compressors	0.00	0.00	0.00	0.00	0.00
			Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00
			Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00
			Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00
			Cranes	0.00	0.00	0.00	0.00	0.00
			Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00
			Excavators	0.00	0.00	0.00	0.00	0.00
			Forklifts	0.00	0.00	0.00	0.00	0.00
			Generator Sets	0.00	0.00	0.00	0.00	0.00
			Graders	0.00	0.00	0.00	0.00	0.00
			Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00
			Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00
			Other Construction Equipment	0.00	0.00	0.00	0.00	0.00
			Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00
			Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00
	0.00	1	Pavers	0.00	0.00	0.00	0.00	0.00
	0.00	1	Paving Equipment	0.00	0.00	0.00	0.00	0.00
			Plate Compactors	0.00	0.00	0.00	0.00	0.00
			Pressure Washers	0.00	0.00	0.00	0.00	0.00
			Pumps	0.00	0.00	0.00	0.00	0.00
	0.00	1	Rollers	0.00	0.00	0.00	0.00	0.00
			Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00
			Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00
			Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00
			Scrapers	0.00	0.00	0.00	0.00	0.00
		0	Signal Boards	0.00	0.00	0.00	0.00	0.00
			Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00
			Surfacing Equipment	0.00	0.00	0.00	0.00	0.00
			Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00
			Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00
			Trenchers	0.00	0.00	0.00	0.00	0.00
			Welders	0.00	0.00	0.00	0.00	0.00
		Paving	pounds per day	0.0	0.0	0.0	0.0	0.0
		Paving	tons per phase	0.0	0.0	0.0	0.0	0.0
Total Emissions all Phases (tons per construction period) =>				0.0	0.1	0.1	0.0	0.0

Equipment default values for horsepower, load factor, and hours/day can be overridden in cells C285 through C317, E285 through E317, and G285 through G317.

Equipment	Default Values Horsepower	Default Values Load Factor	Default Values Hours/day
Aerial Lifts	60	0.46	8
Air Compressors	106	0.48	8
Bore/Drill Rigs	291	0.75	8
Cement and Mortar Mixers	10	0.56	8
Concrete/Industrial Saws	19	0.73	8
Cranes	399	0.43	8
Crushing/Proc. Equipment	142	0.78	8
Excavators	168	0.57	10.00
Forklifts	145	0.30	8
Generator Sets	549	0.74	8
Graders	174	0.61	8
Off-Highway Tractors	267	0.65	8
Off-Highway Trucks	479	0.57	8
Other Construction Equipment	75	0.62	10.00
Other General Industrial Equipment	238	0.51	10.00
Other Material Handling Equipment	191	0.59	8
Pavers	100	0.62	8
Paving Equipment	104	0.53	8
Plate Compactors	8	0.43	8
Pressure Washers	1	0.60	8
Pumps	53	0.74	8
Rollers	95	0.56	8
Rough Terrain Forklifts	93	0.60	8
Rubber Tired Dozers	357	0.59	10.00
Rubber Tired Loaders	157	0.54	8
Scrapers	313	0.72	8
Signal Boards	20	0.78	8
Skid Steer Loaders	44	0.55	8
Surfacing Equipment	362	0.45	8
Sweepers/Scrubbers	91	0.68	8
Tractors/Loaders/Backhoes	108	0.55	10.00
Trenchers	63	0.75	8
Welders	45	0.45	8

50

END OF DATA ENTRY SHEET

Attachment B-3

Copies of Emission Reports and Input Data for Trenching
Based on the Road Construction Model

Road Construction Emissions Model, Version 6.3.2

Emission Estimates for -> Bouldin/Tyler Trenching-Installation											
Project Phases (English Units)	ROG (lbs/day)	CO (lbs/day)	NOx (lbs/day)	Total PM10 (lbs/day)	Exhaust PM10 (lbs/day)	Fugitive Dust PM10 (lbs/day)	Total PM2.5 (lbs/day)	Exhaust PM2.5 (lbs/day)	Fugitive Dust PM2.5 (lbs/day)	CO2 (lbs/day)	
Grubbing/Land Clearing	1.0	14.8	2.5	3.2	0.2	3.0	0.8	0.1	0.6	2,418.3	
Grading/Excavation	4.1	27.3	31.5	4.4	1.4	3.0	1.8	1.2	0.6	5,108.3	
Drainage/Utilities/Sub-Grade	4.5	28.8	33.1	4.5	1.5	3.0	1.9	1.3	0.6	5,123.5	
Paving	2.8	23.5	17.3	1.3	1.3	-	1.1	1.1	-	2,781.3	
Maximum (pounds/day)	4.5	28.8	33.1	4.5	1.5	3.0	1.9	1.3	0.6	5,123.5	
Total (tons/construction project)	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	41.0	

Notes: Project Start Year -> 2013
 Project Length (months) -> 0
 Total Project Area (acres) -> 0
 Maximum Area Disturbed/Day (acres) -> 0
 Total Soil Imported/Exported (yd³/day)-> 0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

Emission Estimates for -> Bouldin/Tyler Trenching-Installation											
Project Phases (Metric Units)	ROG (kgs/day)	CO (kgs/day)	NOx (kgs/day)	Total PM10 (kgs/day)	Exhaust PM10 (kgs/day)	Fugitive Dust PM10 (kgs/day)	Total PM2.5 (kgs/day)	Exhaust PM2.5 (kgs/day)	Fugitive Dust PM2.5 (kgs/day)	CO2 (kgs/day)	
Grubbing/Land Clearing	0.4	6.7	1.1	1.5	0.1	1.4	0.3	0.1	0.3	1,099.2	
Grading/Excavation	1.9	12.4	14.3	2.0	0.6	1.4	0.8	0.6	0.3	2,322.0	
Drainage/Utilities/Sub-Grade	2.1	13.1	15.1	2.1	0.7	1.4	0.9	0.6	0.3	2,328.9	
Paving	1.3	10.7	7.9	0.6	0.6	-	0.5	0.5	-	1,264.2	
Maximum (kilograms/day)	2.1	13.1	15.1	2.1	0.7	1.4	0.9	0.6	0.3	2,328.9	
Total (megagrams/construction project)	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	37.2	

Notes: Project Start Year -> 2013
 Project Length (months) -> 0
 Total Project Area (hectares) -> 0
 Maximum Area Disturbed/Day (hectares) -> 0
 Total Soil Imported/Exported (meters³/day)-> 0

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

Road Construction Emissions Model

Version 6.3.2

Data Entry Worksheet

Note: Required data input sections have a yellow background.

Optional data input sections have a blue background. Only areas with a

yellow or blue background can be modified. Program defaults have a white background.

The user is required to enter information in cells C10 through C25.

**Input Type**

Project Name	Bouldin/Tyler Trenching-Installation	
Construction Start Year	2013	Enter a Year between 2005 and 2025 (inclusive)
Project Type	1	1 New Road Construction 2 Road Widening 3 Bridge/Overpass Construction
Project Construction Time	0.4	months
Predominant Soil/Site Type: Enter 1, 2, or 3	2	1. Sand Gravel 2. Weathered Rock-Earth 3. Blasted Rock
Project Length		miles
Total Project Area	0.2	acres
Maximum Area Disturbed/Day	0.2	acres
Water Trucks Used?	2	1. Yes 2. No
Soil Imported	0.0	yd ³ /day
Soil Exported	0.0	yd ³ /day
Average Truck Capacity	20.0	yd ³ (assume 20 if unknown)

To begin a new project, click this button to clear data previously entered. This button will only work if you opted not to disable macros when loading this spreadsheet.

The remaining sections of this sheet contain areas that can be modified by the user, although those modifications are optional.

Note: The program's estimates of construction period phase length can be overridden in cells C34 through C37.

Construction Periods	User Override of Construction Months	Program					
		Calculated	2005	%	2006	%	2007
		Months					
Grubbing/Land Clearing	0.40	0.04	0.00	0.00	0.00	0.00	0.00
Grading/Excavation	0.27	0.18	0.00	0.00	0.00	0.00	0.00
Drainage/Utilities/Sub-Grade	0.20	0.12	0.00	0.00	0.00	0.00	0.00
Paving	0.13	0.06	0.00	0.00	0.00	0.00	0.00
Totals	1.00	0.40					

Please note: You have entered a different number of months than the project length shown in cell C13.

Hauling emission default values can be overridden in cells C45 through C46.

Soil Hauling Emissions		User Override of					
User Input	Soil Hauling Defaults	Default Values					
Miles/round trip	65.00	30					
Round trips/day	1.00	0					
Vehicle miles traveled/day (calculated)			65				
Hauling Emissions	ROG	NOx	CO	PM10	PM2.5	CO2	
Emission rate (grams/mile)	0.84	10.25	5.45	0.40	0.33	1874.76	
Emission rate (grams/trip)	10.32	7.57	172.85	0.01	0.01	199.87	
Pounds per day	0.1	1.5	0.8	0.1	0.0	268.4	
Tons per construction period	0.00	0.00	0.00	0.00	0.00	0.79	

Worker commute default values can be overridden in cells C60 through C65.

Worker Commute Emissions		User Override of Worker					
	Commute Default Values	Default Values					
Miles/ one-way trip	32.50	20					
One-way trips/day	8.00	2					
No. of employees: Grubbing/Land Clearing	8.00	3					
No. of employees: Grading/Excavation		5					
No. of employees: Drainage/Utilities/Sub-Grade		5					
No. of employees: Paving		4					
	ROG	NOx	CO	PM10	PM2.5	CO2	
Emission rate - Grubbing/Land Clearing (grams/mile)	0.118	0.211	2.201	0.033	0.018	426.660	
Emission rate - Grading/Excavation (grams/mile)	0.118	0.211	2.201	0.033	0.018	426.660	
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.118	0.211	2.201	0.033	0.018	426.660	
Emission rate - Paving (grams/mile)	0.118	0.211	2.201	0.033	0.018	426.660	
Emission rate - Grubbing/Land Clearing (grams/trip)	0.746	0.316	7.305	0.130	0.013	192.690	
Emission rate - Grading/Excavation (grams/trip)	0.746	0.316	7.305	0.130	0.013	192.690	
Emission rate - Draining/Utilities/Sub-Grade (gr/trip)	0.746	0.316	7.305	0.130	0.013	192.690	
Emission rate - Paving (grams/trip)	0.746	0.316	7.305	0.130	0.013	192.690	
Pounds per day - Grubbing/Land Clearing	0.751	1.056	12.143	0.188	0.086	2009.069	
Tons per const. Period - Grub/Land Clear	0.003	0.005	0.053	0.001	0.000	8.840	
Pounds per day - Grading/Excavation	0.751	1.056	12.143	0.188	0.086	2009.069	
Tons per const. Period - Grading/Excavation	0.002	0.003	0.036	0.001	0.000	5.893	
Pounds per day - Drainage/Utilities/Sub-Grade	0.751	1.056	12.143	0.188	0.086	2009.069	
Tons per const. Period - Drain/Util/Sub-Grade	0.002	0.002	0.027	0.000	0.000	4.420	
Pounds per day - Paving	0.464	1.056	12.143	0.188	0.086	970.612	
Tons per const. Period - Paving	0.001	0.002	0.018	0.000	0.000	1.424	
tons per construction period	0.008	0.012	0.134	0.002	0.001	20.577	

Water truck default values can be overridden in cells C91 through C93 and E91 through E93.

Water Truck Emissions	User Override of	Program Estimate of	User Override of Truck	Default Values		
	Default # Water Trucks	Number of Water Trucks	Miles Traveled/Day	Miles Traveled/Day		
Grubbing/Land Clearing - Exhaust	0.00	0	20.00	0		
Grading/Excavation - Exhaust		0		0		
Drainage/Utilities/Subgrade		0		0		
	ROG	NOx	CO	PM10	PM2.5	CO2
Emission rate - Grubbing/Land Clearing (grams/mile)	0.84	10.25	5.45	0.40	0.33	1874.76
Emission rate - Grading/Excavation (grams/mile)	0.84	10.25	5.45	0.40	0.33	1874.76
Emission rate - Draining/Utilities/Sub-Grade (gr/mile)	0.84	10.25	5.45	0.40	0.33	1874.76
Pounds per day - Grubbing/Land Clearing	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grub/Land Clear	0.00	0.00	0.00	0.00	0.00	0.00
Pound per day - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Grading/Excavation	0.00	0.00	0.00	0.00	0.00	0.00
Pound per day - Drainage/Utilities/Subgrade	0.00	0.00	0.00	0.00	0.00	0.00
Tons per const. Period - Drainage/Utilities/Subgrade	0.00	0.00	0.00	0.00	0.00	0.00

Fugitive dust default values can be overridden in cells C110 through C112.

Fugitive Dust	User Override of Max	Default	PM10	PM10	PM2.5	PM2.5
	Acreage Disturbed/Day	Maximum Acreage/Day	pounds/day	tons/per period	pounds/day	tons/per period
Fugitive Dust - Grubbing/Land Clearing		0.15	3.0	0.0	0.6	0.0
Fugitive Dust - Grading/Excavation		0.15	3.0	0.0	0.6	0.0
Fugitive Dust - Drainage/Utilities/Subgrade		0.15	3.0	0.0	0.6	0.0

Off-Road Equipment Emissions

Grubbing/Land Clearing		Default	ROG	CO	NOx	PM10	PM2.5	
Override of Default Number of Vehicles	Number of Vehicles	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day	
	<i>Program-estimate</i>							
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00	
		Air Compressors	0.00	0.00	0.00	0.00	0.00	
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00	
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00	
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00	
		Cranes	0.00	0.00	0.00	0.00	0.00	
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00	
		Excavators	0.00	0.00	0.00	0.00	0.00	
		Forklifts	0.00	0.00	0.00	0.00	0.00	
		Generator Sets	0.00	0.00	0.00	0.00	0.00	
		Graders	0.00	0.00	0.00	0.00	0.00	
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00	
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00	
0.00		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00	
0.00		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00	
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00	
		Pavers	0.00	0.00	0.00	0.00	0.00	
		Paving Equipment	0.00	0.00	0.00	0.00	0.00	
		Plate Compactors	0.00	0.00	0.00	0.00	0.00	
		Pressure Washers	0.00	0.00	0.00	0.00	0.00	
		Pumps	0.00	0.00	0.00	0.00	0.00	
		Rollers	0.00	0.00	0.00	0.00	0.00	
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00	
0.00		1 Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00	
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00	
0.00		1 Scrapers	0.00	0.00	0.00	0.00	0.00	
		0 Signal Boards	0.00	0.00	0.00	0.00	0.00	
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00	
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00	
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00	
1.00		Tractors/Loaders/Backhoes	0.23	2.68	1.47	0.05	0.05	
		Trenchers	0.00	0.00	0.00	0.00	0.00	
		Welders	0.00	0.00	0.00	0.00	0.00	
		Grubbing/Land Clearing	pounds per day	0.2	2.7	1.5	0.1	0.0
		Grubbing/Land Clearing	tons per phase	0.0	0.0	0.0	0.0	0.0

Grading/Excavation		Default	ROG	CO	NOx	PM10	PM2.5
Override of Default Number of Vehicles	Number of Vehicles <i>Program-estimate</i>	Type	pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00
	0	Cranes	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00
	0.00	1 Excavators	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00
	0.00	1 Graders	0.00	0.00	0.00	0.00	0.00
	2.00	Off-Highway Tractors	3.25	14.35	28.91	1.17	1.08
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00
	0	Other Construction Equipment	0.01	0.03	0.04	0.00	0.00
	0.00	Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00
	0.00	Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00
	0.00	Rollers	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00
	0.00	Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00
	0.00	1 Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00
	0.00	1 Scrapers	0.00	0.00	0.00	0.00	0.00
		0 Signal Boards	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00
		Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00
		Trenchers	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00
	Grading/Excavation	pounds per day	3.3	14.4	28.9	1.2	1.1
	Grading	tons per phase	0.0	0.0	0.1	0.0	0.0

Drainage/Utilities/Subgrade Override of Default Number of Vehicles	Default		ROG pounds/day	CO pounds/day	NOx pounds/day	PM10 pounds/day	PM2.5 pounds/day
	Number of Vehicles	Program-estimate					
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00
0.00		Excavators	0.00	0.00	0.00	0.00	0.00
		Forklifts	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00
0.00	1	Graders	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00
		Pavers	0.00	0.00	0.00	0.00	0.00
		Paving Equipment	0.00	0.00	0.00	0.00	0.00
0.00	1	Plate Compactors	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00
		Rollers	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00
2.00		Rubber Tired Dozers	3.77	16.68	32.09	1.33	1.22
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00
0.00	1	Scrapers	0.00	0.00	0.00	0.00	0.00
	0	Signal Boards	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00
		Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00
0.00	1	Trenchers	0.00	0.00	0.00	0.00	0.00
		Welders	0.00	0.00	0.00	0.00	0.00
	Drainage	pounds per day	3.8	16.7	32.1	1.3	1.2
	Drainage	tons per phase	0.0	0.0	0.1	0.0	0.0

Paving	Default		ROG	CO	NOx	PM10	PM2.5
	Number of Vehicles	Type					
Override of Default Number of Vehicles	Program-estimate		pounds/day	pounds/day	pounds/day	pounds/day	pounds/day
		Aerial Lifts	0.00	0.00	0.00	0.00	0.00
		Air Compressors	0.00	0.00	0.00	0.00	0.00
		Bore/Drill Rigs	0.00	0.00	0.00	0.00	0.00
		Cement and Mortar Mixers	0.00	0.00	0.00	0.00	0.00
		Concrete/Industrial Saws	0.00	0.00	0.00	0.00	0.00
		Cranes	0.00	0.00	0.00	0.00	0.00
		Crushing/Proc. Equipment	0.00	0.00	0.00	0.00	0.00
	2.00	Excavators	1.48	8.13	10.91	0.63	0.58
		Forklifts	0.00	0.00	0.00	0.00	0.00
		Generator Sets	0.00	0.00	0.00	0.00	0.00
		Graders	0.00	0.00	0.00	0.00	0.00
		Off-Highway Tractors	0.00	0.00	0.00	0.00	0.00
		Off-Highway Trucks	0.00	0.00	0.00	0.00	0.00
		Other Construction Equipment	0.00	0.00	0.00	0.00	0.00
		Other General Industrial Equipment	0.00	0.00	0.00	0.00	0.00
		Other Material Handling Equipment	0.00	0.00	0.00	0.00	0.00
	0.00	1 Pavers	0.00	0.00	0.00	0.00	0.00
	0.00	1 Paving Equipment	0.00	0.00	0.00	0.00	0.00
		Plate Compactors	0.00	0.00	0.00	0.00	0.00
		Pressure Washers	0.00	0.00	0.00	0.00	0.00
		Pumps	0.00	0.00	0.00	0.00	0.00
	0.00	1 Rollers	0.00	0.00	0.00	0.00	0.00
		Rough Terrain Forklifts	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Dozers	0.00	0.00	0.00	0.00	0.00
		Rubber Tired Loaders	0.00	0.00	0.00	0.00	0.00
		Scrapers	0.00	0.00	0.00	0.00	0.00
		0 Signal Boards	0.00	0.00	0.00	0.00	0.00
		Skid Steer Loaders	0.00	0.00	0.00	0.00	0.00
		Surfacing Equipment	0.00	0.00	0.00	0.00	0.00
		Sweepers/Scrubbers	0.00	0.00	0.00	0.00	0.00
		Tractors/Loaders/Backhoes	0.00	0.00	0.00	0.00	0.00
	1.00	Trenchers	0.87	3.19	5.36	0.46	0.42
		Welders	0.00	0.00	0.00	0.00	0.00
	Paving	pounds per day	2.4	11.3	16.3	1.1	1.0
	Paving	tons per phase	0.0	0.0	0.0	0.0	0.0
Total Emissions all Phases (tons per construction period) =>			0.0	0.1	0.2	0.0	0.0

Equipment default values for horsepower, load factor, and hours/day can be overridden in cells C285 through C317, E285 through E317, and G285 through G317.

Equipment	Default Values Horsepower	Default Values Load Factor	Default Values Hours/day
Aerial Lifts	60	0.46	8
Air Compressors	106	0.48	8
Bore/Drill Rigs	291	0.75	8
Cement and Mortar Mixers	10	0.56	8
Concrete/Industrial Saws	19	0.73	8
Cranes	399	0.43	8
Crushing/Proc. Equipment	142	0.78	8
Excavators	168	0.57	10.00
Forklifts	145	0.30	8
Generator Sets	549	0.74	8
Graders	174	0.61	8
Off-Highway Tractors	267	0.65	10.00
Off-Highway Trucks	479	0.57	8
Other Construction Equipment	75	0.62	0.00
Other General Industrial Equipment	238	0.51	0.00
Other Material Handling Equipment	191	0.59	8
Pavers	100	0.62	8
Paving Equipment	104	0.53	8
Plate Compactors	8	0.43	8
Pressure Washers	1	0.60	8
Pumps	53	0.74	8
Rollers	95	0.56	8
Rough Terrain Forklifts	93	0.60	8
Rubber Tired Dozers	357	0.59	10.00
Rubber Tired Loaders	157	0.54	8
Scrapers	313	0.72	8
Signal Boards	20	0.78	8
Skid Steer Loaders	44	0.55	8
Surfacing Equipment	362	0.45	8
Sweepers/Scrubbers	91	0.68	8
Tractors/Loaders/Backhoes	108	0.55	10.00
Trenchers	63	0.75	10.00
Welders	45	0.45	8

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END OF DATA ENTRY SHEET

Attachment E-4

Copies of Risk Prioritization Evaluation
Based on the SJVAPCD Spreadsheet Ver 2.0

CAS#	Substance	Annual Emissions	Maximum Hourly	Average Hourly	Disp Adj Method Carc	EP Method Carc	EP Method Chronic	EP Method Acute	EP Max of Chronic and Acute
79345	1,1,2,2-Tetrachloroethane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
79005	1,1,2-Trichloroethane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75343	1,1-Dichloroethane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	1,2,3,4,5,6,7,8-OctaD			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	1,2,3,4,5,6,7,8-OctaF			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
39001020	1,2,3,4,6,7,8,9-Octachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3268879	1,2,3,4,6,7,8,9-Octachlorodibenzo-P-dioxin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
67562394	1,2,3,4,6,7,8-Heptachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
35822469	1,2,3,4,6,7,8-Heptachlorodibenzo-P-dioxin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
55673897	1,2,3,4,7,8,9-Heptachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
70648269	1,2,3,4,7,8-Hexachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
39227286	1,2,3,4,7,8-Hexachlorodibenzo-P-dioxin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57117449	1,2,3,6,7,8-Hexachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57653857	1,2,3,6,7,8-Hexachlorodibenzo-P-dioxin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
72918219	1,2,3,7,8,9-Hexachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
19408743	1,2,3,7,8,9-Hexachlorodibenzo-P-dioxin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57117416	1,2,3,7,8-Pentachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
40321764	1,2,3,7,8-Pentachlorodibenzo-P-dioxin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
96128	1,2-Dibromo-3-chloropropane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
78875	1,2-Dichloropropane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
122667	1,2-Diphenylhydrazine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
106887	1,2-Epoxybutane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
106990	1,3-Butadiene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
542756	1,3-Dichloropropene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1120714	1,3-Propane sultone			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
123911	1,4-Dioxane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
42397648	1,6-Dinitropyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
42397659	1,8-Dinitropyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5522430	1-Nitropyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
39635319	2,3,3',4,4',5,5'-HEPTACHLORBIPHENYL (PCB 189)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
38380084	2,3,3',4,4',5-HEXACHLOROBIPHENYL (PCB 156)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

69782907	2,3,3',4,4',5'- HEXACHLOROBIPHENYL (PCB 157)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
32598144	2,3,3',4,4'-Pentachlorobiphenyl {PCB 105}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
52663726	2,3',4,4',5,5'- HEXACHLOROBIPHENYL (PCB 167)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
74472370	2,3,4,4',5-PENTACHLOBIPHENYL (PCB114)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
31508006	2,3',4,4',5- PENTACHLOROBIPHENYL (PCB 118)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
65510443	2,3',4,4',5'- PENTACHOROBIPHENYL (PCB 123)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
60851345	2,3,4,6,7,8-Hexachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57117314	2,3,4,7,8-Pentachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
51207319	2,3,7,8-Tetrachlorodibenzofuran			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1746016	2,3,7,8-Tetrachlorodibenzo-P-Dioxin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
88062	2,4,6-Trichlorophenol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
615054	2,4-Diaminoanisoole			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
95807	2,4-Diaminotoluene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
121142	2,4-Dinitrotoluene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
53963	2-Acetylaminofluorene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
117793	2-Aminoanthraquinone			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
607578	2-Nitrofluorene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
32774166	3,3',4,4',5,5'- HEXACHLOROBIPHENYL (PCB 169)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57465288	3,3',4,4',5- PENTACHLOROBIPHENYL (PCB 126)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
32598133	3,3',4,4'-TETRACHLOROBIPHENYL (PCB77)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
91941	3,3'-Dichlorobenzidine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
70362504	3,4,4',5-TETRACHLOROBIPHENYL (PCB 81)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
56495	3-Methylcholanthrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
101144	4,4'-Methylene bis(2 Chloroaniline) (MOCA)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
101779	4,4'-Methylenedianiline			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
92671	4-Aminobiphenyl			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

95830	4-Chloro-o-phenylenediamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
60117	4-Dimethylaminoazobenzene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57835924	4-Nitropyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3697243	5-Methylchrysene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
602879	5-Nitroacenaphthene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7496028	6-Nitrochrysene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57976	7,12-Dimethylbenz[a]anthracene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
194592	7H-Dibenzo[c,g]carbazole			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75070	Acetaldehyde			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
60355	Acetamide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
107028	Acrolein			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
79061	Acrylamide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
79107	Acrylic acid			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
107131	Acrylonitrile			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
107051	Allyl chloride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
319846	alpha-Hexachlorocyclohexane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
61825	Amitrole			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7664417	Ammonia			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
62533	Aniline			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440382	Arsenic			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1016	Arsenic compounds (inorganic)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7784421	Arsine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1332214	Asbestos			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10294403	Barium chromate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
56553	Benz[a]anthracene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
71432	Benzene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
92875	Benzidine (and its salts)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1020	Benzidine-based dyes			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
50328	Benzo[a]pyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
205992	Benzo[b]fluoranthene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
205823	Benzo[j]fluoranthene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
207089	Benzo[k]fluoranthene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
100447	Benzyl chloride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440417	Beryllium			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
319857	beta-Hexachlorocyclohexane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57578	beta-Propiolactone			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
111444	Bis(2-chloroethyl) ether {DCEE}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
542881	Bis(chloromethyl) ether			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440439	Cadmium			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
13765190	Calcium chromate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2425061	Captafol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
133062	Captan			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75150	Carbon disulfide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
630080	Carbon monoxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
56235	Carbon tetrachloride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
57749	Chlordane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
108171262	Chlorinated paraffin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7782505	Chlorine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10049044	Chlorine dioxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

108907	Chlorobenzene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
510156	Chlorobenzilate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	Chlorodifluoromethane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
67663	Chloroform			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
107302	Chloromethyl methyl			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
76062	Chloropicrin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1333820	Chromium trioxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
18540299	Chromium, hexavalent			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
218019	Chrysene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1066	Coke oven emissions			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440508	Copper			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1319773	Cresols (mixtures of) {Cresylic acid}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
135206	Cupferron			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1073	Cyanide compounds			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	CYANIDE COMPOUNDS								
57125	[Inorganic]			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
117817	Di(2-ethylhexyl) phthalate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
226368	Dibenz[a,h]acridine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2263680	Dibenz[a,h]acridine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
53703	Dibenz[a,h]anthracene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
224420	Dibenz[a,j]acridine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
192645	Dibenzo[a,e]pyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
189640	Dibenzo[a,h]pyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
189559	Dibenzo[a,i]pyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
191300	Dibenzo[a,l]pyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Dibenzofurans (chlorinated) {PCDFs}								
1080	[Treated as 2378TCDD for HRA]			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	Dichlorodifluoromethene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Dichlorodiphenyldichloroethylene								
72559	{DDE}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
73354	Dichloroethylene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
62737	Dichlorovos {DDVP}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Diesel engine exhaust, particulate								
9901	matter (Diesel PM)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
111422	Diethanolamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
79447	Dimethyl carbamoyl chloride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
68122	Dimethyl formamide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
124403	Dimethylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Dioxins, total, w/o individ. isomers								
1086	reported {PCDDs} [Treat as 2378TCDD for HRA]			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1937377	Direct Black 38			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2602462	Direct Blue 6			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
16071866	Direct Brown 95 (technical grade)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
106898	Epichlorohydrin			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
100414	Ethyl benzene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75003	Ethyl chloride {Chlorethane}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

106934	Ethylene dibromide {EDB}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
107062	Ethylene dichloride {EDC}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
107211	Ethylene glycol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
111762	Ethylene glycol monobutyl ethe			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
110805	Ethylene glycol monoethyl ethe			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
111159	Ethylene glycol monoethyl ether acetate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
109864	Ethylene glycol monomethyl ethe			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
110496	Ethylene glycol monomethyl ether acetate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75218	Ethylene oxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
96457	Ethylene thiourea			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
151564	Ethyleneimine {Aziridine}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1101	Fluorides			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
50000	Formaldehyde			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
111308	Glutaraldehyde			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
76448	Heptachlor			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
118741	Hexachlorobenzene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1120	Hexachlorocyclohexane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
608731	Hexachlorocyclohexanes (mixed or technical grade)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
67721	Hexachloroethane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
110543	Hexane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
302012	Hydrazine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7647010	Hydrochloric acid			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
74908	Hydrocyanic acid			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7664393	Hydrogen fluoride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7783075	Hydrogen Selenide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7783075	HYDROGEN SELENIDE			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7783064	Hydrogen sulfide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
193395	Indeno[1,2,3-cd]pyrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
78591	Isophorone			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
67630	Isopropyl alcohol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7439921	Lead			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
301042	Lead acetate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7758976	Lead chromate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1128	Lead compounds (inorganic)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7446277	Lead phosphate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1335326	Lead subacetate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
58899	Lindane {gamma- Hexachlorocyclohexane}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
108316	Maleic anhydride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7439965	Manganese			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
108394	m-Cresol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7487947	Mercuric chloride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7439976	Mercury			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
67561	Methanol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
74839	Methyl bromide {Bromomethane}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

71556	Methyl chloroform {1,1,1-Trichloroethane}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
78933	Methyl ethyl ketone			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
624839	Methyl isocyanate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1634044	Methyl tert-butyl ether			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75092	Methylene chloride {Dichloromethane}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
101688	Methylene diphenyl diisocyanate {MDI}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
90948	Michler's ketone			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
108383	m-Xylene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
91203	Naphthalene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440020	Nickel			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
373024	Nickel acetate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3333673	Nickel carbonate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3333393	Nickel carbonate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
13463393	Nickel carbonyl			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
12054487	Nickel hydroxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1313991	Nickel oxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1146	Nickel refinery dust			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
12035722	Nickel subsulfide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1271289	Nickelocene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7697372	Nitric acid			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
139139	Nitriлотriacetic acid			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10102440	NITROGEN DIOXIDE			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1116547	N-Nitrosodiethanolamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
55185	N-Nitrosodiethylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
62759	N-Nitrosodimethylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
924163	N-Nitrosodi-n-butylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
621647	N-Nitrosodi-n-propylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
86306	N-Nitrosodiphenylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10595956	N-Nitrosomethylethylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
59892	N-Nitrosomorpholine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
684935	N-Nitroso-N-methylurea			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
100754	N-Nitrosopiperidine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
930552	N-Nitrosopyrrolidine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
90040	o-Anisidine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
95487	o-Cresol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8014957	OLEUM			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
95534	o-Toluidine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
95476	o-Xylene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10028156	OZONE			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1151	PAHs, total, w/o individ. components reported [Treated as B(a)P for HRA]			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1336363	PCBs {Polychlorinated biphenyls}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
95692	p-Chloro-o-toluidine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
120718	p-Cresidine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
106445	p-Cresol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
106467	p-Dichlorobenzene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

87865	Pentachlorophenol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
127184	Perchloroethylene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
108952	{Tetrachloroethene}			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75445	Phenol			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75445	Phosgene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7803512	Phosphine	3.80E+01		5.65E-02	0.00E+00	0.00E+00	1.06E+01	0.00E+00	1.06E+01
7664382	Phosphoric acid			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
85449	Phthalic anhydride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
156105	p-Nitrosodiphenylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7758012	Potassium bromate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
115071	Propylene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
107982	Propylene glycol monomethyl ethe			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75569	Propylene oxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75569	Propylene oxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
106423	p-Xylene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
50555	Reserpine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7782492	Selenium			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7446346	Selenium sulfide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1175	Silica, crystalline			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7631869	Silica, crystalline			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10588019	Sodium dichromate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1310732	Sodium hydroxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7789062	Strontium chromate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
100425	Styrene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9960	Sulfates			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9960	SULFATES			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7446095	Sulfur Dioxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7446719	Sulfur Trioxide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7664939	Sulfuric acid			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	Tetrachlorophenols			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
62555	Thioacetamide			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
62566	Thiourea			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
108883	Toluene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1204	Toluene diisocyanate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
26471625	TOLUENE DIISOCYANATE			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
584849	Toluene-2,4-diisocyanate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
91087	Toluene-2,6-diisocyanate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8001352	Toxaphene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
79016	Trichloroethylene			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	Trichlorofluormethane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0	Trichlorotrifluormethane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
121448	Triethylamine			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
51796	Urethane			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7440622	Vanadium (fume or dust)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1314621	VANADIUM PENTOXIDE			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
108054	Vinyl acetate			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75014	Vinyl chloride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
75354	Vinylidene chloride			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1330207	XYLENES (mixed xylenes)			0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Attachment E-5

Calculation of CO₂(e)/CO₂ Ratio

Evaluation of GHG Emissions in Terms of CO₂ Equivalents (CO₂(e)) from Natural Gas and Diesel Combustion

Basis: 1 mmbtu of Natural Gas				
Pollutant	Emission Factor (kg/mmbtu)	Global Warming Potential (GWP)	kg	kg CO ₂ (e)
CO ₂	53.02	1	265.1	265.1
CH ₄	0.0009	21	0.0045	0.0945
N ₂ O	0.0001	310	0.0001	0.031
			265.1	265.2
	Ratio CO ₂ (e)/CO ₂			1.0005
Notes				
CO ₂ (e) - carbon dioxide equivalents				
CO ₂ (e) = kg/day x GWP				
Emission factors from Appendix A, Subchapter 10 (Climate Change), Article 2, Sections 951000 to 95133, California Code of Regulations (CCR) Title 17. Excerpts attached.				

Basis: 1 mmbtu of Diesel or Petroleum Products				
Pollutant	Emission Factor (kg/mmbtu)	Global Warming Potential (GWP)	kg	kg CO ₂ (e)
CO ₂	73.1	1	73.1	73.1
CH ₄	0.003	21	0.003	0.063
N ₂ O	0.0006	310	0.0006	0.186
	Totals		73.1	73.3
	Ratio CO ₂ (e)/CO ₂			1.0034
Notes				
CO ₂ (e) - carbon dioxide equivalents				
CO ₂ (e) = kg x GWP				
Emission factors from Appendix A, Subchapter 10 (Climate Change), Article 2, Sections 951000 to 95133, California Code of Regulations (CCR) Title 17. Excerpts attached.				

APPENDIX A

to the Regulation for the Mandatory Reporting
of Greenhouse Gas Emissions

**ARB COMPENDIUM OF EMISSION FACTORS AND METHODS TO SUPPORT
MANDATORY REPORTING OF GREENHOUSE GAS EMISSIONS**

ARB COMPENDIUM OF EMISSION FACTORS AND METHODS TO SUPPORT MANDATORY REPORTING OF GREENHOUSE GAS EMISSIONS

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- 6. Method for Calculating Emissions of High Global Warming Potential Compounds**

1. Introduction

The contents of this compendium specify acceptable methods and emission factors that operators must use when preparing greenhouse gas emissions data reports for submission to the California Air Resources Board (ARB), as specified in the ARB Regulation for the Mandatory Reporting of Greenhouse Gas Emissions.

2. Unit Conversions

Table 1. Conversion Table		
To Convert From	To	Multiply By
Grams (g)	Tonnes (metric)	1×10^{-6}
Kilograms (kg)	Tonnes (metric)	1×10^{-3}
Megagrams	Tonnes (metric)	1
Gigagrams	Tonnes (metric)	1×10^3
Pounds (lbs)	Tonnes (metric)	4.5359×10^{-4}
Tons (long)	Tonnes (metric)	1.016
Tons (short)	Tonnes (metric)	0.9072
Barrels	Cubic metres (m ³)	0.15898
Cubic feet (ft ³)	Cubic metres (m ³)	0.028317
Liters	Cubic meters (m ³)	1×10^{-3}
Cubic yards	Cubic meters (m ³)	0.76455
Gallons (liquid, US)	Cubic meters (m ³)	3.7854×10^{-3}
Imperial gallon	Cubic meters (m ³)	4.54626×10^{-3}
Joule	Gigajoules (GJ)	1×10^{-9}
Kilojoule	Gigajoules (GJ)	1×10^{-6}
Megajoule	Gigajoules (GJ)	1×10^{-3}
Terajoule (TJ)	Gigajoules (GJ)	1×10^3
Btu	Gigajoules (GJ)	1.05506×10^{-6}
Kilocalorie	Gigajoules (GJ)	4.187×10^{-6}
Tonne oil eq. (toe)	Gigajoules (GJ)	41.86
kWh	Gigajoules (GJ)	3.6×10^{-3}
Btu / ft ³	GJ / m ³	3.72589×10^{-5}
Btu / lb	GJ / Tonnes (metric)	2.326×10^{-3}
Lb / ft ³	Tonnes (metric) / m ³	1.60185×10^{-2}
Psi	Bar	0.0689476
Kgf / cm ³ (tech atm)	Bar	0.980665
Atm	Bar	1.01325
Mile	Kilometer	1.6093
Hectares	Acres	2.471
Barrels	Gallons (liquid, US)	42

3. Global Warming Potentials

According to the Intergovernmental Panel on Climate Change (IPCC), the global warming potential (GWP) of a greenhouse gas is defined as the ratio of the time-integrated radiative forcing from the instantaneous release of 1 kilogram (kg) of a trace substance relative to that of 1 kg of a reference gas. The reference gas used is CO₂. The values given below are those reported in the IPCC Second Assessment Report (IPCC 1996). These values are used to be consistent with other statewide and national Greenhouse Gas (GHG) inventories. Operators must use these values when converting emissions of greenhouse gases to carbon dioxide equivalent values (CO₂e) for purposes of estimating *de minimis* or other emissions as specified in this article.

Table 2. Global Warming Potentials (100-Year Time Horizon)	
Gas	GWP
CO ₂	1
CH ₄ *	21
N ₂ O	310
HFC-23	11,700
HFC-32	650
HFC-125	2,800
HFC-134a	1,300
HFC-143a	3,800
HFC-152a	140
HFC-227ea	2,900
HFC-236fa	6,300
HFC-4310mee	1,300
CF ₄	6,500
C ₂ F ₆	9,200
C ₄ F ₁₀	7,000
C ₆ F ₁₄	7,400
SF ₆	23,900
* The CH ₄ GWP includes the direct effects and those indirect effects due to the production of tropospheric ozone and stratospheric water vapor. The indirect effect due to the production of CO ₂ is not included.	
Source: IPCC Climate Change 1995: The Science of Climate Change. (1996) Intergovernmental Panel on Climate Change, J.T. Houghton, L.G. Meira Filho, B.A. Callander, N. Harris, A. Kattenberg, and K. Maskell, eds. Cambridge University Press. Cambridge, U.K.	

5. Emission Factors

When working with the following emission factor tables the molar mass ratio of carbon dioxide to carbon (CO₂/C) is assumed to be 3.664. Complete oxidation is assumed for all fuels (oxidation factor = 1).

(a) Default Carbon Content, Heat Content, and Carbon Dioxide Emission Factors for Stationary Combustion

The default heat contents specified in Table 4 are provided for use with sections 95125(a) and (b) of the regulation.

The default carbon dioxide emission factors from stationary combustion on a heat content basis (kg CO₂ / MMBtu) specified in Table 4 and Table 5 are provided for use with sections 95125(a), (c) and (h) of the regulation.

Fuel Type	Default Carbon Content	Default Heat Content	Default CO₂ Emission Factor	Default CO₂ Emission Factor
	kg C / MMBtu	MMBtu / Short Ton	kg CO₂ / Short Ton	kg CO₂ / MMBtu
Coal and Coke				
Anthracite	28.26	25.09	2,597.94	103.54
Bituminous	25.49	24.93	2,328.35	93.40
Sub-bituminous	26.48	17.25	1,673.64	97.02
Lignite	26.30	14.21	1,369.32	96.36
Unspecified (Residential/Commercial)	26.00	22.24	2,118.67	95.26
Unspecified (Industrial Coking)	25.56	26.28	2,461.17	93.65
Unspecified (Other Industrial)	25.63	22.18	2,082.89	93.91
Unspecified (Electric Power)	25.76	19.97	1,884.86	94.38
Coke	27.85	24.80	2,530.65	102.04
Natural Gas (By Heat Content)	kg C / MMBtu	Btu / Standard cubic foot	kg CO₂ / Standard cubic ft.	kg CO₂ / MMBtu
975 to 1,000 Btu / Standard cubic foot	14.73	n/a	n/a	53.97
1000 to 1,025 Btu / Std cubic foot	14.43	n/a	n/a	52.87
1025 to 1,050 Btu / Std cubic foot	14.47	n/a	n/a	53.02
1050 to 1,075 Btu / Std cubic foot	14.58	n/a	n/a	53.42
1075 to 1,100 Btu / Std cubic foot	14.65	n/a	n/a	53.68
Greater than 1,100 Btu / Std cubic foot	14.92	n/a	n/a	54.67
Unspecified (Weighted U.S. Average)	14.47	1,027	0.0544	53.02

Table 4. Default Carbon Content, Heat Content, and Carbon Dioxide Emission Factors from Stationary Combustion by Fuel Type (continued)				
	kg C / MMBtu	MMBtu / Barrel	kg CO₂ / gallon	kg CO₂ / MMBtu
Petroleum Products				
Asphalt & Road Oil	20.62	6.636	11.94	75.55
Aviation Gasoline	18.87	5.048	8.31	69.14
Distillate Fuel Oil (#1, 2 & 4)	19.95	5.825	10.14	73.10
Jet Fuel	19.33	5.670	9.56	70.83
Kerosene	19.72	5.670	9.75	72.25
LPG (energy use)	17.19	3.861	5.79	62.98
Propane	17.20	3.824	5.74	63.02
Ethane	16.25	2.916	4.13	59.54
Isobutane	17.75	4.162	6.44	65.04
n-Butane	17.72	4.328	6.69	64.93
Lubricants	20.24	6.065	10.71	74.16
Motor Gasoline	19.33	5.218	8.80	70.83
Residual Fuel Oil (#5 & 6)	21.49	6.287	11.79	78.74
Crude Oil	20.33	5.800	10.29	74.49
Naphtha (<401 deg. F)	18.14	5.248	8.30	66.46
Natural Gasoline	18.24	4.620	7.35	66.83
Other Oil (>401 deg. F)	19.95	5.825	10.14	73.10
Pentanes Plus	18.24	4.620	7.35	66.83
Petrochemical Feedstocks	19.37	5.428	9.17	70.97
Petroleum Coke	27.85	6.024	14.64	102.04
Still Gas	17.51	6.000	9.17	64.16
Special Naphtha	19.86	5.248	9.09	72.77
Unfinished Oils	20.33	5.825	10.33	74.49
Waxes	19.81	5.537	9.57	72.58
Other Solid Fuels				
Biomass Derived Fuels (Solid). Wood and Wood Waste (12% moisture content) or other solid biomass-derived fuels	25.60	15.38	1,442.62	93.80
Municipal Solid Waste (MSW)	24.74	8.7	788.7	90.65
Biomass-derived Fuels (Gas)				
Biogas*	28.4	Btu / Standard cubic foot	kg CO ₂ / Standard cubic ft.	kg CO ₂ / MMBtu
Biogas*	28.4	Varies	Varies	104.06
Note: Heat content factors are based on higher heating values (HHV). * The emission factors for biogas include both the CO ₂ from combustion and the pass-through CO ₂ , which are assumed to be in equal proportions.				
Source: U.S. EPA, <i>Inventory of Greenhouse Gas Emissions and Sinks: 1990-2005</i> (2007), Annex 2.1, Tables A-28, A-31, A-32, A-35, and A-36, except: Heat Content factors for Unspecified Coal (by sector), Coke, Naphtha (<401 deg. F), and Other Oil (>401 deg. F) (from U.S. Energy Information Administration, <i>Annual Energy Review 2005</i> (2006), Tables A-1, A-4, and A-5); Heat Content factors for Coal (by type) and LPG and all factors for Wood and Wood Waste, Landfill Gas, and Wastewater Treatment Biogas (from EPA Climate Leaders, <i>Stationary Combustion Guidance</i> (2004), Tables B-1 and B-2). MSW from Energy Information Administration, http://www.eia.doe.gov/oiaf/1605/factors.html and from California Air Resources Board, MSW California Air Resources Board, 2008.				

(b) Methane and Nitrous Oxide Emission Factors for Stationary Combustion

The default methane and nitrous oxide emission factors for stationary combustion in Table 6 are provided for use with section 95125(b) of the regulation. For readability, these emission factors are provided in units of grams/MMBtu, but should be converted to kg/MMBtu (i.e., divided by 1000) when using them in the equations in section 95125(b).

Table 6. Default CH₄ and N₂O Emission Factors from Stationary Combustion by Fuel Type		
Fuel Type	Default CH₄ Emission Factor (g CH₄/ MMBtu)	Default N₂O Emission Factor (g N₂O / MMBtu)
Asphalt	3.0	0.6
Aviation Gasoline	3.0	0.6
Coal	10.0	1.5
Crude Oil	3.0	0.6
Derived Gases (low Btu gases)	0.3	0.1
Digester Gas	0.9	0.1
Distillate	3.0	0.6
Gasoline	3.0	0.6
Jet Fuel	3.0	0.6
Kerosene	3.0	0.6
Landfill Gas	0.9	0.1
LPG	1.0	0.1
Lubricants	3.0	0.6
MSW	30.0	4.0
Naphtha	3.0	0.6
Natural Gas	0.9	0.1
Natural Gas Liquids	3.0	0.6
Other Biomass	30.0	4.0
Petroleum Coke	3.0	0.6
Propane	1.0	0.1
Refinery Gas	0.9	0.1
Residual Fuel Oil	3.0	0.6
Tires	3.0	0.6
Waste Oil	30.0	4.0
Waxes	3.0	0.6
Wood (Dry)	30.0	4.0
Notes: Heat content factors are based on higher heating values (HHV). Values were converted from LHV to HHV assuming that LHV are 5 percent lower than HHV for solid and liquid fuels and 10 percent lower for gaseous fuels. Those employing this table are assumed to fall under the IPCC definitions of the "Energy Industry" or "Manufacturing Industries and Construction". In all fuels except for coal the values for these two categories are identical. For coal combustion, those who fall within the IPCC "Energy Industry" category may employ a value of 1 g of CH ₄ /MMBtu.		
Source: Intergovernmental Panel on Climate Change, <i>2006 IPCC Guidelines for National Greenhouse Gas Inventories</i> (2006), Volume 2, Tables 2.2, 2.3, and 2.4.		