APPENDIX 8.1F

Construction Phase Impacts

CONSTRUCTION PHASE IMPACTS

8.1F.1 Onsite Construction

Construction of the Project is expected to last approximately 10 months. The onsite construction will be performed in the following five main phases:

Site preparation;
Foundation work;
Installation of major equipment;
Construction/installation of major structures; and
Start up and commissioning.

Site preparation includes clearing, grading, excavation of footings and foundations, and backfilling operations. After site preparation is finished, the construction of the foundations and structures is expected to begin. Once the foundations and structures are finished, installation and assembly of the mechanical and electrical equipment are scheduled to commence.

Fugitive dust emissions from the construction of the Project will result from:

Dust entrained during site preparation and grading/excavation at the construction site;
Dust entrained during onsite travel on paved and unpaved surfaces;
Dust entrained during aggregate and soil loading and unloading operations; and
Wind erosion of areas disturbed during construction activities.

Combustion emissions during construction will result from:

Exhaust from the Diesel construction equipment used for site preparation, grading, excavation, and construction of onsite structures;
Exhaust from water trucks used to control construction dust emissions;
Exhaust from Diesel-powered welding machines, electric generators, air compressors, water pumps, etc.;
Exhaust from Diesel trucks used to deliver concrete, fuel, and construction supplies to the construction site; and
Exhaust from automobiles and trucks used by workers to commute to the construction site.

To determine the potential worst-case daily construction impacts, exhaust and dust emission rates have been evaluated for each source of emissions. Worst-case daily dust and exhaust emissions are expected to occur during the first month of construction during site preparation. Annual emissions are based on the average equipment mix during the 10-month construction period.

8.1F.2 Natural Gas/Water Pipelines and Transmission Lines

The installation of a 0.4-mile long natural gas pipeline will generate short-term construction impacts including fugitive dust and construction equipment combustion emissions. For this pipeline route, the excavation, installation of pipe, backfilling, and site cleanup will be performed in approximately 500-foot-long sections over a short duration to minimize fugitive dust and construction equipment combustion emissions.

The installation of the water pipeline will also generate short-term construction impacts

including fugitive dust and construction equipment combustion emissions.

The proposed project also includes the installation of a 0.25-mile long transmission line interconnect. As with the construction of the natural gas and water pipelines, this construction activity will result in fugitive dust and construction equipment combustion emissions.

8.1F.3 Available Mitigation Measures

The following mitigation measures are proposed to control exhaust emissions from the Diesel heavy equipment used during construction of the Project:

- Operational measures, such as limiting engine idling time and shutting down equipment when not in use;
- Regular preventive maintenance to prevent emission increases due to engine problems;
- Use of low sulfur and low aromatic fuel meeting California standards for motor vehicle Diesel fuel; and
- Use of low-emitting Diesel engines meeting federal emissions standards for construction equipment if available.

The following mitigation measures are proposed to control fugitive dust emissions during construction of the project:

- Use either water application or chemical dust suppressant application to control dust emissions from unpaved surface travel and unpaved parking areas;
- Use vacuum sweeping and/or water flushing of paved road surface to remove buildup of loose material to control dust emissions from travel on the paved access road (including adjacent public streets impacted by construction activities) and paved parking areas;
- Cover all trucks hauling soil, sand, and other loose materials, or require all trucks to maintain at least two feet of freeboard;
- Limit traffic speeds on unpaved surfaces to 25 mph;
- Install sandbags or other erosion control measures to prevent silt runoff to roadways;
- Re-plant vegetation in disturbed areas as quickly as possible;
- As needed, use gravel pads along with wheel washers or wash tires of all trucks exiting construction site that carry track-out dirt from unpaved surfaces; and
- Mitigate fugitive dust emissions from wind erosion of areas disturbed from construction activities (including storage piles) by application of either water or chemical dust suppressant and/or use of wind breaks.

8.1F.4 Estimation of Emissions with Mitigation Measures

8.1F.4.1 Onsite Construction

Tables 8.1F-1 and 8.1F-2 show the estimated maximum daily and annual heavy equipment exhaust and fugitive dust emissions with recommended mitigation measures for onsite construction activities. Detailed emission calculations are included as Attachment 8.1F-1.

8.1F.4.2 Pipeline/Transmission Line Construction

Table 8.1F-3 shows the estimated maximum daily heavy equipment exhaust and fugitive dust emissions with recommended mitigation measures for the natural gas pipeline, water pipeline, and transmission line interconnect construction activities. The following is the expected construction period for each pipeline/transmission line route:

- Natural gas pipeline – 1 month
- Water pipeline – 1 month
- Transmission line interconnect – 1 month

Because of the temporary nature of these construction activities, annual emissions are not shown in the following emission summary tables for these construction activities. Detailed emission calculations are included as Attachment 8.1F-1.

Table 8.1F-1
Maximum Daily Emissions During Onsite Construction
(First Month; Maximum Dust Emissions), Pounds Per Day

	NO_x	CO	VOC	SO_x	PM_{10}
Onsite					
Construction Equipment	136.1	64.9	10.7	0.1	6.4
Fugitive Dust	--	--	--	--	15.7
Offsite					
Worker Travel, Truck Deliveries	26.4	93.6	8.3	0.8	1.2
Total Emissions					
Total	162.5	158.5	19.0	0.9	23.3

Table 8.1F-2
Annual Emissions During Onsite Construction, Tons Per Year

	NO_x	CO	VOC	SO_x	PM_{10}
Onsite					
Construction Equipment	8.3	5.8	0.9	0.0	0.5
Fugitive Dust	--	--	--	--	0.4
Offsite					
Worker Travel, Truck Deliveries	1.5	6.5	0.6	0.0	0.1
Total Emissions					
Total	9.8	12.3	1.5	0.0	1.0

Table 8.1F-3
Maximum Daily Emissions During Pipeline/Transmission Line Interconnect Construction
Pounds Per Day

	NO_x	CO	VOC	SO_x	PM_{10}
Natural Gas Pipeline					
Onsite					
Construction Equipment	55.81	17.93	4.14	1.89	2.77
Fugitive Dust	--	--	--	--	4.66
Offsite					
Truck Deliveries and Worker Travel	22.27	55.99	5.21	0.77	1.12
Total Emissions	78.08	73.92	9.36	2.66	8.55
Water Pipeline					
Onsite					
Construction Equipment	61.98	22.61	4.85	2.22	3.17
Fugitive Dust	--	--	--	--	5.47
Offsite					
Truck Deliveries and Worker Travel	31.55	61.80	6.04	1.15	1.64
Total Emissions	93.53	84.41	10.90	3.37	10.28
Transmission Line Interconnect					
Onsite					
Construction Equipment	76.13	15.58	4.83	2.20	3.47
Fugitive Dust	--	--	--	--	1.14
Offsite					
Truck Deliveries and Worker Travel	49.49	66.01	7.12	1.92	2.67
Total Emissions	125.62	81.59	11.95	4.12	7.28

8.1F.5 Analysis of Ambient Impacts from Onsite Construction

Ambient air quality impacts from emissions during construction of the Project were estimated using an air quality dispersion modeling analysis. The modeling analysis considers the construction site location, the surrounding topography, and the sources of emissions during construction, including vehicle and equipment exhaust emissions and fugitive dust.

8.1F.5.1 Dispersion Model

As in the analysis of project operating impacts, the EPA-approved Industrial Source Complex Short Term (ISCST3) model was used to estimate ambient impacts from construction activities. A detailed discussion of the ISCST3 dispersion model is included in Section 8.1.5.

The emission sources for the construction site were grouped into two categories: exhaust emissions and dust emissions. An effective emission plume height of 4.15 meters was used for all exhaust emissions.[1] For construction dust emissions, an effective plume height of 0.5 meters was used in the modeling analysis. The exhaust and dust emissions were modeled as area sources that covered the total area of the construction site. The construction impacts modeling analysis used the same receptor locations as used for the project operating impact analysis. A detailed discussion of the receptor locations is included in Section 8.1.5 of the AFC.

To determine the construction impacts on short-term ambient standards (24 hours and less), the worst-case daily onsite construction emission levels shown in Table 8.1F-1 were used. For pollutants with annual average ambient standards, the annual onsite emission levels shown in Table 8.1F-2 were used. The same meteorological data set and background ambient levels used for the project operating modeling analysis was used for the construction emission impacts analysis.

8.1F.5.2 Modeling Results

Based on the emission rates of NO_x, SO_2, CO, and PM_{10} and the meteorological data, the ISCST3 model calculates hourly and annual ambient impacts for each pollutant. As mentioned above, the modeled 1-hour, 3-hour, 8-hour, and 24-hour ambient impacts are based on the worst-case daily emission rates of NO_x, SO_2, CO, and PM_{10}. The annual impacts are based on the annual emission rates of these pollutants.

The one-hour and annual average concentrations of NO_2 were computed following the revised EPA guidance for computing these concentrations (August 9, 1995 *Federal Register,* 60 FR 40465). The OLM_ISC model was used for the one-hour average NO_2 impacts. The annual average was calculated using the ambient ratio method (ARM) with the EPA default value of 0.75 for the annual average NO_2/NO_x ratio.

The modeling analysis results are shown in Table 8.1F-4. Also included in the table are the maximum background levels that have occurred during the past few years and the resulting total ambient impacts. As shown in Table 8.1F-4, with the exception of PM_{10} 24-hr impacts, construction impacts alone for all modeled pollutants are expected to be below the most stringent state and national standards. With the exception of 24-hour and annual PM_{10} impacts, construction activities are not expected to cause the violation of any state or federal ambient air quality standard. However, the state 24-hour and annual average PM_{10} standards are exceeded in the absence of the construction emissions for the Project.

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[1] This release height is based on the data used in ARB's Diesel Risk Reduction Plan for Diesel vehicles.

Table 8.1F-4

Modeled Maximum Construction Impacts

Pollutant	Averaging Time	Maximum Construction Impacts ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)
NO_2[a]	1-Hour	256	194	450	470	--
	Annual	23	41	64	--	100
SO_2	1-Hour	0.6	76.0	77	650	--
	3-Hour	0.4	52.4	53	--	1300
	24-Hour	0.1	23.6	24	109	365
	Annual	0.0	5.2	5	--	80
CO	1-Hour	349	13,045	13,394	23,000	40,000
	8-Hour	161	8,353	8,514	10,000	10,000
PM_{10}	24-Hour	57	158	215	50	150
	Annual[b]	6	41	47	20	50

Notes: a. OLM_ISC used for 1-hr average impact and ARM applied for annual average, using EPA default ratio of 0.75.
b. Annual Arithmetic Mean.

The dust mitigation measures already proposed by the applicant are expected to be very effective in minimizing fugitive dust emissions. The attached isopleth diagrams (see Attachment 8.1F-1) show the extent of the modeled impacts from construction PM_{10} for the 24-hour and annual averaging periods. As shown on these isopleths, while maximum impacts occur next to the project site fenceline, concentrations decrease rapidly at locations only a couple of hundred meters away from the project site. For example, as shown on the isopleths for 24-hr average PM_{10} impacts, along the fenceline PM_{10} impacts are approximately 50 $\mu g/m^3$. However, at locations only 100 meters way from the fenceline PM_{10} impacts decrease to approximately 20 $\mu g/m^3$ (only 40% of the level at the fenceline).

It is also important to note that emissions in an exhaust plume are dispersed through the entrainment of ambient air, which dilutes the concentration of the emissions as they are carried away from the source by winds. The process of mixing the pollutants with greater and greater volumes of cleaner air is controlled primarily by the turbulence in the atmosphere. This dispersion occurs both horizontally, as the exhaust plume rises above the emission point, and vertically, as winds carry the plume horizontally away from its source.

The rise of a plume above its initial point of release is a significant contributing factor to the reductions in ground-level concentrations, both because a rising plume entrains more ambient air as it travels downwind, and because it travels farther downwind (and thus also undergoes more horizontal dispersion) before it impacts the ground. Vertical plume rise occurs as a result of

buoyancy (plume is hotter than ambient air, and hot air, being less dense, tends to rise) and/or momentum (plume has an initial vertical velocity).

In ISCST3, area sources are not considered to have either buoyant or momentum plume rise, and therefore the model assumes that there is no vertical dispersion taking place. Thus a significant source of plume dilution is ignored when sources are modeled as area sources in ISCST3.

The project construction site impacts are not unusual in comparison to most construction sites; construction sites that use good dust suppression techniques and low-emitting vehicles typically do not cause violations of air quality standards. The input and output modeling files are being provided electronically.

8.1F.5.3 Health Risk from Diesel Exhaust

The combustion portion of annual PM_{10} emissions from Table 8.1F-2 above were modeled separately to determine the annual average Diesel PM_{10} exhaust concentration. This was used with the ARB-approved unit risk value of 300 in one million for a 70-year lifetime to determine the potential carcinogenic risk from Diesel exhaust during construction. The exposure was also adjusted by a factor of 0.8/70, or 0.01143, to correct for the 10-month exposure during the construction period.

The maximum modeled annual average concentration of Diesel exhaust PM_{10} is 1.93 ug/m^3. Using the unit risk value and adjustment factors described above, the carcinogenic risk due to exposure to Diesel exhaust during construction activities is expected to be approximately 6.6 in one million. This is below the 10 in one million level considered to be significant under the San Joaquin Valley APCD's CEQA guidelines.

It is also important to note that these impacts are highly localized near the project site. As shown in the attached annual average Diesel combustion PM_{10} isopleth diagram (see Attachment 8.1F-1), the area in which the risk may exceed 6 in one million (i.e., ambient annual average Diesel PM_{10} impact equal to or greater than 1.8 ug/m^3) extends less than 50 meters from the facility fenceline. The area in which the risk may exceed 1 in one million (Diesel PM_{10} impact equal to or greater than 0.29 ug/m^3) extends about 400 meters from the southeast facility fenceline. This analysis remains conservative because, as discussed above, the modeled PM_{10} concentrations from construction operations are overpredicted by the ISCST3 model.

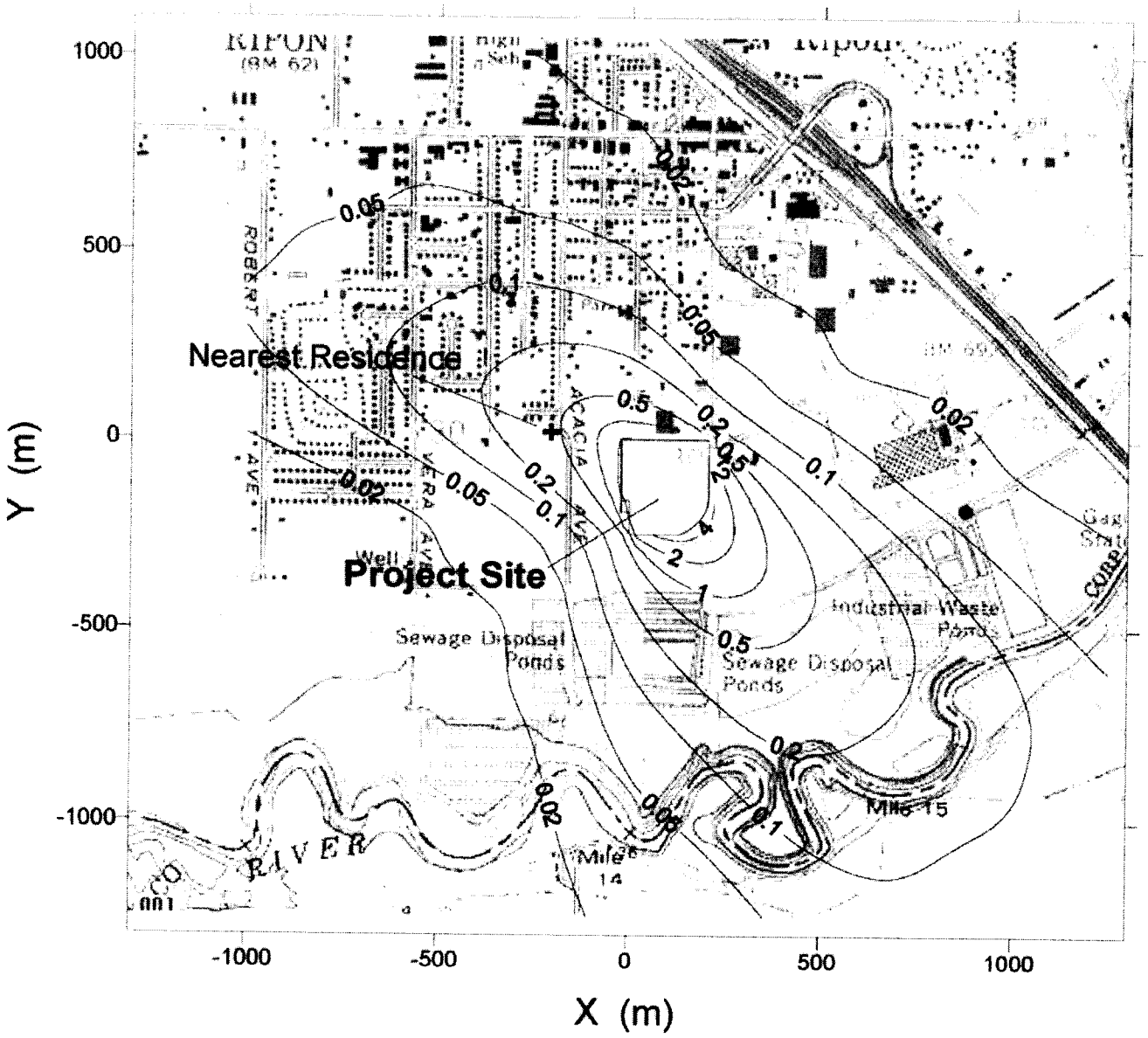
8.1F.5.4 Analysis of Ambient Impacts from Pipeline/Transmission Line Interconnect Construction

Construction of the natural gas/water pipelines and the transmission line interconnect activities will be of short duration, will require minimal equipment, and will generally occur along public roads and utility rights-of-way covering a large geographical area. Therefore, the potential ambient air quality impacts associated with these construction projects are expected to be minimal.

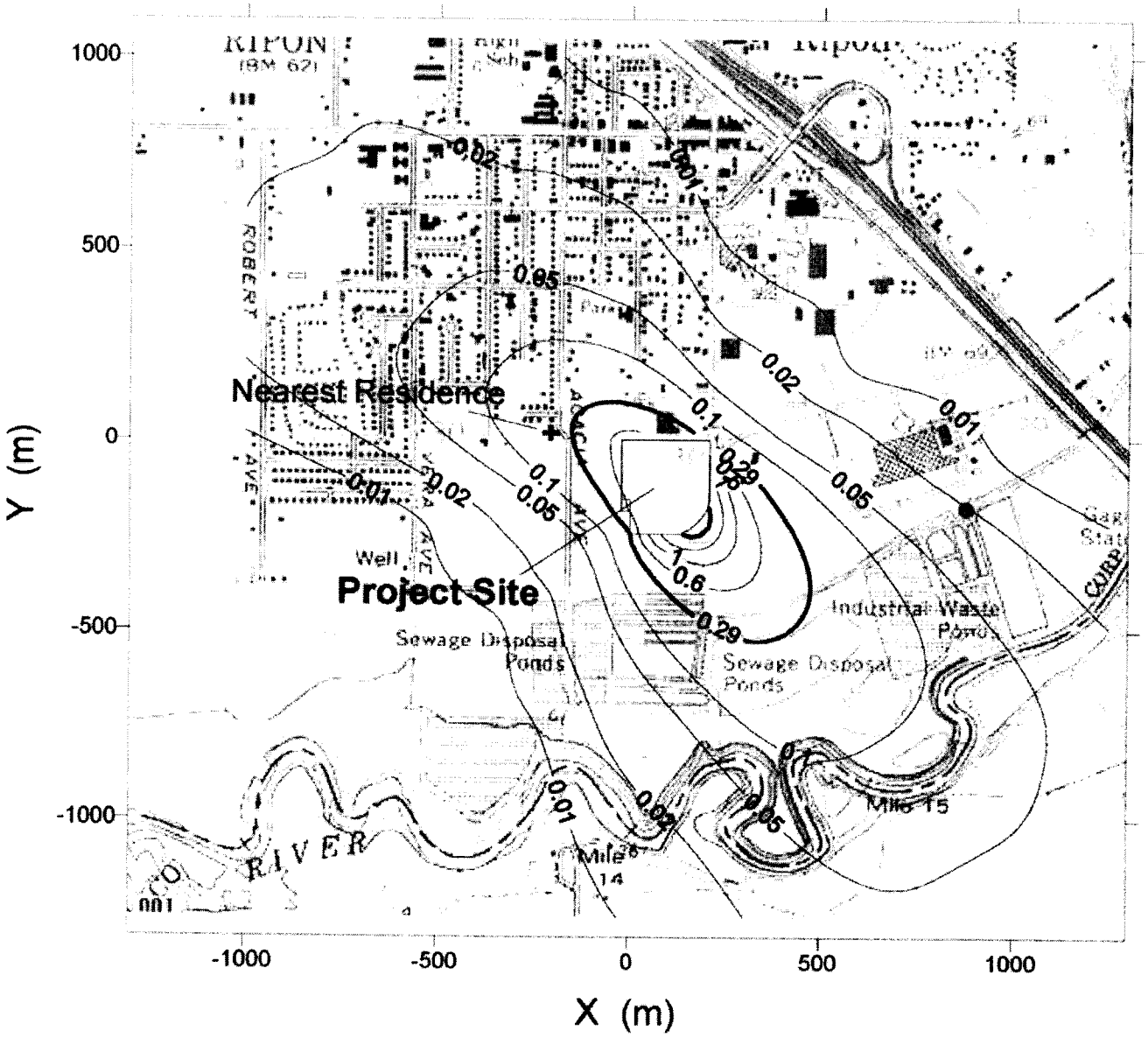
Attachment 8.1F-1

Detailed Construction Emission Calculations

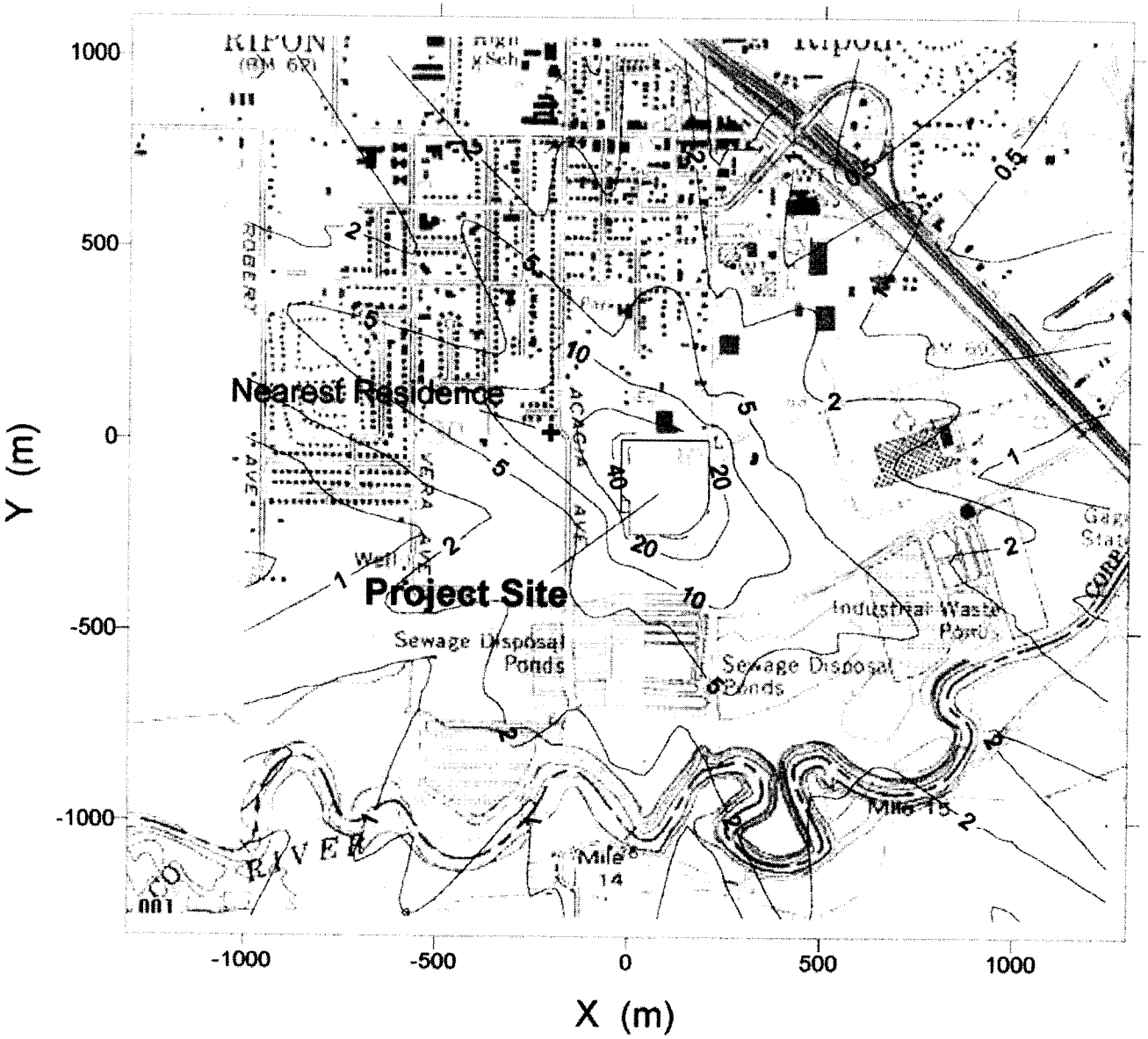
MID Ripon - Construction - Annual PM10 (ug/m3)



MID Ripon - Construction - Annual Diesel PM10 (ug/m3)



MID Ripon - Construction - 24-hr PM10 (ug/m3)



Construction Equipment Daily Exhaust Emissions (Month 1)
MID Electric Generating Station

Equipment	Gasoline/ Diesel	Number of Units	Hrs/Day Per Unit	Gals/Hr Per Unit	Total Fuel Use (Gals/day)	Emission Factors (lbs/1000 gals)(1) NOx	CO	POC	SOx	PM10	Daily Emissions (lbs/day) NOx	CO	POC	SOx	PM10
Crawler Crane- Greater than 300 ton	D	0	2	7.50	0.00	270.01	39.13	15.65	0.21	11.74	0.00	0.00	0.00	0.00	0.00
Crawler Crane- Greater than 200 ton	D	0	4	5.00	0.00	270.01	39.13	15.65	0.21	11.74	0.00	0.00	0.00	0.00	0.00
Crane - Mobile 65 ton	D	0	4	4.00	0.00	270.01	39.13	15.65	0.21	11.74	0.00	0.00	0.00	0.00	0.00
Cranes -Mobile 45 ton	D	0	4	4.00	0.00	270.01	39.13	15.65	0.21	11.74	0.00	0.00	0.00	0.00	0.00
Cranes - Mobile 35 ton	D	0	4	4.00	0.00	270.01	39.13	15.65	0.21	11.74	0.00	0.00	0.00	0.00	0.00
Bulldozer D6H	D	1	8	5.50	44.00	270.01	39.13	15.65	0.21	11.74	11.88	1.72	0.69	0.01	0.52
Bulldozer D4C	D	1	8	3.00	24.00	270.01	39.13	15.65	0.21	11.74	6.48	0.94	0.38	0.01	0.28
Excavator- Trencher	D	0	8	2.00	0.00	270.01	39.13	15.65	0.21	11.74	0.00	0.00	0.00	0.00	0.00
Excavator- Earth Scraper	D	3	8	9.00	216.00	270.01	39.13	15.65	0.21	11.74	58.32	8.45	3.38	0.05	2.54
Excavator-Motor Grader	D	1	8	5.00	40.00	270.01	39.13	15.65	0.21	11.74	10.80	1.57	0.63	0.01	0.47
Excavator- Backhoe/loader	D	0	8	2.50	0.00	270.01	39.13	15.65	0.21	11.74	0.00	0.00	0.00	0.00	0.00
Excavator - loader	D	1	8	2.50	20.00	270.01	39.13	15.65	0.21	11.74	5.40	0.78	0.31	0.00	0.23
Vibratory Roller	D	1	8	10.00	80.00	270.01	39.13	15.65	0.21	11.74	21.60	3.13	1.25	0.02	0.94
Portable Compaction roller	D	0	8	10.00	0.00	270.01	39.13	15.65	0.21	11.74	0.00	0.00	0.00	0.00	0.00
Truck- Water	D	1	8	3.13	25.04	170.68	106.79	15.33	0.21	9.59	4.27	2.67	0.38	0.01	0.24
Forklift	D	1	4	2.50	10.00	270.01	39.13	15.65	0.21	11.74	2.70	0.39	0.16	0.00	0.12
Dump Truck	D	2	8	3.13	50.08	170.68	106.79	15.33	0.21	9.59	8.55	5.35	0.77	0.01	0.48
Service Truck- 1 ton	D	0	8	1.56	0.00	74.40	59.47	5.57	0.21	4.83	0.00	0.00	0.00	0.00	0.00
Truck- Fuel/Lube	D	1	2	3.13	6.26	170.68	106.79	15.33	0.21	9.59	1.07	0.67	0.10	0.00	0.06
Concrete Pumper Truck	D	0	8	3.13	0.00	170.68	106.79	15.33	0.21	9.59	0.00	0.00	0.00	0.00	0.00
Tractor Truck 5th Wheel	D	0	8	3.13	0.00	170.68	106.79	15.33	0.21	9.59	0.00	0.00	0.00	0.00	0.00
Trucks- Pickup 3/4 ton	G	2	8	0.78	12.48	62.81	677.30	46.28	0.27	1.56	0.78	8.45	0.58	0.00	0.02
Trucks- 3 ton	D	1	8	1.56	12.48	74.40	59.47	5.57	0.21	4.83	0.93	0.74	0.07	0.00	0.06
Diesel Powered Welder	D	0	4	1.27	0.00	313.05	195.66	46.96	0.21	39.13	0.00	0.00	0.00	0.00	0.00
Light Plants	D	0	8	1.27	0.00	313.05	195.66	46.96	0.21	39.13	0.00	0.00	0.00	0.00	0.00
Portable Compaction- Vibratory Plate	D	0	8	0.25	0.00	313.05	195.66	46.96	0.21	39.13	0.00	0.00	0.00	0.00	0.00
Portable Compaction- Vibratory Ram	D	0	8	0.25	0.00	313.05	195.66	46.96	0.21	39.13	0.00	0.00	0.00	0.00	0.00
Articulating Boom Platforms	D	0	8	0.25	0.00	313.05	195.66	46.96	0.21	39.13	0.00	0.00	0.00	0.00	0.00
Pumps	G	2	8	0.13	2.03	79.44	13813.38	748.58	0.00	2.35	0.16	28.07	1.52	0.00	0.00
Air Compressor 185 CFM	D	1	8	1.27	10.16	313.05	195.66	46.96	0.21	39.13	3.18	1.99	0.48	0.00	0.40
Air Compressor 750 CFM	D	0	8	1.27	0.00	313.05	195.66	46.96	0.21	39.13	0.00	0.00	0.00	0.00	0.00
Concrete Vibrators	D	0	8	0.25	0.00	313.05	195.66	46.96	0.21	39.13	0.00	0.00	0.00	0.00	0.00
Concrete Trowel Machine	D	0	0.8	1.27	0.00	313.05	195.66	46.96	0.21	39.13	0.00	0.00	0.00	0.00	0.00
Fusion Welder	D	0	8	1.27	0.00	313.05	195.66	46.96	0.21	39.13	0.00	0.00	0.00	0.00	0.00
Portable Power Generators	D	0	8	1.27	0.00	313.05	195.66	46.96	0.21	39.13	0.00	0.00	0.00	0.00	0.00
Total											136.13	64.92	10.69	0.12	6.36
Total for Gasoline-Powered Eqt											0.95	36.52	2.10	0.00	0.02
Total for Diesel-Powered Eqt											135.18	28.40	8.59	0.11	6.33

Notes:
(1) See notes for combustion emissions.

Construction Equipment Annual Exhaust Emissions
MID Electric Generating Station

Equipment	Gasoline/ Diesel	Average Number of Units Per Year(1)	Average Operating Hrs/Day Per Unit	Gals/Hr Per Unit	Average Operating Days per Year	Total Fuel Use (Gals/yr)	Emission Factors (lbs/1000 gals)(2)					Annual Emissions (tons/yr)				
							NOx	CO	POC	SOx	PM10	NOx	CO	POC	SOx	PM10
Crawler Crane- Greater than 300 ton	D	0.41	2	7.50	200	1,227	270.01	39.13	15.65	0.21	11.74	0.17	0.02	0.01	0.00	0.01
Crawler Crane- Greater than 200 ton	D	1.05	4	5.00	200	4,182	270.01	39.13	15.65	0.21	11.74	0.56	0.08	0.03	0.00	0.02
Crane - Mobile 65 ton	D	0.91	4	4.00	200	2,909	270.01	39.13	15.65	0.21	11.74	0.39	0.06	0.02	0.00	0.02
Cranes -Mobile 45 ton	D	0.50	4	4.00	200	1,600	270.01	39.13	15.65	0.21	11.74	0.22	0.03	0.01	0.00	0.01
Cranes - Mobile 35 ton	D	0.95	4	4.00	200	3,055	270.01	39.13	15.65	0.21	11.74	0.41	0.06	0.02	0.00	0.02
Bulldozer D6H	D	0.14	8	5.50	200	1,200	270.01	39.13	15.65	0.21	11.74	0.16	0.02	0.01	0.00	0.01
Bulldozer D4C	D	0.18	8	3.00	200	873	270.01	39.13	15.65	0.21	11.74	0.12	0.02	0.01	0.00	0.01
Excavator- Trencher	D	0.27	8	2.00	200	873	270.01	39.13	15.65	0.21	11.74	0.12	0.02	0.01	0.00	0.01
Excavator- Earth Scraper	D	0.14	8	9.00	200	1,964	270.01	39.13	15.65	0.21	11.74	0.27	0.04	0.02	0.00	0.01
Excavator-Motor Grader	D	0.32	8	5.00	200	2,545	270.01	39.13	15.65	0.21	11.74	0.34	0.05	0.02	0.00	0.01
Excavator- Backhoe/loader	D	0.73	8	2.50	200	2,909	270.01	39.13	15.65	0.21	11.74	0.39	0.06	0.02	0.00	0.02
Excavator - loader	D	0.18	8	2.50	200	727	270.01	39.13	15.65	0.21	11.74	0.10	0.01	0.01	0.00	0.00
Vibratory Roller	D	0.36	8	10.00	200	5,818	270.01	39.13	15.65	0.21	11.74	0.79	0.11	0.05	0.00	0.03
Portable Compaction roller	D	0.36	8	10.00	200	5,818	270.01	39.13	15.65	0.21	11.74	0.79	0.11	0.05	0.00	0.03
Truck- Water	D	0.73	8	3.13	200	3,642	170.68	106.79	15.33	0.21	9.59	0.31	0.19	0.03	0.00	0.02
Forklift	D	1.00	4	2.50	200	2,000	270.01	39.13	15.65	0.21	11.74	0.27	0.04	0.02	0.00	0.01
Dump Truck	D	0.27	8	3.13	200	1,366	170.68	106.79	15.33	0.21	9.59	0.12	0.07	0.01	0.00	0.01
Service Truck- 1 ton	D	0.41	8	1.56	200	1,021	74.40	59.47	5.57	0.21	4.83	0.04	0.03	0.00	0.00	0.00
Truck- Fuel/Lube	D	0.77	2	3.13	200	967	170.68	106.79	15.33	0.21	9.59	0.08	0.05	0.01	0.00	0.00
Concrete Pumper Truck	D	0.14	8	3.13	200	683	170.68	106.79	15.33	0.21	9.59	0.06	0.04	0.01	0.00	0.00
Tractor Truck 5th Wheel	D	0.82	8	3.13	200	4,097	170.68	106.79	15.33	0.21	9.59	0.35	0.22	0.03	0.00	0.02
Trucks- Pickup 3/4 ton	G	3.73	8	0.78	200	4,652	62.81	677.30	46.28	0.27	1.56	0.15	1.58	0.11	0.00	0.00
Trucks- 3 ton	D	1.82	8	1.56	200	4,538	74.40	59.47	5.57	0.21	4.83	0.17	0.13	0.01	0.00	0.01
Diesel Powered Welder	D	0.91	4	1.27	200	924	313.05	195.66	46.96	0.21	39.13	0.14	0.09	0.02	0.00	0.02
Light Plants	D	1.55	8	1.27	200	3,140	313.05	195.66	46.96	0.21	39.13	0.49	0.31	0.07	0.00	0.06
Portable Compaction- Vibratory Plate	D	1.18	8	0.25	200	473	313.05	195.66	46.96	0.21	39.13	0.07	0.05	0.01	0.00	0.01
Portable Compaction- Vibratory Ram	D	1.00	8	0.25	200	400	313.05	195.66	46.96	0.21	39.13	0.06	0.04	0.01	0.00	0.01
Articulating Boom Platforms	D	2.59	8	0.25	200	1,036	313.05	195.66	46.96	0.21	39.13	0.16	0.10	0.02	0.00	0.02
Pumps	G	1.09	8	0.13	200	222	79.44	13813.38	748.58	0.00	2.35	0.01	1.53	0.08	0.00	0.00
Air Compressor 185 CFM	D	0.95	8	1.27	200	1,940	313.05	195.66	46.96	0.21	39.13	0.30	0.19	0.05	0.00	0.04
Air Compressor 750 CFM	D	1.38	8	1.27	200	2,806	313.05	195.66	46.96	0.21	39.13	0.44	0.27	0.07	0.00	0.05
Concrete Vibrators	D	2.14	8	0.25	200	855	313.05	195.66	46.96	0.21	39.13	0.13	0.08	0.02	0.00	0.02
Concrete Trowel Machine	D	0.59	0.8	1.27	200	120	313.05	195.66	46.96	0.21	39.13	0.02	0.01	0.00	0.00	0.00
Fusion Welder	D	0.29	8	1.27	200	581	313.05	195.66	46.96	0.21	39.13	0.09	0.06	0.01	0.00	0.01
Portable Power Generators	D	0.14	8	1.27	200	277	313.05	195.66	46.96	0.21	39.13	0.04	0.03	0.01	0.00	0.01
Total												8.33	5.81	0.88	0.01	0.54
Total for Gasoline-Powered Eqt												0.15	3.11	0.19	0.00	0.00
Total for Diesel-Powered Eqt												8.18	2.71	0.69	0.01	0.53

Notes:
(1) Based on average number of units operating over 10 month construction period.
(2) See notes on combustion emissions.

Daily Fugitive Dust Emissions (Month 1)
MID Electric Generating Station

Equipment	Number of Units	Daily Process Rate Per Unit	Total Process Rate	Units	PM10 Emission Factor(1) (lbs/unit)	Control Factor(1) (%)	PM10 Emissions (lbs/day)
Bulldozer D6H	1	8.0	8.0	hours	0.7528	90%	0.63
Bulldozer D4C	1	8.0	8.0	hours	0.7528	90%	0.63
Excavator- Trencher Excavation	0						
Excavator- Earth Scraper Excavation	3	8.0	24.0	hours	0.7528	69%	5.68
Excavator- Earth Scraper Unpaved Road Travel	3	14.5	43.6	vmt	0.2656	90%	1.20
Excavator-Motor Grader	1	24.0	24.0	vmt	0.2754	90%	0.69
Excavator- Backhoe Excavation	0						
Excavator - Loader Excavation	1	3,250.0	3,250.0	tons	0.0004	69%	0.43
Excavator - Loader Unpaved Road Travel	1	28.4	28.4	vmt	0.1148	90%	0.34
Water Truck Unpaved Road Travel	1	20.0	20.0	vmt	0.1522	90%	0.32
Forklift Unpaved Road Travel	1	16.0	16.0	vmt	0.0970	90%	0.16
Dump Truck Unpaved Road Travel	2	13.6	27.3	vmt	0.1589	90%	0.45
Dump Truck Unloading	2	1,625.0	3,250.0	tons	0.0004		1.38
Service Truck Unpaved Road Travel	0						
Fuel/Lube Truck Unpaved Road Travel	1	3.4	3.4	vmt	0.1181	90%	0.04
Concrete Pumper Truck Unpaved Road Travel	0						
Tractor Truck 5th Wheel Unpaved Road Travel	0						
Pickup Truck Unpaved Road Travel	2	17.0	34.1	vmt	0.0599	90%	0.21
3 ton Truck Unpaved Road Travel	1	8.5	8.5	vmt	0.0803	90%	0.07
Windblown Dust (active construction area)	N/A	720,000.0	720,000.0	sq.ft.	2.523E-05	90%	1.89
Worker Gravel Road Travel	44	0.5	21.7	vmt	0.0477	90%	0.11
Delivery Truck Gravel Road Travel	10	0.5	4.9	vmt	0.1266	90%	0.06
Delivery Truck Unpaved Road Travel	10	0.2	1.7	vmt	0.1589	90%	0.03
Total =							14.32

Notes:
(1) See notes for fugitive dust emission calculations.

Annual Fugitive Dust Emissions
MID Electric Generating Station

Activity	Average Daily PM10 Emissions(1) (lbs/day)	Days per Year	Annual PM10 Emissions (tons/yr)
Construction Activities	3.47	200	0.35
Windblown Dust	0.59	280	0.08
Total =			0.43

Notes:
(1) Based on average of daily emissions during 10 month construction period.

Delivery Truck Daily Emissions (Maximum Monthly)
MID Electric Generating Station

Number of Deliveries Per Day(1)	Average Round Trip Haul Distance (miles)	Vehicle Miles Traveled Per Day	Emission Factors (lbs/vmt)(1) NOx	CO	POC	SOx	PM10	Daily Emissions (lbs/day) NOx	CO	POC	SOx	PM10
10	70	700	0.0280	0.0175	0.0025	0.0012	0.0016	19.61	12.27	1.76	0.81	1.10
Idle exhaust (2)												0.042

Notes:
(1) See notes for combustion emissions.
(2) 10 trucks per day times 1 hr idle time per visit times 0.0042 lb/hr.

Delivery Truck Annual Emissions
MID Electric Generating Station

Average Number of Deliveries Per Year	Average Round Trip Haul Distance (miles)	Vehicle Miles Traveled Per Year	Emission Factors (lbs/vmt)(1) NOx	CO	POC	SOx	PM10	Annual Emissions (tons/yr) NOx	CO	POC	SOx	PM10
1000	70	70000.00	0.0280	0.0175	0.0025	0.0012	0.0016	0.98	0.61	0.09	0.04	0.06
Idle exhaust (2,3)												0.0021

Notes:
(1) See notes for combustion emissions.
(2) Annual average of 5 trucks per day, 200 days per year times 1 hr idle time per visit times 0.0042 lb/hr
(3) Based on 1.91 g/hr idle emission rate for the composite HDD truck fleet in 2001 from EPA's PART5 model.

Worker Travel Daily Emissions (Maximum Monthly)
MID Electric Generating Station

Number of Workers Per Day(1)	Average Vehicle Occupancy (person/veh.)	Number of Round Trips Per Day	Average Round Trip Haul Distance (Miles)	Vehicle Miles Traveled Per Day (Miles)	Emission Factors (lbs/vmt)(1)					Daily Emissions (lbs/day)				
					NOx	CO	POC	SOx	PM10	NOx	CO	POC	SOx	PM10
44	1.3	34	70	2369	0.0029	0.0343	0.0027	0.0000	0.0001	6.81	81.37	6.50	0.00	0.14

Notes:
(1) See notes for combustion emissions.

Worker Travel Annual Emissions
MID Electric Generating Station

Average Number of Workers Per Day	Average Vehicle Occupancy (person/veh.)	Number of Round Trips Per Day	Average Round Trip Haul Distance (Miles)	Days per Year	Vehicle Miles Traveled Per Year	Emission Factors (lbs/vmt)(1)					Annual Emissions (tons/yr)				
						NOx	CO	POC	SOx	PM10	NOx	CO	POC	SOx	PM10
32	1.3	25	70	200	344,615	0.0029	0.0343	0.0027	0.0000	0.0001	0.50	5.92	0.47	0.00	0.01

Notes:
(1) See notes for combustion emissions.

Natural Gas Pipeline Construction Heavy Equipment Daily Emissions

Equipment	Equipment Rating	Units	Load Factor(1)	Number of Units	Hrs/Day Per Unit	Emission Factors (1) NOx	CO	VOC	SOx	PM10	Units	Daily Emissions (lbs/day) NOx	CO	VOC	SOx	PM10
Trencher	150	bhp	0.38	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	8.67	1.26	0.50	0.23	0.38
Backhoe	100	bhp	0.38	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	5.78	0.84	0.34	0.15	0.25
Compactor	100	bhp	0.59	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	8.97	1.30	0.52	0.24	0.39
Paving machine	100	bhp	0.56	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	8.52	1.23	0.49	0.22	0.37
Grader	100	bhp	0.54	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	8.21	1.19	0.48	0.22	0.36
Water Truck	150	bhp	0.65	1	10	3.36	2.60	0.39	0.18	0.22	gm/bhp-hr	7.22	5.59	0.84	0.39	0.47
Fuel/lube truck	175	bhp	0.65	1	10	3.36	2.60	0.39	0.18	0.22	gm/bhp-hr	8.43	6.52	0.98	0.45	0.55
Total =												55.81	17.93	4.14	1.89	2.77

Notes:
(1) See notes for combustion emissions.

Water Pipeline Construction Heavy Equipment Daily Emissions

Equipment	Equipment Rating	Units	Load Factor(1)	Number of Units	Hrs/Day Per Unit	Emission Factors (1) NOx	CO	VOC	SOx	PM10	Units	Daily Emissions (lbs/day) NOx	CO	VOC	SOx	PM10
Trencher	150	bhp	0.38	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	8.67	1.26	0.50	0.23	0.38
Backhoe	100	bhp	0.38	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	5.78	0.84	0.34	0.15	0.25
Compactor	100	bhp	0.59	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	8.97	1.30	0.52	0.24	0.39
Loader	150	bhp	0.38	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	8.67	1.26	0.50	0.23	0.38
Grader	100	bhp	0.54	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	8.21	1.19	0.48	0.22	0.36
Water Truck	150	bhp	0.65	1	10	3.36	2.60	0.39	0.18	0.22	gm/bhp-hr	7.22	5.59	0.84	0.39	0.47
Dump Truck	300	bhp	0.65	1	10	3.36	2.60	0.39	0.18	0.22	gm/bhp-hr	14.44	11.18	1.68	0.77	0.95
Total =												61.98	22.61	4.85	2.22	3.17

Notes:
(1) See notes for combustion emissions.

Transmission Line Interconnect Construction Heavy Equipment Daily Emissions

Equipment	Equipment Rating	Units	Load Factor(1)	Number of Units	Hrs/Day Per Unit	Emission Factors (1) NOx	CO	VOC	SOx	PM10	Units	Daily Emissions (lbs/day) NOx	CO	VOC	SOx	PM10
Auger	150	bhp	0.75	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	17.11	2.48	0.99	0.45	0.74
Backhoe	100	bhp	0.38	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	5.78	0.84	0.34	0.15	0.25
Crane	250	bhp	0.43	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	16.35	2.37	0.95	0.43	0.71
Crawler Tractor	300	bhp	0.57	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	26.01	3.77	1.51	0.68	1.13
Water Truck	150	bhp	0.65	1	10	3.36	2.60	0.39	0.18	0.22	gm/bhp-hr	7.22	5.59	0.84	0.39	0.47
Air Compressor	50	bhp	0.48	1	10	6.90	1.00	0.40	0.18	0.30	gm/bhp-hr	3.65	0.53	0.21	0.10	0.16
Total =												76.13	15.58	4.83	2.20	3.47

Notes:
(1) See notes for combustion emissions.

Natural Gas Pipeline Construction Delivery Truck Daily Emissions

Number of Deliveries Per Day	Average Round Trip Haul Distance (miles)	Vehicle Miles Traveled Per Day	Emission Factors (lbs/vmt)(1) NOx	CO	VOC	SOx	PM10	Daily Emissions (lbs/day) NOx	CO	VOC	SOx	PM10
4	165.6	662.4	0.0280181	0.017529412	0.002516	0.001158	0.001575	18.56	11.61	1.67	0.77	1.04

Notes:
(1) See notes for combustion emissions.

Natural Gas Pipeline Construction Worker Travel Daily Emissions

Number of Workers Per Day	Average Vehicle Occupancy (person/veh.)	Number of Round Trips Per Day	Average Round Trip Haul Distance (Miles)	Vehicle Miles Traveled Per Day (Miles)	Emission Factors (lbs/vmt)(1) NOx	CO	POC	SOx	PM10	Daily Emissions (lbs/day) NOx	CO	POC	SOx	PM10
12	1.3	18	70	1292	0.00	0.034344	0.002743	1.88E-06	5.83E-05	3.71	44.38	3.54	0.00	0.08

Water Pipeline Construction Delivery Truck Daily Emissions

Number of Deliveries Per Day	Average Round Trip Haul Distance (miles)	Vehicle Miles Traveled Per Day	Emission Factors (lbs/vmt)(1) NOx	CO	VOC	SOx	PM10	Daily Emissions (lbs/day) NOx	CO	VOC	SOx	PM10
6	165.6	993.6	0.0280181	0.017529412	0.002516	0.001158	0.001575	27.84	17.42	2.50	1.15	1.56

Notes:
(1) See notes for combustion emissions.

Water Pipeline Construction Worker Travel Daily Emissions

Number of Workers Per Day	Average Vehicle Occupancy (person/veh.)	Number of Round Trips Per Day	Average Round Trip Haul Distance (Miles)	Vehicle Miles Traveled Per Day (Miles)	Emission Factors (lbs/vmt)(1) NOx	CO	POC	SOx	PM10	Daily Emissions (lbs/day) NOx	CO	POC	SOx	PM10
12	1.3	18	70	1292	0.00	0.034344	0.002743	1.88E-06	5.83E-05	3.71	44.38	3.54	0.00	0.08

Transmission Line Interconnect Construction Delivery Truck Daily Emissions

Number of Deliveries Per Day	Average Round Trip Haul Distance (miles)	Vehicle Miles Traveled Per Day	Emission Factors (lbs/vmt)(1) NOx	CO	VOC	SOx	PM10	Daily Emissions (lbs/day) NOx	CO	VOC	SOx	PM10
10	165.6	1656	0.0280181	0.017529412	0.002516	0.001158	0.001575	46.40	29.03	4.17	1.92	2.61

Notes:
(1) See notes for combustion emissions.

Transmission Line Interconnect Construction Worker Travel Daily Emissions

Number of Workers Per Day	Average Vehicle Occupancy (person/veh.)	Number of Round Trips Per Day	Average Round Trip Haul Distance (Miles)	Vehicle Miles Traveled Per Day (Miles)	Emission Factors (lbs/vmt)(1) NOx	CO	POC	SOx	PM10	Daily Emissions (lbs/day) NOx	CO	POC	SOx	PM10
10	1.3	15	70	1077	0.00	0.034344	0.002743	1.88E-06	5.83E-05	3.09	36.99	2.95	0.00	0.06

Natural Gas Pipeline Construction Daily Fugitive Dust Emissions

Operation	Daily Process Rate Per Unit	Units	PM10 Emission Factor(1) (lbs/unit)	Control Factor(1) (%)	PM10 Emissions (lbs/day)
Windblown Dust	2000	sq.ft./day	2.52E-05	66%	0.02
Excavation	667	cu.yd./day	0.0018	0%	1.20
Back filling	700	tons/day	0.0001	0%	0.07
Grader Operation	10	vmt	0.2754	0%	2.75
Water truck unpaved surface travel	10	vmt	0.1522	66%	0.51
Delivery truck unpaved surface trave	2	vmt	0.15888	66%	0.11
Total =					4.66

Notes:
(1) See notes for fugitive dust emission calculations.

Water Pipeline Construction Daily Fugitive Dust Emissions

Operation	Daily Process Rate Per Unit	Units	PM10 Emission Factor(1) (lbs/unit)	Control Factor(1) (%)	PM10 Emissions (lbs/day)
Windblown Dust	3000	sq.ft./day	2.52E-05	66%	0.03
Excavation	1500	cu.yd./day	0.0018	0%	2.70
Back filling	900	tons/day	0.0001	0%	0.09
Grader Operation	8	vmt	0.2754	0%	2.20
Water truck unpaved surface travel	8	vmt	0.1522	66%	0.39
Delivery truck unpaved surface trave	1	vmt	0.15888	66%	0.06
Total =					5.47

Notes:
(1) See notes for fugitive dust emission calculations.

Transmission Line Interconnect Construction Daily Fugitive Dust Emissions

Operation	Daily Process Rate Per Unit	Units	PM10 Emission Factor(1) (lbs/unit)	Control Factor(1) (%)	PM10 Emissions (lbs/day)
Windblown Dust	1000	sq.ft./day	2.52E-05	66%	0.01
Excavation	500	cu.yd./day	0.0018	0%	0.90
Back filling	250	tons/day	0.0001	0%	0.03
Water truck unpaved surface travel	2	vmt	0.1522	66%	0.10
Delivery truck unpaved surface trave	2	vmt	0.15888	66%	0.10
Total =					1.14

Notes:
(1) See notes for fugitive dust emission calculations.

Notes - Combustion Emissions

(1) For Construction Equipment
For heavy Diesel construction equipment, emission factors based on equipment meeting EPA 1996 off-road Diesel standards and use of CARB ultra low-sulfur fuel.
For trucks, depending on size of truck, emissions factors based on MVE17G version 1.0c for heavy-heavy duty or medium duty Diesel trucks, fleet average for calendar year 2000.
For portable equipment, emission factors based on EPA's "Non-road Engine and Vehicle Emission Study Report", 11/91, Table 2-07, for generator sets, welders, pumps, and air compressors less than 50 hp.

(2) For Delivery Trucks
From MVE17G version 1.0c, heavy-heavy duty Diesel trucks, fleet average for calendar year 2000.

(3) For Worker Travel
From MVE17G version 1.0c, average of light duty automobiles and light duty trucks, fleet average for calendar year 2000.

Notes - Fugitive Dust Emission Calculations

(1) Paved road travel emission factors for delivery trucks and worker automobiles are based on AP-42, Section 13.2.1, 10/97.
(Based on default road silt loading shown in AP-42, page 13.2.1-5, 10/97, limited access roads.)
(2) Wind erosion emission factor for active construction area is based on "Improvement of Specific Emission Factors (BACM Project No. 1), Final Report", prepared for South Coast AQMD by Midwest Research Institute, March 1996.
(3) Finish grading emission factor is based on AP-42, Table 11.9-1, 7/98.
(4) Bulldozer excavation emission factor is based AP-42, Table 11.9-1, 7/98.
(Based on default soil silt and moisture contents shown in AP-42, Table 11.9-3, 7/98, overburden.)
(5) Material unloading emission factors are based on AP-42, p. 13.2.4-3, 1/95.
(Based on average annual wind speed recorded onsite and default soil moisture content shown in AP-42, Table 11.9-3, 7/98, overburden.)
(6) Loader unpaved surface travel emission factor is based on AP-42, Section 13.2.2, 1/95.
(Based on default soil silt and moisture contents shown in AP-42, Table 11.9-3, 7/98, overburden.)
(7) Trenching emission factor is based on AP-42, Table 11.9-2 (dragline operations), 1/95.
(Based on default soil moisture content shown in AP-42, Table 11.9-3, 7/98, overburden.)
(8) Unpaved surface travel emission factors for water trucks, fuel trucks, service trucks, dump trucks, forklifts, pickup trucks, delivery trucks, and concrete trucks are based on AP-42, Section 13.2.2, 9/98.
(Based on default soil silt and moisture contents shown in AP-42, Table 11.9-3, 7/98, overburden.)
(9) Dust control efficiency for unpaved road travel and active excavation area is based on "Control of Open Fugitive Dust Sources", U.S. EPA, 9/88.
(Based on default evaporation rate shown in EPA document, Figure 3-2, 9/88, and typical water application rate shown in EPA document, page 3-23, 9/88.)