URS

November 3, 2008

Ivor Benci-Woodward
California Energy Commission
1516 Ninth Street, MS-15
Sacramento, CA 95814

Subject: **Willow Pass Generating Station**
Application for Certification No. 08-AFC-06
Submittal of Revised Air Quality and Public Health Tables

Dear Mr. Benci-Woodward:

In response to a Bay Area Air Quality Management District (BAAQMD) request, pleased find enclosed revisions to the air dispersion and public health modeling results for the Willow Pass Generating Station.

Also enclosed are 5 CDs containing electronic copies of revised air quality and public health modeling input and output files.

Please contact me at (415) 243-3833 if you have any questions or require additional information.

Sincerely,

URS CORPORATION

Kathy Rushmore
Project Manager

Enclosure

cc: Jon Sacks, Mirant
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Revised AFC Air Quality and Public Health Tables

In Response to BAAQMD Comments

Application for Certification (08-AFC-06) for WILLOW PASS GENERATING STATION Pittsburg, California

October 2008

Prepared for:

MIRANT™
WILLOW PASS, LLC

Prepared by:

URS

1.0 INTRODUCTION

The purpose of this submittal is to present revised Willow Pass Generating Station (WPGS) air quality and health risk modeling results. Air dispersion and health risk remodeling was necessary because Bay Area Air Quality Management District (BAAQMD) requested processing corrections to the meteorological data sets used in the original modeling and the use of the most recent version of the health risk model HARP (version 1.4a). BAAQMD also requested that two meteorological data sets (sets A and B) be used when modeling operational project emissions. Meteorological data set A uses two land-use sectors around the onsite meteorological station at Pittsburg Power Plant. Meteorological data set B uses three land-use sectors around the proposed turbines at the WPGS site.

Corrections to the meteorological data include processing both onsite meteorological data sets A and B with a local time stamp instead of using Greenwich Mean Time in AERMET, and using meteorological data set A (onsite meteorological station) coordinates of 594,586.5 m E; 4,210,812.5 m N (UTM NAD83) for surface characteristics in AERSURFACE. Meteorological set B uses 597,136 m E; 4,210,724 m N (UTM NAD83) for the study center in AERSURFACE. Surface moisture conditions, provided for context, can be found in Table 7.1-20. Land use characteristics are provided for meteorological data set A in Table 7.1-21a (Revised), and in Table 7.1-21b (New) for meteorological data set B.

New turbine impact screening modeling was performed, as well as revised refined modeling to evaluate impacts for turbine startup conditions, turbine commissioning, turbine normal operations, and a revised health risk assessment. Except for the above changes in the pre-processing of meteorological input data, the modeling methodology for each of these analyses was unchanged from that presented in the original Application for Certification (AFC).

Fugitive emissions that would be associated with project construction were recalculated and are presented in Appendix J3 (Revised) using the construction equipment given for the WPGS instead of using the conservative emission factor of 1.3 lb/hour-acre (emissions per acre for each hour of construction activity) of ground disturbance from Midwest Research Institute, 1996.

All revised modeling and meteorological processing files are included in a CD accompanying these revised tables.

The following tables, figures, and appendices that are marked as "Revised" replace the corresponding tables, figures, and appendices presented in the WPGS AFC. Tables that are marked as "New" present operational modeling results using meteorological data set B. Unmarked tables have not been revised and are included for context only.

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Table 7.1-10 (Revised)
Daily Maximum Construction Emissions of Criteria Pollutants (lbs/day)

Activity	PM_{10}	$PM_{2.5}$	CO	VOC	NO_X	SO_X
Onsite Combustion Emissions						
Construction Equipment	10.43	9.51	608.06	37.41	212.86	0.23
Worker vehicles and delivery trucks	0.04	0.03	3.12	0.35	0.65	0.003
Trains	0.20	0.18	0.94	0.31	5.57	3.69
Construction Combustion Subtotal (lbs)	**10.7**	**9.7**	**612.1**	**38.1**	**219.1**	**3.9**
Onsite Fugitive Dust Emissions						
Vehicle Travel on Paved Roads and Parking Lot	0.28	0.03	–	–	–	–
Demolition/Bulldozing/ Excavation	3.26	0.68	–	–	–	–
Fugitive Subtotal (lbs)	**3.5**	**0.7**	–	–	–	–
Offsite On-Highway Emissions						
Worker Passenger Vehicle and delivery trucks – Combustion Emissions	1.30	0.89	103.84	11.62	21.57	0.11
Worker Passenger Vehicle and delivery trucks – Paved Road Dust	9.39	1.07	–	–	–	–
Trains Combustion Emissions	6.67	6.13	31.43	10.48	186.70	11.06
Subtotal of Offsite Emissions (lbs)	**17.4**	**8.1**	**135.3**	**22.1**	**208.3**	**11.2**
Total Max. Daily Emissions (lbs)	**31.6**	**18.5**	**747.4**	**60.2**	**427.3**	**15.1**

Notes.
Bold indicates maximum concentration
CO = carbon monoxide
NO_X = nitrogen oxide(s)
PM_{10} = particulate matter less than 10 micrometers in diameter
$PM_{2.5}$ = particulate matter less than 2.5 micrometers in diameter
SO_X = sulfur oxide(s)
VOC = volatile organic compounds

Table 7.1-11 (Revised)
Maximum Annual Construction Emissions of Criteria Pollutants (tons/year)

Activity	PM_{10}	$PM_{2.5}$	CO	VOC	NO_X	SO_X
Onsite Combustion Emissions						
Construction Equipment	0.72	0.65	61.14	3.44	17.21	0.02
Worker vehicles and delivery trucks	0.004	0.003	0.57	0.03	0.08	0.0003
Trains	0.15	0.13	0.68	0.23	4.07	2.69
Construction Combustion Subtotal (tons)	**0.9**	**0.8**	**62.4**	**3.7**	**21.3**	**2.7**
Onsite Fugitive Dust Emissions						
Vehicle Travel on Unpaved Roads and Parking Lot	0.04	0.004	–	–	–	–
Demolition/Bulldozing/ Excavation	0.71	0.15	–	–	–	–
Fugitive Subtotal (tons)	**0.7**	**0.2**	–	–	–	–
Offsite On-Highway Emissions						
Worker Passenger Vehicle and delivery trucks – Combustion Emissions	0.14	0.10	9.63	1.10	2.50	0.01
Worker Passenger Vehicle and delivery trucks – Paved Road Dust	1.18	0.15	–	–	–	–
Trains – Combustion Emissions	4.87	4.48	22.95	7.65	136.29	8.07
Subtotal of Offsite Emissions (tons)	**6.2**	**4.7**	**32.6**	**8.7**	**138.8**	**8.1**
Total Max. Yearly Emissions (tons)	**7.8**	**5.7**	**95.0**	**12.4**	**160.1**	**10.8**

Notes:
Bold indicates maximum concentration
CO = carbon monoxide
NO_X = nitrogen oxide(s)
PM_{10} = particulate matter less than 10 micrometers in diameter
$PM_{2.5}$ = particulate matter less than 2.5 micrometers in diameter
SO_X = sulfur oxide(s)
VOC = volatile organic compounds

Table 7.1-20
Surface Moisture Conditions for Years 2002-2005

Surface Moisture Condition by Month for the Antioch Pump Plant 3 Station

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2002	dry	dry	avg	dry	dry	dry	dry	dry	dry	dry	avg	wet
2003	avg	dry	avg	wet	wet	dry	dry	wet	dry	dry	avg	wet
2004	avg	wet	dry	dry	avg	dry	dry	dry	dry	wet	avg	wet
2005	wet	avg	wet	avg	avg	wet	dry	dry	dry	dry	dry	wet

Note: Surface moisture conditions provided by BAAQMD.

Table 7.1-21a* (Revised)
Land Use Characteristics Used in AERMET Meteorological Data Set A

Month	Sector	Range	Land Use Characteristics				
			Albedo (α)	Bowen Ratio (β) Avg. sfc moisture	Bowen Ratio (β) Dry sfc moisture	Bowen Ratio (β) Wet sfc moisture	Surface Roughness (Zo) (m)
Jan	1	90°-270°	0.15	0.35	0.57	0.26	0.027
Jan	2	270°-90°	0.15	0.35	0.57	0.26	0.008
Feb	1	90°-270°	0.14	0.27	0.47	0.23	0.031
Feb	2	270°-90°	0.14	0.27	0.47	0.23	0.008
Mar	1	90°-270°	0.14	0.27	0.47	0.23	0.031
Mar	2	270°-90°	0.14	0.27	0.47	0.23	0.008
Apr	1	90°-270°	0.14	0.31	0.53	0.24	0.032
Apr	2	270°-90°	0.14	0.31	0.53	0.24	0.008
May	1	90°-270°	0.14	0.31	0.53	0.24	0.032
May	2	270°-90°	0.14	0.31	0.53	0.24	0.008
Jun	1	90°-270°	0.14	0.31	0.53	0.24	0.032
Jun	2	270°-90°	0.14	0.31	0.53	0.24	0.008
Jul	1	90°-270°	0.14	0.31	0.53	0.24	0.032
Jul	2	270°-90°	0.14	0.31	0.53	0.24	0.008
Aug	1	90°-270°	0.14	0.35	0.57	0.26	0.032
Aug	2	270°-90°	0.14	0.35	0.57	0.26	0.008
Sep	1	90°-270°	0.14	0.35	0.57	0.26	0.032
Sep	2	270°-90°	0.14	0.35	0.57	0.26	0.008
Oct	1	90°-270°	0.14	0.35	0.57	0.26	0.032
Oct	2	270°-90°	0.14	0.35	0.57	0.26	0.008
Nov	1	90°-270°	0.15	0.35	0.57	0.26	0.027
Nov	2	270°-90°	0.15	0.35	0.57	0.26	0.008
Dec	1	90°-270°	0.15	0.35	0.57	0.26	0.027
Dec	2	270°-90°	0.15	0.35	0.57	0.26	0.008

* This table is a revised version of Table 7.1-21 included in the WPGS AFC.

Table 7.1-21b (New)
Land Use Characteristics Used in AERMET Meteorological Data Set B

Month	Sector	Range	Land Use Characteristics				
			Albedo (α)	Bowen Ratio (β) Average Surface Moisture	Bowen Ratio (β) Dry Surface Moisture	Bowen Ratio (β) Wet Surface Moisture	Surface Roughness (Z_o) (m)
Jan	1	102°-194°	0.15	0.34	0.55	0.25	0.517
Jan	2	194°-279°	0.15	0.34	0.55	0.25	0.3
Jan	3	279°-102°	0.15	0.34	0.55	0.25	0.011
Feb	1	102°-194°	0.14	0.27	0.47	0.23	0.548
Feb	2	194°-279°	0.14	0.27	0.47	0.23	0.322
Feb	3	279°-102°	0.14	0.27	0.47	0.23	0.011
Mar	1	102°-194°	0.14	0.27	0.47	0.23	0.548
Mar	2	194°-279°	0.14	0.27	0.47	0.23	0.322
Mar	3	279°-102°	0.14	0.27	0.47	0.23	0.011
Apr	1	102°-194°	0.14	0.3	0.52	0.24	0.569
Apr	2	194°-279°	0.14	0.3	0.52	0.24	0.333
Apr	3	279°-102°	0.14	0.3	0.52	0.24	0.011
May	1	102°-194°	0.14	0.3	0.52	0.24	0.569
May	2	194°-279°	0.14	0.3	0.52	0.24	0.333
May	3	279°-102°	0.14	0.3	0.52	0.24	0.011
Jun	1	102°-194°	0.14	0.3	0.52	0.24	0.569
Jun	2	194°-279°	0.14	0.3	0.52	0.24	0.333
Jun	3	279°-102°	0.14	0.3	0.52	0.24	0.011
Jul	1	102°-194°	0.14	0.3	0.52	0.24	0.569
Jul	2	194°-279°	0.14	0.3	0.52	0.24	0.333
Jul	3	279°-102°	0.14	0.3	0.52	0.24	0.011
Aug	1	102°-194°	0.14	0.34	0.55	0.25	0.569
Aug	2	194°-279°	0.14	0.34	0.55	0.25	0.333
Aug	3	279°-102°	0.14	0.34	0.55	0.25	0.011
Sep	1	102°-194°	0.14	0.34	0.55	0.25	0.569
Sep	2	194°-279°	0.14	0.34	0.55	0.25	0.333
Sep	3	279°-102°	0.14	0.34	0.55	0.25	0.011
Oct	1	102°-194°	0.14	0.34	0.55	0.25	0.569

Table 7.1-21b (New)
Land Use Characteristics Used in AERMET Meteorological Data Set B (Continued)

Month	Sector	Range	Land Use Characteristics				
			Albedo (α)	Bowen Ratio (β) Average Surface Moisture	Bowen Ratio (β) Dry Surface Moisture	Bowen Ratio (β) Wet Surface Moisture	Surface Roughness (Z_o) (m)
Oct	2	194°-279°	0.14	0.34	0.55	0.25	0.333
Oct	3	279°-102°	0.14	0.34	0.55	0.25	0.011
Nov	1	102°-194°	0.15	0.34	0.55	0.25	0.517
Nov	2	194°-279°	0.15	0.34	0.55	0.25	0.3
Nov	3	279°-102°	0.15	0.34	0.55	0.25	0.011
Dec	1	102°-194°	0.15	0.34	0.55	0.25	0.517
Dec	2	194°-279°	0.15	0.34	0.55	0.25	0.3
Dec	3	279°-102°	0.15	0.34	0.55	0.25	0.011

Table 7.1-22a* (Revised)
WPGS Turbine Screening Results FP10 Combined-Cycle Units With Meteorological Data Set A

Normal Operations – New Siemens Peaker Flex-Plant 10 Emissions and stack parameters per Turbine													
Case		Case 1A	Case 1B	Case 1C	Case 2A	Case 2B	Case 2C	Case 3A	Case 3B	Case 3C	Case 3D	Case 3E	Case 3F
Ambient Temperature		Winter Minimum – 20°F			Yearly Average-59°F			Summer Maximum – 94°F					
CTG Load Level		100%	85%	60%	100%	85%	60%	100%	100%	100%	100%	85%	60%
Evaporative Cooler Status/Effectiveness		OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF
Power Augmentation Status		OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF
Stack Outlet Temperature (°F)		350	346	343.7	340	337	328.7	338	348	333	341	346	323.3
Stack Outlet Temperature (°K)		449.82	447.59	446.32	444.26	442.59	437.98	443.15	448.71	440.37	444.82	447.59	434.98
Stack Exit Velocity (ft/s)		70.5	61.5	50.1	64.3	57.0	44.9	65.2	62.5	61.6	59.0	53.4	42.8
Stack Exit Velocity (m/s)		21.479	18.752	15.260	19.587	17.378	13.694	19.860	19.059	18.763	17.979	16.282	13.054
NO_X (at 2.0 ppm) (lb/hr)		17.4	15.1	12.0	15.8	13.9	10.0	16.3	15.2	15.3	14.3	12.9	10.0
CO (at 3.0 ppm) (lb/hr)		26.1	22.7	18.0	23.7	20.9	15.0	24.5	22.8	23.0	21.5	19.3	15.0
SO_2 (lb/hr) (based on 0.4 gr total S/100 scf)		2.6	2.3	1.8	2.3	2.1	1.6	2.4	2.2	2.3	2.1	1.9	1.5
SO_2 (lb/hr) (based on 1.0 gr total S/100 scf)		6.4	5.6	4.5	5.8	5.2	4.0	6.0	5.6	5.6	5.3	4.7	3.8
PM_{10} (lb/hr)		10.0	8.9	8.0	9.3	8.3	8.0	8.9	8.8	8.5	8.5	7.7	8.0
NO_X (g/s)		2.194	1.904	1.513	1.993	1.753	1.261	2.056	1.917	1.930	1.803	1.623	1.261
CO (g/s)		3.292	2.856	2.270	2.989	2.629	1.892	3.083	2.875	2.894	2.705	2.435	1.892
SO_2 (g/s) (based on 0.4 gr total S/100 scf)		0.324	0.284	0.226	0.294	0.260	0.201	0.303	0.283	0.285	0.266	0.239	0.191
SO_2 (g/s) (based on 1.0 gr total S/100 scf)		0.811	0.710	0.565	0.736	0.650	0.501	0.758	0.707	0.712	0.664	0.598	0.477
PM_{10} (g/s)		1.261	1.122	1.009	1.173	1.047	1.009	1.122	1.110	1.072	1.072	0.965	1.009
Model Results – Maximum X/Q concentration ($\mu g/m^3/(g/s)$) predicted from AERMOD													
1 hour		12.99616	14.12715	15.70620	13.91224	14.80330	18.06803	13.84360	13.98057	14.32300	14.48790	15.07712	19.1520
3 hour		7.25330	7.90962	9.11455	7.79251	8.40100	9.66233	7.75591	7.81704	8.05436	8.13285	8.69538	9.84629
8 hour		4.81947	4.98066	5.01687	4.99937	5.02252	4.90416	4.95192	4.96544	4.99700	5.00577	5.02894	4.81770
24 hour		1.62596	1.68012	1.76205	1.67300	1.69401	1.82320	1.67051	1.67503	1.68557	1.68848	1.71034	1.84255
annual		0.07917	0.08872	0.10137	0.08681	0.09477	0.10847	0.08623	0.08738	0.09067	0.09215	0.09733	0.11093
Maximum Concentration ($\mu g/m^3$) predicted per Pollutant Normal Operations													
NO_X	1 hour	**28.5179**	26.9020	23.7687	27.7209	25.9494	22.7858	28.4571	26.7992	27.6362	26.1273	24.4709	24.1528
	annual	**0.1737**	0.1689	0.1534	0.1730	0.1661	0.1368	**0.1773**	0.1675	0.1749	0.1662	0.1580	0.1399
CO	1 hour	**42.7769**	40.3530	35.6531	41.5814	38.9240	34.1787	42.6856	40.1988	41.4543	39.1910	36.7064	36.2292
	8 hour	**15.8633**	14.2268	11.3883	14.8227	13.2063	9.2770	15.2688	14.2773	14.4626	13.5410	12.2433	9.1135
SO_2	1 hour	**10.5384**	10.0240	8.8809	10.2428	9.6270	9.0593	10.4913	9.8825	10.1995	9.6269	9.0166	9.1260
	3 hour	**5.8816**	5.6123	5.1537	5.7372	5.4634	4.8447	5.8778	5.5257	5.7356	5.4041	5.2001	4.6918
	24 hour	**1.3185**	1.1921	0.9963	1.2317	1.1017	0.9142	1.2660	1.1840	1.2003	1.1220	1.0228	0.8780
	annual	0.0257	0.0252	0.0229	0.0256	0.0247	0.0218	**0.0261**	0.0247	0.0258	0.0245	0.0233	0.0211
PM_{10}	24 hour	**2.0505**	1.8857	1.7777	1.9622	1.7732	1.8394	1.8750	1.8589	1.8068	1.8100	1.6501	1.8589
	annual	0.0998	0.0996	0.1023	0.1018	0.0992	0.1094	0.0968	0.0970	0.0972	0.0988	0.0939	**0.1119**

* This table is a revised version of Table 7.1-22 included in the WPGS AFC
Note. **Bold** indicates maximum concentration when compared to data set B (Table 7.1-22b)

Table 7.1-22b (New)
WPGS Turbine Screening Results FP10 Combined-Cycle Units
With Meteorological Data Set B

Case		Case 1A	Case 1B	Case 1C	Case 2A	Case 2B	Case 2C	Case 3A	Case 3B	Case 3C	Case 3D	Case 3E	Case 3F
Ambient Temperature		Winter Minimum – 20°F			Yearly Average-59°F			Summer Maximum – 94°F					
CTG Load Level		100%	85%	60%	100%	85%	60%	100%	100%	100%	100%	85%	60%
Evaporative Cooler Status/Effectiveness		OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF
Power Augmentation Status		OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	OFF	OFF	OFF
Stack Outlet Temperature (°F)		350	346	343.7	340	337	328.7	338	348	333	341	346	323.3
Stack Outlet Temperature (°K)		449.82	447.59	446.32	444.26	442.59	437.98	443.15	448.71	440.37	444.82	447.59	434.98
Stack Exit Velocity (ft/s)		70.5	61.5	50.1	64.3	57.0	44.9	65.2	62.5	61.6	59.0	53.4	42.8
Stack Exit Velocity (m/s)		21.479	18.752	15.260	19.587	17.378	13.694	19.860	19.059	18.763	17.979	16.282	13.054
NO_X (at 2.0 ppm) (lb/hr)		17.4	15.1	12.0	15.8	13.9	10.0	16.3	15.2	15.3	14.3	12.9	10.0
CO (at 3.0 ppm) (lb/hr)		26.1	22.7	18.0	23.7	20.9	15.0	24.5	22.8	23.0	21.5	19.3	15.0
SO_2 (lb/hr) (based on 0.4 gr total S/100 scf)		2.6	2.3	1.8	2.3	2.1	1.6	2.4	2.2	2.3	2.1	1.9	1.5
SO_2 (lb/hr) (based on 1.0 gr total S/100 scf)		6.4	5.6	4.5	5.8	5.2	4.0	6.0	5.6	5.6	5.3	4.7	3.8
PM_{10} (lb/hr)		10.0	8.9	8.0	9.3	8.3	8.0	8.9	8.8	8.5	8.5	7.7	8.0
NO_X (g/s)		2.194	1.904	1.513	1.993	1.753	1.261	2.056	1.917	1.930	1.803	1.623	1.261
CO (g/s)		3.292	2.856	2.270	2.989	2.629	1.892	3.083	2.875	2.894	2.705	2.435	1.892
SO_2 (g/s) (based on 0.4 gr total S/100 scf)		0.324	0.284	0.226	0.294	0.260	0.201	0.303	0.283	0.285	0.266	0.239	0.191
SO_2 (g/s) (based on 1.0 gr total S/100 scf)		0.811	0.710	0.565	0.736	0.650	0.501	0.758	0.707	0.712	0.664	0.598	0.477
PM_{10} (g/s)		1.261	1.122	1.009	1.173	1.047	1.009	1.122	1.110	1.072	1.072	0.965	1.009
Model Results – Maximum X/Q concentration ($\mu g/m^3/(g/s)$) predicted from AERMOD													
1 hour		13.61692	14.46808	16.59227	14.32166	15.23843	18.05708	14.27371	14.36597	14.60301	14.73681	15.76335	18.55055
3 hour		7.96325	8.61448	9.20965	8.50637	8.95599	9.98215	8.47221	8.52881	8.74621	8.81519	9.06381	10.62437
8 hour		4.63452	4.79308	4.83201	4.77163	4.83126	4.73849	4.76420	4.77770	4.80937	4.81780	4.83954	4.70164
24 hour		1.56225	1.61569	1.62898	1.60845	1.62870	1.72835	1.60594	1.61049	1.62122	1.62413	1.63150	1.83840
annual		0.07190	0.08092	0.09283	0.07908	0.08666	0.09965	0.07852	0.07962	0.08273	0.08413	0.08912	0.10208
Maximum Concentration ($\mu g/m^3$) predicted per Pollutant Normal Operations													
NO_X	1 hour	**29.88006**	27.55124	25.10964	28.53670	26.71212	22.77198	29.34120	27.53797	28.17651	26.57620	25.58471	23.39430
	annual	**0.15777**	0.15409	0.14048	0.15757	0.15191	0.12567	**0.16141**	0.15262	0.15963	0.15172	0.14465	0.12873
CO	1 hour	**44.82009**	41.32686	37.66445	42.80505	40.06818	34.15798	44.01180	41.30695	42.26476	39.86430	38.37706	35.09146
	8 hour	**15.25452**	13.69103	10.96866	14.26161	12.70340	8.96364	14.69001	13.73748	13.91952	13.03255	11.78222	8.89394
SO_2	1 hour	**11.04178**	10.26595	9.38196	10.54424	9.91003	9.05381	10.81728	10.15493	10.39893	9.79228	9.42695	8.83936
	3 hour	**6.45730**	6.11248	5.20752	6.26276	5.82436	5.00505	6.42064	6.02879	6.22825	5.85749	5.42043	5.06253
	24 hour	**1.26681**	1.14643	0.92109	1.18423	1.05919	0.86659	1.21706	1.13841	1.15448	1.07920	0.97569	0.87600
	annual	0.02332	0.02297	0.02100	0.02329	0.02254	0.01999	**0.02380**	0.02251	0.02357	0.02236	0.02132	0.01946
PM_{10}	24 hour	**1.97017**	1.81343	1.64346	1.88644	1.70480	1.74371	1.80249	1.78729	1.73786	1.74098	1.57399	1.85474
	annual	0.09067	0.09082	0.09366	0.09275	0.09071	0.10054	0.08813	0.08836	0.08868	0.09018	0.08598	**0.10299**

Note: **Bold** indicates maximum concentration when compared to data set A (Table 7.1-22a)

Table 7.1-24 (Revised)
Maximum Modeled Criteria Pollutant Impacts Due to WPGS Construction: Site Demolition, Grading, Laydown, Building, and Pipeline Excavation Emissions (Short-Term Impact Estimates Based on Month 6 Construction Activities)

Pollutant	Averaging Period	Maximum Modeled Impact ($\mu g/m^3$)	Background[1] ($\mu g/m^3$)	Maximum Total Predicted Concentration ($\mu g/m^3$)	Most Stringent AAQS ($\mu g/m^3$)	UTM Coordinates NAD27	
						East (m)	North (m)
Construction Impacts							
CO	1 hour	684.45	3,762	4,446	23,000	596,988	4,210,672
	8 hours	253.48	2,166	2,419	10,000	597,426	4,210,331
NO_2	1 hour[2]	226.97	109.04	336	339	596,400	4,207,400
	Annual[2]	6.31	22.56	29	57	597,478	4,210,517
PM_{10}	24 hours[3]	49.11	84	133	50	597,100	4,210,387
	Annual[3]	4.52	20	25	20	597,074	4,210,414
$PM_{2.5}$	24 hours[3]	10.67	62	73	35	597,100	4,210,387
	Annual[3]	1.04	10	11	12	597,132	4,210,378
SO_2	1 hour	38.63	122.67	161	655	596,400	4,207,400
	3 hours	24.75	65.25	90	1300	596,659	4,210,346
	24 hours	10.03	23.49	34	105	596,631	4,210,119
	Annual	0.14	7.83	8	80	596,976	4,209,931

Notes:
1 Background represents the maximum values measured at the monitoring stations described in previous sections, for 2004-2006.
2 Results for NO_2 during construction used ozone limiting method with ambient ozone data collected at the Pittsburg monitoring station for the years 2002-2005.
3 PM_{10} and $PM_{2.5}$ background levels exceed ambient standards.
4 In February 2007, the CARB approved new, more stringent CAAQS for NO_2. The new standards of 339 $\mu g/m^3$ (1 hour) and 57 $\mu g/m^3$ (annual) became effective in March 2008

AAQS = ambient air quality standard
CO = carbon monoxide
$\mu g/m^3$ = micrograms per cubic meter
NO_2 = nitrogen dioxide
PM_{10} = particulate matter less than or equal to 10 microns in diameter
$PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter.
SO_2 = sulfur dioxide
UTM = Universal Transverse Mercator

Table 7.1-25a* (Revised)
AERMOD Modeling Results for WPGS Operations
Using Meteorological Data Set A
(All Project Sources Combined)

Pollutant	Averaging Period	Maximum Predicted Impact ($\mu g/m^3$)	Significant Air Quality Impacts ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)[1]	Total Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	CAAQS ($\mu g/m^3$)	Maximum UTMX NAD27 (m)	Maximum UTMY NAD27 (m)
NO_2	1-hour[2]	30.7 (normal operations)	19[6]	109.04	139.74	NA	339[5]	594800	4205750
		99.9 (startup operations)	NA	109.04	208.94	NA	339[5]	593,750	4,206,725
	Annual[2]	0.28	1.0	22.56	22.8	100	57[5]	597,074	4,210,414
SO_2	1-hour	12.5	NA	122.67	135.17	NA	655	594,800	4,205,750
	3-hour	7.1	25	65.25	72.35	1300	NA	593,375	4,206,075
	24-hour	**1.5**	5	23.49	24.99	365	105	597,150	4,203,075
	Annual	**0.015**	1.0	7.83	7.85	80	NA	594,200	4,206,725
CO	1-hour	28.3 (normal operations)	2,000	3,762	3,790	40,000	23,000	594,800	4,205,750
		721.5 (startup operations)	NA	3,762	4,484	40,000	23,000	593,750	4,206,725
	8-hour	**67.4**	500	2,166	2,233	10,000	10,000	597,150	4,203,075
PM_{10}	24-hour[3,4]	**2.33**	5	84	86.3	150	50	595,150	4,203,075
	Annual[3,4]	**0.08**	1.0	20	20.08	NA	20	594,300	4,206,925
$PM_{2.5}$	24-hour[3,4]	**2.33**	NA	62	64.3	35	NA	595,150	4,203,075
	Annual[3,4]	**0.08**	NA	10	10.08	15	12	594,300	4,206,925

* This table is a revised version of Table 7.1-25 included in the WPGS AFC.

Notes:

Bold indicates highest estimated impact when compared to data set B (Table 7.1-25b).

1 Background represents the maximum values measured at the monitoring stations identified in Section 7.1.1.2.
2 Results for NO_2 during operations used ozone limiting method with ambient ozone data collected at the Pittsburg air quality monitoring station for the years 2002-2005.
3 PM_{10} and $PM_{2.5}$ background levels exceed ambient standards.
4 All PM_{10} emissions from project sources were also considered to be $PM_{2.5}$.
5 In February 2007, CARB approved new, more stringent CAAQS for NO_2 as shown in the table above. These changes became effective in March 2008.
6 If predicted maximum 1-hour NO_2 concentration due to new sources is below this significant threshold, no further analysis is required. Otherwise, it must be demonstrated that the project's impacts plus background will be below applicable ambient air quality standards.

Table 7.1-25b (New)
AERMOD Modeling Results for WPGS Operations
Using Meteorological Data Set B
(All Project Sources Combined)

Pollutant	Averaging Period	Maximum Predicted Impact ($\mu g/m^3$)	Significant Air Quality Impacts ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)[1]	Total Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	CAAQS ($\mu g/m^3$)	Maximum UTMX NAD27 (m)	Maximum UTMY NAD27 (m)
NO_2	1-hour[2]	31.2 (normal operations)	19[6]	109.04	140.24	NA	339[5]	593,350	4,206,250
		92.9 (startup operations)	NA	109.04	201.94	NA	339[5]	593,425	4,206,250
	Annual[2]	**0.29**	1.0	22.56	22.85	100	57[5]	597,074	4,210,414
SO_2	1-hour	**12.8**	NA	122.67	135.47	NA	655	593,350	4,206,250
	3-hour	**7.5**	25	65.25	72.75	1300	NA	593,400	4,206,125
	24-hour	1.4	5	23.49	25.99	365	105	597,150	4,203,075
	Annual	0.013	1.0	7.83	7.84	80	NA	593,400	4,206,250
CO	1-hour	**28.7** (normal operations)	2,000	3,762	3,791	40,000	23,000	593,350	4,206,250
		671.2 (startup operations)	NA	3,762	4,433	40,000	23,000	593,425	4,206,250
	8-hour	65.1	500	2,166	2,231	10,000	10,000	597,150	4,203,075
PM_{10}	24-hour[3,4]	2.25	5	84	86.3	150	50	595,150	4,203,075
	Annual[3,4]	0.07	1.0	20	20.07	NA	20	594,300	4,206,925
$PM_{2.5}$	24-hour[3,4]	2.25	NA	62	64.3	35	NA	595,150	4,203,075
	Annual[3,4]	0.07	NA	10	10.07	15	12	594,300	4,206,925

Notes

Bold indicates highest estimated impact when compared to data set A (Table 7.1-25a).

1 Background represents the maximum values measured at the monitoring stations
2 Results for NO_2 during operations used ozone limiting method with ambient ozone data collected at the Pittsburg air quality monitoring station for the years 2002-2005
3 PM_{10} and $PM_{2.5}$ background levels exceed ambient standards.
4 All PM_{10} emissions from project sources were also considered to be $PM_{2.5}$.
5 In February 2007, CARB approved new, more stringent CAAQS for NO_2 as shown in the table above. These changes became effective in March 2008
6 If predicted maximum 1-hour NO_2 concentration due to new sources is below this significant threshold, no further analysis is required. Otherwise, it must be demonstrated that the project's impacts plus background will be below applicable ambient air quality standards

Table 7.1-26a* (Revised)
Turbine Commissioning Modeling Results Using Meteorological Data Set A

Modeling Scenario	Pollutant	Averaging Period	Maximum Estimated Impact from FP10 1 and gas heater ($\mu g/m^3$)	Maximum Estimated Impact from FP10 2 and gas heater ($\mu g/m^3$)	Background[1] ($\mu g/m^3$)	Total Predicted Concentration from FP10 1 ($\mu g/m^3$)	Total Predicted Concentration from FP10 2 ($\mu g/m^3$)	Most Stringent Standard ($\mu g/m^3$)
Each FP10 Turbine commissioning with fuel gas heater[4]	CO	1 hour	**4,761**	**4,826**	3,762	8,523	8,588	23,000
		8 hours	**1,333**	**1,263**	2,166	3,499	3,429	10,000
	NO_2[3]	1 hour	**198.4**	**198.3**	109.04	307.44	307.34	339[2]

*This table is a revised version of Table 7.1-26 included in the WPGS AFC

Notes:

Bold indicates highest estimated impact when compared to data set B (Table 7.1-26b)

1 Background represents the maximum values measured at the monitoring stations.
2 In February 2007, the CARB approved new, more stringent CAAQS for NO_2. The new standards of 339 $\mu g/m^3$ (1 hour) and 57 $\mu g/m^3$ (annual) became effective in March 2008
3 NO_2 modeling for Commissioning was conducted with the OLM algorithm
4 Applicant will agree to a condition limiting commissioning of Flex 10 plants to one unit at a time.

CO = carbon monoxide
$\mu g/m^3$ = micrograms per cubic meter
NO_2 = nitrogen dioxide

Table 7.1-26b (New)
Turbine Commissioning Modeling Results Using Meteorological Data Set 8

Modeling Scenario	Pollutant	Averaging Period	Maximum Estimated Impact from FP10 1 and gas heater ($\mu g/m^3$)	Maximum Estimated Impact from FP10 2 and gas heater ($\mu g/m^3$)	Background1 ($\mu g/m^3$)	Total Predicted Concentration from FP10 1 ($\mu g/m^3$)	Total Predicted Concentration from FP10 2 ($\mu g/m^3$)	Most Stringent Standard ($\mu g/m^3$)
Two FP10 Turbines commissioning with fuel gas heater[4]	CO	1 hour	4450	4477	3,762	7,912	8,239	23,000
		8 hours	1284	1180	2,166	3,450	3,346	10,000
	NO_2[3]	1 hour	196.8	196.6	109.04	305.84	305.64	339[2]

Notes:

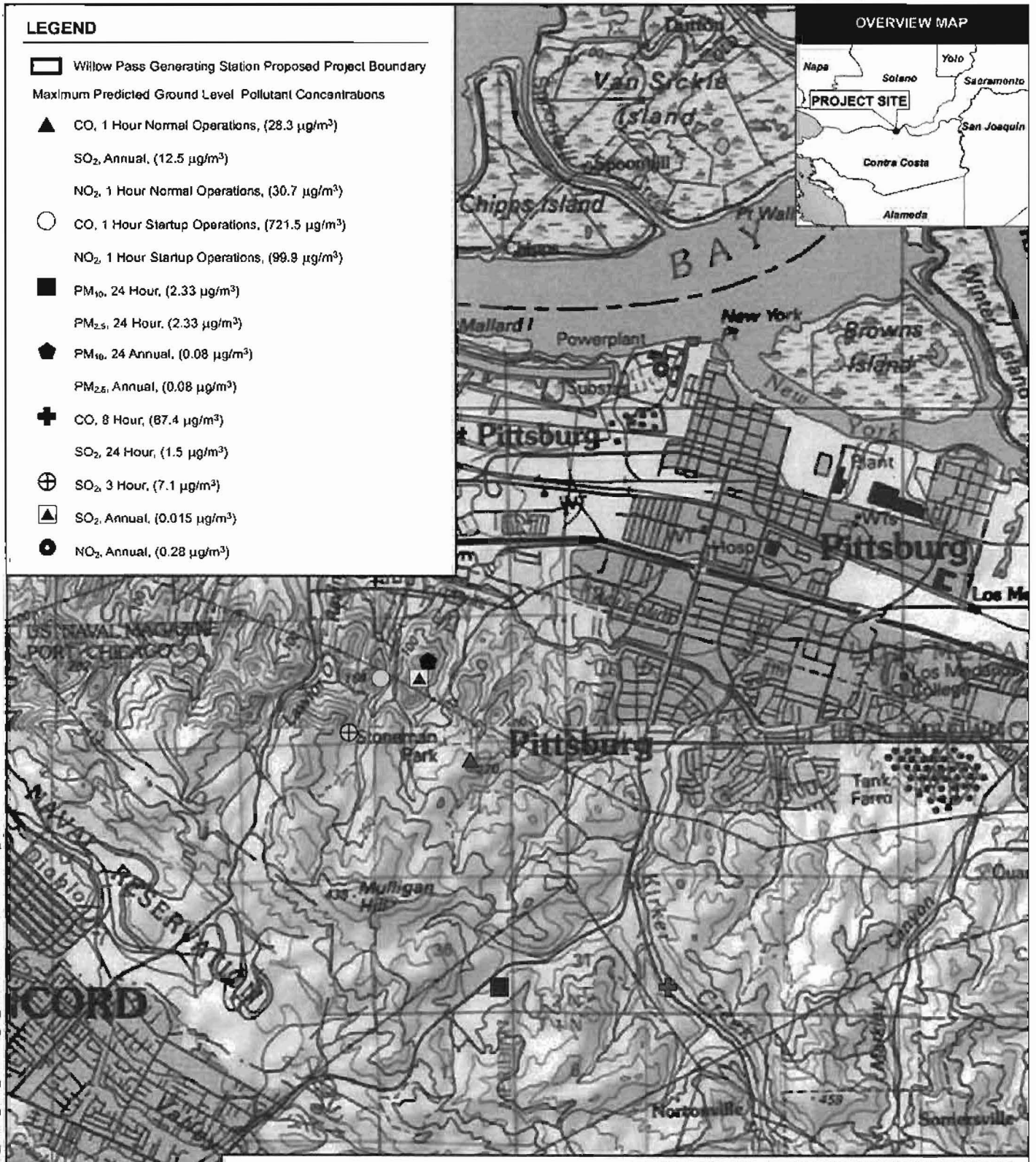
1 Background represents the maximum values measured at the monitoring stations.
2 In February 2007, the CARB approved new, more stringent CAAQS for NO_2. The new standards of 339 $\mu g/m^3$ (1 hour) and 57 $\mu g/m^3$ (annual) became effective in March 2008
3 NO_2 modeling for Commissioning was conducted with the OLM algorithm
4 Applicant will agree to a condition limiting commissioning of Flex 10 plants to one unit at a time.

CO = carbon monoxide
$\mu g/m^3$ = micrograms per cubic meter
NO_2 = nitrogen dioxide

Table 7.6-4 (Revised)
Estimated Cancer Risk and Acute and Chronic Non-cancer Total Hazard Indices Due to WPGS Emissions of TACs

Receptor Type	Risk Type	Maximum Risk	NAD83 UTM Easting (m)	NAD83 UTM Northing (m)	Description & Distance of Receptor from fenceline
Point of Maximum Impact	Cancer Risk (in 1 million)	0.111	602,112	4,206,806	Grid[1] approximately 6 km southeast
	Chronic Total Hazard Index	0.005	602,112	4,206,806	Grid[1] approximately 6 km southeast
	Acute Total Hazard Index	0.142	604,262	4,208,066	Grid[1] approximately 7 km east-southeast
Sensitive/ Residential Receptor	Cancer Risk (in 1 million)	0.084	594,105	4,207,202	Kids Jump for Fun[2] ~ 4 km southwest of Project
	Chronic Total Hazard Index	0.004	594,105	4,207,202	Kids Jump for Fun[2] ~ 4 km southwest of Project
	Acute Total Hazard Index	0.105	594,105	4,207,202	Kids Jump for Fun[2] ~ 4 km southwest of Project

Notes:
[1] Modeling grid receptor location.
[2] Daycare center



LOCATIONS OF MAXIUMUM PREDICTED GROUND LEVEL POLLUTANT CONCENTRATIONS FOR THE OPERATIONAL PROJECT AREA USING METEOROLOGICAL DATA SET A

Willow Pass Generating Station
Mirant Willow Pass, LLC
Pittsburg, California

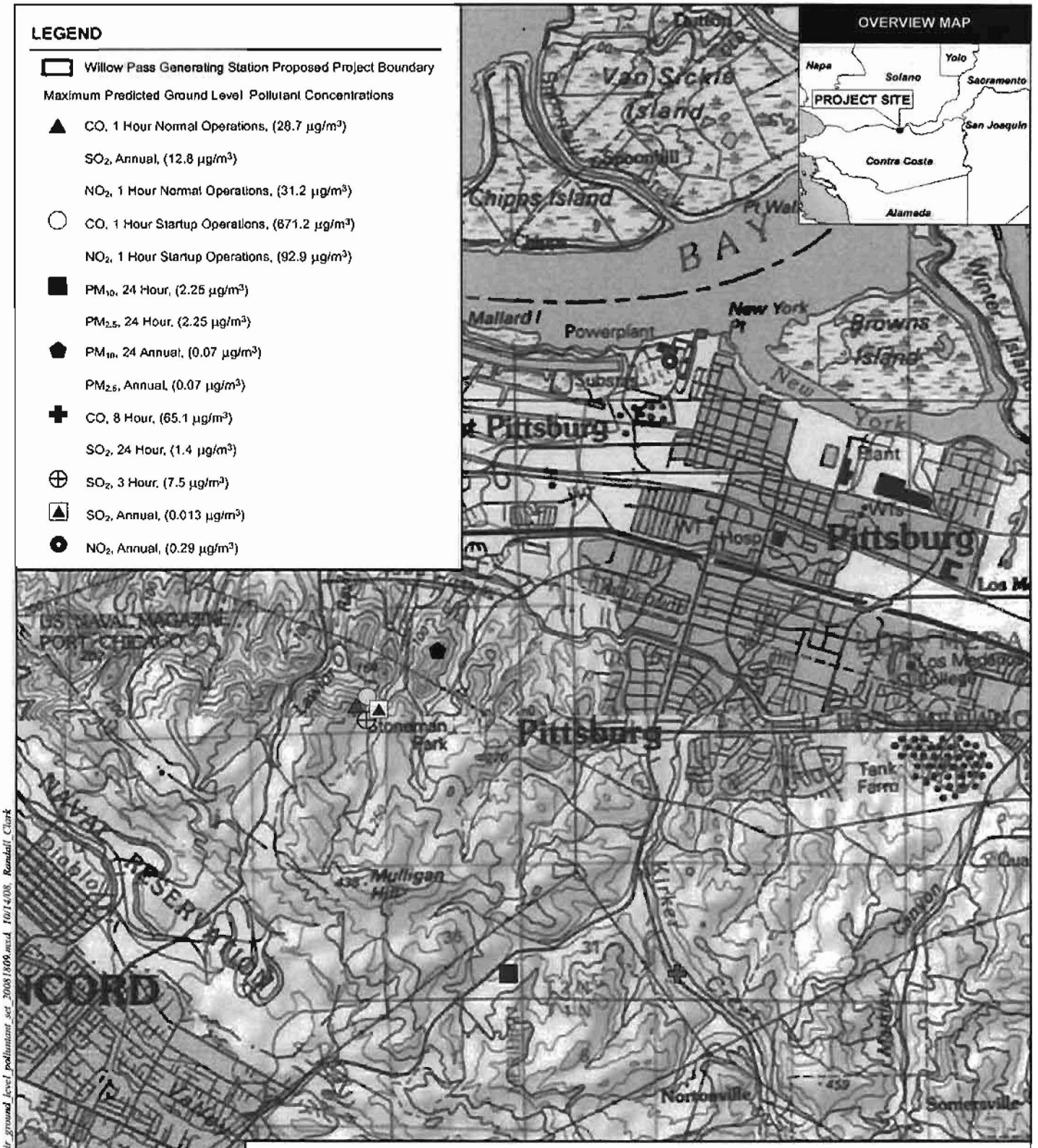
October 2008
28067343

URS

FIGURE 7.1-5a (REVISED)

Path: G:\gis\projects\28067343\mxd\air_ground_level_pollutant_set_A081809.mxd, 10/14/08, Randall_Clark

10/31/08 vsa ..T:\Mirant Pittsburg-Willow Pass\Graphics\ATC_Air Permit\7.1-5a_ground_level_pollutant_dataset A.ai



LOCATIONS OF MAXIUMUM PREDICTED GROUND LEVEL POLLUTANT CONCENTRATIONS FOR THE OPERATIONAL PROJECT AREA USING METEOROLOGICAL DATA SET B

Willow Pass Generating Station
Mirant Willow Pass, LLC
Pittsburg, California

October 2008
28067343

URS

FIGURE 7.1-5b (NEW)

Path: G:\gis\projects\1577\28067343\mxd\air_ground_level_pollutant_set_20081009.mxd 10/14/08, Randall_Clark

10/31/08 vsa ..T:\Mirant Pittsburg-Willow Pass\Graphics\ATC_Air Permit\7.1-5b_ground_level_pollutant_dataset B.ai

Appendix J3
Construction Emissions (Revised)

Mirant-Willow Pass Generating Station
Construction Equipment List

				Year			Year													Year														Year							
				2009			2010													2011														2012							
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	
Construction Equipment	**% Usage**	**HP**	**Fuel**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Total per Eq**
On-Road Vehicles																																									
Concrete Pumper Truck	15%	350	Dsl			1	1	1	1														1	1	1	1	1	1	1	1	1							14
Dump Truck	35%	300	Dsl			1	1	1	1														1	2	2	2	2	2	2	1	1	1	1					23
Dump Truck (30 Ton)	100%	300	Dsl							10	1	1	1																									13
Fuel/Lube Truck	25%	150	Gas	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	32
Pickup truck	75%	150	Gas	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	82
Water Truck	50%	300	Dsl	1	1	1	1	1	1														1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	22
Off-Road Vehicles																																								0
Air Compressor	80%	50	Gas	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1				1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	41
Articulating Boom Manlift (120, 80, 60 and 40 FT)	70%	75	Gas				2	2	4	4	6	6	6	6	6	8	12	12	10	10	10	12	12	12	12	12	12	8	8	8	8	6	6	6	4	2	2	234
Backhoe Loader	40%	80	Dsl			2	2	2	2	2	1	1	1	1	1							1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	31
Jumping Jack Compactors	60%	7.5	Gas								2	2	2											1	1	2	2	2	2	2	2	2	2	2					26
150 Ton Crawler Crane	50%	300	Dsl	1	1	1		1	1	1	1	1	1	1	1	1														1	1	1	1	1	1	1	1	20
M2250 Crawler Crane	25%	500	Dsl						1	1	1																			1	1	1	1	1				9
Hydraulic Crane (45 Ton)	65%	250	Dsl	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1									1	1	1	1	1	1	1	1	26
Hydraulic Crane (55 Ton)	65%	300	Dsl	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1				1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	38
Bull Dozer	80%	300	Dsl																				1	1	1	1	1	1										6
Bull Dozer w/ripper	80%	300	Dsl							1																												1
Hydraulic Excavator	65%	250	Dsl			2	2	2	2	4	2	2	2	1	1							1	1	2	2	2	2	2	2	2	2	1	1					40
Forklift	75%	40	Gas	1	1	1	1	2	2	2	3	2	2	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	2	2	57
Front End Loader	70%	130	Dsl		1	1	1	1	1	2	2	2	2	1	1	1						1	2	2	2	2	2	2	2	2	2	2	2					39
Light Plant	30%	25	Gas		1	1	1	1									1	1	1	1																		8
Tractor	50%	195	Dsl	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	34
Vibratory Roller	80%	125	Gas			1	1	1	1														1	1	1	1	1	1	1	1	1	1	1					15
Walk Behind Vibratory Roller	60%	25	Gas			1	1	1	1		1	1	1										1	1	2	2	2	2	2	1	1	1	1					23
Welder (Diesel)	70%	25	Dsl	2	2	2	1	1	1	2	2	3	3	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	53
Total per month				12	14	22	22	24	28	38	30	28	28	20	20	20	23	23	19	17	16	27	33	34	36	37	37	33	32	33	33	31	33	26	23	18	18	887

Mirant-Willow Pass Generating Station
Emission Factors for Construction Equipment

Equipment Description		% usage	hp	Emission Factors (lbs/hr) [with the % usage factor included]								
				CO	CO_2	CH_4	N_2O	NO_x	PM_{10}	$PM_{2.5}$	SO_x	ROG[1]
On-Road Vehicles	**Fuel Class**											
Concrete Pumper Truck	HHDT-DSL	15	350	0.044	10.468	0.000	0.000	0.091	0.006	0.006	0.00010	0.021
Dump Truck	HHDT-DSL	35	300	0.103	24.425	0.001	0.000	0.212	0.015	0.013	0.00023	0.049
Dump Truck (30 ton)	HHDT-DSL	100	300	0.295	69.786	0.002	0.001	0.607	0.042	0.038	0.00066	0.139
Fuel/Lube Truck	MHD-GAS	25	150	0.150	9.217	0.000	0.000	0.012	0.000	0.000	0.00009	0.012
Pickup truck, 1 ton	MHD-GAS	75	150	0.451	27.650	0.001	0.001	0.035	0.001	0.001	0.00028	0.036
Water Truck	HHDT-DSL	50	300	0.148	34.893	0.001	0.001	0.304	0.021	0.019	0.00033	0.069
Off-Road Vehicles	**SCAB Eq Name**											
Air Compressor, GAS	Air Compressors	80	50	4.048	27.077	0.009	0.009	0.226	0.002	0.002	0.00033	0.162
Articulating Boom Manlift (120, 80, 60 and 40 Ft.), GAS	Aerial Lifts	70	75	1.859	24.952	0.003	0.007	0.150	0.002	0.002	0.00027	0.062
Backhoe loader	Tractors/Loaders/Backhoes	40	80	0.147	15.804	0.001	0.000	0.178	0.017	0.016	0.00019	0.049
Compactors, Jumping Jack , GAS	Plate Compactors	60	7.5	0.758	1.662	0.002	0.002	0.018	0.006	0.005	0.00005	0.034
Crane, 150 Ton, Crawler	Cranes	50	300	0.218	62.874	0.005	0.002	0.712	0.027	0.025	0.00068	0.072
Crane, 330 Ton, Crawler, M2250	Cranes	25	500	0.179	45.025	0.004	0.001	0.469	0.018	0.017	0.00044	0.048
Crane, 45 Ton Hydraulic	Cranes	65	250	0.238	72.903	0.005	0.002	0.852	0.033	0.030	0.00082	0.085
Crane, 55 Ton Hydraulic	Cranes	65	300	0.284	81.736	0.007	0.002	0.925	0.036	0.033	0.00089	0.093
Dozer	Rubber Tired Dozers	80	300	0.816	159.811	0.008	0.003	2.176	0.095	0.087	0.00174	0.245
Dozer w/Ripper	Rubber Tired Dozers	80	300	0.816	159.811	0.008	0.003	2.176	0.095	0.087	0.00174	0.245
Excavator, Hydraulic	Excavators	85	250	0.352	134.680	0.007	0.002	1.364	0.047	0.043	0.00152	0.130
Forklift, GAS	Forklifts	75	40	4.048	11.518	0.004	0.006	0.089	0.002	0.002	0.00017	0.067
Front End Loader	Tractors/Loaders/Backhoes	70	130	0.285	42.630	0.003	0.001	0.480	0.039	0.036	0.00049	0.073
Light Plant, GAS	Other Construction Equipment	30	25	1.803	2.761	0.002	0.002	0.026	0.002	0.001	0.00007	0.038
Tractor, Farm	Off-Highway Tractors	50	195	0.392	65.209	0.003	0.001	0.916	0.049	0.045	0.00073	0.115
Vibratory Roller, GAS	Rollers	80	125	4.653	65.792	0.016	0.018	0.770	0.005	0.005	0.00063	0.288
Walk behind Vibratory Roller, GAS	Rollers	60	25	4.562	15.244	0.008	0.006	0.074	0.001	0.001	0.00023	0.137
Welder	Welders	70	25	0.048	7.900	0.001	0.000	0.078	0.006	0.005	0.00010	0.019

Note:

[1] Assuming ROGs are equivalent to VOCs

- Emission factors for on-road vehicles are based on results from Emfac Emissions Model 2007 Version 2.3 (HHDT-DSL=heavy heavy-duty trucks-diesel; MHD-GAS=medium heavy duty-GAS). EMFAC scenario year was 2009 and the selected area was Contra Costa County. PM_{10} values include break wear and tire wear.

- Emission factors for off-road diesel equipment are based on the maximum emission factors from 2009 to 2012 of the South Coast Air Quality Management District (AQMD) data . Linear interpolation was used to calculate the emission factor for horse power values that were not listed.

- Emission factors for off-road gasoline equipment are based on the maximum emission factors from 2009 to 2012 using OFFROAD2007 Dated December 15, 2007. Linear interpolation was used to calculate the emission factor for horse power values that were not listed.

- CO_2 emissions for off-road equipment were estimated using USEPA AP-42 Chapter 3.3 - Gasoline and Diesel Industrial Engines, and Chapter 3.4 - Large Stationary Diesel and All Stationary Dual-fuel Engines

- $PM_{2.5}$ emission factors were determined by multiplying PM_{10} numbers by a "$PM_{2.5}$ fraction of PM_{10}" value. Fractional values for $PM_{2.5}$ were taken from the SCAQMD guidance: Final - Methodology to Calculate $PM_{2.5}$ and $PM_{2.5}$ Significance

  On-Road Vehicles:
  - $PM_{2.5}$ Fraction of PM_{10}, Brake wear: 0.429
  - $PM_{2.5}$ Fraction of PM_{10}, Diesel: 0.920
  - PM2.5 Fraction of PM10, Tire wear: 0.250

  Off-Road Vehicles:
  - PM2.5 Fraction of PM10, Diesel: 0.920

- CH_4 and N_2O factors for on-road vehicles are derived from California Climate Action Registry General Reporting Protocol Version 2.2 (March 2007), Table C.4 using the mileage accrual rates by age table from EMFAC2007 Version 2.3, November 1, 2006, California Air Resources Board, normalized accrual rates (annual odometer mileage weighted by population) for LDT, MHD, and HHD diesel fueled trucks in the San Joaquin Valley Air Basin. These emissions are in g/mile. On-road vehicles are limited to 10 mph, which is used to convert to lb/hr

- CH_4 and N_2O factors for off-road equipment are derived from California Climate Action Registry General Reporting Protocol Version 2.2 (March 2007), Table C.6 (distillate fuel factors for the industrial sector) using the following to convert from kg/gallon to lb/hp-hour, and then multiplying by the rated horsepower rating: 1 gallon/137,000 Btu, 7,000 Btu/hp-hour, and 2.2046 lb/kg.

Mirant-Willow Pass Generating Station
Monthly Construction Emissions

Month	CO		CO_2		CH_4		N_2O		NO_x		PM_{10}		$PM_{2.5}$		SO_2		ROG	
	Monthly Emissions (tons)	12-Month Total (tons)	Monthly Emissions (tons)	12-Month Total (tons)	Monthly Emissions (tons)	12-Month Total (tons)	Monthly Emissions (tons)	12-Month Total (tons)	Monthly Emissions (tons)	12-Month Total (tons)	Monthly Emissions (tons)	12-Month Total (tons)	Monthly Emissions (tons)	12-Month Total (tons)	Monthly Emissions (tons)	12-Month Total (tons)	Monthly Emissions (tons)	12-Month Total (tons)
October, 2009	1.16	NA	48.02	NA	0.00	NA	0.00	NA	0.47	NA	0.02	NA	0.02	NA	0.00	NA	0.09	NA
November, 2009	1.39	NA	53.03	NA	0.00	NA	0.00	NA	0.52	NA	0.02	NA	0.02	NA	0.00	NA	0.10	NA
December, 2009	2.53	NA	98.90	NA	0.01	NA	0.01	NA	0.96	NA	0.04	NA	0.04	NA	0.00	NA	0.19	NA
January, 2010	2.91	NA	96.61	NA	0.01	NA	0.01	NA	0.94	NA	0.04	NA	0.04	NA	0.00	NA	0.20	NA
February, 2010	3.38	NA	104.79	NA	0.01	NA	0.01	NA	1.02	NA	0.04	NA	0.04	NA	0.00	NA	0.21	NA
March, 2010	4.08	NA	126.90	NA	0.01	NA	0.01	NA	1.23	NA	0.05	NA	0.04	NA	0.00	NA	0.25	NA
April, 2010	3.56	NA	239.67	NA	0.01	NA	0.01	NA	2.34	NA	0.11	NA	0.10	NA	0.00	NA	0.41	NA
May, 2010	4.58	NA	121.58	NA	0.01	NA	0.01	NA	1.13	NA	0.05	NA	0.04	NA	0.00	NA	0.25	NA
June, 2010	3.68	NA	113.25	NA	0.01	NA	0.01	NA	1.06	NA	0.05	NA	0.04	NA	0.00	NA	0.22	NA
July, 2010	3.68	NA	113.25	NA	0.01	NA	0.01	NA	1.06	NA	0.05	NA	0.04	NA	0.00	NA	0.22	NA
August, 2010	2.45	NA	81.90	NA	0.01	NA	0.01	NA	0.76	NA	0.03	NA	0.03	NA	0.00	NA	0.15	NA
September, 2010	2.45	35.84	81.90	1,279.97	0.01	0.11	0.01	0.09	0.76	12.28	0.03	0.53	0.03	0.49	0.00	0.01	0.15	2.42
October, 2010	2.81	37.49	76.82	1,302.77	0.01	0.12	0.01	0.10	0.62	12.43	0.02	0.54	0.02	0.49	0.00	0.01	0.14	2.48
November, 2010	3.77	39.87	70.50	1,320.29	0.01	0.12	0.01	0.11	0.56	12.47	0.02	0.53	0.02	0.48	0.00	0.01	0.16	2.54
December, 2010	3.77	41.11	70.50	1,291.88	0.01	0.12	0.01	0.11	0.56	12.03	0.02	0.51	0.02	0.46	0.00	0.01	0.16	2.50
January, 2011	3.32	41.53	56.16	1,250.43	0.01	0.12	0.01	0.12	0.42	11.51	0.01	0.48	0.01	0.44	0.00	0.01	0.13	2.44
February, 2011	2.86	41.02	51.16	1,196.80	0.01	0.11	0.01	0.12	0.39	10.88	0.01	0.45	0.01	0.41	0.00	0.01	0.11	2.34
March, 2011	2.66	39.60	50.86	1,120.76	0.01	0.11	0.01	0.11	0.39	10.03	0.01	0.41	0.01	0.38	0.00	0.01	0.11	2.19
April, 2011	3.71	39.74	93.28	974.17	0.01	0.10	0.01	0.11	0.75	8.44	0.03	0.33	0.03	0.30	0.00	0.01	0.19	1.97
May, 2011	4.94	40.10	127.31	979.91	0.01	0.10	0.01	0.12	1.16	8.46	0.05	0.33	0.04	0.30	0.00	0.01	0.28	2.01
June, 2011	4.98	41.40	142.15	1,008.81	0.01	0.10	0.02	0.12	1.31	8.71	0.05	0.33	0.05	0.30	0.00	0.01	0.29	2.08
July, 2011	5.55	43.28	144.00	1,039.58	0.01	0.11	0.02	0.13	1.32	8.97	0.05	0.34	0.05	0.31	0.00	0.01	0.31	2.18
August, 2011	6.01	46.84	145.27	1,102.82	0.02	0.11	0.02	0.14	1.33	9.54	0.05	0.36	0.05	0.33	0.00	0.01	0.32	2.35
September, 2011	6.01	50.39	145.27	1,166.29	0.02	0.12	0.02	0.15	1.33	10.11	0.05	0.36	0.05	0.35	0.00	0.01	0.32	2.52
October, 2011	5.19	52.77	134.29	1,229.76	0.01	0.13	0.01	0.15	1.26	10.75	0.05	0.41	0.05	0.38	0.00	0.01	0.29	2.67
November, 2011	5.10	54.10	116.71	1,275.96	0.01	0.13	0.01	0.15	1.02	11.21	0.04	0.44	0.04	0.40	0.00	0.01	0.27	2.78
December, 2011	4.66	54.86	132.23	1,337.69	0.01	0.14	0.01	0.16	1.21	11.86	0.05	0.47	0.04	0.43	0.00	0.01	0.27	2.89
January, 2012	4.66	56.32	132.23	1,414.77	0.01	0.15	0.01	0.16	1.21	12.66	0.05	0.50	0.04	0.46	0.00	0.02	0.27	3.05
February, 2012	5.09	56.55	116.00	1,478.60	0.01	0.15	0.01	0.17	1.05	13.33	0.04	0.53	0.04	0.49	0.00	0.02	0.26	3.18
March, 2012	5.13	81.01	124.86	1,562.81	0.01	0.18	0.01	0.17	1.17	14.11	0.05	0.57	0.04	0.52	0.00	0.02	0.27	3.35
April, 2012	3.84	61.14	88.72	1,548.04	0.01	0.18	0.01	0.17	0.79	14.15	0.03	0.57	0.03	0.52	0.00	0.02	0.18	3.34
May, 2012	3.43	59.83	83.23	1,503.95	0.01	0.18	0.01	0.16	0.76	13.75	0.03	0.55	0.03	0.51	0.00	0.02	0.17	3.23
June, 2012	2.50	57.16	58.48	1,430.30	0.01	0.15	0.01	0.15	0.56	13.10	0.03	0.53	0.02	0.48	0.00	0.02	0.14	3.06
July, 2012	2.50	54.10	58.48	1,354.78	0.01	0.14	0.01	0.14	0.56	12.44	0.03	0.50	0.02	0.46	0.00	0.01	0.14	2.91
August, 2012	0.57	48.67	15.37	1,224.48	0.00	0.13	0.00	0.13	0.11	11.23	0.00	0.45	0.00	0.41	0.00	0.01	0.00	2.59
Maximum (100 % load)	6.01	61.14	239.67	1,562.81	0.02	0.18	0.02	0.17	2.34	14.15	0.11	0.57	0.10	0.52	0.00	0.02	0.41	3.35
Average	3.91	48.19	103.37	1,266.09	0.01	0.13	0.01	0.14	0.93	11.43	0.04	0.44	0.03	0.42	0.00	0.01	0.21	2.63
Average (75% load)	4.50	45.88	178.90	1,164.45	0.01	0.12	0.01	0.13	1.79	10.61	0.09	0.43	0.08	0.39	0.00	0.01	0.31	2.51

Note:
[1] Assuming ROGs are equivalent to VOCs
- Assuming 75% operational average load

Mirant-Willow Pass Generating Station
Combustion Emissions from Delivery Trucks and Passenger Vehicles

Transportation Information

-Total HHDT miles/year = 57,600
-Total LDA peak miles/year = 1,425,600

Comment

Truck miles based on the assumption that they will travel 15 miles/trip, there will be an average of 16 1-way trips/day and 20days/month of truck delivery

Passenger vehicle miles based on the assumption that they will travel an average 15 miles/trip , there will be an average of 360 1-way trips/day and 22 days/month of construction

DATA FROM EMFAC2007

Equipment Description	Vehicle Miles Traveled per Day	Tons Per Day					
		CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	ROG
Heavy-Heavy Duty Diesel Truck 2009	405,000	2.24	7.92	0.32	0.28	0.01	0.55
Passenger Vehicles 2009	13,268,000	61.54	5.32	0.48	0.27	0.06	6.59

Note:

- Emission factors for on-road, heavy-heavy-duty vehicles and light duty autos are based on results from Emfac Emissions Model 2007 Version 2.3. The values are the projected values for the HHDT and LDA vehicles within Contra Costa County in the respective year
- $PM_{2.5}$ emission factors were determined by multiplying PM_{10} numbers by a "$PM_{2.5}$ fraction of PM_{10}" value. Fractional values for $PM_{2.5}$ were taken from the SCAQMD guidance: Final - Methodology to Calculate $PM_{2.5}$ and PM2.5 Significance Thresholds, October 2006: Appendix A-Updated
  - $PM_{2.5}$ Fraction of PM_{10}, Brake wear: 0.429
  - $PM_{2.5}$ Fraction of PM_{10}, Diesel: 0.920
  - $PM_{2.5}$ Fraction of PM_{10}, Tire wear: 0.250

CALCULATION OF EMISSION FACTOR

Equipment Description	Pounds per Mile					
	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	ROG
Heavy-Heavy Duty Diesel Truck 2009	1.11E-02	3.91E-02	1.58E-03	1.36E-03	4.94E-05	2.72E-03
Passenger Vehicles 2009	9.28E-03	8.02E-04	7.24E-05	4.11E-05	9.04E-06	9.93E-04

Note:

- The following equation was used to obtain the emission factors:

$$EF = ER / VMT * 2000$$

Where: EF= emission factor in pounds per mile
ER = Emission Rate in tons per day
VMT = Average vehicle miles traveled per day in Contra Costa county

EMISSIONS

Equipment Description	Tons Emitted Per Year					
	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	ROG
Heavy-Heavy Duty Diesel Truck 2009	0.32	1.13	0.05	0.04	0.0014	0.08
Passenger Vehicles 2009	6.61	0.57	0.05	0.029	0.0064	0.71
TOTAL	6.93	1.70	0.10	0.07	0.0079	0.79

Note:

- The following equation was used to obtain the emission factors:

$$M = EF * D / 2000$$

Where: M = Mass emissions rate from refinery related activities in tons per year
EF= emission factor in pounds per mile
D = Distance traveled by trucks to the refinery in miles per year.

Mirant-Willow Pass
Maximum Daily Fugitive Dust Emissions

Grading and Demolition - Fugitive Dust Emissions

Maximum fugitive dust from construction activity occure in month 6 during grading and demolition activities

Bulldozing/Earth clearing

$E = 0.45 * G^{1.5} / H^{1.4} * 2.2046$ — PM10 Emissions from bulldozing (lb/hr) from SCAQMD Table A9-9-F

7.5 G = Silt content (%) (from Table A9-9-F-1 for overburden)
15 H = Moisture content of surface material (%) (from Table A9-9-F-2 for moist dirt)
0.46 lb/hr of PM10

Equipment	Quantity	Hours/Day	Watering Control Efficiency	PM10 Emissions (lb/hr)	PM10 Emissions (lb/day)	PM2.5 Emissions (lb/hr)	PM2.5 Emissions (lb/day)
Dozer/Tractor	1	8	85%	0.07	0.55	0.01	0.11
			Total	0.068	0.552	0.014	0.115

22 construction days per month
6 Total months of onsite soil movement from proj description

Water efficiency from CEQA Table 11-4 watering 3 times daily or using chemical suppressants

Dirt Piling or Material Handling

$E = 0.00112 * (G/5)^{1.3} / (H/2)^{1.4}$ — PM10 Emissions from Dirt Piling or Material Handling (lb/hr) from SCAQMD Table A9-9-G

10 G = Mean Wind speed (mph), From PG&E onsite meteorological station at Pittsburg power plant
15 H = Moisture content of surface material (percent) (from Table A9-9-G-1 for moist dirt)
0.00018 lb/ton of PM10

Equipment	Quantity	Hours/Day	Material Handled (ton/day)	Material Handled (ton)	Watering Control Efficiency	PM10 Emissions (lb/hr)	PM10 Emissions (lb/day)	PM2.5 Emissions (lb/hr)	PM2.5 Emissions (lb/day)
Loader	3	8	872	116,166	85%	0.0027	0.0216	0.0008	0.0045
Dump Trucks	1	8	872	116,166	85%	0.0027	0.0216	0.0008	0.0045
					Total	0.0054	0.0432	0.0011	0.0089

[1] Assume Loaders involved in grading and excavators in demolition

Water efficiency from CEQA Table 11-4 watering 3 times daily or using chemical suppressants

696 yd3/day — 872 ton/day
92,133 yd3 — 116,166 tons — 2500 density of soil (lb/yd3) (Physical Soil Property default density)

Amount of soil moved from project description — 92,133 cubic yds, total soil moved from cut and fill combined

Cover Storage Pile

SCAQMD Table A9-9-E

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

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

7.5 G = Silt content (%) (from Table A9-9-E-1 for overburden)
55 H = Mean number of days per year with at least 0.01 inches of precipitation (from Western Regional Climate Center for Antioch Pump Plant 3)
30 I = Percentage of time that the unobstructed wind speed exceeds 12 mph at mean pile height, From PG&E onsite meteorological station at PPP
0.5 J = Fraction of TSP that is PM10 = 0.5
11.213 lb/acre/day

Source	Quantity	Size of Pile (acres)	Hours/Day	Watering Control Efficiency	PM10 Emissions (lb/hr)	PM10 Emissions (lb/day)	PM2.5 Emissions (lb/hr)	PM2.5 Emissions (lb/day)
Cover Storage Pile	1	1	24	85%	0.070	1.682	0.015	0.350

Water efficiency from CEQA Table 11-4 watering 3 times daily or using chemical suppressants
number of piles and pile size assumed for activities occuring in this month

Demolition

SCAQMD Table A9-9-H

E=0.00042*J

Total building and asphalt volume to be demolished — 969,550 cubic ft — Concrete density — 4000 lb/yd3 — AP 42 Appendix A Miscellaneous Data and Conversion factors
Demolition to occur over 6 months — 132 days
7,497 J=Building volume (cubic feet) handled per day

Source	PM10 Emissions (lbs/day)	PM2.5 Emissions (lbs/day)	PM10 Emissions (tons/yr)	PM2.5 Emissions (tons/yr)	Watering Control Efficiency
Demolition	0.47	0.10	0.03	0.01	85%

6,000 cy debris
25,150 cy concrete
10,000 tons brick — ~ 5000 cy brick
1,000 tons gunite — ~ 500 cy brick

excavators used in demolition
Water efficiency from CEQA Table 11-4 watering 3 times daily or using chemical suppressants to reduce visible dust plumes

Travel on unpaved road

$F = 2.1 * G/12 * H/30 * (J/3)^{0.7} * (I/4)^{0.5} * (365-K)/365$ — SCAQMD Table A9-9-D

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

15 G = Surface silt loading (%) (average value between stone quarrying plant road and farm road, SCAQMD Table A9-9-D-1)
5 H = Mean vehicle speed (mph)
value listed in table I = Mean number of wheels on vehicle
value listed in table J = Mean vehicle weight (ton)
55 H = Mean number of days per year with at least 0.01 inches of precipitation (from Western Regional Climate Center for Antioch Pump Plant 3)

Vehicle Type	No. Of Unit	Round Trips /Day/ Unit	Round Trip Distance (mile)	Daily VMT (all units)	Mean Vehicle Weight (tons)	Number of Wheels on Vehicle	PM10 EF (lb/VMT)	Watering Control Efficiency	PM10 Emissions (lb/hr)	PM10 Emissions (lb/day)	PM2.5 Emissions (lb/hr)	PM2.5 Emissions (lb/day)
Vibratory Rollers	2	2	0.1	0.4	5	4	0.53	85%	0.003	0.032	0.001	0.007
Pickup Truck	2	2	0.1	0.4	2	4	0.28	85%	0.001	0.017	0.000	0.004
Water Truck	1	4	0.1	0.4	13	10	1.84	85%	0.006	0.098	0.002	0.021
Forklift	2	1	0.1	0.2	13	4	1.04	85%	0.003	0.031	0.001	0.007
Manlift	4	1	0.1	0.4	13	4	1.04	85%	0.005	0.062	0.001	0.013
Concrete truck	1	1	0.1	0.1	13	10	1.64	85%	0.002	0.025	0.000	0.005
								Total	0.022	0.265	0.005	0.056

mean site is approximately 0.2 mi x 0.2 mi
Assumed maximum travel speed is 5 mph
Equipment weight from SCAQMD Table A9-9-D-3
Water efficiency from CEQA Table 11-4 watering 3 times daily or using chemical suppressants
PM2.5 emission factors from updated CEIDARS List with PM2.5 fractions.
PM2.5 numbers obtained by multiplying the PM10 values by fraction in CEIDARS list for appropriate fugitive dust sources.

Fugitive Dust Emissions from the construction of linears during month 6

Dirt Piling or Material Handling
$E = 0.00112 * (G/5)^{1.3} / (H/2)^{1.4}$

PM10 Emissions from Dirt Piling or Material Handling (lb/hr) from SCAQMD Table A9-9-G
10 G = Mean Wind speed (mph), From PG&E onsite meteorological station at Pittsburg power plant
15 H = Moisture content of surface material (%) (from Table A9-9-G-1 for moist dirt)
0.00016 lb/ton of PM10

Equipment	Quantity	Hours/Day	Material Handled (ton/day)	Material Handled (ton)	Watering Control Efficiency	PM10 Emissions (lb/hr)	PM10 Emissions (lb/day)	PM2.5 Emissions (lb/hr)	PM2.5 Emissions (lb/day)
Loader	3	8	4	1,144	85%	1.30E-05	1.04E-04	2.71E-06	2.16E-05
Dump Truck	1	8	4	1,144	85%	1.30E-05	1.04E-04	2.71E-06	2.16E-05
					Total	2.60E-05	2.08E-04	5.41E-06	4.33E-05

12 Total months of soil movement for construction of all linears, assume
22 construction days per month

Notes:
Water efficiency from CEQA Table 11-4 watering 3 times daily or using chemical suppressants

3 yd3/day 4 ton/day
916 yd3 1,144 tons 2500 density of soil (lb/yd3)
(Physical Soil Property default density)

Amount of soil moved 916 cubic yds

Length of disturbed area	350 m	382.765 yd	assume gets disturbed in 1 month
Assumed width of disturbed area	1 m	1.094	
Assumed depth of distrubed area	2 m	2.187	

Travel on paved road
$F = 0.77 * ((G * 0.35)^{0.3})$ SCAQMD Table A9-9-C
Emission factor for vehicle travel on unpaved roads (lb/VMT)

8.65 G = Surface silt loading (oz/yd^3) (construction site without cleaning--conservative. SCAQMD Table A9-9-C-1)

Vehicle Type	No. of Unit	Round Trips /Day/ Unit	Round Trip Distance (mile)	Daily VMT (all units)	PM10 EF (lbs/VMT)	Watering Control Efficiency	PM10 Emissions (lbs/hr)	PM10 Emissions (lbs/day)	PM2.5 Emissions (lbs/hr)	PM2.5 Emissions (lbs/day)
Field truck	2	2	0.25	1	1.08	85%	0.014	0.162	0.003	0.034
Water truck	1	2	0.25	0.5	1.08	85%	0.007	0.081	0.001	0.017
						Total	0.020	0.243	0.004	0.052

Notes:
Water efficiency from CEQA Table 11-4 watering 3 times daily or using chemical suppressants
PM2.5 emission factors from updated CEIDARS List with PM2.5 fractions.
PM2.5 numbers obtained by multiplying the PM10 values by fraction in CEIDARS list for appropriate fugitive dust sources.
Equipment and quantity of equipment per year based on estimate for the linears being constructed
Round trips based on average length from site at start of linear area to end of linear area
22 Maximum number of days per month of construction
12 Maximum number of hours per construction day

Annual Fugitive Dust Emissions

Months 1-12 demolition and grading activities
Bulldozing/Earth clearing
$E = 0.45 * S^{1.5} / M^{2.4} + 2.2046$

PM10 Emissions from bulldozing (lb/hr) from SCAQMD Table A9-9-F
7.5 G = Silt content (%) (from Table A9-9-F-1 for overburden)
15 H = Moisture content of surface material (%) (from Table A9-9-F-2 for moist dirt)
0.46 lb/hr of PM10

Equipment	Quantity/ year	Hours/ Day	Hours/ year/ Unit	Watering Control Efficiency	PM10 Emissions (tons/yr)	PM2.5 Emissions (tons/yr)
Tractor/Dozer	13	8	1056	85%	0.473	0.096
				Total	0.473	0.096

8 Total months of soil movement onsite
22 construction days per month
Water efficiency from CEQA Table 11-4 watering 3 times daily or using chemical suppressants

Dirt Piling or Material Handling
$E = 0.00112 * (G/5)^{1.3} / (H/2)^{1.4}$

PM10 Emissions from Dirt Piling or Material Handling (lb/hr) from SCAQMD Table A9-9-G
10 G = Mean Wind speed (mph), From PG&E onsite meteorological station at Pittsburg power plant
15 H = Moisture content of surface material (%) (from Table A9-9-G-1 for moist dirt)
0.00018 lb/ton of PM10

Equipment	Quantity/ year	Hours/ Day	Annual Material Handled (ton)	Watering Control Efficiency	PM10 Emissions (tons/yr)	PM2.5 Emissions (tons/yr)
Loaders	30	8	115,166	85%	1.42E-03	2.95E-04
Dump Trucks	17	8	115,166	85%	1.42E-03	2.95E-04
				Total	2.84E-03	5.89E-04

Water efficiency from CEQA Table 11-4 watering 3 times daily or using chemical suppressants

856 yd3/day — 672 ton/day
92,133 yd3 — 115,166 tons — 2500 density of soil (lb/yd3) (Physical Soil Property default density for Mid'z Loamy Sand soil)
Amount of soil moved from project description — 92,133 cubic yds, total soil moved from cut and fill combined

Cover Storage Pile
SCAQMD Table A9-9-E
$E = 1.7 * G/1.5 * (365-H)/235 * I/15 * J$
PM10 Emission factor from wind erosion of storage piles per day per acre
7.5 G = Silt content (%) (from Table A9-9-E-1 for overburden)
55 H = Mean number of days per year with at least 0.01 inches of precipitation (from Western Regional Climate Center for Antioch Pump Plant 3)
30 I = Percentage of time that the unobstructed wind speed exceeds 12 mph at mean pile height, From PG&E onsite meteorological station at PPP
0.5 J = Fraction of TSP that is PM10 = 0.5
11.213 lb/acre/day

wind speed percentage based on 2002-2006 (5 yrs) of wind speed data (actual hours > 12 mph) as recorded at John Wayne airport station

Source	Quantity	Size of Pile (acre)	Days / year	Watering Control Efficiency	PM10 Emissions (tons/yr)	PM2.5 Emissions (tons/yr)
Cover Storage Pile	1	1	180	85%	1.51E-01	3.16E-02

Water efficiency from CEQA Table 11-4 watering 3 times daily or using chemical suppressants
pile size assumed
Days per year accounts for weekend days also, not just work days

Demolition
SCAQMD Table A9-9-H
$E = 0.00042 * J$
Total Building and asphalt volume to be demolished: 999560 cubic ft — Concrete density: 4000 lb/yd3 — AP 42 Appendix A Miscellaneous Data and Conversion factors
Demolition to occur in month 1-8
132 days
7,497 J=Volume (cubic feet) handled per day

Source	PM10 Emissions (lbs/day)	PM2.5 Emissions (lbs/day)	PM10 Emissions (tons/yr)	PM2.5 Emissions (tons/yr)	Watering Control Efficiency
Demolition	0.47	0.10	0.03	0.01	85%

6,000 cy debris
25,150 cy concrete
10,000 tons brick — ÷ 5000 cy brick
1,000 tons gunite — ÷ 500 cy brick

excavators used in demolition
Water efficiency from CEQA Table 11-4 watering 3 times daily or using chemical suppressants to reduce visible dust plumes

Travel on unpaved road
$E = 2.1 * G/12 * H/30 * (J/3)^{0.7} * (I/4)^{1.5} * (365-K)/365$ — SCAQMD Table A9-9-D
Emission factor for vehicle travel on unpaved roads (lb/VMT)
15 G = Surface silt loading (%) (average value between stone quarrying plant road and Zuni road, SCAQMD Table A9-9-D-1)
5 H = Mean vehicle speed (mph)
value listed in table I = Mean number of wheels on vehicle
value listed in table J = Mean vehicle weight (ton)
55 H = Mean number of days per year with at least 0.01 inches of precipitation (from Western Regional Climate Center for Antioch Pump Plant 3)

Vehicle Type	Quantity/ year	Round Trips /Day/ Unit	Round Trip Distance (mile)	Daily VMT per Unit	Annual VMT for all Units	Mean Vehicle Weight (tons)	Number of Wheels on Vehicle	PM10 EF (lbs/VMT)	Watering Control Efficiency	PM10 Emissions (tons/yr)	PM2.5 Emissions (tons/yr)
Vibratory Rollers	11	2	0.1	0.2	48.4	5	4	0.53	85%	0.002	0.000
Pickup Truck	24	2	0.1	0.20	105.6	2	4	0.28	85%	0.002	0.000
Water Truck	8	4	0.1	0.40	52.8	13	10	1.64	85%	0.006	0.001
Forklift	19	1	0.1	0.10	41.8	13	4	1.04	85%	0.003	0.001
Manlift	42	1	0.1	0.10	92.4	13	4	1.04	85%	0.007	0.002
Concrete truck	4	1	0.1	0.10	8.8	13	10	1.64	85%	0.001	0.000
									Total	0.020	0.004

Assumed maximum travel speed is 5 mph
Equipment weight from SCAQMD Table A9-9-D-3
Water efficiency from CEQA Table 11-4 watering 3 times daily or using chemical suppressants
PM2.5 emission factors from updated CEIDARS List with PM2.5 fractions
PM2.5 numbers obtained by multiplying the PM10 values by fraction in CEIDARS list for appropriate fugitive dust sources.
onsite site is approximately 0.2 mi x 0.2 mi

22 Maximum number of days per month of construction

Annual (months 1-12) Fugitive Dust Emissions from construction of linears

Dirt Piling or Material Handling

$E = 0.00112 * (G/5)^{1.3} / (H/2)^{1.4}$

PM10 Emissions from Dirt Piling or Material Handling (lb/hr) from SCAQMD Table A9-9-G

10 G = Mean Wind speed (mph). From PG&E onsite meteorological station at Pittsburg power plant

15 H = Moisture content of surface material (%) (from Table A9-9-G-1 for moist dirt)

0.0001E lb/ton of PM10

Equipment	Quantity/ year	Hours/ Day	Annual Material Handled (ton)	Watering Control Efficiency	PM10 Emissions (tons/yr)	PM2.5 Emissions (tons/yr)
Loader	30	8	1,144	85%	1.41E-05	2.93E-06
Dump Truck	17	8	1,144	85%	1.41E-05	2.93E-06
				Total	**2.82E-05**	**5.86E-06**

12 Total months of soil movement for construction of linears

22 construction days per month

Notes:

Water efficiency from CEQA Table 11-4 watering 3 times daily or using chemical suppressants

3 yd3/day — 4 ton/day

916 yd3 — 1,144 tons — 2500 density of soil (lb/yd3) (Physical Soil Property default density)

Amount of soil moved: 916 cubic yds

Length of disturbed area	350 m	382.765 yd
Assumed width of disturbed area	1 m	1.094 yd
Assumed depth of distrubed area	2 m	2.187 yd

Travel on paved road

$F = 0.77 * ((G * 0.35)^{0.3})$ SCAQMD Table A9-9-C

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

8.85 G = Surface silt loading (oz/yd^3) (construction site without cleaning--conservative. SCAQMD Table A9-9-C-1)

Vehicle Type	Quantity/ year	Round Trips /Day/ Unit	Round Trip Distance (mile)	Daily VMT per Unit	Annual VMT for all Units	PM10 EF (lbs/VMT)	Watering Control Efficiency	PM10 Emissions (tons/yr)	PM2.5 Emissions (tons/yr)
Field truck	24	2	0.25	0.5	264	1.08	85%	0.021	0.005
Water truck	12	2	0.25	0.5	132	1.08	85%	0.011	0.002
							Total	**0.032**	**0.007**

Notes:

Water efficiency from CEQA Table 11-4 watering 3 times daily or using chemical suppressants

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

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

Equipment and quantity of equipment year based on estimate for the linears being constructed

Round trips based on average length from site at start of linear area to end of linear area

22 Maximum number of days per month of construction

12 Maximum number of hours per construction day

Entrained Dust Calculation - Dry Paved Road

$$E = k\left(\frac{sL}{2}\right)^{0.65} \times \left(\frac{W}{3}\right)^{1.5} - C$$

Entrained Dust Calculation - Natural Mitigation With Precipitation Correction Factor

$$E_{ext} = \left[k\left(\frac{sL}{2}\right)^{0.65}\left(\frac{W}{3}\right)^{1.5} - C\right]\left(1 - \frac{P}{4N}\right)$$

Entrained dust estimates calculated using guidance from AP 42, Fifth Edition, Volume I Chapter 13.2.1. Paved Roads

Where:
E = particulate emission factor
Ext = annual or other long-term average emission factor
k = particle size multiplier for particle size range and units of interest
sLa = arterial (major street/highway) road surface silt loading
sLc = collector road surface silt loading
W = average weight (tons) of the vehicles traveling the road
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.
P = number of "wet" days with at least 0.01 in of precipitation during the averaging period
N = number of days in the averaging period (e.g., 365 for annual, 91 for seasonal, 30 for monthly)
VMT = vehicle mile traveled

Paved Roads PM_{10} Delivery Trucks

Equation Values			Source
k =	0.016	lb/VMT	AP 42, Table 13.2-1.1; default k value for PM_{10}
sLa =	0.035	g/m^2	Silt loading values based on silt loadings measured by MRI in the South Coast Air Quality Management
sLc =	0.035	g/m^2	District
			Muleski, Greg. Improvement of Specific Emission Factors (BACM Project No. 1), Final Report. Midwest Research Institute. March 29, 1996.
W =	23.25	ton	Average fleet weight is based on the assumption from the average weight of HHDT (EMFAC2007): 46500 lbs
C =	0.00047	lb/VMT	AP 42, Table 13.2-1.2; default C value for PM_{10}
P =	56	wet days	From WRCC Antioch meteorological station
N =	365	days	
Annual VMT arterial highway =	57,600	miles/year	Total annual VMT is calculated based on assumption of 15 miles/one way,16 1-way trips/day at 20 days/month
Annual VMT paved road onsite collector =	1,728	miles/year	Total annual VMT is calculated based on assumption of .45 miles/one way,16 1-way trips/day at 20 days/month

Road Surface	VMT	E	Base Emissions	Corrected[1]	Ext	Mitigated Emissions	Corrected[1]
	miles/yr	lb/VMT	ton/yr	ton/yr	lb/VMT	ton/yr	ton/yr
Arterial	57,600	0.024421	0.70	0.70	0.0234846	0.68	0.68
Collector	1,728	0.024421	0.02	0.02	0.0234846	0.02	0.02
Totals Delivery trucks				0.72			0.70

Note:
[1] AP 42, Fifth Edition, Volume I Chapter 13.2.1, page 13.2.1-6. "There may be situations where low silt loading and/or low average weight will yield calculated negative emissions from equation 1. If this occurs, the emissions calculated from equati

Paved Roads $PM_{2.5}$ Delivery Trucks

Equation Values			Source
k =	0.0024	lb/VMT	AP 42, Table 13.2-1.1; default k value for $PM_{2.5}$
sLa =	0.035	g/m^2	Silt loading values based on silt loadings measured by MRI in the South Coast Air Quality Management
sLc =	0.035	g/m^2	District
			Muleski, Greg. Improvement of Specific Emission Factors (BACM Project No. 1), Final Report. Midwest Research Institute. March 29, 1996.
W =	23.25	ton	46500 lbs
C =	0.00036	lb/VMT	AP 42, Table 13.2-1.2; default C value for $PM_{2.5}$
P =	56	wet days	From WRCC Antioch meteorological station when >=0.10 in
N =	365	days	
Annual VMT arterial highway =	57,600	miles/year	Total annual VMT is calculated based on assumption of 15 miles/one way,16 1-way trips/day at 20
Annual VMT paved road onsite collector =	1,766	miles/year	Total annual VMT is calculated based on assumption of .46 miles/one way,16 1-way trips/day at 20 days/month

Road Surface	VMT	E	Base Emissions	Corrected[1]	Ext	Mitigated Emissions	Corrected[1]
	miles/yr	lb/VMT	ton/yr	ton/yr	lb/VMT	ton/yr	ton/yr
Arterial	57,600	0.003374	0.10	0.10	0.0032443	0.09	0.09
Collector	1,766	0.003374	0.00	0.00	0.0032443	0.00	0.00
Totals				1.001E-01			9.630E-02

Note: 1 AP 42, Fifth Edition, Volume I Chapter 13.2.1, page 13.2.1-5. "There may be situations where low silt loading and/or low average weight will yield calculated negative from equation 1. If this occurs, the emissions calculated from equation 1 should be set to zero."

Entrained Dust Calculation - Dry Paved Road

$$E = k\left(\frac{sL}{2}\right)^{0.65} \times \left(\frac{W}{3}\right)^{1.5} - C$$

Entrained Dust Calculation - Natural Mitigation With Precipitation Correction Factor

$$E_{ext} = \left[k\left(\frac{sL}{2}\right)^{0.65}\left(\frac{W}{3}\right)^{1.5} - C\right]\left(1 - \frac{P}{4N}\right)$$

Entrained dust estimates calculated using guidance from AP 42, Fifth Edition, Volume I Chapter 13.2.1: Paved Roads

Where:
E = particulate emission factor
Ext = annual or other long-term average emission factor
k = particle size multiplier for particle size range and units of interest
sLa = arterial (major street/highway) road surface silt loading
sLc = collector road surface silt loading
W = average weight (tons) of the vehicles traveling the road
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.
P = number of "wet" days with at least 0.01in of precipitation during the averaging period
N = number of days in the averaging period (e.g., 365 for annual, 91 for seasonal, 30 for monthly)
VMT = vehicle mile traveled

Paved Roads PM_{10} Passenger Vehicles

Equation Values			Source
k =	0.016	lb/VMT	AP 42, Table 13.2-1.1: default k value for PM_{10}
sLa =	0.035	g/m^2	Silt loading values based on silt loadings measured by MRI in the South Coast Air Quality Management
sLc =	0.035	g/m^2	District
			Muleski, Greg. Improvement of Specific Emission Factors (BACM Project No. 1),
			Final Report. Midwest Research Institute. March 29, 1996.
W =	2	ton	Assumed average passenger vehicle weight
C =	0.00047	lb/VMT	AP 42, Table 13.2-1.2: default C value for PM_{10}
P =	56	wet days	From WRCC Antioch meteorological station
N =	365	days	
			Total annual VMT is calculated based on assumption of 15 miles/one way,360 1-way trips/day at
Annual VMT arterial highway =	1,425,600	miles/year	22days/month
Annual VMT paved road onsite			Total annual VMT is calculated based on assumption of .4 miles/one way,360 1-way trips/day at
collector =	42,768	miles/year	22days/month

			Base			Mitigated	
Road Surface	VMT	E	Emissions	Corrected[1]	Ext	Emissions	Corrected[1]
	miles/yr	lb/VMT	ton/yr	ton/yr	lb/VMT	ton/yr	ton/yr
Arterial	1,425,600	0.000158	0.11	0.11	0.0001519	0.11	0.11
Collector	42,768	0.000158	0.00	0.00	0.0001519	0.00	0.00
Totals				0.12			0.11

Note:

Paved Roads $PM_{2.5}$ Passenger Vehicles

Equation Values			Source
k =	0.0024	lb/VMT	AP 42, Table 13.2-1.1: default k value for $PM_{2.5}$
sLa =	0.035	g/m^2	Silt loading values based on silt loadings measured by MRI in the South Coast Air Quality Management
sLc =	0.035	g/m^2	District
			Muleski, Greg. Improvement of Specific Emission Factors (BACM Project No. 1),
			Final Report. Midwest Research Institute. March 29, 1996.
W =	2	ton	Assumed average passenger vehicle weight
C =	0.00036	lb/VMT	AP 42, Table 13.2-1.2: default C value for $PM_{2.5}$
P =	56	wet days	From WRCC Antioch meteorological station when >=0.10 in.
N =	365	days	
			Total annual VMT is calculated based on assumption of 15 miles/one way,360 1-way trips/day at
Annual VMT arterial highway =	1,425,600	miles/year	22days/month
Annual VMT paved road onsite			Total annual VMT is calculated based on assumption of .4 miles/one way,360 1-way trips/day at
collector =	42,768	miles/year	22days/month

			Base			Mitigated	
Road Surface	VMT	E	Emissions	Corrected[1]	Ext	Emissions	Corrected[1]
	miles/yr	lb/VMT	ton/yr	ton/yr	lb/VMT	ton/yr	ton/yr
Arterial	1,425,600	-0.000286	-0.19	0	-0.0002558	-0.18	0
Collector	42,768	-0.000286	-0.01	0	-0.0002558	-0.01	0
Totals				0.000E+00			0.000E+00

Note: 1 AP 42, Fifth Edition, Volume I Chapter 13.2.1, page 13.2.1-5. "There may be situations where low silt loading and/or low average weight will yield calculated negative from equation 1, if this occurs, the emissions calculated from equation 1 should be set to zero." = 0

Combustion emissions from diesel trains: Trains will be delivering large equipment onsite during constructio
4 rail deliveries for the entire project

Fleet average emission factors for all locomotives

(g/bhp-hr)

Year	HC	CO	NOx	PM
2010	0.44	1.32	7.84	0.28

Reference: EPA Technical Highlights, Emission Factors for Locomotives, December 1997.

4 trains
3600 bhp per train assume 20% load of total load 18,000 bhp for 5mph
0.45 mile onsite
5 miles/hr, assumed speed onsite

Peak hour onsite

Etr-h (lb/hr)=Ntrh (train/hr)*P(bhp/train)*(L (mile)/Vt (miles/hr))*C1(lb/g)*Efh(g/bhp-hr)

assume max # of trains that would ever come in one hour is 1

CO 1.8hr (lbs/hr)	NOx 1hr (lbs/hr)	SO2 1.3 hr (lbs/hr)
0.94	5.80	3.69

Daily onsite

Etr-d(lb/day)=NTr-d (train/day)*P(bhp/train)*(L(mile)/Vt(miles/hr))*C1(lb/g)*Efd(g/bhp-hr)

assume max # of trains that would ever come in one day is 1
and that it would be onsite 1 hour

PM10 24hr (lbs/day)	PM2.5 24hr (lbs/day)	SO2 24 hr (lbs/day)	ROCs (use HCs) (lbs/day)
0.20	0.18	3.69	0.31

0.92 PM2.5 fraction of total PM. Reference: Caldara Table A for trains

Annual onsite

Etr-a(tons/year)=Etr-d(lb/day)*365(days/year)*C2(ton/lb)

max # of trains that come in one year is 4
and that they would run 1 hour onsite each

PM10 annual (tons/yr	PM2.5 annual (tons/yr	NOx annual (tons/yr	CO annual (tons/yr	SO2 annual (tons/yr	ROCs (use HCs) (tons/yr)
0.15	0.13	4.09	0.69	2.69	0.23

Etr-h=Peak hour locomotive emissions (lb/hr)
Etr-d=Daily locomotive emissions (lb/day)
Etr-a=Annual locomotive emissions (tons/year)
Ntr-h=Number of trains during the peak hour (trains/hr)
Ntr-d=Number of daily trains
P=Power rating of locomotives for individual trains (18,000 bhp/train)
L: Length of one-way rail line across project site
Vt: Train speed
C1: Conversion factor 0.002205 lb/g
C2: Conversion factor 0.0005 tons/lb

SO2 ONSITE

20.8 bhp-hr/gal	EPA estimated conversion factor
18000 bhp	assumed typical brake horsepower of one locomotive full load
20	assumed percent load when train is traveling 5mph
7.1	lbs/gallon
15	sulfur fuel by weight (15 parts per million, multiplied by 100 for percentage)

3.69 lbs/hr SO2

SO2 OFFSITE

20.8 bhp-hr/gal	EPA estimated conversion factor
18000 bhp	assumed typical brake horsepower of one locomotive full load
60	assumed percent load when train is traveling 30 mph
7.1	lbs/gallon
15	sulfur fuel by weight (15 parts per million, multiplied by 100 for percentage)

11.08 lbs/hr SO2

Offsite Combustion emissions--trains

4 trains
10800 bhp per train assume 60% load of total load 18,000 bhp for 30mph
30.00 miles offsite round trip
30 miles/hr, assumed speed onsite

Daily offsite

Etr-d(lb/day)=NTr-d (train/day)*P(bhp/train)*(L(mile)/Vt(miles/hr))*C1(lb/g)*Efd(g/bhp-hr)

assume max # of trains that would ever run in one day is 1
and that it would run 1 hour offsite

PM10 24hr (lbs/day)	PM2.5 24hr (lbs/day)	SO2 24 hr (lbs/day)	CO (lbs/day)	NOx (lbs/day)	ROCs(use HCs) (lbs/day)
6.67	6.13	11.06	31.43	186.70	10.48

0.92 PM2.5 fraction of total PM. Reference: Caldara Table A for trains

Annual offsite

Etr-a(tons/year)=Etr-d(lb/day)*365(days/year)*C2(ton/lb)

max # of trains that come in one year is 4
and that they would run 1 hour offsite each

PM10 annual (tons/yr	PM2.5 annual (tons/yr	SO2 annual (tons/yr	CO (tons/yr)	NOx annual (tons/yr	ROCs(use HCs) (tons/yr)
4.87	4.48	8.07	22.95	136.29	7.65

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION FOR THE *WILLOW PASS GENERATING STATION*	**Docket No. 08-AFC-6** **PROOF OF SERVICE** **(Revised 10/24/2008)**

INSTRUCTIONS: All parties shall either (1) send an original signed document plus 12 copies or (2) mail one original signed copy AND e-mail the document to the address for the Docket as shown below, AND (3) all parties shall also send a printed or electronic copy of the document, which includes a proof of service declaration to each of the individuals on the proof of service list shown below:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 08-AFC-6
1516 Ninth Street, MS-15
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DECLARATION OF SERVICE

I, Hilarie Anderson declare that on November 4, 2008, I deposited copies of the attached Revised Air Quality and Public Health Tables in the United States mail at Sacramento, CA with first-class postage thereon fully prepaid and addressed to those identified on the Proof of Service list above.

OR

Transmission via electronic mail was consistent with the requirements of California Code of Regulations, title 20, sections 1209, 1209.5, and 1210. All electronic copies were sent to all those identified on the Proof of Service list above.

I declare under penalty of perjury that the foregoing is true and correct.

Original signature in Dockets
Hilarie Anderson