Appendix I
Air Quality Data

APPENDIX I - AIR QUALITY

APPENDIX I-A

Calculation of Maximum Hourly, Daily, and Annual Emissions

Tables presented in this Appendix are as follows:

I-A-1	Ammonia Slip Emissions
I-A-2a,b	Maximum Hourly, Daily, and Annual Emissions Estimates
I-A-3	Fuel Use Calculations
I-A-4	Turbine / HRSG Air Toxic Emissions Estimates
I-A-5	Turbine / HRSG Performance Data Sheets
I-A-6a,b,c,d	Cooling Tower PM10 Emissions Estimates
I-A-7a,b	Cooling Tower Air Toxic Emissions Estimates
I-A-8	Typical Natural Gas Analysis Data
I-A-9	Typical Refinery Gas Analysis Data
I-A-10	GHG Emissions Estimates
I-A-11	California Greenhouse Gas Inventory
I-A-12	Project Greenhouse Gas Emissions Summary
I-A-13	Example VOC Service Component List

In addition to the above tables, other miscellaneous support data for the device-specific emissions calculations may also be included in this Appendix.

Table I-A-1 Ammonia Slip Emissions

Ammonia slip emissions were derived from KPE calculations supplied on 2-5-09.

- Ammonia slip limit of 5 ppmvd used for emissions estimates.
- Annual hourly average ammonia slip emissions = 11.05 lbs/hr.
- Daily ammonia slip emissions = 265.2 lbs/day
- Annual ammonia emissions = 48.399 tons/yr

Table I-A-2a

Detailed Calculations for Maximum Hourly, Daily and Annual Criteria Pollutant Emissions

Updated 3/1/09

Maximum Hourly, Daily and Annual Emissions		Base Load		Cold Start		Warm Start		NOx			SO2	CO			VOC			PM10/PM2.5		NOx	CO	VOC	PM10/PM2.5	SO2	NOx	CO	VOC
								Base Load	Cold Start	Warm Start	Base	Base Load	Cold Start	Warm Start	Base Load	Cold Start	Warm Start	PM10	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Shutdown	Cold Startup	Cold Startup	Cold Startup
	max. hour	hrs/day	hrs/yr	hrs/day	hrs/yr	hrs/day	hrs/yr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	hrs/yr	lb/hr	lb/hr	lb/hr	lb/hr	lb/hr	lb/event	lb/event	lb/event
Turbine with DB/max firing	1	18	8720	6	12	0	12	11.940	175.000	21.324	6.840	14.540	210.000	58.721	4.160	4.200	2.613	10.000	16	12.848	57.601	4.105	9.340	5.948	211.240	300.650	9.950
Cooling tower	1	24	8760	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.33	0	0	0	0	0	0	0	0	0

	NOx			SO2			CO			VOC			PM10/PM2.5		
	Max	Max	Total	Max	Max	Total	Max	Max	Total	Max	Max	Total	Max	Max	Total
	lb/hr	lb/day	tpy	lb/hr	lb/day	tpy	lb/hr	lb/day	tpy	lb/hr	lb/day	tpy	lb/hr	lb/day	tpy
Turbine with DB/max firing	175.00	637.40	52.71	6.84	164.16	29.95	210.00	863.02	64.81	4.16	99.84	18.21	10.00	240.00	43.79
Cooling tower	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	7.92	1.45
Total	175.00	637.40	39.90	6.84	164.16	29.95	210.00	863.02	64.81	4.16	99.84	18.21	10.33	247.92	45.24
	lb/hr	lb/day	tpy	lb/hr	lb/day	tpy	lb/hr	lb/day	tpy	lb/hr	lb/day	tpy	lb/hr	lb/day	tpy

Assumptions:

Worst case day based on one cold start.
Emissions data based on 36 degree F with 100% load and full duct firing
Turbine BACT will be:

- NOx 2.0 ppm (1-hour)
- CO 4.0 ppm (3-hour)
- VOC 2.0 ppm
- PM10/2.5 Exclusive use of gaseous fuels and limited to 10 lb/hr
- SO2 Exclusive use of gaseous fuels at 0.75 gr/100 scf and 40 ppm on RG
- NH3 5 ppm

Cooling tower based on 0.001% drift eliminator efficiency with nitrified water TDS 3575 mg/l
Cold Start = 4 times per year at 3 hours each, worst case day is two cold starts not exceeding 6 hours
Worst case day = two cold starts (6 hours) + 18 hours full duct firing
Cold Start Assumptions:

- Hour 1 less than 50% load with max Nox at 175 lb/hr, CO at 210 lb/hr and VOC at 4.2 lb/hr
- Hour 2 approaches and meets 50 % load with Nox at 34.3 lb/hr, CO at 76.11 lb/hr, and VOC at 1.59 lb/hr (Kiewitt)
- Hour 3 Full load with duct firing and compliance with BACT

Worst case day for VOC = 24 hours with full duct firing

Table I-A-2b South Coast AQMD Monthly Emissions Calculations (lbs)

		lbs/hr	lbs/day	31 day lbs/month	30 day avg lbs/month	Offsets Req'd lbs/month	Offsets Req'd lb-day	Annual TPY
Cooling Tower	PM10	0.332	7.97	247.0	239.0	0.0	0	1.45
Turbine 1	NOx	11.94	637.40	9257.34	8958.7	0.0	0	52.71
	CO	14.54	863.02	11476.663	11106.4	0.0	0	64.81
	VOC	4.16	99.84	3092.483	2992.7	3591.3	119.7	18.21
	PM10/PM2.5	10	240.00	7443.884	7203.8	8644.5	288.2	43.77
	SOx	5.77	164.16	5090.359	4926.2	0.0	0	29.93
	NH3	11.05	265.20	8232.25	7966.7	0.0	0	48.40

	NOx	CO	VOC	PM10/PM2.5	SOx
Max Month Avg Daily Emissions (lb-day) (adjusted for the ERC ratio)	N/A	**N/A**	**119.7**	**288.2**	**N/A**
Total Annual Emissions (tons):	**39.9**	**64.8**	**18.2**	**43.8**	**29.9**
	RTCs				**RTCs**

Monthly Operations Data

Max Month = 31 days

Base	Annual	Max Month
Hours	8720	736
Startups	16	3
Shutdowns	16	2
Total	**8760**	**744**

	Normal lbs/hr	Cold Startup lb/event	Warm Startup lb/event
NOx	11.94	211.24	21.324
CO	14.54	300.65	58.721
VOC	4.16	9.95	2.613
PM10/PM2.5	10	30	5.21
SOx	6.84	20.52	3.18
NH3	11.05	33.15	11.05

RTCs for NOx and SOx based on a 1:1 ratio.

ERC ratio for PM10/PM2.5 and VOC is 1.2:1

Table I-A-3

Estimated Fuel Use Summary for the Project

System	Fuel	Per Hour, mmscf	Per Day, mmscf	Per Year, mmscf
Combustion Turbine	Natural gas	1.03238	24.777	9,043.65
Combustion Turbine	Natural gas and refinery gas	1.03995	24.959	9,109.96
HRSG-Duct Burner	Refinery gas	0.4475	10.739	3,919.83

Source: Watson Cogeneration Steam and Electric Reliability Project Team, 2008.
Notes:
Scf = standard cubic feet
Mmscf = million standard cubic feet
Based on 24 hours per day and 365 days per year
Turbine natural gas HHV = 1028.05 btu/scf
Turbine refinery gas HHV = 998.95 btu/scf
Turbine blend gas HHV = 1018.54 btu/scf (65% natural gas, 35% refinery gas by weight)
HRSG duct burner refinery gas HHV = 998.95 btu/scf
Turbine heat rate HHV = 1062.05 mmbtu/hr
HRSG heat rate HHV = 447.94 mmbtu/hr

Table I-A-4
Calculation of Hazardous and Toxic Pollutant Emissions
Watson Cogen Expansion

	OPS Option 1		OPS Option 2		OPS Option 3		OP Hours/Yr	
	Nat Gas %	Ref Gas %	Nat Gas %	Ref Gas %	Nat Gas %	Ref Gas %	Option 1	8760
Turbine Fuel Scenario	100	0	65	35	65	35	Option 2	8760
	1	0	0.65	0.35	0.65	0.35	OP Hours/Day	
HRSG Fuel Scenario	0	100	0	100	100	0	Option 1	24
	0	1	0	1	1	0	Option 2	24
mmscf/hr, Turbine	1.0331	0	0.6996	0.3401	0.6996	0.3401		
mmscf/hr, HRSG	0	0.4484	0	0.4484	0.4358	0		

Compound	Turbine EF Nat Gas lbs/mmscf	Turbine EF Ref Gas lbs/mmscf	HRSG/DB EF Nat Gas lbs/mmscf	HRSG/DB EF Ref Gas lbs/mmscf	OPS Option 1 lbs/hr	OPS Option 1 lbs/day	OPS Option 1 tpy	OPS Option 2 lbs/hr	OPS Option 2 lbs/day	OPS Option 2 tpy	OPS Option 3 lbs/hr	OPS Option 3 lbs/day	OPS Option 3 tpy
Organics, etc.													
Acetaldehyde	4.08E-02	2.18E-02	8.87E-03	3.97E-03	4.39E-02	1.05E+00	1.92E-01	3.77E-02	9.06E-01	1.65E-01	3.98E-02	9.56E-01	1.74E-01
Acrolein	6.53E-03	0.00E+00	0.00E+00	0.00E+00	6.75E-03	1.62E-01	2.95E-02	4.57E-03	1.10E-01	2.00E-02	4.57E-03	1.10E-01	2.00E-02
Ammonia (lbs/hr)	Table 5.2A-1	Table 5.2A-1	Table 5.2A-1	Table 5.2A-1	7.80E+00	1.87E+02	3.42E+01	7.80E+00	1.87E+02	3.42E+01	7.80E+00	1.87E+02	3.42E+01
Benzene	1.33E-02	1.49E-01	4.31E-03	2.06E-01	1.06E-01	2.55E+00	4.65E-01	1.52E-01	3.66E+00	6.67E-01	6.19E-02	1.48E+00	2.71E-01
1,3-Butadiene	1.27E-04	0.00E+00	0.00E+00	0.00E+00	1.31E-04	3.15E-03	5.75E-04	8.88E-05	2.13E-03	3.89E-04	8.88E-05	2.13E-03	3.89E-04
Ethylbenzene	1.79E-02	1.82E-03	0.00E+00	0.00E+00	1.85E-02	4.44E-01	8.10E-02	1.31E-02	3.15E-01	5.76E-02	1.31E-02	3.15E-01	5.76E-02
Formaldehyde	7.24E-01	1.22E-01	2.21E-01	1.60E-02	7.55E-01	1.81E+01	3.31E+00	5.55E-01	1.33E+01	2.43E+00	6.44E-01	1.55E+01	2.82E+00
Hexane	1.33E-03	0.00E+00	1.30E-03	0.00E+00	1.37E-03	3.30E-02	6.02E-03	9.30E-04	2.23E-02	4.08E-03	1.50E-03	3.59E-02	6.56E-03
Naphthalene	1.66E-03	0.00E+00	1.99E-08	2.06E-04	1.81E-03	4.34E-02	7.92E-03	1.25E-03	3.01E-02	5.49E-03	1.16E-03	2.79E-02	5.09E-03
Other Total PAHs	3.14E-04	2.62E-04	2.58E-08	2.41E-04	4.32E-04	1.04E-02	1.89E-03	4.17E-04	1.00E-02	1.83E-03	3.09E-04	7.41E-03	1.35E-03
Propylene	7.71E-01	0.00E+00	1.55E-02	0.00E+00	7.97E-01	1.91E+01	3.49E+00	5.39E-01	1.29E+01	2.36E+00	5.46E-01	1.31E+01	2.39E+00
Propylene oxide	2.96E-02	0.00E+00	0.00E+00	0.00E+00	3.06E-02	7.34E-01	1.34E-01	2.07E-02	4.97E-01	9.07E-02	2.07E-02	4.97E-01	9.07E-02
Toluene	7.10E-02	1.09E+00	3.40E-03	8.40E-01	4.50E-01	1.08E+01	1.97E+00	7.97E-01	1.91E+01	3.49E+00	4.22E-01	1.01E+01	1.85E+00
Xylene	2.61E-02	3.14E+00	5.80E-03	0.00E+00	2.70E-02	6.47E-01	1.18E-01	1.09E+00	2.61E+01	4.76E+00	1.09E+00	2.61E+01	4.77E+00
H2S	0.00E+00	1.65E-01	0.00E+00	2.74E-01	1.23E-01	2.95E+00	5.38E-01	1.79E-01	4.30E+00	7.84E-01	5.61E-02	1.35E+00	2.46E-01
Metals, etc.													
Arsenic	0.00E+00	6.62E-05	2.00E-04	7.04E-04	3.16E-04	7.58E-03	1.38E-03	3.38E-04	8.12E-03	1.48E-03	1.10E-04	2.63E-03	4.80E-04
Antimony	0.00E+00	6.62E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.25E-05	5.40E-04	9.86E-05	2.25E-05	5.40E-04	9.86E-05
Barium	0.00E+00	8.73E-04	4.40E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.97E-04	7.13E-03	1.30E-03	2.21E-03	5.31E-02	9.70E-03
Beryllium	0.00E+00	2.05E-03	1.20E-05	1.55E-04	6.95E-05	1.67E-03	3.04E-04	7.67E-04	1.84E-02	3.36E-03	7.02E-04	1.69E-02	3.08E-03
Cadmium	0.00E+00	7.41E-03	1.10E-03	2.38E-03	1.07E-03	2.56E-02	4.67E-03	3.59E-03	8.61E-02	1.57E-02	3.00E-03	7.20E-02	1.31E-02
Chromium 6	0.00E+00	2.04E-03	1.40E-03	7.70E-03	3.45E-03	8.29E-02	1.51E-02	4.15E-03	9.95E-02	1.82E-02	1.30E-03	3.13E-02	5.71E-03
Cobalt	0.00E+00	1.55E-04	8.40E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.27E-05	1.27E-03	2.31E-04	8.93E-05	2.14E-03	3.91E-04
Copper	0.00E+00	5.78E-02	8.50E-04	6.30E-03	2.82E-03	6.78E-02	1.24E-02	2.25E-02	5.40E-01	9.85E-02	2.00E-02	4.81E-01	8.77E-02
Lead	0.00E+00	3.99E-02	0.00E+00	2.42E-03	1.09E-03	2.60E-02	4.75E-03	1.47E-02	3.52E-01	6.42E-02	1.36E-02	3.26E-01	5.94E-02
Manganese	0.00E+00	1.80E-01	3.80E-04	2.39E-03	1.07E-03	2.57E-02	4.69E-03	6.23E-02	1.49E+00	2.73E-01	6.14E-02	1.47E+00	2.69E-01
Mercury	0.00E+00	2.15E-02	2.60E-04	3.23E-04	1.45E-04	3.48E-03	6.34E-04	7.46E-03	1.79E-01	3.27E-02	7.43E-03	1.78E-01	3.25E-02
Nickel	0.00E+00	2.33E-01	2.10E-03	5.59E-03	2.51E-03	6.02E-02	1.10E-02	8.17E-02	1.96E+00	3.58E-01	8.02E-02	1.92E+00	3.51E-01
Selenium	0.00E+00	5.42E-03	2.40E-05	2.06E-03	9.24E-04	2.22E-02	4.05E-03	2.77E-03	6.64E-02	1.21E-02	1.85E-03	4.45E-02	8.12E-03
Silver	0.00E+00	1.37E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.66E-05	1.12E-03	2.04E-04	4.66E-05	1.12E-03	2.04E-04
Thallium	0.00E+00	3.31E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.13E-05	2.70E-04	4.93E-05	1.13E-05	2.70E-04	4.93E-05
Vanadium	0.00E+00	0.00E+00	2.30E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E-03	2.41E-02	4.39E-03
Zinc	0.00E+00	1.57E-02	2.90E-02	3.42E+00	1.53E+00	3.68E+01	6.72E+00	1.54E+00	3.69E+01	6.74E+00	1.80E-02	4.31E-01	7.87E-02
*													

Notes:
1. assumes SCR with COC on GT/HRSG
2. EFs from CARB Catef, EPA AP-42, Ventura County APCD, or from BP data

Table I-A-5 (22 pages)

Watson Cogeneration Steam and Electric Reliability Project
Stack Emissions Summary
Non-startup and Non-shutdown Cases

This document presents the results of the calculations to determine the stack emissions mass flow rates based on the following:

- SCAQMD allowable emissions concentrations (in ppmvd at 15% O_2) for NOx, CO, VOC, and ammonia slip.
- Equipment manufacturer's estimated emissions rates for UHC and PM_{10}.
- Fuel sulfur content for SO_2 mass emissions rates.

General Notes and Assumptions

A. The following worst case fuel gas analyses are provided at the end of this document.
   1. Natural gas: Based on a typical pipeline gas analysis provided by KPE, with methane adjusted downward to reduce the heating value to 1028 Btu/scf HHV.
   2. Refinery gas: Based on a grab sample dated 11/28/2008, provided by the refinery and having a heating value at the low end of the range of grab samples for year 2008.
   3. Composite CTG fuel gas, which is a blend of natural gas and refinery gas, selected as follows:
      i. GE requires, for DLN combustors, that fuel gas hydrogen content (H_2 % by vol.) not exceed 5%, ethane content (C_2H_6 % by vol.) not exceed 15% and the Modified Wobbe Index (MWI) for the fuel gas not exceed +/-5% of the MWI set point.
      ii. The composite CTG fuel gas is a mixture which approaches the GE limit of 5% hydrogen, which is the controlling constraint in the GE criteria stated in (i) above. In other words, the blend was selected by trial and error to yield a fuel gas hydrogen content of 4.8% by volume,
      iii. Note that the 11/28/2008 refinery gas sample has a hydrogen content that is typical for that sample's heating value.
   4. The selected fuels and blend produce the mass emissions rates proposed for the "Project".

B. GE CTG exhaust emissions are based on preliminary GE performance data.

C. CTG emissions calculations are based on firing a blend of natural gas and the refinery gas, and the following:
   1. Natural gas sulfur content is assumed to be 0.75 gr. / 100 SCF.
   2. Sulfur content of refinery gas is assumed to be a maximum of 40 ppmv.
   3. CTG exhaust emissions data (dated 5/13/08) from GE E-mail dated May 14, 2008 for 9/42 Dry Low NO_X combustor (DLN-1). Note that GE PM_{10} emissions are front-half only.
   4. The percent refinery gas (by weight) blended with natural gas is indicated on the summary sheet for each heat balance case.
   5. Natural gas and blended gas analyses are provided at the end of this report.

D. Stack emissions calculations are based on the use of 100% refinery gas in the duct burner as follows:
   1. Sulfur content of refinery gas is assumed to be a maximum of 40 ppm.

2. Refinery gas heating value = 999 Btu/scf HHV (20,031 Btu/lb HHV).
3. Refinery gas Mol. Wt. = 18.88 lb/lb-mol.
4. Refinery gas analysis is provided at the end of this report.

E. Refer to the Heat Balances for the combustion turbine load and duct firing heat input.

F. Duct burner emissions are expected, not guaranteed, based on E-mail from John Zink company dated July 7, 2008, adjusted for heat balance conditions at the following emissions rates:
   1. NOx: 0.060 LB/Million BTU (HHV).
   2. Carbon Monoxide: 0.050 LB/Million BTU (HHV).
   3. Total Hydrocarbons: 0.030 LB/Million BTU (HHV).
   4. Hydrocarbons as CH_4: 0.010 LB/Million BTU (HHV).
   5. Hydrocarbons as VOC: 0.020 LB/Million BTU (HHV).
   6. PM_{10}: 0.010 LB/Million BTU (HHV).
   7. SO_2: Calculated based on fuel sulfur content.

G. The stack emissions permit levels and SCR System removal efficiencies for NOx, CO, and VOC's are consistent with current equipment performance capabilities. Catalyst removal efficiencies for NOx, CO, and VOC emissions are as required to meet the indicated stack permit levels in ppmvd. Worst case emissions, which are those in Case E-3, require the following catalyst removal efficiencies:
   1. NOx: 81.5%
   2. CO: 82.5%
   3. VOC: 64.9%

H. The "Emissions Total (lb/hr)" on the following tables represents the stack emissions and are based on the following:
   1. NOx, CO, VOC and Ammonia Slip (NH_3) values are calculated as follows:
      i. Stack Permit Level (ppmdv at 15%O_2), corrected to the ppm at actual stack gas O_2 content, then converted to a mass flow rate (lb/hr) using the calculated stack gas flow (lb-mol/hr - dry at actual % O_2).
      ii. The "stack gas" means the exhaust gas after the duct burner.
      iii. NOx, CO, and VOC emissions are controlled by the catalyst in the HRSG.
      iv. Ammonia Slip (NH_3) controlled by the ammonia injection system.
   2. UHC, VOC and PM_{10} values are calculated as follows:
      i. The stack emissions are the sum of the GE data in lb/hr plus the duct burner contribution as stated in Note I above, plus a 10% margin on duct burner emissions.
      ii. These emissions are uncontrolled so there is no reduction in the HRSG.
      iii. PM_{10} emissions include ammonium bisulfate particulate formed from sulfur in the natural gas and refinery gas.
   3. SO_2 values are calculated as follows:
      i. Sulfur concentrations in the natural gas and refinery gas burned are converted to an SO_2 mass flow rate (lb/hr).
      ii. No credit is assumed for SO_2 reduction in the HRSG due to conversion to SO_3 and then to ammonium bisulfate.

I. Stack Diameter and Velocity Calculations:

1. Stack diameter has been established at 15.5 ft. to provide a maximum gas exit velocity under 25 m/s.
2. Stack velocity is calculated using the stack flow at standard conditions, the stack gas temperature from the heat balances, and the stack inside diameter (I.D.). Volumetric flows are calculated as follows: Exhaust gas flows – wet basis (lb/hr) are converted to volumetic flows (scf/hr) by dividing by the wet gas density at standard conditions of 60 F and 14.696 psia. This is the "stack flow at standard conditions". Flows at standard conditions (dscf/hr) are then converted to actual volumes (acfm) by using the perfect gas law, i.e. multiply by [T_{STACK} + 460) / (60 + 460)] where T_{STACK} is the stack gas temperature calculated by GateCycle for the heat balances. Note there is no correction for stack pressure since it is assumed to be atmospheric, i.e. 14.696 psia.

End of Notes

Case E-1	36 F/36% RH	1@100% CTG	Unfired	2/20/2009

STACK EMISSIONS SUMMARY TABLE

Pollutant	Combustion Turbine (lb/hr)	Duct Burner (lb/hr)	Uncontrolled Emissions (lb/hr)	Stack Emissions (lb/hr)	Removal Efficiency %	Stack Emissions (ppmvd)	Stack Permit Level (ppmvd)
NO_X	35.00	0.00	35.00	8.22	76.5%	2	2
CO	57.00	0.00	57.00	10.01	82.4%	4	4
VOC	2.00	0.00	2.00	2.87	0.0%	2	2
UHC	10.00	0.00	10.00	10.00	0.0%	--	--
PM_{10}	5.00	0.00	5.00	5.00	0.0%	--	--
SO_2	3.80	0.00	3.80	3.80	0.0%	--	--
NH_3	--	--	--	7.61	N/A	5	5
	Notes b, c & e	Notes a & c					

NOTES:

a. Duct Burner Emissions are based on values from John Zink.

b. CT Natural Gas Sulfur Content: 0.75 gr. S/100 SCF

c. Refinery Gas Sulfur Content: 40 ppm by vol.

d. STACK: Stack Flow at standard conditions (SCFH): 33,243,381

Stack Flow at actual conditions (ACFM): 905,030

I.D. (ft): 15.5 Gas Temp. (F): 389.4

Velocity (ft/s): 79.94 Velocity (m/s): 24.4

e. Combustion Turbine Refinery Gas Blend (by wt.) 35%

Case E-2	36 F/36% RH	1@100% CTG	Min Fired	2/20/2009

STACK EMISSIONS SUMMARY TABLE

Pollutant	Combustion Turbine (lb/hr)	Duct Burner (lb/hr)	Uncontrolled Emissions (lb/hr)	Stack Emissions (lb/hr)	Removal Efficiency %	Stack Emissions (ppmvd)	Stack Permit Level (ppmvd)
NO_X	35.00	2.98	37.98	8.59	77.4%	2	2
CO	57.00	2.48	59.48	10.46	82.4%	4	4
VOC	2.00	0.99	2.99	3.00	0.0%	2	2
UHC	10.00	0.50	10.50	10.50	0.0%	--	--
PM_{10}	5.00	0.50	5.50	5.50	0.0%	--	--
SO_2	3.80	0.31	4.11	4.11	0.0%	--	--
NH_3	--	--	--	7.95	N/A	5	5
	Notes b, c & e	Notes a & c					

NOTES:

a. Duct Burner Emissions are based on values from John Zink.

b. CT Natural Gas Sulfur Content: 0.75 gr. S/100 SCF

c. Refinery Gas Sulfur Content: 40 ppm by vol.

d. STACK: Stack Flow at standard conditions (SCFH): 33,286,095

Stack Flow at actual conditions (ACFM): 900,858

I.D. (ft): 15.5 Gas Temp. (F): 384.4

Velocity (ft/s): 79.57 Velocity (m/s): 24.3

e. Combustion Turbine Refinery Gas Blend (by wt.) 35%

Case E-3	36 F/36% RH	1@100% CTG	Max Fired	2/20/2009

STACK EMISSIONS SUMMARY TABLE

Pollutant	Combustion Turbine (lb/hr)	Duct Burner (lb/hr)	Uncontrolled Emissions (lb/hr)	Stack Emissions (lb/hr)	Removal Efficiency %	Stack Emissions (ppmvd)	Stack Permit Level (ppmvd)
NO_X	35.00	29.56	64.56	11.94	81.5%	2	2
CO	57.00	24.64	81.64	14.54	82.2%	4	4
VOC	2.00	9.85	11.85	4.16	64.9%	2	2
UHC	10.00	4.93	14.93	14.93	0.0%	--	--
PM_{10}	5.00	4.93	9.93	9.93	0.0%	--	--
SO_2	3.80	3.03	6.84	6.84	0.0%	--	--
NH_3	--	--	--	11.05	N/A	5	5
	Notes b, c & e	Notes a & c					

NOTES:

a. Duct Burner Emissions are based on values from John Zink.

b. CT Natural Gas Sulfur Content: 0.75 gr. S/100 SCF

c. Refinery Gas Sulfur Content: 40 ppm by vol.

d. STACK: Stack Flow at standard conditions (SCFH): 33,665,953

Stack Flow at actual conditions (ACFM): 913,081

I.D. (ft): 15.5 Gas Temp. (F): 386.2

Velocity (ft/s): 80.65 Velocity (m/s): 24.6

e. Combustion Turbine Refinery Gas Blend (by wt.) 35%

Case E-4	59 F/60% RH	1@100% CTG	Unfired	2/20/2009

STACK EMISSIONS SUMMARY TABLE

Pollutant	Combustion Turbine (lb/hr)	Duct Burner (lb/hr)	Uncontrolled Emissions (lb/hr)	Stack Emissions (lb/hr)	Removal Efficiency %	Stack Emissions (ppmvd)	Stack Permit Level (ppmvd)
NO_X	33.00	0.00	33.00	7.95	75.9%	2	2
CO	54.00	0.00	54.00	9.68	82.1%	4	4
VOC	1.80	0.00	1.80	2.77	0.0%	2	2
UHC	9.00	0.00	9.00	9.00	0.0%	--	--
PM_{10}	5.00	0.00	5.00	5.00	0.0%	--	--
SO_2	3.68	0.00	3.68	3.68	0.0%	--	--
NH_3	--	--	--	7.36	N/A	5	5
	Notes b, c & e	Notes a & c					

NOTES:

a. Duct Burner Emissions are based on values from John Zink.

b. CT Natural Gas Sulfur Content: 0.75 gr. S/100 SCF

c. Refinery Gas Sulfur Content: 40 ppm by vol.

d. STACK: Stack Flow at standard conditions (SCFH): 32,110,948

Stack Flow at actual conditions (ACFM): 872,656

I.D. (ft): 15.5 Gas Temp. (F): 387.9

Velocity (ft/s): 77.08 Velocity (m/s): 23.5

e. Combustion Turbine Refinery Gas Blend (by wt.) 35%

Case E-5	59 F/60% RH	1@100% CTG	Min Fired	2/20/2009

STACK EMISSIONS SUMMARY TABLE

Pollutant	Combustion Turbine (lb/hr)	Duct Burner (lb/hr)	Uncontrolled Emissions (lb/hr)	Stack Emissions (lb/hr)	Removal Efficiency %	Stack Emissions (ppmvd)	Stack Permit Level (ppmvd)
NO_X	33.00	2.98	35.98	8.33	76.9%	2	2
CO	54.00	2.48	56.48	10.14	82.0%	4	4
VOC	1.80	0.99	2.79	2.90	0.0%	2	2
UHC	9.00	0.50	9.50	9.50	0.0%	--	--
PM_{10}	5.00	0.50	5.50	5.50	0.0%	--	--
SO_2	3.68	0.31	3.99	3.99	0.0%	--	--
NH_3	--	--	--	7.71	N/A	5	5
	Notes b, c & e	Notes a & c					

NOTES:

a. Duct Burner Emissions are based on values from John Zink.

b. CT Natural Gas Sulfur Content: 0.75 gr. S/100 SCF

c. Refinery Gas Sulfur Content: 40 ppm by vol.

d. STACK: Stack Flow at standard conditions (SCFH): 32,153,573

Stack Flow at actual conditions (ACFM): 868,662

I.D. (ft): 15.5 Gas Temp. (F): 382.9

Velocity (ft/s): 76.73 Velocity (m/s): 23.4

e. Combustion Turbine Refinery Gas Blend (by wt.) 35%

Case E-6	59 F/60% RH	1@100% CTG	Max Fired	2/20/2009

STACK EMISSIONS SUMMARY TABLE

Pollutant	Combustion Turbine (lb/hr)	Duct Burner (lb/hr)	Uncontrolled Emissions (lb/hr)	Stack Emissions (lb/hr)	Removal Efficiency %	Stack Emissions (ppmvd)	Stack Permit Level (ppmvd)
NO_X	33.00	27.88	60.88	11.47	81.2%	2	2
CO	54.00	23.24	77.24	13.96	81.9%	4	4
VOC	1.80	9.29	11.09	4.00	64.0%	2	2
UHC	9.00	4.65	13.65	13.65	0.0%	--	--
PM_{10}	5.00	4.65	9.65	9.65	0.0%	--	--
SO_2	3.68	2.86	6.54	6.54	0.0%	--	--
NH_3	--	--	--	10.61	N/A	5	5
	Notes b, c & e	Notes a & c					

NOTES:

a. Duct Burner Emissions are based on values from John Zink.

b. CT Natural Gas Sulfur Content: 0.75 gr. S/100 SCF

c. Refinery Gas Sulfur Content: 40 ppm by vol.

d. STACK: Stack Flow at standard conditions (SCFH): 32,508,699

Stack Flow at actual conditions (ACFM): 880,236

I.D. (ft): 15.5 Gas Temp. (F): 384.8

Velocity (ft/s): 77.75 Velocity (m/s): 23.7

e. Combustion Turbine Refinery Gas Blend (by wt.) 35%

Case E-7	85 F/60% RH	1@100% CTG	Unfired	2/20/2009

STACK EMISSIONS SUMMARY TABLE

Pollutant	Combustion Turbine (lb/hr)	Duct Burner (lb/hr)	Uncontrolled Emissions (lb/hr)	Stack Emissions (lb/hr)	Removal Efficiency %	Stack Emissions (ppmvd)	Stack Permit Level (ppmvd)
NO_X	31.00	0.00	31.00	7.49	75.8%	2	2
CO	51.00	0.00	51.00	9.13	82.1%	4	4
VOC	1.80	0.00	1.80	2.61	0.0%	2	2
UHC	9.00	0.00	9.00	9.00	0.0%	--	--
PM_{10}	5.00	0.00	5.00	5.00	0.0%	--	--
SO_2	3.47	0.00	3.47	3.47	0.0%	--	--
NH_3	--	--	--	6.94	N/A	5	5
	Notes b, c & e	Notes a & c					

NOTES:

a. Duct Burner Emissions are based on values from John Zink.

b. CT Natural Gas Sulfur Content: 0.75 gr. S/100 SCF

c. Refinery Gas Sulfur Content: 40 ppm by vol.

d. STACK: Stack Flow at standard conditions (SCFH): 30,424,924

Stack Flow at actual conditions (ACFM): 824,886

I.D. (ft): 15.5 Gas Temp. (F): 385.9

Velocity (ft/s): 72.86 Velocity (m/s): 22.2

e. Combustion Turbine Refinery Gas Blend (by wt.) 35%

Case E-8	85 F/60% RH	1@100% CTG	Min Fired	2/20/2009

STACK EMISSIONS SUMMARY TABLE

Pollutant	Combustion Turbine (lb/hr)	Duct Burner (lb/hr)	Uncontrolled Emissions (lb/hr)	Stack Emissions (lb/hr)	Removal Efficiency %	Stack Emissions (ppmvd)	Stack Permit Level (ppmvd)
NO_X	31.00	2.98	33.98	7.87	76.8%	2	2
CO	51.00	2.48	53.48	9.58	82.1%	4	4
VOC	1.80	0.99	2.79	2.74	1.8%	2	2
UHC	9.00	0.50	9.50	9.50	0.0%	--	--
PM_{10}	5.00	0.50	5.50	5.50	0.0%	--	--
SO_2	3.47	0.31	3.77	3.77	0.0%	--	--
NH_3	--	--	--	7.28	N/A	5	5
	Notes b, c & e	Notes a & c					

NOTES:

a. Duct Burner Emissions are based on values from John Zink.

b. CT Natural Gas Sulfur Content: 0.75 gr. S/100 SCF

c. Refinery Gas Sulfur Content: 40 ppm by vol.

d. STACK: Stack Flow at standard conditions (SCFH): 30,467,423

Stack Flow at actual conditions (ACFM): 821,253

I.D. (ft): 15.5 Gas Temp. (F): 381.0

Velocity (ft/s): 72.54 Velocity (m/s): 22.1

e. Combustion Turbine Refinery Gas Blend (by wt.) 35%

Case E-9	85 F/60% RH	1@100% CTG	Max Fired	2/20/2009

STACK EMISSIONS SUMMARY TABLE

Pollutant	Combustion Turbine (lb/hr)	Duct Burner (lb/hr)	Uncontrolled Emissions (lb/hr)	Stack Emissions (lb/hr)	Removal Efficiency %	Stack Emissions (ppmvd)	Stack Permit Level (ppmvd)
NO_X	31.00	25.51	56.51	10.71	81.1%	2	2
CO	51.00	21.26	72.26	13.04	82.0%	4	4
VOC	1.80	8.50	10.30	3.73	63.8%	2	2
UHC	9.00	4.25	13.25	13.25	0.0%	--	--
PM_{10}	5.00	4.25	9.25	9.25	0.0%	--	--
SO_2	3.47	2.62	6.09	6.09	0.0%	--	--
NH_3	--	--	--	9.91	N/A	5	5
	Notes b, c & e	Notes a & c					

NOTES:

a. Duct Burner Emissions are based on values from John Zink.

b. CT Natural Gas Sulfur Content: 0.75 gr. S/100 SCF

c. Refinery Gas Sulfur Content: 40 ppm by vol.

d. STACK: Stack Flow at standard conditions (SCFH): 30,787,871

Stack Flow at actual conditions (ACFM): 831,766

I.D. (ft): 15.5 Gas Temp. (F): 382.9

Velocity (ft/s): 73.47 Velocity (m/s): 22.4

e. Combustion Turbine Refinery Gas Blend (by wt.) 35%

Case E-10	102 F/16% RH	1@100% CTG	Unfired	2/20/2009

STACK EMISSIONS SUMMARY TABLE

Pollutant	Combustion Turbine (lb/hr)	Duct Burner (lb/hr)	Uncontrolled Emissions (lb/hr)	Stack Emissions (lb/hr)	Removal Efficiency %	Stack Emissions (ppmvd)	Stack Permit Level (ppmvd)
NO_X	32.00	0.00	32.00	7.48	76.6%	2	2
CO	52.00	0.00	52.00	9.10	82.5%	4	4
VOC	1.80	0.00	1.80	2.61	0.0%	2	2
UHC	9.00	0.00	9.00	9.00	0.0%	--	--
PM_{10}	5.00	0.00	5.00	5.00	0.0%	--	--
SO_2	3.53	0.00	3.53	3.53	0.0%	--	--
NH_3	--	--	--	6.92	N/A	5	5
	Notes b, c & e	Notes a & c					

NOTES:

a. Duct Burner Emissions are based on values from John Zink.

b. CT Natural Gas Sulfur Content: 0.75 gr. S/100 SCF

c. Refinery Gas Sulfur Content: 40 ppm by vol.

d. STACK: Stack Flow at standard conditions (SCFH): 30,600,923

Stack Flow at actual conditions (ACFM): 829,952

I.D. (ft): 15.5 — Gas Temp. (F): 386.2

Velocity (ft/s): 73.31 — Velocity (m/s): 22.3

e. Combustion Turbine Refinery Gas Blend (by wt.) 35%

Case E-11	102 F/16% RH	1@100% CTG	Min Fired	2/20/2009

STACK EMISSIONS SUMMARY TABLE

Pollutant	Combustion Turbine (lb/hr)	Duct Burner (lb/hr)	Uncontrolled Emissions (lb/hr)	Stack Emissions (lb/hr)	Removal Efficiency %	Stack Emissions (ppmvd)	Stack Permit Level (ppmvd)
NO_X	32.00	2.98	34.98	7.85	77.6%	2	2
CO	52.00	2.48	54.48	9.56	82.5%	4	4
VOC	1.80	0.99	2.79	2.74	2.0%	2	2
UHC	9.00	0.50	9.50	9.50	0.0%	--	--
PM_{10}	5.00	0.50	5.50	5.50	0.0%	--	--
SO_2	3.46	0.31	3.77	3.77	0.0%	--	--
NH_3	--	--	--	7.27	N/A	5	5
	Notes b, c & e	Notes a & c					

NOTES:

a. Duct Burner Emissions are based on values from John Zink.

b. CT Natural Gas Sulfur Content: 0.75 gr. S/100 SCF

c. Refinery Gas Sulfur Content: 40 ppm by vol.

d. STACK: Stack Flow at standard conditions (SCFH): 30,643,477

Stack Flow at actual conditions (ACFM): 826,097

I.D. (ft): 15.5 Gas Temp. (F): 381.1

Velocity (ft/s): 72.97 Velocity (m/s): 22.2

e. Combustion Turbine Refinery Gas Blend (by wt.) 35%

Case E-12	102 F/16% RH	1@100% CTG	Max Fired	2/20/2009

STACK EMISSIONS SUMMARY TABLE

Pollutant	Combustion Turbine (lb/hr)	Duct Burner (lb/hr)	Uncontrolled Emissions (lb/hr)	Stack Emissions (lb/hr)	Removal Efficiency %	Stack Emissions (ppmvd)	Stack Permit Level (ppmvd)
NO_X	32.00	25.77	57.77	10.72	81.4%	2	2
CO	52.00	21.48	73.48	13.06	82.2%	4	4
VOC	1.80	8.59	10.39	3.74	64.0%	2	2
UHC	9.00	4.30	13.30	13.30	0.0%	--	--
PM_{10}	5.00	4.30	9.30	9.30	0.0%	--	--
SO_2	3.46	2.65	6.10	6.10	0.0%	--	--
NH_3	--	--	--	9.92	N/A	5	5
	Notes b, c & e	Notes a & c					

NOTES:

a. Duct Burner Emissions are based on values from John Zink.

b. CT Natural Gas Sulfur Content: 0.75 gr. S/100 SCF

c. Refinery Gas Sulfur Content: 40 ppm by vol.

d. STACK: Stack Flow at standard conditions (SCFH): 30,968,019

Stack Flow at actual conditions (ACFM): 835,938

I.D. (ft): 15.5 Gas Temp. (F): 382.2

Velocity (ft/s): 73.84 Velocity (m/s): 22.5

e. Combustion Turbine Refinery Gas Blend (by wt.) 35%

Annual Average	63.1 F/60% RH	1@100% CTG	Unfired	2/20/2009

STACK EMISSIONS SUMMARY TABLE

Pollutant	Combustion Turbine (lb/hr)	Duct Burner (lb/hr)	Uncontrolled Emissions (lb/hr)	Stack Emissions (lb/hr)	Removal Efficiency %	Stack Emissions (ppmvd)	Stack Permit Level (ppmvd)
NO_X	32.68	0.00	32.68	7.88	75.9%	2	2
CO	53.53	0.00	53.53	9.60	82.1%	4	4
VOC	1.80	0.00	1.80	2.75	0.0%	2	2
UHC	9.00	0.00	9.00	9.00	0.0%	--	--
PM_{10}	5.00	0.00	5.00	5.00	0.0%	--	--
SO_2	3.65	0.00	3.65	3.65	0.0%	--	--
NH_3	--	--	--	7.29	N/A	5	5
	Notes b, c & e	Notes a & c					

NOTES:

a. Duct Burner Emissions are based on values from John Zink.

b. CT Natural Gas Sulfur Content: 0.75 gr. S/100 SCF

c. Refinery Gas Sulfur Content: 40 ppm by vol.

d. STACK: Stack Flow at standard conditions (SCFH): 31,845,075

Stack Flow at actual conditions (ACFM): 865,109

I.D. (ft): 15.5 Gas Temp. (F): 387.6

Velocity (ft/s): 76.41 Velocity (m/s): 23.3

e. Combustion Turbine Refinery Gas Blend (by wt.) 35%

Annual Average	63.1 F/60% RH	1@100% CTG	Min Fired	2/20/2009

STACK EMISSIONS SUMMARY TABLE

Pollutant	Combustion Turbine (lb/hr)	Duct Burner (lb/hr)	Uncontrolled Emissions (lb/hr)	Stack Emissions (lb/hr)	Removal Efficiency %	Stack Emissions (ppmvd)	Stack Permit Level (ppmvd)
NO_X	32.68	2.98	35.66	8.26	76.9%	2	2
CO	53.53	2.48	56.01	10.05	82.1%	4	4
VOC	1.80	0.99	2.79	2.88	0.0%	2	2
UHC	9.00	0.50	9.50	9.50	0.0%	--	--
PM_{10}	5.00	0.50	5.50	5.50	0.0%	--	--
SO_2	3.65	0.31	3.95	3.95	0.0%	--	--
NH_3	--	--	--	7.64	N/A	5	5
	Notes b, c & e	Notes a & c					

NOTES:

a. Duct Burner Emissions are based on values from John Zink.

b. CT Natural Gas Sulfur Content: 0.75 gr. S/100 SCF

c. Refinery Gas Sulfur Content: 32 ppm by vol.

d. STACK: Stack Flow at standard conditions (SCFH): 31,887,680

Stack Flow at actual conditions (ACFM): 861,186

I.D. (ft): 15.5 Gas Temp. (F): 382.6

Velocity (ft/s): 76.07 Velocity (m/s): 23.2

e. Combustion Turbine Refinery Gas Blend (by wt.) 35%

Annual Average	63.1 F/60% RH	1@100% CTG	Max Fired	2/20/2009

STACK EMISSIONS SUMMARY TABLE

Pollutant	Combustion Turbine (lb/hr)	Duct Burner (lb/hr)	Uncontrolled Emissions (lb/hr)	Stack Emissions (lb/hr)	Removal Efficiency %	Stack Emissions (ppmvd)	Stack Permit Level (ppmvd)
NO_X	32.68	27.51	60.19	11.35	81.2%	2	2
CO	53.53	22.92	76.45	13.82	81.9%	4	4
VOC	1.80	9.17	10.97	3.96	63.9%	2	2
UHC	9.00	4.58	13.58	13.58	0.0%	--	--
PM_{10}	5.00	4.58	9.58	9.58	0.0%	--	--
SO_2	3.65	2.82	6.47	6.47	0.0%	--	--
NH_3	--	--	--	10.50	N/A	5	5
	Notes b, c & e	Notes a & c					

NOTES:

a. Duct Burner Emissions are based on values from John Zink.

b. CT Natural Gas Sulfur Content: 0.75 gr. S/100 SCF

c. Refinery Gas Sulfur Content: 40 ppm by vol.

d. STACK: Stack Flow at standard conditions (SCFH): 32,237,338

Stack Flow at actual conditions (ACFM): 872,578

I.D. (ft): 15.5 Gas Temp. (F): 384.5

Velocity (ft/s): 77.07 Velocity (m/s): 23.5

e. Combustion Turbine Refinery Gas Blend (by wt.) 35%

Natural Gas S = 0.75 gr/100scf Substance	Formula	Gas Composition % by vol	% by wt
		0.0000%	remainder
Water Vapor	H_2O		0.000%
Nitrogen	N_2	0.684%	1.124%
Oxygen	O_2	0.000%	0.000%
Argon	Ar	0.000%	0.000%
Carbon Dioxide	CO_2	1.073%	2.770%
Sulfur Dioxide	SO_2	0.000%	
Carbon Monoxide	CO	0.000%	0.000%
Hydrogen Sulfide	H_2S	0.000%	0.000%
Hydrogen	H_2	0.004%	0.000%
Air			0.000%
Methane	C_1H_4	95.097%	89.491%
Ethane	C_2H_6	2.305%	4.066%
Propane	C_3H_8	0.533%	1.379%
Iso-butane	C_4H_{10}	0.095%	0.324%
Normal-butane	C_4H_{10}	0.101%	0.344%
Iso-pentane	C_5H_{12}	0.032%	0.135%
Normal-pentane	C_5H_{12}	0.022%	0.093%
Hexanes	C_6H_{14}	0.054%	0.273%
Heptanes	C_7H_{16}	0.000%	0.000%
Octanes	C_8H_{18}	0.000%	0.000%
Nonanes	C_9H_{20}	0.000%	0.000%
Decanes	$C_{10}H_{22}$	0.000%	0.000%
		100.00%	100.00%

Heat of Combustion			
Btu/scf		Btu/lb	
HHV	LHV	HHV	LHV
1028.05	**926.76**	**22834.6**	**20584.6**

Refinery Gas sample dated 11/28/2008

Refinery Gas 32 ppm Sulfur Substance	Formula	Gas Composition % by vol	% by wt
		0.0000%	remainder
Water Vapor	H_2O		0.000%
Nitrogen	N_2	8.540%	12.669%
Oxygen	O_2	0.000%	0.000%
Argon	Ar		0.000%
Carbon Dioxide	CO_2	0.280%	0.653%
Sulfur Dioxide	SO_2		
Carbon Monoxide	CO	1.790%	2.655%
Hydrogen Sulfide	H_2S	0.000%	0.000%
Hydrogen	H_2	14.680%	1.567%
Air			0.000%
Methane	C_1H_4	48.280%	41.017%
Ethane	C_2H_6	17.720%	28.217%
Propane	C_3H_8	0.140%	0.327%
Iso-butane	C_4H_{10}	0.0000%	0.000%
Normal-butane	C_4H_{10}	0.0000%	0.000%
Iso-pentane	C_5H_{12}	0.0000%	0.000%
Normal-pentane	C_5H_{12}	0.0000%	0.000%
Hexanes	C_6H_{14}	0.0000%	0.000%
Heptanes	C_7H_{16}	0.0000%	0.000%
ETHYLENE	C_2H_4	8.3500%	12.405%
PROPYLENE	C_3H_6	0.2200%	0.490%
I-BUTENE	C_4H_8	0.0000%	0.000%
		100.000%	100.00%

Heat of Combustion			
Btu/scf		Btu/lb	
HHV	LHV	HHV	LHV
998.95	**907.03**	**20031.1**	**18188.2**

35% Refinery Gas, 65% Natural Gas

Substance	Formula	Gas Composition % by vol	Gas Composition % by wt
Composite Gas		0.0000%	remainder
Water Vapor	H_2O		0.000%
Nitrogen	N_2	3.254%	5.165%
Oxygen	O_2	0.000%	0.000%
Argon	Ar	0.000%	0.000%
Carbon Dioxide	CO_2	0.814%	2.029%
Sulfur Dioxide	SO_2		
Carbon Monoxide	CO	0.586%	0.929%
Hydrogen Sulfide	H_2S	0.000%	0.000%
Hydrogen	H_2	4.805%	0.549%
Air		0.000%	0.000%
Methane	C_1H_4	79.783%	72.526%
Ethane	C_2H_6	7.347%	12.519%
Propane	C_3H_8	0.404%	1.011%
Iso-butane	C_4H_{10}	0.064%	0.211%
Normal-butane	C_4H_{10}	0.068%	0.224%
Iso-pentane	C_5H_{12}	0.022%	0.088%
Normal-pentane	C_5H_{12}	0.015%	0.061%
Hexanes	C_6H_{14}	0.036%	0.177%
Heptanes	C_7H_{16}	0.000%	0.000%
ETHYLENE	C_2H_4	2.731%	4.342%
PROPYLENE	C_3H_6	0.072%	0.172%
I-BUTENE	C_4H_8	0.000%	0.000%
		100.000%	100.00%

Heat of Combustion			
Btu/scf		Btu/lb	
HHV	LHV	HHV	LHV
1018.54	**920.30**	**21853.4**	**19745.8**

Abbreviations

AFC	Application for Certification
BTU	British Thermal Unit
CEC	California Energy Commission
CO	Carbon monoxide
CTG	Combustion Turbine Generator
GE	General Electric
HHV	Higher Heating Value
HRSG	Heat Recover Heat Generator
KPE	Kiewit Power Engineers
lb/hr	pounds per hour
LHV	Lower Heating Value
Mol. Wt.	Molecular Weight
MWI	Modified Wobbe Index
NH_3	Unreacted anhydrous ammonia (ammonia slip)
NO_X	Nitrogen oxides
PM	Particulate Matter
PM_{10}	Particulate Matter having an aerodynamic diameter of 10 microns or less
ppmvd	part per million, volumetric dry basis
SCAQMD	South Coast Air Quality Management District
SCR	Selective Catalytic Reduction
SO_2	Sulfur dioxide
VOC	Volatile Organic Compounds
UHC	Unburned Hydrocarbons

Table I-A-6a

Expected Cooling Tower PM10 Emissions (new cells only)

Project:	Watson Cogen		Tower Dimensions (optional)		
Mfg:	Marley/BAE or equivalent		Deck Height:	30.6	Ft. AGL
# Cells:	2		Length:	433.3	Ft.
acfm/Cell:	949003		Width:	54.7	Ft.
Drift Loss	0.001	%	Fan Exit Height:	44.34	Ft. AGL
Drift Frac	0.00001		Exhaust Fan Diam:	31.6	Ft.

GPM:	18600	water circulation rate thru tower	
Lb/hr:	9296280	water circulation rate thru tower	optional input
			required input

Operation Hours: 24 hrs/day 8760 hrs/year

Scenario: Estimated Max TDS in circulating water

Maximum Expected TDS (mg/l) * :	3575	
at	-	cycles of concentration
Drift Loss (lb water/hr):	93.0	
Circulating Water Rate (gpm):	18600	

Estimated PM10 Emissions

Total Tower Emissions		**Per Cell Emissions**	
lbs/hr:	0.332	0.166	lbs/hr
lbs/day:	7.976	3.988	lbs/day
tons/yr:	1.456	0.728	tons/yr

Table I-A-6b

Expected Cooling Tower PM10 Emissions (existing cells-nitified water)

Project:	Watson Cogen		Tower Dimensions (optional)		
Mfg:	Existing Tower		Deck Height:	28	Ft. AGL
# Cells:	7		Length:	336	Ft.
acfm/Cell:	915442		Width:	54.7	Ft.
Drift Loss	0.002	%	Fan Exit Height:	46	Ft. AGL
Drift Frac	0.00002		Exhaust Fan Diam:	30.5	Ft.

GPM:	65100	water circulation rate thru tower	
Lb/hr:	32536980	water circulation rate thru tower	optional input
			required input

Operation Hours:	24	hrs/day	8760	hrs/year

Scenario: Estimated Max TDS in circulating water

Maximum Expected TDS (mg/l) * :		3575	
	at	-	cycles of concentration
Drift Loss (lb water/hr):		650.7	
Circulating Water Rate (gpm):		65100	

Estimated PM10 Emissions

Total Tower Emissions		**Per Cell Emissions**	
lbs/hr:	2.326	0.332	lbs/hr
lbs/day:	55.833	7.976	lbs/day
tons/yr:	10.190	1.456	tons/yr

Table I-A-6c

Expected Cooling Tower PM10 Emissions (existing cells-current water)

			Tower Dimensions (optional)		
Project:	Watson Cogen				
Mfg:	Existing Tower		Deck Height:	28	Ft. AGL
# Cells:	7		Length:	336	Ft.
acfm/Cell:	915442		Width:	54.7	Ft.
Drift Loss	0.002	%	Fan Exit Height:	46	Ft. AGL
Drift Frac	0.00002		Exhaust Fan Diam:	30.5	Ft.

GPM:	58200	water circulation rate thru tower
Lb/hr:	29088360	water circulation rate thru tower

optional input
required input

Operation Hours:	24	hrs/day	8760	hrs/year

Scenario: Estimated Max TDS in circulating water

Maximum Expected TDS (mg/l) * :		3000	
	at	-	cycles of concentration
Drift Loss (lb water/hr):		581.8	
Circulating Water Rate (gpm):		58200	

Estimated PM10 Emissions

Total Tower Emissions		**Per Cell Emissions**	
lbs/hr:	1.745	0.249	lbs/hr
lbs/day:	41.887	5.984	lbs/day
tons/yr:	7.644	1.092	tons/yr

Table I-A-6d

Expected Cooling Tower PM10 Emissions (existing cells-nitrified water-BACT)

Project:	Watson Cogen		Tower Dimensions (optional)		
Mfg:	Existing Tower		Deck Height:	28	Ft. AGL
# Cells:	7		Length:	336	Ft.
acfm/Cell:	915442		Width:	54.7	Ft.
Drift Loss	0.001	%	Fan Exit Height:	46	Ft. AGL
Drift Frac	0.00001		Exhaust Fan Diam:	30.5	Ft.

GPM: 58200 water circulation rate thru tower

Lb/hr: 29088360 water circulation rate thru tower

optional input

required input

Operation Hours: 24 hrs/day 8760 hrs/year

Scenario: Estimated Max TDS in circulating water

Maximum Expected TDS (mg/l) * :		3575	
	at	-	cycles of concentration
Drift Loss (lb water/hr):		290.9	
Circulating Water Rate (gpm):		58200	

Estimated PM10 Emissions

Total Tower Emissions		Per Cell Emissions	
lbs/hr:	1.040	0.149	lbs/hr
lbs/day:	24.958	3.565	lbs/day
tons/yr:	4.555	0.651	tons/yr

Table I-A-7a
Calculation of Hazardous and Toxic Pollutant Emissions from Cooling Towers

Watson Cogen-New Cells — Op Hrs/Day: 24

Total Cells: 2 — Max Drift Rate: 93 lbs/hr — Op Hrs/Yr: 8760

Constituent	Concentration in Cooling Tower Water		Total All Cells Emissions, lb/hr	Total All Cells Emissions, lb/day	Total All Cells Emissions, ton/yr	Single Cell Emissions, lb/hr	Single Cell Emissions, lb/day
Ammonia	0.045	mg/l	4.19E-06	1.00E-04	1.83E-05	2.09E-06	5.02E-05
Arsenic	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cadmium	0.25	mg/l	2.33E-05	5.58E-04	1.02E-04	1.16E-05	2.79E-04
Chromium	0.25	mg/l	2.33E-05	5.58E-04	1.02E-04	1.16E-05	2.79E-04
Copper	0.25	mg/l	2.33E-05	5.58E-04	1.02E-04	1.16E-05	2.79E-04
Lead	0.5	mg/l	4.65E-05	1.12E-03	2.04E-04	2.33E-05	5.58E-04
Mercury	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nickel	0.25	mg/l	2.33E-05	5.58E-04	1.02E-04	1.16E-05	2.79E-04
Silver	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PAHs	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Boron	0.9	mg/l	8.37E-05	2.01E-03	3.67E-04	4.19E-05	1.00E-03
Cyanide	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoride	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese	0.25	mg/l	2.33E-05	5.58E-04	1.02E-04	1.16E-05	2.79E-04
Selenium	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Strontium	4.3	mg/l	4.00E-04	9.60E-03	1.75E-03	2.00E-04	4.80E-03
Potassium	26	mg/l	2.42E-03	5.80E-02	1.06E-02	1.21E-03	2.90E-02
Iron	0.25	mg/l	2.33E-05	5.58E-04	1.02E-04	1.16E-05	2.79E-04
Bromide	0.1	mg/l	9.30E-06	2.23E-04	4.07E-05	4.65E-06	1.12E-04
Aluminum	0.5	mg/l	4.65E-05	1.12E-03	2.04E-04	2.33E-05	5.58E-04
Zinc	0.25	mg/l	2.33E-05	5.58E-04	1.02E-04	1.16E-05	2.79E-04
Barium	0.37	mg/l	3.44E-05	8.26E-04	1.51E-04	1.72E-05	4.13E-04
Cobalt	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Molybdenum	0.5	mg/l	4.65E-05	1.12E-03	2.04E-04	2.33E-05	5.58E-04
Silica	56	mg/l	5.21E-03	1.25E-01	2.28E-02	2.60E-03	6.25E-02
Vanadium	0.25	mg/l	2.33E-05	5.58E-04	1.02E-04	1.16E-05	2.79E-04
*	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Notes: (1) Water analysis data supplied BP, 6-27-08 sample date. NALCO, CT-16.

Table I-A-7b
Calculation of Hazardous and Toxic Pollutant Emissions from Cooling Towers

Watson Cogen-Existing Cells — Op Hrs/Day: 24
Total Cells: 7 — Max Drift Rate: 650.7 lbs/hr — Op Hrs/Yr: 8760

Constituent	Concentration in Cooling Tower Water		Total All Cells Emissions, lb/hr	Total All Cells Emissions, lb/day	Total All Cells Emissions, ton/yr	Single Cell Emissions, lb/hr	Single Cell Emissions, lb/day
Ammonia	0.045	mg/l	2.93E-05	7.03E-04	1.28E-04	4.18E-06	1.00E-04
Arsenic	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cadmium	0.25	mg/l	1.63E-04	3.90E-03	7.13E-04	2.32E-05	5.58E-04
Chromium	0.25	mg/l	1.63E-04	3.90E-03	7.13E-04	2.32E-05	5.58E-04
Copper	0.25	mg/l	1.63E-04	3.90E-03	7.13E-04	2.32E-05	5.58E-04
Lead	0.5	mg/l	3.25E-04	7.81E-03	1.43E-03	4.65E-05	1.12E-03
Mercury	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nickel	0.25	mg/l	1.63E-04	3.90E-03	7.13E-04	2.32E-05	5.58E-04
Silver	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PAHs	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Boron	0.9	mg/l	5.86E-04	1.41E-02	2.57E-03	8.37E-05	2.01E-03
Cyanide	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Fluoride	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese	0.25	mg/l	1.63E-04	3.90E-03	7.13E-04	2.32E-05	5.58E-04
Selenium	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Strontium	4.3	mg/l	2.80E-03	6.72E-02	1.23E-02	4.00E-04	9.59E-03
Potassium	26	mg/l	1.69E-02	4.06E-01	7.41E-02	2.42E-03	5.80E-02
Iron	0.25	mg/l	1.63E-04	3.90E-03	7.13E-04	2.32E-05	5.58E-04
Bromide	0.1	mg/l	6.51E-05	1.56E-03	2.85E-04	9.30E-06	2.23E-04
Aluminum	0.5	mg/l	3.25E-04	7.81E-03	1.43E-03	4.65E-05	1.12E-03
Zinc	0.25	mg/l	1.63E-04	3.90E-03	7.13E-04	2.32E-05	5.58E-04
Barium	0.37	mg/l	2.41E-04	5.78E-03	1.05E-03	3.44E-05	8.25E-04
Cobalt	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Molybdenum	0.5	mg/l	3.25E-04	7.81E-03	1.43E-03	4.65E-05	1.12E-03
Silica	56	mg/l	3.64E-02	8.75E-01	1.60E-01	5.21E-03	1.25E-01
Vanadium	0.25	mg/l	1.63E-04	3.90E-03	7.13E-04	2.32E-05	5.58E-04
*	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
*	0	mg/l	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Notes: (1) Water analysis data supplied BP, 6-27-08 sample date. NALCO, CT-16.

Table I-A-8

Typical Natural Gas Analysis Data*

Component Analysis		Chemical Analysis	
Component	**Average Volume %**	**Constituent**	**Average Weight %**
Methane	**95**	**Carbon**	**72.8**
Ethane	**2**	**Hydrogen**	**23.79**
Nitrogen	**2**	**Nitrogen**	**1.08**
Carbon Dioxide	**1**	**Oxygen**	**2.33**
		Sulfur	**<=0.33 gr/100scf (annual average)**
		HHV	**1027**

*SoCal Gas System

Table I-A-9

"Extreme Case" fuel gas compositions and expected heating values- refinery gas for HRSG duct burner.

Fuel Gas Composition Percent by Volume

No.	Case Description	HHV (Btu/lb)	LHV (Btu/lb)	H_2	O_2	N_2	CO	CO_2	Methane, CH_4	Ethane, C_2H_6	Ethylene, C_2H_4	Propane, C_3H_8	Propylene, C_3H_6	Butane, C_4H_{10}	n-Butane, C_4H_{10}	i-Butane, C_4H_{10}	Hexane, C_6H_{14}	Undetermined
1	Highest Btu/lb, Highest Hydrogen	21947	20030	32.16	0.00	4.17	0.00	0.11	26.22	9.66	5.43	9.49	4.39	2.02	3.19	1.12	2.01	0.04
2	Lowest Btu/lb, Highest Nitrogen, Highest CO2	19810	18156	14.75	0.00	9.55	0.00	1.24	30.47	10.53	5.94	11.61	6.30	2.67	3.35	1.40	2.13	0.04
3	Highest n-Butane	21390	19597	20.14	0.00	4.77	0.00	0.10	29.32	11.37	6.80	7.89	5.41	3.52	6.84	1.59	2.21	0.04
4	Highest Propylene	21192	19479	15.69	0.00	4.89	0.00	0.04	27.25	10.55	6.92	10.58	14.98	2.72	2.10	1.43	2.05	0.79
5	Highest Hexane	21208	19479	16.78	0.00	5.06	0.00	0.02	27.67	12.24	7.34	9.07	11.78	2.70	2.13	1.35	3.82	0.04
6	Highest i-Butane	21163	19420	16.17	0.00	5.40	0.00	0.03	28.85	12.36	7.87	11.18	8.40	2.63	2.58	2.10	2.38	0.04
7	Highest Propane	21104	19364	14.70	0.00	5.51	0.00	0.08	27.14	11.32	6.94	18.54	6.59	2.74	2.39	1.48	2.53	0.04
8	Lowest Hydrogen	21099	19349	12.38	0.00	5.53	0.00	0.06	32.20	12.35	6.35	15.32	6.18	2.58	2.55	1.60	2.85	0.04
9	Highest Butane	21633	19816	16.58	0.00	3.63	0.00	0.02	30.03	12.78	5.24	13.77	4.82	4.74	6.11	1.16	0.98	0.15
10	Highest Ethane	21577	19766	12.49	0.00	3.82	0.00	0.01	31.42	19.32	6.72	10.38	6.88	1.48	3.36	0.94	0.77	2.40
11	Highest Ethylene	21501	19606	17.34	0.00	5.36	0.00	0.03	38.69	17.96	8.42	6.35	0.47	1.79	2.09	0.10	1.37	0.05
12	Lowest Methane	21715	19869	30.71	0.00	4.36	0.00	0.04	22.04	8.73	5.51	10.93	5.83	3.48	4.30	1.00	3.03	0.03
13	Highest Methane	21888	19954	16.43	0.00	3.72	0.00	0.12	41.09	14.87	5.83	12.45	0.45	1.24	2.65	0.04	1.06	0.04

Table I-A-10
Calculation of GHG Emissions
Watson Cogen Expansion

Base Emissions Factors Compound	Turbine EF Nat Gas lbs/mmbtu	Turbine EF Ref Gas lbs/mmbtu	HRSG/DB EF Nat Gas lbs/mmbtu	HRSG/DB EF Ref Gas lbs/mmbtu	Turbine Calculated Blended Fuel EF lb/mmbtu	HRSG Calculated Blended Fuel EF lb/mmbtu
CO2	116.14	95.40	116.14	95.40	109.45135	95.4
CH4	0.0287	0.0000	0.0287	0.0000	0.01944425	0
N2O	0.00022	0.00022	0.00022	0.00022	0.000221	0.000221

Operating Scenarios, HHV	**1**	**2**	**3**	**4**	**5**
Turbine, mmbtu/hr NG	1062.05	0	0	1062.05	0
Turbine, mmbtu/hr RG	0	0	0	0	0
Turbine, mmbtu/hr Blend	0	1061.58	1061.58	0	0
HRSG, mmbtu/hr NG	0	0	447.94	447.94	0
HRSG, mmbtu/hr RG	447.94	447.94	0	0	0
HRSG, mmbtu/hr Blend	0	0	0	0	0
Operating Scenarios, hrs					
Turbine, hrs/yr NG	8760	0	0	8760	0
Turbine, hrs/yr RG	0	0	0	0	0
Turbine, hrs/yr Blend	0	8760	8760	0	0
HRSG, hrs/yr NG	0	0	8760	8760	0
HRSG, hrs/yr RG	8760	8760	0	0	0
HRSG, hrs/yr Blend	0	0	0	0	0

Fuel Data	
NG, btu/scf (HHV)	1028.05
RG, btu/scf (HHV)	1006.77

Blend Fuel Data	mmbtu/hr	Blend Factor
Turbine NG, %	67.75	0.6775
Turbine RG, %	32.25	0.3225
HRSG NG, %	0	0
HRSG RG, %	100	1

Emissions	**1**	**2**	**3**	**4**	**5**
CO2, lbs/yr	1.4549E+09	1.3922E+09	1.4736E+09	1.5362E+09	0.0000E+00
Methane, lbs/yr	2.6701E+05	1.8082E+05	2.9344E+05	3.7963E+05	0.0000E+00
N2O, lbs/yr	2.9233E+03	2.9224E+03	2.9224E+03	2.9233E+03	0.0000E+00
CO2e, lbs/yr	1.4614E+09	1.3969E+09	1.4806E+09	1.5451E+09	0.0000E+00
CO2e, tons/yr	7.3069E+05	6.9844E+05	7.4032E+05	7.7256E+05	0.0000E+00
CO2e, metric tons/yr	**657618.3**	**628598.1**	**666284.6**	**695304.8**	**0.0**

Footnotes and References Applicable to Calculations and Table
1. assumes SCR with COC on GT/HRSG

Natural Gas Emissions Factors
2. CCAR, Version 2.1, June 2006, natural gas emissions factors and carbon content adjustment.
3. EME-Greenhouse Gas Emission Factor Review, URS, 2003, CO2 emissions factors for natural gas and refinery gas.
4. ETC/ACC Technical Paper 2003/10, Comparison of GHG CO2 Emission Factors, July 2003

Refinery Gas Emissions Factors
5. CARB, GHG Inventory, N2O from Fuel Combustion-Refinery Gas (webpage), refinery gas N2O emissions factor. www.arb.ca.gov/cc/inventory/doc/docs1/1a1b_petroleumrefining_fuelcombustion_refinery/
6. Petroleum Industry Guidelines for Reporting GHG Emissions, 12/2003, IPIECA-OGP-API
7. BP supplied data, Refinery Fuel Gas to Merox, GHG Factor for CO2-5 Yr. Avg (see support data on next page)

Support Data for Table I-A-10

Refinery Fuel Gas to Merox
GHG Factor in lbs CO_2/MMBTU

Year	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Average
2008	83.7	87.9	92.5	89.5	88.4
2007	97.5	95.5	101.2	99.8	98.5
2006	100.1	97.6	94.3	89.7	95.4
2005	94.7	100.4	97.9	101.3	98.6
2004	90.8	92.3	101.1	100.9	96.3
			5 Year Average		**95.4**

Greenhouse Gases-Estimation and Reporting

Greenhouse gases (GHG) that contribute to global climate change are carbon dioxide (CO2), methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (SF6). In response to Executive Order S-3-05, which stated California's particular vulnerability to climate change, the California Global Warming Solutions Act of 2006-Assembly Bill 32 (AB32), was signed into effect on September 27, 2006. In chaptering the bill, the California Legislature found that: "Global warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in the quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other human health-related problems".

Emissions of CO2 occur primarily from combustion of a wide variety of fossil and non-fossil fuels. The major categories of fuel combustion CO2 sources can be broken into sectors for residential, commercial, industrial, transportation, and electricity generation. The transportation sector includes all motor gasoline and diesel fuel combustion. To date, there is no separate estimate for the level of GHG emissions caused by gasoline or diesel fuel combustion related to statewide construction activities. Other GHG emissions such as methane (CH4) and nitrous oxide (N2O) are also being assessed by State inventories but occur in much smaller quantities. The global warming potential of methane is about 21 times that of CO_2, while the warming potential for N_2O is about 310 times that of CO_2. When quantifying GHG emissions, the different global warming potentials of GHG pollutants are usually taken into account by normalizing their rates to an <u>equivalent CO2 emission rate</u> (CO_2e.).

California's greenhouse gas emissions are significant in the global context and growing over time (CEC, 2007). The State is responsible for approximately 500 million metric tons of CO2 equivalent ($MMTCO_2e$) or more than one percent of the 49,000 $MMTCO_2e$ emitted globally (IPCC, 2007). Electricity generation within California is responsible for approximately 50 million metric tons of CO2 (considering short term variations) or approximately 15 percent of the total statewide CO2 emissions and about one percent of statewide methane emissions. Electricity generation in other states delivered to California over high-voltage transmission lines also causes a substantial quantity of GHG emissions, about 10 percent more than the amount from in-state electricity generation. The use of sulfur hexafluoride (SF6) in power transformers and circuit breakers at power plants and along transmission lines also poses a concern, because this pollutant can slowly leak from the equipment (as a fugitive emission). SF_6 has an extremely high global warming potential (one ton of SF6 is equivalent to approximately 23,900 tons of CO2).

Statewide emissions of greenhouse gases from relevant source categories in 1990, 2000, and 2005, as available from the California Energy Commission (CEC), are summarized in Table I-A-11.

Table I-A-11 California Greenhouse Gas Inventory (million metric tons CO_2e)			
Category/Year	**1990**	**2000**	**2005**
Residential Fuel Combustion	28.97	30.25	na
Commercial Fuel Combustion	12.65	15.63	na
Industrial Fuel Combustion	66.12	76.17	na
Transportation Fuel Combustion	161.08	181.68	na
Electricity Generation (In State)	43.36	55.87	49.0
Methane (as CO_2e)	25.82	26.32	na
Nitrous Oxide (as CO_2e)	32.75	31.43	na
Electricity Transmission and Distribution (SF_6 as CO_2e)	2.32	1.14	na
Total California Greenhouse Gases w/o Electricity Imports	389.97	440.47	na
Electricity Imports (as CO_2e)	43.31	40.48	na
Total California Greenhouse Gases w/Electricity Imports	433.28	480.94	na
Source: CEC, 2007- CEC/CARB memo dated 1-23-07.			

The Electricity Greenhouse Gas Emissions Standards Act (per SB1368) was enacted in 2006, and requires base load generation resources or contracts to be subject to the GHG or Environmental Performance Standard. The California Public Utility Commission has adopted an emissions performance standard for the state's investor owned utilities of 1,100 pounds (0.5 metric tons) of CO_2 per megawatt-hour. This standard applies to base load power from new power plants, new investments in existing power plants, and new or renewed contracts with term limits of five (5) years or more, including contracts with power plants outside of California.

The Energy Commission has designed and adopted regulations that:

- Establish a standard for baseload generation owned by, or under long-term contract to publicly owned utilities, of 1,100 lbs CO2 per megawatt-hour (MWh). This will encourage the development of power plants that meet California's growing energy needs while minimizing their emissions of greenhouse gases,

- Require posting of notices of public deliberations by publicly owned utilities on long-term investments on the Energy Commission website. This will facilitate public awareness of utility efforts to meet customer needs for energy over the long-term while meeting the State's standards for environmental impact, and,

- Establish a public process for determining the compliance of proposed investments with the emissions performance standard (EPS). This process includes the following components:

- A utility may request that the Commission determine whether or not an investment under consideration is subject to or complies with the EPS (Request for Evaluation of a Proposed Procurement).
- A utility may request that an investment be exempted from the requirement that it meet the EPS if the investment is necessary to ensure reliable service to utility customers or to avoid a threat of significant financial harm (Request for Reliability or Financial Exemption), or, if the utility is under a legal obligation to contribute a share of a larger investment (Request for Exemption Due to Pre-existing Multi-Party Commitment).
- A utility must submit a compliance filing upon committing to an investment that is required to meet the EPS (Compliance Filing).
- Any party may request that the Energy Commission conduct a complaint or investigation proceeding to determine a utility's compliance with the regulations (Request for Compliance Investigation).

Investments that must be in compliance with the EPS include:

- Construction or purchase (turnkey agreements) of new power plants designed and intended for baseload generation;
- Purchase of existing power plants designed and intended for baseload generation, or ownership shares thereof, other than combined cycle natural gas power plants in operation or permitted prior to June 30, 2007.

Capital investments in existing, utility-owned power plants designed and intended for baseload generation, other than those for routine maintenance, that:

- For combined-cycle, natural gas power plants permitted before June 20, 2007, increase the generation capacity by 50 megawatts (MW) or more.
- For other power plants, are intended to extend the life of one or more units by five years or more.
- Are intended to increase the rated capacity of the power plant.
- Are intended to convert a non-baseload power plant into a baseload power plant.

Baseload generation as defined in SB1368 means “electricity generation from a power plant that is designed and intended to provide electricity at an annualized plant capacity factor of at least 60 percent.”

The proposed facility will comply with each of these regulations as applicable.

Societal Reduction of Greenhouse Gas Emissions

An important objective of the Project is to conserve natural gas and reduce overall environmental impacts from emissions and contributions to global climate change. Combined heat and power (CHP), also known as cogeneration, increases energy efficiency and provides related greenhouse-gas (GHG) reduction benefits by sequentially producing two energy products—electricity and useful heat—from a single fuel source. The California Energy Commission has found that new CHP applications could play a large part in avoiding future greenhouse gas emissions due to the combined efficiency of the heat and power portions of the project. Although cogeneration facilities use fuel for combustion, they utilize much more of the fuel’s energy potential than do conventional power facilities and are therefore more energy efficient. CHP requires less fuel to produce a given energy output, and avoids transmission and distribution losses that occur when electricity travels over power lines. Because less fuel is burned to produce each unit of energy output, CHP reduces particulate emissions and greenhouse gas emissions per unit of useful output. Gas-fired power stations continue to be an important part of a lower-carbon energy solution, because natural gas is the cleanest fossil fuel available and an important part of the California supply picture for at least the medium term.

The California Air Resources Board (CARB) Scoping Plan outlines California's strategy for achieving GHG reductions mandated by AB32. The Plan adopted by CARB's board on December 11, 2008, addressed the role of the electricity sector in achieving GHG reductions. Specific electricity sector emissions reduction measures include energy efficiency, CHP, and 33% renewables. The Scoping Plan recommends that the state promote the widespread development of efficient CHP to displace the need for new or expanded conventional power plants and has set a target of an additional 4,000 MW of installed CHP capacity by 2020, enough to displace approximately 30,000 GWh of generation from less efficient resources. Existing CHP in California already saves millions of tonnes of GHG emissions annually and CARB estimates the potential for new CHP to bring an additional annual reduction of nearly 6.7MMTCO2e of GHG reductions by 2020.

Increased efficiency translates into reduced demand for natural gas and lower societal GHG emissions. Alternatively, the electric and thermal production equipment that consumes natural gas to separately produce thermal energy and electricity is overall less efficient than CHP which produces both electricity and thermal output using the same input fuel. A reduction in the fuel consumed to produce heat and power means a reduction in emissions, including GHG emissions. The range of the expected GHG reduction benefits associated with the Project is illustrated in Table I-A12 below. Under annual average operating conditions, the Project results in annual CO2 emission reductions from 8.1% up to 16.3% as compared to the Separate Production case presented.

Scenario 1 compares (i) the Project's combustion turbine fueled solely with natural gas and refinery gas duct firing to (ii) the separate production of thermal energy in an industrial boiler and electricity generated consistent with operating data[1] for recent vintage combined cycle gas turbines (CCGT). Scenario 1 results in annual CO2 emission reductions of 8.1% as compared to the Separate Production case presented.

Scenario 2 modifies Scenario 1 by employing a blend of refinery and natural gas in the Project's combustion turbine. Scenario 2 results in annual CO2 emission reductions of 12.1% as compared to the Separate Production case presented.

Scenario 3 compares (i) the Project's combustion turbine fueled solely with natural gas and refinery gas duct firing to (ii) the separate production of thermal energy in an industrial boiler and electricity generated from natural gas fueled resources at prices consistent with the South of Path 15 (SP-15) market pricing hub.[2] Scenario 3 results in annual CO2 emission reductions of 12.4% as compared to the Separate Production case presented.

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[1] Based on 2006 EIA data for CA CCGT installed in or after 2001 with 100 MWa or greater annual operation.

[2] Based on SP-15 average prices for the period February 2008 through January 2009, Topock bidweek natural gas prices and SoCalGas intrastate transportation costs.

Scenario 4 modifies Scenario 3 by employing a blend of refinery and natural gas in the Project's combustion turbine. Scenario 4 results in annual CO2 emission reductions of 16.3% as compared to the Separate Production case presented.

Table I-A-12
Project Greenhouse Gas Emissions Summary

		CO2e (Metric Tons per Year)			
Line	**Description**	**Scenario 1**	**Scenario 2**	**Scenario 3**	**Scenario 4**
1	New Combined Heat & Power	662,875	633,623	662,875	633,623
	Alternative Separate Production				
2	Electricity	292,972	292,972	328,623	328,623
3	Boiler - Thermal	428,281	428,281	428,281	428,281
4	Total Separate Production	721,253	721,253	756,904	756,904
5	Net Emissions (Line 1 less Line 4)	-58,378	-87,630	-94,029	-123,281

Table I-A-13
Example VOC Service Component List for Cogen Unit #1
Note: A similar list is expected to apply to Proposed Unit #5.

Desired Process/System **P17S1** **COGENERATION UNIT NO.1**

Component Type		Service	Total Existing Components
Valves	Sealed Bellows	Gas/Vapor and Light Liquid	6
	AQMD Approved I&M Program	Fuel & Natural Gas	0
		Gas Vapor	339
		Light Liquid	74
		Heavy Liquid	64
Pumps	Sealless Type	Light Liquid	0
	Double Mechanical Seals or Equivalent	Light Liquid	0
	Single Mechanical Seal	Heavy Liquid	2
Compressor		Gas/Vapor	1
Flanges		All	1,639
Pressure Relief Valves		All	5
Process Drains		All	674

Notes:
All HL component counts estimated based on HL pumps and from Chemical Manufacturers Association document
Factors of 32 HL valves/HL pump and 139 HL flanges/HL pump were used - same numbers as AER fees
Pressure Relief Valves includes HL PRDs
For HL pumps and pressure relief valves, lube oil components are not included
Assumed zero fuel/natural gas valves
All LLG components grouped with LL
All LL pumps included under Double Mechanical Seal or Equivalent category
Flanges made up of connectors, hatches, instrumentation, manways, meters, others, sampling lines, site glasses
Process drains includes controlled and uncontrolled drains (no other 1176 components)

APPENDIX I-B

Modeling Support Data

Tables presented in this Appendix are as follows:

I-B-1 Wind Rose Frequency (Count) Distribution (Long Beach, AQMD)

I-B-2 Wind Rose Frequency (Normalized) Distribution (Long Beach, AQMD)

I-B-3 Long Beach WSO Climate Summary

I-B-4 Ambient Air Quality Standards

I-B-5 South Coast Air Basin Historical Air Quality Data

I-B-6 SCAQMD Air Monitoring Summary Data for 2005

I-B-7 SCAQMD Air Monitoring Summary Data for 2006

I-B-8 SCAQMD Air Monitoring Summary Data for 2007

I-B-9 Building Coordinates and Height Data

I-B-10 Facility Impact/Modeling Results Summary

I-B-11 Construction Impact/Modeling Summary

In addition, this appendix contains the following figures:

I-B-1 Proposed Facility Plot Plan

I-B-2 Coarse and Fine Receptor Grids

I-B-3 Facility Boundary Data

I-B-4 Long Beach ASOS Sensor Location

I-B-5 South Coast Air Basin Monitoring Stations Map

I-B-6 Annual Composite Wind Rose

I-B-7 Winter Quarter Composite Wind Rose

I-B-8 Spring Quarter Composite Wind Rose

I-B-9 Summer Quarter Composite Wind Rose

I-B-10 Fall Quarter Composite Wind Rose

Attachment I-B-1 Modeling Protocol

Modeling input/output files are included in the enclosed CD's.

Station ID: 53101
Year: 1981
Date Range: Jan 1 - Dec 31
Time Range: 00:00 - 23:00

Run ID:

Table I-B-1

Frequency Distribution
(Count)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.5 - 2.1	2.1 - 3.6	3.6 - 5.7	5.7 - 8.8	8.8 - 11.1	>= 11.1	Total
348.75-11.25	487	20	0	0	0	0	507
11.25-33.75	367	7	0	0	0	0	374
33.75-56.25	394	19	0	0	0	0	413
56.25-78.75	249	35	7	0	0	0	291
78.75-101.25	294	48	3	0	0	0	345
101.25-123.75	174	26	1	0	0	0	201
123.75-146.25	264	72	1	0	0	0	337
146.25-168.75	262	108	2	0	0	0	372
168.75-191.25	506	362	1	0	0	0	869
191.25-213.75	185	43	0	0	0	0	228
213.75-236.25	160	55	5	0	0	0	220
236.25-258.75	216	252	47	3	0	0	518
258.75-281.25	854	857	98	19	2	0	1830
281.25-303.75	266	8	1	0	0	0	275
303.75-326.25	238	0	0	0	0	0	238
326.25-348.75	204	7	0	0	0	0	211
Total	5120	1919	166	22	2	0	8760

Frequency of Calm Winds: 1531
Average Wind Speed: 1.41 m/s

Station ID: 53101
Year: 1981
Date Range: Jan 1 - Dec 31
Time Range: 00:00 - 23:00

Run ID:

Table I-B-2

Frequency Distribution
(Normalized)

Wind Direction (Blowing From) / Wind Speed (m/s)

	0.5 - 2.1	2.1 - 3.6	3.6 - 5.7	5.7 - 8.8	8.8 - 11.1	>= 11.1	Total
348.75-11.25	0.055594	0.002283	0.000000	0.000000	0.000000	0.000000	0.057877
11.25-33.75	0.041895	0.000799	0.000000	0.000000	0.000000	0.000000	0.042694
33.75-56.25	0.044977	0.002169	0.000000	0.000000	0.000000	0.000000	0.047146
56.25-78.75	0.028425	0.003995	0.000799	0.000000	0.000000	0.000000	0.033219
78.75-101.25	0.033562	0.005479	0.000342	0.000000	0.000000	0.000000	0.039384
101.25-123.75	0.019863	0.002968	0.000114	0.000000	0.000000	0.000000	0.022945
123.75-146.25	0.030137	0.008219	0.000114	0.000000	0.000000	0.000000	0.038470
146.25-168.75	0.029909	0.012329	0.000228	0.000000	0.000000	0.000000	0.042466
168.75-191.25	0.057763	0.041324	0.000114	0.000000	0.000000	0.000000	0.099201
191.25-213.75	0.021119	0.004909	0.000000	0.000000	0.000000	0.000000	0.026027
213.75-236.25	0.018265	0.006279	0.000571	0.000000	0.000000	0.000000	0.025114
236.25-258.75	0.024658	0.028767	0.005365	0.000342	0.000000	0.000000	0.059132
258.75-281.25	0.097489	0.097831	0.011187	0.002169	0.000228	0.000000	0.208904
281.25-303.75	0.030365	0.000913	0.000114	0.000000	0.000000	0.000000	0.031393
303.75-326.25	0.027169	0.000000	0.000000	0.000000	0.000000	0.000000	0.027169
326.25-348.75	0.023288	0.000799	0.000000	0.000000	0.000000	0.000000	0.024087
Total	0.584475	0.219064	0.018950	0.002511	0.000228	0.000000	0.825228

Frequency of Calm Winds: 17.48%
Average Wind Speed: 1.41 m/s

Table I-B-3

(2 pages)

LONG BEACH WSCMO, CALIFORNIA (045085)

Period of Record Monthly Climate Summary

Period of Record : 4/ 1/1958 to 12/31/2007

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	66.8	67.3	68.3	71.7	73.6	77.1	82.5	83.9	82.2	78.0	72.1	67.2	74.2
Average Min. Temperature (F)	45.5	47.3	49.7	52.3	56.8	60.3	63.8	64.9	62.8	57.9	50.5	45.3	54.8
Average Total Precipitation (in.)	2.65	2.93	1.92	0.72	0.20	0.06	0.02	0.07	0.20	0.39	1.23	1.61	12.01
Average Total SnowFall (in.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	0	0	0

Percent of possible observations for period of record.
Max. Temp.: 100% Min. Temp.: 100% Precipitation: 100% Snowfall: 90% Snow Depth: 90.4%
Check Station Metadata or Metadata graphics for more detail about data completeness.

Western Regional Climate Center, wrcc@dri.edu

LONG BEACH WSCMO, CALIFORNIA

NCDC 1971-2000 Monthly Normals

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Monthly
Mean Max. Temperature (F)	68.0	68.5	68.9	72.7	74.0	78.3	82.9	84.6	83.1	78.9	73.4	68.8	75.2
Highest Mean Max. Temperature (F)	76.7	73.9	75.0	76.9	80.3	86.1	87.0	90.5	89.8	83.9	81.5	75.7	90.5
Year Highest Occurred	1976	1977	1988	1996	1997	1981	1984	1998	1984	1976	1977	1976	1998
Lowest Mean Max. Temperature (F)	63.2	64.4	64.5	66.2	68.9	73.0	78.0	80.1	76.8	71.9	68.1	64.0	63.2
Year Lowest Occurred	1995	1998	1991	1975	1995	1982	1987	1999	1986	2000	2000	1971	1995
Mean Temperature (F)	57.0	58.3	59.7	63.0	65.9	69.8	73.8	75.1	73.4	68.6	61.8	57.1	65.3
Highest Mean Temperature (F)	61.7	61.8	64.6	67.5	71.3	75.9	77.5	80.1	80.0	72.4	66.8	61.7	80.1
Year Highest Occurred	1986	1995	1978	1992	1997	1981	1984	1998	1984	1976	1977	1977	1998
Lowest Mean Temperature (F)	53.9	55.6	55.4	57.3	62.2	65.9	70.4	70.9	68.5	64.7	56.9	52.9	52.9
Year Lowest Occurred	1974	1990	1973	1975	1995	1999	1987	1999	1986	2000	1994	1971	1971
Mean Min. Temperature (F)	46.0	48.1	50.4	53.2	57.8	61.3	64.6	65.6	63.7	58.3	50.1	45.3	55.4
Highest Mean Min. Temperature (F)	50.5	52.4	56.5	58.0	62.2	65.6	67.9	69.8	70.2	62.5	54.8	52.5	70.2
Year Highest Occurred	1980	1995	1978	1992	1997	1981	1984	1983	1984	1987	1997	1977	1984
Lowest Mean Min. Temperature (F)	42.0	42.6	44.1	48.3	54.3	58.2	62.6	61.7	59.4	53.7	45.3	41.8	41.8
Year Lowest Occurred	1972	1974	1977	1971	1971	1999	1999	1999	1973	1971	1994	1974	1974
Mean Precipitation (in.)	2.95	3.01	2.43	0.60	0.23	0.08	0.02	0.10	0.24	0.40	1.12	1.76	12.94
Highest Precipitation (in.)	12.76	12.09	8.75	2.31	2.32	0.86	0.21	2.03	1.45	2.30	4.21	5.29	12.76
Year Highest Occurred	1995	1998	1983	1999	1977	1993	1986	1977	1976	2000	1985	1971	1995
Lowest Precipitation (in.)	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Year Lowest Occurred	1976	1984	1997	1997	1997	2000	2000	2000	2000	1999	2000	2000	1976
Heating Degree Days (F)	267.	205.	186.	99.	39.	5.	0.	0.	1.	16.	128.	265.	1211.
Cooling Degree Days (F)	3.	5.	10.	28.	55.	135.	260.	302.	244.	119.	20.	5.	1186.

Western Regional Climate Center, wrcc@dri.edu

Table I-B-4

Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards [1]		Federal Standards [2]		
		Concentration [3]	Method [4]	Primary [3,5]	Secondary [3,6]	Method [7]
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM10)	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter (PM2.5)	24 Hour	No Separate State Standard		35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	15.0 µg/m^3		
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	None	Non-Dispersive Infrared Photometry (NDIR)
	1 Hour	20 ppm (23 mg/m^3)		35 ppm (40 mg/m^3)		
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	—
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (57 µg/m3)	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m^3)	Same as Primary Standard	Gas Phase Chemiluminescence
	1 Hour	0.18 ppm (339 µg/m^3)		—		
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	—	Ultraviolet Fluorescence	0.030 ppm (80 µg/m^3)	—	Spectrophotometry (Pararosaniline Method)
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (365 µg/m^3)	—	
	3 Hour	—		—	0.5 ppm (1300 µg/m^3)	
	1 Hour	0.25 ppm (655 µg/m^3)		—	—	—
Lead[8]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	—
	Calendar Quarter	—		1.5 µg/m^3	Same as Primary Standard	High Volume Sampler and Atomic Absorption
	Rolling 3-Month Average[9]	—		0.15 µg/m^3		
Visibility Reducing Particles	8 Hour	Extinction coefficient of 0.23 per kilometer — visibility of ten miles or more (0.07 — 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		No Federal Standards		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[8]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

See footnotes on next page ...

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter—PM10, PM2.5, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2. National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24 hour standard is attained when the expected number of days per calender year with a 24-hour average concentration above 150 $\mu g/m^3$ is equal to or less than one. For PM2.5, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact U.S. EPA for further clarification and current federal policies.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

4. Any equivalent procedure which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.

5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

7. Reference method as described by the EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by the EPA.

8. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

9. National lead standard, rolling 3-month average: final rule signed October 15, 2008.

Table I-B-5

OZONE (ppm)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005[1]
Peak 1-Hour Indicator	0.375	0.360	0.344	0.319	0.320	0.310	0.304	0.286	0.297	0.279	0.249	0.233	0.229	0.224	0.211	0.213	0.172	0.172	0.178	0.175	
Peak 8-Hour Indicator	0.252	0.251	0.243	0.230	0.213	0.212	0.210	0.200	0.200	0.192	0.186	0.175	0.168	0.182	0.179	0.178	0.144	0.144	0.146	0.144	
4th High 1-Hr. in 3 Yrs	0.360	0.350	0.350	0.340	0.330	0.330	0.310	0.300	0.300	0.280	0.250	0.231	0.215	0.217	0.211	0.211	0.170	0.169	0.180	0.171	
Avg. of 4th High 8-Hr. in 3 Yrs	0.226	0.222	0.217	0.205	0.192	0.186	0.182	0.180	0.177	0.171	0.165	0.161	0.148	0.154	0.147	0.146	0.129	0.128	0.131	0.127	
Maximum 1-Hr. Concentration	0.390	0.350	0.330	0.350	0.340	0.330	0.320	0.300	0.280	0.300	0.256	0.239	0.205	0.244	0.174	0.184	0.190	0.169	0.194	0.163	0.182
Max. 8-Hr. Concentration	0.288	0.251	0.210	0.258	0.252	0.193	0.203	0.218	0.195	0.208	0.203	0.173	0.148	0.206	0.142	0.149	0.144	0.144	0.153	0.145	0.145
Days Above State Standard	207	217	196	216	211	185	184	190	185	165	153	141	144	107	111	115	121	116	125	105	97
Days Above Nat. 1-Hr. Std.	158	167	161	178	157	131	130	142	124	118	98	85	64	60	39	33	36	45	64	28	30
Days Above Nat. 8-Hr. Std.	181	191	179	194	181	161	160	173	161	148	120	115	118	93	93	94	92	96	109	88	84

1 Preliminary data for January through October 2005 are shown here, however they are subject to change. 2004 is the last year for which complete and approved data is available, thus annual statistics are not included.

PM10 (ug/m3)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Max. 24-Hr. Concentration (State)				287	271	475	179	649	231	161	219	162	208	116	183	139	219	126	159	133
Max. 24-Hr. Concentration (Nat)				289	271	475	179	649	231	161	219	162	208	116	183	139	219	130	164	137
Annual Average (State)					94.0	78.2	76.0	79.0	72.5	65.5	68.8	61.5	65.3	50.2	72.2	60.1	62.9	56.2	55.1	53.5
Annual Average (Nat)				94.5	93.0	78.2	76.1	79.0	72.5	65.5	68.8	62.8	65.6	50.2	72.2	59.1	63.3	58.1	55.6	54.8
Calc Days Above State 24-Hr Std				345	338	301	294	282	293	276	252	276	290	238	288	300	278	297	252	279
Calc Days Above Nat 24-Hr Std				44	32	33	15	24	12	3	31	6	17	0	6	0	5	0	6	0

PM2.5 (ug/m3)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Max. 24-Hr. Concentration (State)															121.4	119.6	104	82.1	121.2	93.8
Max. 24-Hr. Concentration (Nat)															121.4	119.6	98.0	82.1	121.2	93.8
98th Percentile of 24-Hr Conc.															85.6	83.0	74.3	66.3	76.6	72.4
Annual Average (State)																24.0	25.0	25.8	24.8	16.6
Avg. of Qtrly. Means (Nat)															31.0	28.3	31.0	27.4	24.8	22.1

CARBON MONOXIDE (ppm)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Peak 8-Hr. Indicator	21.1	21.1	21.7	21.9	22.5	21.9	19.0	17.7	16.5	16.7	15.6	16.1	15.5	15.4	13.7	12.6	11.2	9.4	8.7	8.3
Max. 1-Hr. Concentration	33.0	27.0	26.0	32.0	31.0	24.0	30.0	28.0	21.0	24.9	16.8	22.5	19.2	17.0	19.0	13.8	11.7	15.8	12.2	10.4
Max. 8-Hr. Concentration	27.7	19.7	19.6	27.5	21.8	16.8	17.4	18.8	14.6	18.2	13.8	17.5	17.1	13.3	11.2	10.1	7.6	10.1	7.3	6.5
Days Above State 8-Hr. Std.	64	58	50	73	71	50	51	39	29	27	17	26	18	13	11	6	0	1	0	0
Days Above Nat. 8-Hr. Std.	54	49	40	65	67	42	41	34	19	19	14	19	13	10	7	3	0	1	0	0

NITROGEN DIOXIDE (ppm)	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Peak 1-Hr. Indicator	0.317	0.303	0.311	0.335	0.322	0.324	0.312	0.311	0.285	0.241	0.229	0.242	0.237	0.202	0.185	0.213	0.216	0.200	0.161	0.150
Max. 1-Hr. Concentration	0.350	0.330	0.420	0.540	0.340	0.280	0.380	0.300	0.260	0.247	0.239	0.250	0.200	0.255	0.307	0.214	0.251	0.262	0.163	0.157
Max. Annual Average	0.060	0.061	0.055	0.061	0.057	0.055	0.055	0.051	0.050	0.050	0.046	0.042	0.043	0.043	0.051	0.044	0.041	0.040	0.035	0.033

Table I-B-6

2005 AIR QUALITY
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

2005

Source/Receptor Area No.	Location	Station No.	Carbon Monoxide: No. Days of Data	CO: Max. Conc. in ppm 1-hour	CO: Max Conc. in ppm 8-hour	CO: No. Days Standard Exceeded a) Federal ≥ 9.5 ppm 8-hour	CO: State > 9.0 ppm 8-hour	Ozone: No. Days of Data	O3: Max. Conc. in ppm 1-hour	O3: Max. Conc. in ppm 8-hour	O3: Fourth High Conc. ppm 8-hour	O3: No. Days Standard Exceeded: Health Advisory ≥ 0.15 ppm 1-hour	O3: Federal b) > 0.12 ppm 1-hour	O3: Federal b) > 0.08 ppm 8-hour	O3: State c) > 0.09 ppm 1-hour	O3: State c) > 0.07 ppm 8-hour	Nitrogen Dioxide: No. Days of Data	NO2: Max Conc. in ppm 1-hour d)	NO2: Annual Average d) AAM Conc. ppm	Sulfur Dioxide: No. Days of Data	SO2: Max. Conc. in ppm 1-hour e)	SO2: Max. Conc. in ppm 24-hour e)
LOS ANGELES COUNTY																						
1	Central LA	087	365	4	3.1	0	0	365	0.121	0.098	0.072	0	0	1	2	2	364	0.13	0.0278	357	0.07	0.010
2	Northwest Coastal LA County	091	365	3	2.1	0	0	361	0.114	0.090	0.077	0	0	1	7	5	365	0.08	0.0178	–	–	–
3	Southwest Coastal LA County	820	365	3	2.1	0	0	365	0.086	0.076	0.068	0	0	0	0	1	365	0.09	0.0134	365	0.04	0.012
4	South Coastal LA County 1	072	365	4	3.5	0	0	365	0.091	0.068	0.059	0	0	0	0	0	365	0.14	0.0241	365	0.04	0.010
4	South Coastal LA County 2	077	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
6	West San Fernando Valley	074	350	5	3.5	0	0	365	0.138	0.113	0.098	0	2	12	30	29	365	0.09	0.0202	–	–	–
7	East San Fernando Valley	069	363	4	3.4	0	0	365	0.142	0.108	0.081	0	2	2	13	12	365	0.09	0.0294	361	0.01	0.006
8	West San Gabriel Valley	088	363	4	2.8	0	0	363	0.145	0.114	0.086	1	2	5	13	12	363	0.10	0.0241	–	–	–
9	East San Gabriel Valley 1	060	365	3	1.7	0	0	365	0.145	0.122	0.087	1	4	6	20	14	365	0.09	0.0251	–	–	–
9	East San Gabriel Valley 2	591	358	2	1.9	0	0	363	0.160	0.130	0.099	2	8	13	31	29	360	0.09	0.0224	–	–	–
10	Pomona/Walnut Valley	075	365	4	2.5	0	0	361	0.140	0.112	0.096	0	4	11	26	18	365	0.08	0.0312	–	–	–
11	South San Gabriel Valley	085	113*	3*	2.4*	0*	0*	116*	0.077*	0.065*	0.051*	0*	0*	0*	0*	0*	116*	0.09*	0.0308*	–	–	–
12	South Central LA County	084	365	7	5.9	0	0	365	0.111	0.081	0.063	0	0	0	1	1	360	0.11	0.0312	–	–	–
13	Santa Clarita Valley	090	365	2	1.3	0	0	364	0.173	0.141	0.118	5	11	47	65	69	347	0.087	0.0190	–	–	–
ORANGE COUNTY																						
16	North Orange County	3177	365	7	3.1	0	0	365	0.094	0.075	0.067	0	0	0	0	1	361	0.09	0.0249	–	–	–
17	Central Orange County	3176	365	4	3.3	0	0	365	0.095	0.077	0.075	0	0	0	1	4	365	0.09	0.0211	–	–	–
18	North Coastal Orange County	3195	364	5	3.2	0	0	338	0.085	0.073	0.068	0	0	0	0	0	355	0.09	0.0131	359	0.01	0.008
19	Saddleback Valley	3812	365	2	1.6	0	0	365	0.125	0.085	0.078	0	1	1	3	6	–	–	–	–	–	–
RIVERSIDE COUNTY																						
22	Norco/Corona	4155	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
23	Metropolitan Riverside County 1	4144	363	3	2.5	0	0	358	0.144	0.129	0.105	0	3	33	46	62	365	0.08	0.0222	365	0.02	0.011
23	Metropolitan Riverside County 2	4146	365	4	2.4	0	0	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
23	Mira Loma	5212	362	3	2.1	0	0	358	0.135	0.116	0.105	0	3	25	34	51	346	0.08	0.0160	–	–	–
24	Perris Valley	4149	–	–	–	–	–	365	0.126	0.103	0.082	0	1	3	11	18	–	–	–	–	–	–
25	Lake Elsinore	4158	365	2	1.0	0	0	365	0.149	0.119	0.097	1	4	15	37	46	365	0.07	0.0142	–	–	–
29	Banning Airport	4164	–	–	–	–	–	359	0.144	0.132	0.119	0	10	39	47	66	329	0.07	0.0148	–	–	–
30	Coachella Valley 1**	4137	364	2	0.8	0	0	363	0.139	0.116	0.108	0	4	35	41	63	352	0.10	0.0120	–	–	–
30	Coachella Valley 2**	4157	–	–	–	–	–	365	0.114	0.095	0.092	0	0	18	18	36	–	–	–	–	–	–
SAN BERNARDINO COUNTY																						
32	Northwest San Bernardino Valley	5175	364	3	1.8	0	0	365	0.149	0.121	0.101	1	8	15	34	34	364	0.10	0.0313	–	–	–
33	Southwest San Bernardino Valley	5817	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
34	Central San Bernardino Valley 1	5197	365	3	2.1	0	0	355	0.150	0.128	0.113	2	9	23	49	47	361	0.10	0.0310	365	0.01	0.004
34	Central San Bernardino Valley 2	5203	356	4	2.4	0	0	361	0.163	0.129	0.114	4	9	31	54	58	361	0.0.08	0.0259	–	–	–
35	East San Bernardino Valley	5204	–	–	–	–	–	364	0.146	0.123	0.113	1	6	24	36	45	–	–	–	–	–	–
37	Central San Bernardino Mountains	5181	–	–	–	–	–	354	0.182	0.145	0.130	7	18	69	80	102	–	–	–	–	–	–
38	East San Bernardino Mountains	5818	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	DISTRICT MAXIMUM			7	5.9	0	0		0.182	0.145	0.130	7	18	69	80	102		0.14	0.0313		0.07	0.012
	SOUTH COAST AIR BASIN			7	5.9	0	0		0.182	0.145	0.130	11	30	84	102	120		0.14	0.0313		0.07	0.012

ppm - Parts Per Million parts of air, by volume. AAM = Annual Arithmetic Mean -- - Pollutant not monitored.

* Less than 12 full months of data. May not be representative. ** Salton Sea Air Basin.

a) - The federal 1-hour standard (1-hour average CO > 35 ppm) and state 1-hour standard (1-hour average CO > 20 ppm) were not exceeded. For comparison of data with the federal 8-hour CO standard (9 ppm), 8-hour averages with one decimal place should be rounded to integers.

b) – The federal 1-hour ozone standard was revoked and replaced by the 8-hour average ozone standard effective June 15, 2004.

c) - Air Resources Board has established a new 8-hour average California ozone standard of 0.07 ppm effective May 17, 2005.

d) - The state standard is 1-hour average NO_2 > 0.25 ppm. The federal standard is annual arithmetic mean NO_2 > 0.0534 ppm.

e) - The state standards are 1-hour average SO_2 > 0.25 ppm and 24-hour average SO_2 > 0.04 ppm. The federal standards are annual arithmetic mean SO_2 > 0.03 ppm, 24-hour average > 0.14 ppm, and 3-hour average > 0.50 ppm.

South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765-4182
www.aqmd.gov

The map showing the locations of source/receptor areas can be accessed via the Internet at http://www.aqmd.gov/telemweb/areamap.aspx. Locations of source/receptor areas are shown on the "South Coast Air Quality Management District Air Monitoring Areas" map available free of charge from SCAQMD Public Information.

2005

2005 AIR QUALITY
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Source/Receptor Area No.	Location	Station No.	PM10[f] No. Days of Data	PM10 Max. Conc. in µg/m³ 24-hour	PM10 No. (%) Samples Exceeding Standard Federal > 150 µg/m³ 24-hour	PM10 No. (%) Samples Exceeding Standard State > 50 µg/m³ 24-hour	PM10 Annual Average[i] AAM Conc. µg/m³	PM2.5[g] No. Days of Data	PM2.5 Max. Conc. in µg/m³ 24-hour	PM2.5 98th Percentile Conc. in µg/m³ 24-hour	PM2.5 No. (%) Samples Exceeding Standard Federal > 65 µg/m³ 24-hour	PM2.5 Annual Averages[j] AAM Conc. µg/m³	TSP[h] No. Days of Data	TSP Max. Conc. in µg/m³ 24-hour	TSP Annual Average AAM Conc. µg/m³	Lead[h] Max. Monthly Average Conc.[k] µg/m³	Lead Max. Quarterly Average Conc.[k] µg/m³	Sulfate[h] Max. Conc. in µg/m³ 24-hour	Sulfate No. (%) Samples Exceeding Standard State ≥ 25 µg/m³ 24-hour
	LOS ANGELES COUNTY																		
1	Central LA	087	61	70	0	4(6.6)	29.6	334	73.7	53.2	2(0.6)	18.1	66	141	66.7	0.02	0.02	14.2	0
2	Northwest Coastal LA County	091	–	–	–	–	–	–	–	–	–	–	59	89	41.6	–	–	11.7	0
3	Southwest Coastal LA County 2	820	54	44	0	0	22.9	–	–	–	–	–	–	–	–	–	–	–	–
4	South Coastal LA County 1	072	59	66	0	5(8.5)	29.6	324	53.9	41.4	0	16.0	61	112	55.5	0.01	0.01	16.8	0
4	South Coastal LA County 2	077	59	131	0	18(30.5)	43.4	344	50.8	37.8	0	14.7	–	–	–	–	–	–	–
6	West San Fernando Valley	074	–	–	–	–	–	104	39.6	35.8	0	13.9	–	–	–	–	–	–	–
7	East San Fernando Valley	069	61	92	0	5(8.2)	34.3	106	63.2	50.6	0	17.9	–	–	–	–	–	–	–
8	West San Gabriel Valley	088	–	–	–	–	–	113	62.9	43.1	0	15.1	58	89	44.6	–	–	11.2	0
9	East San Gabriel Valley 1	060	55	76	0	12(21.8)	35.1	292*	132.7*	53.2*	1(0.3)*	17.0*	58	142	70.9	–	–	10.2	0
9	East San Gabriel Valley 2	591	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
10	Pomona/Walnut Valley	075	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
11	South San Gabriel Valley	085	–	–	–	–	–	76*	58.2*	54.0*	0*	17.0*	39*	104*	66.4*	0.03	0.03	9.9	0
12	South Central LA County	084	–	–	–	–	–	114	54.6	48.5	0	17.5	57	118	67.4	0.03	0.02	17.3	0
13	Santa Clarita Valley	090	60	55	0	1(1.7)	25.8	–	–	–	–	–	–	–	–	–	–	–	–
	ORANGE COUNTY																		
16	North Orange County	3177	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
17	Central Orange County	3176	61	65	0	3(4.9)	28.2	333	54.7	41.9	0	14.7	–	–	–	–	–	–	–
18	North Coastal Orange County	3195	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
19	Saddleback Valley	3812	55	41	0	0	19.0	113	35.4	31.4	0	10.7	–	–	–	–	–	–	–
	RIVERSIDE COUNTY																		
22	Norco/Corona	4155	58	79	0	5(8.6)	31.6	–	–	–	–	–	–	–	–	–	–	–	–
23	Metropolitan Riverside County 1	4144	123	123	0	69(56.1)	52.0	334	98.7	58.4	4(1.2)	21.0	59	173	96.7	0.02	0.02	10.3	0
23	Metropolitan Riverside County 2	4146	–	–	–	–	–	110	95.0	41.0	1(0.9)	18.0	60	125	75.8	0.01	0.01	10.3	0
23	Mira Loma	5212	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
24	Perris Valley	4149	60	80	0	19(31.7)	39.2	–	–	–	–	–	–	–	–	–	–	–	–
25	Lake Elsinore	4158	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
29	Banning Airport	4164	58	76	0	2(3.4)	26.6	–	–	–	–	–	–	–	–	–	–	–	–
30	Coachella Valley 1**	4137	59	66	0	2(3.4)	25.9	83*	26.2*	25.0*	0*	8.4*	–	–	–	–	–	–	–
30	Coachella Valley 2**	4157	115	106	0	39(34.2)	45.7	104	44.4	25.0	0	10.5	–	–	–	–	–	–	–
	SAN BERNARDINO COUNTY																		
32	Northwest San Bernardino Valley	5175	–	–	–	–	–	–	–	–	–	–	57	94	53.4	0.02	0.02	8.4	0
33	Southwest San Bernardino Valley	5817	60	74	0	19(31.7)	40.8	110	87.8	49.6	1(0.9)	18.8	–	–	–	–	–	–	–
34	Central San Bernardino Valley 1	5197	60	108	0	29(48.3)	50.0	109	96.8	48.2	1(0.9)	18.9	61	295	100.2	–	–	10.4	0
34	Central San Bernardino Valley 2	5203	60	72	0	23(38.3)	42.3	109	106.3	43.4	1(0.9)	17.4	60	175	87.1	0.02	0.01	10.9	0
35	East San Bernardino Valley	5204	58	61	0	12(20.7)	33.2	–	–	–	–	–	–	–	–	–	–	–	–
37	Central San Bernardino Mountains	5181	56	49	0	0	25.8	–	–	–	–	–	–	–	–	–	–	–	–
38	East San Bernardino Mountains	5818	–	–	–	–	–	51	38.8	38.8	0	12.1	–	–	–	–	–	–	–
	DISTRICT MAXIMUM			131	0	69	52.0		132.7	58.4	4	21.0		295	100.2	0.03	0.03	17.3	0
	SOUTH COAST AIR BASIN			131	0	89	52.0		132.7	58.4	6	21.0		295	100.2	0.03	0.03	17.3	0

µg/m³ - Micrograms per cubic meter of air. AAM - Annual Arithmetic Mean AGM – Annual Geometric Mean – - Pollutant not monitored.

* Less than 12 full months of data. May not be representative. ** Salton Sea Air Basin.

f) - PM10 samples were collected every 6 days at all sites except for Station Numbers 4144 and 4157 where samples were collected every 3 days.

g) - PM2.5 samples were collected every 3 days at all sites except for the following sites: Station Numbers 060, 072, 077, 087, 3176, and 4144 where samples were taken every day, and Station Number 5818 where samples were taken every 6 days.

h) - Total suspended particulates, lead, and sulfate were determined from samples collected every 6 days by the high volume sampler method, on glass fiber filter media.

i) - Federal PM10 standard is annual average (AAM) > 50 µg/m³. State standard is annual average (AAM) > 20 µg/m³ (changed from AGM > 30 µg/m³, effective July 5, 2003).

j) - Federal PM2.5 standard is annual average (AAM) > 15 µg/m³. State standard is annual average (AAM) > 12 µg/m³ (state standard was established on July 5, 2003).

k) - Federal lead standard is quarterly average > 1.5 µg/m³; and state standard is monthly average ≥ 1.5 µg/m³. No location exceeded lead standards.
Maximum monthly and quarterly lead concentrations at special monitoring sites immediately downwind of stationary lead sources were 0.44 µg/m³ and 0.34 µg/m³, respectively, both recorded at Central Los Angeles.

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Table I-B-7

2006 AIR QUALITY
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

2006

Source/Receptor Area No.	Location	Station No.	Carbon Monoxide a) No. Days of Data	CO Max. Conc. in ppm 1-hour	CO Max Conc. in ppm 8-hour	Ozone b) No. Days of Data	O3 Max. Conc. in ppm 1-hour	O3 Max. Conc. in ppm 8-hour	O3 Fourth High Conc. ppm 8-hour	No. Days Standard Exceeded: Health Advisory ≥ 0.15 ppm 1-hour	Federal > 0.12 ppm 1-hour	Federal > 0.08 ppm 8-hour	State > 0.09 ppm 1-hour	State > 0.07 ppm 8-hour	Nitrogen Dioxide c) No. Days of Data	NO2 Max Conc. in ppm 1-hour	NO2 Max Conc. in ppm 24-hour	NO2 Annual Average AAM Conc. ppm	Sulfur Dioxide d) No. Days of Data	SO2 Max. Conc. in ppm 1-hour	SO2 Max. Conc. in ppm 24-hour	SO2 Annual Average AAM Conc. ppm
LOS ANGELES COUNTY																						
1	Central LA	087	362	3	2.6	362	0.11	0.079	0.077	0	0	0	8	4	360	0.11	0.06	0.0288	365	0.03	0.006	0.0019
2	Northwest Coastal LA County	091	365	3	2.0	365	0.10	0.074	0.069	0	0	0	3	0	365	0.08	0.05	0.0173	–	–	–	–
3	Southwest Coastal LA County	820	363	3	2.3	360	0.08	0.066	0.062	0	0	0	0	0	351	0.10	0.05	0.0155	363	0.02	0.006	0.0020
4	South Coastal LA County 1	072	360	4	3.4	364	0.08	0.058	0.058	0	0	0	0	0	357	0.10	0.05	0.0215	364	0.03	0.010	0.0012
4	South Coastal LA County 2	077	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
6	West San Fernando Valley	074	365	5	3.4	361	0.16	0.108	0.105	1	6	17	32	39	363	0.07	0.04	0.0174	–	–	–	–
7	East San Fernando Valley	069	365	4	3.5	365	0.17	0.128	0.099	2	6	12	25	23	365	0.10	0.05	0.0274	360	0.01	0.004	0.0006
8	West San Gabriel Valley	088	360	4	2.8	365	0.15	0.117	0.095	1	5	7	25	24	365	0.12	0.06	0.0245	–	–	–	–
9	East San Gabriel Valley 1	060	365	2	1.7	364	0.17	0.120	0.091	2	7	10	23	19	365	0.11	0.07	0.0258	–	–	–	–
9	East San Gabriel Valley 2	591	363	2	2.0	363	0.18	0.128	0.107	2	10	15	37	31	362	0.10	0.06	0.0206	–	–	–	–
10	Pomona/Walnut Valley	075	365	3	2.1	365	0.15	0.128	0.109	2	9	16	32	30	365	0.10	0.06	0.0307	–	–	–	–
11	South San Gabriel Valley	085	232*	3*	2.7*	250*	0.13*	0.095*	0.080*	0*	1*	3*	9*	5*	204*	0.10*	0.06*	0.0283*	–	–	–	–
12	South Central LA County	084	365	8	6.4	365	0.09	0.066	0.064	0	0	0	0	0	363	0.14	0.08	0.0306	–	–	–	–
13	Santa Clarita Valley	090	363	2	1.3	359	0.16	0.120	0.112	1	20	40	62	64	359	0.08	0.04	0.0184	–	–	–	–
ORANGE COUNTY																						
16	North Orange County	3177	362	6	3.0	362	0.15	0.114	0.092	1	3	4	8	9	361	0.09	0.05	0.0224	–	–	–	–
17	Central Orange County	3176	365	5	3.0	365	0.11	0.088	0.072	0	0	1	5	3	343	0.11	0.06	0.0197	–	–	–	–
18	North Coastal Orange County	3195	365	4	3.0	365	0.07	0.064	0.062	0	0	0	0	0	361	0.10	0.05	0.0145	353	0.01	0.004	0.0013
19	Saddleback Valley	3812	365	2	1.8	356	0.12	0.105	0.092	0	0	6	13	17	–	–	–	–	–	–	–	–
RIVERSIDE COUNTY																						
22	Norco/Corona	4155	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
23	Metropolitan Riverside County 1	4144	365	3	2.1	365	0.15	0.116	0.113	1	8	30	45	59	365	0.08	0.05	0.0199	365	0.01	0.004	0.0013
23	Metropolitan Riverside County 2	4146	365	4	2.3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
23	Mira Loma	5214	364	4	2.7	364	0.16	0.119	0.107	1	4	25	39	48	332	0.08	0.05	0.0194	–	–	–	–
24	Perris Valley	4149	–	–	–	351	0.17	0.122	0.114	3	12	53	76	84	–	–	–	–	–	–	–	–
25	Lake Elsinore	4158	362	1	1.0	362	0.14	0.109	0.102	0	3	24	40	58	352	0.07	0.05	0.0151	–	–	–	–
29	Banning Airport	4164	–	–	–	357	0.14	0.115	0.104	0	8	44	57	78	355	0.11	0.04	0.0161	–	–	–	–
30	Coachella Valley 1**	4137	365	2	1.0	361	0.13	0.109	0.101	0	2	23	37	67	359	0.09	0.05	0.0103	–	–	–	–
30	Coachella Valley 2**	4157	–	–	–	364	0.10	0.089	0.087	0	0	7	4	29	–	–	–	–	–	–	–	–
SAN BERNARDINO COUNTY																						
32	Northwest San Bernardino Valley	5175	360	3	1.8	365	0.17	0.130	0.114	2	14	25	50	54	337	0.10	0.07	0.0310	–	–	–	–
33	Southwest San Bernardino Valley	5817	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
34	Central San Bernardino Valley 1	5197	365	3	2.0	361	0.16	0.123	0.116	1	12	29	47	49	362	0.09	0.06	0.0270	365	0.01	0.003	0.0019
34	Central San Bernardino Valley 2	5203	364	3	2.3	362	0.15	0.127	0.119	3	10	29	52	57	362	0.09	0.05	0.0252	–	–	–	–
35	East San Bernardino Valley	5204	–	–	–	365	0.16	0.135	0.125	5	11	36	60	64	–	–	–	–	–	–	–	–
37	Central San Bernardino Mountains	5181	–	–	–	365	0.16	0.142	0.112	2	9	59	71	96	–	–	–	–	–	–	–	–
38	East San Bernardino Mountains	5818	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	DISTRICT MAXIMUM			8	6.4		0.18	0.142	0.125	5	20	59	76	96		0.14	0.08	0.0310		0.03	0.010	0.0020
	SOUTH COAST AIR BASIN			8	6.4		0.18	0.142	0.125	10	35	86	102	121		0.14	0.08	0.0310		0.03	0.010	0.0020

ppm - Parts Per Million parts of air, by volume. AAM = Annual Arithmetic Mean -- - Pollutant not monitored.

* Less than 12 full months of data. May not be representative. ** Salton Sea Air Basin.

a) - The federal 8-hour standard (8-hour average CO > 9 ppm) and state 8-hour standard (8-hour average CO > 9.0 ppm) were not exceeded. The federal and state 1-hour standards (35 ppm and 20 ppm) were not exceeded, either.

b) - The federal 1-hour ozone standard was revoked and replaced by the 8-hour average ozone standard effective June 15, 2005. The 8-hour average California ozone standard of 0.07 ppm was established effective May 17, 2006.

c) - The state standard is 1-hour average NO_2 > 0.25 ppm. The federal standard is annual arithmetic mean NO_2 > 0.0534 ppm. Air Resources Board has approved to lower the NO_2 1-hour standard to 0.18 ppm and establish a new annual standard of 0.030 ppm. The revisions are expected to become effective later in 2007.

d) - The state standards are 1-hour average SO_2 > 0.25 ppm and 24-hour average SO_2 > 0.04 ppm. The federal standards are annual arithmetic mean SO_2 > 0.03 ppm, 24-hour average > 0.14 ppm, and 3-hour average > 0.50 ppm. The federal and state SO_2 standards were not exceeded.

South Coast Air Quality Management District
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The map showing the locations of source/receptor areas can be accessed via the Internet at http://www.aqmd.gov/telemweb/areamap.aspx. Locations of source/receptor areas are shown on the "South Coast Air Quality Management District Air Monitoring Areas" map available free of charge from SCAQMD Public Information.

2006 AIR QUALITY
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

2006

No.	Source/Receptor Area Location	Station No.	PM10 e): No. Days of Data	PM10: Max. Conc. in µg/m³ 24-hour	PM10: No. (%) Samples Exceeding Standard Federal > 150 µg/m³ 24-hour	PM10: No. (%) Samples Exceeding Standard State > 50 µg/m³ 24-hour	PM10: Annual Average AAM h) Conc. µg/m³	PM2.5 f): No. Days of Data	PM2.5: Max. Conc. in µg/m³ 24-hour	PM2.5: 98th Percentile Conc. in µg/m³ 24-hour	PM2.5: No. (%) Samples Exceeding Standard Federal i) > 35 µg/m³ 24-hour	PM2.5: No. (%) Samples Exceeding Standard Federal i) > 65 µg/m³ 24-hour	PM2.5: Annual Averages AAM j) Conc. µg/m³	TSP g): No. Days of Data	TSP: Max. Conc. in µg/m³ 24-hour	TSP: Annual Average AAM Conc. µg/m³	Lead g): Max. Monthly Average Conc. k) µg/m³	Lead: Max. Quarterly Average Conc. k) µg/m³	Sulfate g): Max. Conc. in µg/m³ 24-hour	Sulfate: No. (%) Samples Exceeding Standard State ≥ 25 µg/m³ 24-hour
	LOS ANGELES COUNTY																			
1	Central LA	087	59	59	0	3(5.1)	30.3	330	56.2	38.9	11(3.3)	0	15.6	59	109	63.3	0.02	0.01	18.2	0
2	Northwest Coastal LA County	091	–	–	–	–	–	–	–	–	–	–	–	56	76	40.2	–	–	12.2	0
3	Southwest Coastal LA County	820	51	45	0	0	26.5	–	–	–	–	–	–	56	84	43.1	0.01	0.01	13.6	0
4	South Coastal LA County 1	072	61	78	0	6(9.8)	31.1	290*	58.5*	34.9*	5(1.7)*	0*	14.2*	62	157	62.9	0.01	0.01	17.8	0
4	South Coastal LA County 2	077	58	117	0	19(32.7)	45.0	320	53.6	35.3	6(1.9)	0	14.5	59	192	71.1	0.01	0.01	18.8	0
6	West San Fernando Valley	074	–	–	–	–	–	92	44.1	32.0	1(1.1)	0	12.9	–	–	–	–	–	–	–
7	East San Fernando Valley	069	54	71	0	10(18.5)	35.6	104	50.7	43.4	6(5.8)	0	16.6	–	–	–	–	–	–	–
8	West San Gabriel Valley	088	–	–	–	–	–	113	45.9	32.1	1(0.9)	0	13.4	60	123	42.8	–	–	28.7	1(1.7)
9	East San Gabriel Valley 1	060	58	81	0	7(12.1)	31.9	278*	52.8*	38.5*	8(2.9)*	0*	15.5*	59	142	68.4	–	–	20.8	0
9	East San Gabriel Valley 2	591	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
10	Pomona/Walnut Valley	075	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
11	South San Gabriel Valley	085	–	–	–	–	–	116	72.2	43.1	7(6)	1(0.9)	16.7	58	768	79.3	0.03	0.02	28.6	1(1.7)
12	South Central LA County	084	–	–	–	–	–	107	55.0	44.5	4(3.7)	0	16.7	58	147	68.4	0.02	0.02	24.1	0
13	Santa Clarita Valley	090	58	53	0	1(1.7)	23.4	–	–	–	–	–	–	–	–	–	–	–	–	–
	ORANGE COUNTY																			
16	North Orange County	3177	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
17	Central Orange County	3176	56	104	0	7(12.5)	33.4	330	56.2	40.5	8(2.4)	0	14.1	–	–	–	–	–	–	–
18	North Coastal Orange County	3195	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
19	Saddleback Valley	3812	50	57	0	1(2.0)	22.8	106	47.0	25.7	1(0.9)	0	11.0	–	–	–	–	–	–	–
	RIVERSIDE COUNTY																			
22	Norco/Corona	4155	57	74	0	10(17.5)	36.5	–	–	–	–	–	–	–	–	–	–	–	–	–
23	Metropolitan Riverside County 1	4144	118	109	0	71(60.2)	54.4	300	68.5	53.7	32(10.7)	1(0.3)	19.0	59	169	91.2	0.01	0.01	10.8	0
23	Metropolitan Riverside County 2	4146	–	–	–	–	–	105	55.3	47.7	9(8.6)	0	17.0	59	131	72.9	0.01	0.01	9.9	0
23	Mira Loma	5214	59	124	0	41(69.5)	64.0	113	63.0	52.5	14(12.4)	0	20.6	–	–	–	–	–	–	–
24	Perris Valley	4149	54	125	0	19(35.2)	45.0	–	–	–	–	–	–	–	–	–	–	–	–	–
25	Lake Elsinore	4158	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
29	Banning Airport	4164	55	75	0	8(14.6)	31.1	–	–	–	–	–	–	–	–	–	–	–	–	–
30	Coachella Valley 1**	4137	57	73+	0+	2(3.5)+	24.5+	111	24.8	15.9	0	0	7.7	–	–	–	–	–	–	–
30	Coachella Valley 2**	4157	115	122+	0+	57(49.6)+	52.7+	107	24.3	19.1	0	0	9.5	–	–	–	–	–	–	–
	SAN BERNARDINO COUNTY																			
32	Northwest San Bernardino Valley	5175	–	–	–	–	–	–	–	–	–	–	–	58	105	54.6	0.01	0.01	9.1	0
33	Southwest San Bernardino Valley	5817	62	78	0	17(27.4)	42.3	107	53.7	41.5	7(6.5)	0	18.5	–	–	–	–	–	–	–
34	Central San Bernardino Valley 1	5197	60	142	0	31(51.7)	53.5	112	52.6	43.8	7(6.3)	0	17.6	59	190	101.0	–	–	10.3	0
34	Central San Bernardino Valley 2	5203	57	92	0	24(42.1)	46.0	102	55.0	48.4	8(7.8)	0	17.8	54	174	87.0	0.02	0.01	11.0	0
35	East San Bernardino Valley	5204	60	103	0	12(20.0)	36.2	–	–	–	–	–	–	–	–	–	–	–	–	–
37	Central San Bernardino Mountains	5181	58	63	0	1(1.7)	26.2	–	–	–	–	–	–	–	–	–	–	–	–	–
38	East San Bernardino Mountains	5818	–	–	–	–	–	42*	40.1*	40.1*	1(2.4)*	0*	11.2*	–	–	–	–	–	–	–
	DISTRICT MAXIMUM			142+	0+	71	64.0		72.2	53.7	32	1	20.6		768	101.0	0.03	0.02	28.7	1
	SOUTH COAST AIR BASIN			142+	0+	75	64.0		72.2	53.7	32	1	20.6		768	101.0	0.03	0.02	28.7	1

µg/m³ - Micrograms per cubic meter of air AAM - Annual Arithmetic Mean -- - Pollutant not monitored

* Less than 12 full months of data. May not be representative. ** Salton Sea Air Basin.

e) - PM10 samples were collected every 6 days at all sites except for Station Numbers 4144 and 4157 where samples were collected every 3 days.

f) - PM2.5 samples were collected every 3 days at all sites except for the following sites: Station Numbers 060, 072, 077, 087, 3176, and 4144 where samples were taken every day, and Station Number 5818 where samples were taken every 6 days.

g) - Total suspended particulates, lead, and sulfate were determined from samples collected every 6 days by the high volume sampler method, on glass fiber filter media.

h) - Federal annual PM10 standard (AAM > 50 µg/m³) was revoked effective December 17, 2006. State standard is annual average (AAM) > 20 µg/m³.

i) - U.S. EPA has revised the federal 24-hour PM2.5 standard from 65 µg/m³ to 35 µg/m³; effective December 17, 2006.

j) - Federal PM2.5 standard is annual average (AAM) > 15 µg/m³. State standard is annual average (AAM) > 12 µg/m³.

k) - Federal lead standard is quarterly average > 1.5 µg/m³; and state standard is monthly average ≥ 1.5 µg/m³. No location exceeded lead standards. Maximum monthly and quarterly lead concentrations at special monitoring sites immediately downwind of stationary lead sources were 0.24 µg/m³ and 0.22 µg/m³, respectively, both recorded at Central Los Angeles.

\+ - The data for the samples collected on a high-wind day (July 16, 2006) at Palm Springs and Indio (226 µg/m³ and 313 µg/m³, respectively) were excluded in accordance with EPA's Natural Events Policy.

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Table I-B-8

2007 AIR QUALITY
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

2007

Source/Receptor Area No.	Location	Station No. State Code	Station No. District Code	Carbon Monoxide[a] No. Days of Data	Carbon Monoxide Max. Conc. in ppm 1-hour	Carbon Monoxide Max Conc. in ppm 8-hour	Ozone No. Days of Data	Ozone Max. Conc. in ppm 1-hour	Ozone Max. Conc. in ppm 8-hour	Ozone Fourth High Conc. ppm 8-hour	Ozone Health Advisory ≥ 0.15 ppm 1-hour	No. Days Standard Exceeded, Federal[b] > 0.12 ppm 1-hour	Federal > 0.08 ppm 8-hour	Federal > 0.075 ppm 8-hour	State[c] > 0.09 ppm 1-hour	State > 0.070 ppm 8-hour	Nitrogen Dioxide[d] No. Days of Data	Nitrogen Dioxide Max Conc. in ppm 1-hour	Nitrogen Dioxide Annual Average AAM Conc. ppm	Sulfur Dioxide[e] No. Days of Data	Sulfur Dioxide Max. Conc. in ppm 1-hour	Sulfur Dioxide Max. Conc. in ppm 24-hour	Sulfur Dioxide Annual Average AAM Conc. ppm
	LOS ANGELES COUNTY																						
1	Central LA	70087	087	359	3	2.2	355	0.115	0.102	0.072	0	0	2	3	3	6	360	0.10	0.0299	351	0.01	0.003	0.0009
2	Northwest Coastal LA County	70091	091	365	3	1.9	360	0.117	0.087	0.067	0	0	1	2	2	2	353	0.08	0.0200	–	–	–	–
3	Southwest Coastal LA County	70111	820	361	3	2.4	361	0.087	0.074	0.066	0	0	0	0	0	1	331*	0.08	0.0140	361	0.02	0.009	0.0028
4	South Coastal LA County 1	70072	072	347*	3	2.6	365	0.099	0.073	0.056	0	0	0	0	1	1	365	0.11	0.0207	365	0.11	0.011	0.0027
4	South Coastal LA County 2	70110	077	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
6	West San Fernando Valley	70074	074	358	4	2.8	358	0.129	0.104	0.092	0	1	8	28	21	43	358	0.08	0.0186	–	–	–	–
7	East San Fernando Valley	70069	069	365	4	2.8	365	0.116	0.096	0.088	0	0	6	13	13	19	363	0.09	0.0289	365	0.01	0.003	0.0010
8	West San Gabriel Valley	70088	088	365	3	2.4	365	0.149	0.100	0.089	0	3	6	11	13	21	365	0.09	0.0246	–	–	–	–
9	East San Gabriel Valley 1	70060	060	365	3	2.0	365	0.158	0.112	0.096	1	3	13	20	22	28	365	0.12	0.0253	–	–	–	–
9	East San Gabriel Valley 2	70591	591	365	2	2.0	364	0.147	0.116	0.104	0	3	14	26	25	40	365	0.11	0.0227	–	–	–	–
10	Pomona/Walnut Valley	70075	075	365	3	2.1	365	0.153	0.108	0.102	1	2	10	18	19	25	365	0.10	0.0318	–	–	–	–
11	South San Gabriel Valley	70185	085	365	5	2.9	364	0.135	0.100	0.079	0	2	2	5	6	9	361	0.11	0.0249	–	–	–	–
12	South Central LA County	70084	084	365	8	5.1	365	0.102	0.077	0.056	0	0	0	1	1	2	365	0.10	0.0291	–	–	–	–
13	Santa Clarita Valley	70090	090	361	2	1.2	357	0.135	0.110	0.101	0	2	16	44	31	64	339*	0.08	0.0196	–	–	–	–
	ORANGE COUNTY																						
16	North Orange County	30177	3177	360	6	3.3	365	0.152	0.107	0.082	1	1	2	8	7	9	365	0.08	0.0219	–	–	–	–
17	Central Orange County	30178	3176	346*	4	2.9	365	0.127	0.099	0.073	0	1	1	1	2	7	359	0.10	0.0208	–	–	–	–
18	North Coastal Orange County	30195	3195	362	5	3.1	362	0.082	0.072	0.065	0	0	0	0	0	2	362	0.07	0.0132	358	0.01	0.004	0.0010
19	Saddleback Valley	30002	3812	364	3	2.1	365	0.108	0.089	0.080	0	0	2	5	5	10	–	–	–	–	–	–	–
	RIVERSIDE COUNTY																						
22	Norco/Corona	33155	4155	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
23	Metropolitan Riverside County 1	33144	4144	364	4	2.9	365	0.131	0.111	0.099	0	2	15	46	31	69	364	0.07	0.0206	323*	0.02	0.002	0.0017
23	Metropolitan Riverside County 2	33146	4146	365	4	2.1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
23	Mira Loma	33165	5214	359	3	2.1	360	0.118	0.104	0.092	0	0	10	23	16	48	349*	0.07	0.0181	–	–	–	–
24	Perris Valley	33149	4149	–	–	–	365	0.139	0.116	0.103	0	4	37	73	66	88	–	–	–	–	–	–	–
25	Lake Elsinore	33158	4158	365	2	2.3	359	0.130	0.108	0.097	0	3	19	35	26	55	358	0.06	0.0174	–	–	–	–
29	Banning Airport	33164	4164	–	–	–	365	0.129	0.113	0.095	0	1	12	43	28	63	363	0.08	0.0147	–	–	–	–
30	Coachella Valley 1**	33137	4137	365	2	1.0	365	0.126	0.101	0.097	0	1	20	58	29	83	365	0.06	0.0103	–	–	–	–
30	Coachella Valley 2**	33155	4157	–	–	–	365	0.106	0.094	0.087	0	0	6	29	8	48	–	–	–	–	–	–	–
	SAN BERNARDINO COUNTY																						
32	Northwest San Bernardino Valley	36175	5175	365	2	1.6	365	0.145	0.115	0.112	0	7	18	35	32	55	327*	0.10	0.0276	–	–	–	–
33	Southwest San Bernardino Valley	36025	5817	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
34	Central San Bernardino Valley 1	36197	5197	359	3	1.8	359	0.144	0.122	0.112	0	9	19	43	40	60	358	0.09	0.0239	359	0.01	0.004	0.0019
34	Central San Bernardino Valley 2	36203	5203	365	4	2.3	365	0.153	0.121	0.117	1	8	24	51	48	74	351	0.08	0.0245	–	–	–	–
35	East San Bernardino Valley	36204	5204	–	–	–	365	0.149	0.124	0.112	0	7	25	58	54	79	–	–	–	–	–	–	–
37	Central San Bernardino Mountains	36181	5181	–	–	–	365	0.171	0.137	0.126	4	13	59	93	67	115	–	–	–	–	–	–	–
38	East San Bernardino Mountains	36001	5818	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	DISTRICT MAXIMUM				8	5.1		0.171	0.137	0.126	4	13	59	93	67	115		0.12	0.0318		0.11	0.011	0.0028
	SOUTH COAST AIR BASIN				8	5.1		0.171	0.137	0.126	5	18	79	108	96	128		0.12	0.0318		0.11	0.011	0.0028

ppm - Parts Per Million parts of air, by volume. AAM = Annual Arithmetic Mean -- - Pollutant not monitored.

* Less than 12 full months of data; may not be representative. ** Salton Sea Air Basin.

a) - The federal 8-hour standard (8-hour average CO > 9 ppm) and state 8-hour standard (8-hour average CO > 9.0 ppm) were not exceeded. The federal and state 1-hour standards (35 ppm and 20 ppm) were not exceeded, either.

b) - The federal 1-hour ozone standard was revoked and replaced by the 8-hour average ozone standard effective June 15, 2005. U.S. EPA has revised the federal 8-hour ozone standard from 0.084 ppm to 0.075 ppm, effective May 27, 2008.

c) - The 8-hour average California ozone standard of 0.070 ppm was established effective May 17, 2006.

d) - The federal standard is annual arithmetic mean $NO_2 > 0.0534$ ppm. California Air Resources Board has revised the NO_2 1-hour state standard from 0.25 ppm to 0.18 ppm and has established a new annual standard of 0.030 ppm, effective March 20, 2008.

e) - The state standards are 1-hour average $SO_2 > 0.25$ ppm and 24-hour average $SO_2 > 0.04$ ppm. The federal standards are annual arithmetic mean $SO_2 > 0.03$ ppm, 24-hour average > 0.14 ppm, and 3-hour average > 0.50 ppm. The federal and state SO_2 standards were not exceeded.

South Coast
Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765-4182
www.aqmd.gov

The map showing the locations of source/receptor areas can be accessed via the Internet at http://www.aqmd.gov/telemweb/areamap.aspx. Locations of source/receptor areas are shown on the "South Coast Air Quality Management District Air Monitoring Areas" map available free of charge from SCAQMD Public Information.

Due to technical difficulties, lead and sulfate data are not available and will be provided at a later time.

2007 AIR QUALITY
SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

2007

Source/Receptor Area No.	Location	Station No. State Code	Station No. District Code	Suspended Particulates PM10 f) No. Days of Data	PM10 Max. Conc. in µg/m³ 24-hour	PM10 No. (%) Samples Exceeding Standards: Federal > 150 µg/m³ 24-hour	PM10 No. (%) Samples Exceeding Standards: State > 50 µg/m³ 24-hour	PM10 Annual Average Conc. i) (AAM) µg/m³	Fine Particulates PM2.5 g) No. Days of Data	PM2.5 Max. Conc. in µg/m³ 24-hour	PM2.5 98th Percentile Conc. in µg/m³ 24-hour	PM2.5 No. (%) Samples Exceeding Federal Standard: Current > 35 j) µg/m³ 24-hour	PM2.5 No. (%) Samples Exceeding Federal Standard: Old > 65 j) µg/m³ 24-hour	PM2.5 Annual Average Conc. k) (AAM) µg/m³	Particulates h) No. Days of Data	Particulates Max. Conc. in µg/m³ 24-hour	Particulates Annual Average Conc. (AAM) µg/m³	Lead h) Max. Monthly Average Conc. l) µg/m³	Lead h) Max. Quarterly Average Conc. l) µg/m³	Sulfate h) Max. Conc. l) in µg/m³ 24-hour	Sulfate h) %Samples Exceeding State Standard ≥ 25 µg/m³ 24-hour
	LOS ANGELES COUNTY																				
1	Central LA	70087	087	57	78	0	5(9)	33.3	324	64.2	51.2	20(0.6)	0	16.8	58	194	73.5				
2	Northwest Coastal LA County	70091	091	--	--	--	--	--	--	--	--	--	--	--	57	180	57.6				
3	Southwest Coastal LA County	70111	820	56	96	0	2(4)	27.7	--	--	--	--	--	--	55	286	51.8				
4	South Coastal LA County 1	70072	072	58	75+	0+	5(9)+	30.2+	332	82.9	40.8	12(3.6)	1(0.3)	14.6	59	732	76.5				
4	South Coastal LA County 2	70110	077	57	123+	0+	17(30)+	41.7+	326	68.0	33.7	6(1.8)	1(0.3)	13.7	58	694	79.4				
6	West San Fernando Valley	70074	074	--	--	--	--	--	95	43.3	33.4	1(1.1)	0	13.1	--	--	--				
7	East San Fernando Valley	70069	069	55	109	0	11(20)	40.0	98	56.5	47.7	9(9.2)	0	16.8	--	--	--				
8	West San Gabriel Valley	70088	088	--	--	--	--	--	108	68.9	45.4	3(2.8)	1(0.9)	14.3	56	123	46.3				
9	East San Gabriel Valley 1	70060	060	57	83+	0+	11(19)+	35.6+	292*	63.8	49.3	19(6.5)	0	15.9	58	243	77.8				
9	East San Gabriel Valley 2	70591	591	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
10	Pomona/Walnut Valley	70075	075	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
11	South San Gabriel Valley	70185	085	--	--	--	--	--	101	63.6	49.5	5(5.0)	0	16.7	55	196	76.0				
12	South Central LA County	70084	084	--	--	--	--	--	106	49.0	46.1	4(3.8)	0	15.9	59	327	78.8				
13	Santa Clarita Valley	70090	090	58	131+	0+	5(9)+	29.9+	--	--	--	--	--	--	--	--	--				
	ORANGE COUNTY																				
16	North Orange County	30177	3177	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
17	Central Orange County	30178	3176	59	75+	0+	5(9)+	31.0+	336	79.4	46.5	14(4.2)	1(0.3)	14.5	--	--	--				
18	North Coastal Orange County	30195	3195	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
19	Saddleback Valley	30002	3812	58	74	0	3(5)	23.0	98	46.9	35.0	2(2.0)	0	11.3	--	--	--				
	RIVERSIDE COUNTY																				
22	Norco/Corona	33155	4155	59	93+	0+	10(17)+	39.6+	--	--	--	--	--	--	--	--	--				
23	Metropolitan Riverside County 1	33144	4144	116	118+	0+	66(51)+	54.7+	295*	75.7	54.3	33(11.2)	3(1.0)	19.1	57	237	111.0				
23	Metropolitan Riverside County 2	33146	4146	--	--	--	--	--	101	68.6	57.3	8(7.9)	1(1.0)	18.1	60	674	88.9				
23	Mira Loma	33165	5214	56	142	0	41(73)	68.5	110	69.7	60.1	13(11.8)	1(0.9)	21.0	--	--	--				
24	Perris Valley	33149	4149	59	120+	0+	32(54)+	54.8+	--	--	--	--	--	--	--	--	--				
25	Lake Elsinore	33158	4158	--	--	--	--	--	--	--	--	--	--	--	--	--	--				
29	Banning Airport	33164	4164	49*	78	0	7(14)	33.3	--	--	--	--	--	--	--	--	--				
30	Coachella Valley 1**	33137	4137	55	83	0	6(11)	30.5	104	32.5	20.5	0	0	8.7	--	--	--				
30	Coachella Valley 2**	33155	4157	87*	146+	0+	51(59)+	53.5+	97	26.8	26.5	0	0	9.8	--	--	--				
	SAN BERNARDINO COUNTY																				
32	Northwest San Bernardino Valley	36175	5175	--	--	--	--	--	--	--	--	--	--	--	60	206	63.5				
33	Southwest San Bernardino Valley	36025	5817	58	115+	0+	14(24)+	43.4+	102	72.8	53.0	6(5.9)	1(1.0)	17.9	--	--	--				
34	Central San Bernardino Valley 1	36197	5197	58	111+	0+	33(57)+	54.9+	107	77.5	64.9	10(9.3)	2(1.9)	19.0	58	242	96.2				
34	Central San Bernardino Valley 2	36203	5203	58	136+	0+	28(48)+	51.4+	99	72.1	68.4	11(11.1)	3(3.0)	18.3	59	536	106.9				
35	East San Bernardino Valley	36204	5204	60	97	0	19(32)	39.7	--	--	--	--	--	--	--	--	--				
37	Central San Bernardino Mountains	36181	5181	54	89	0	2(4)	27.2	--	--	--	--	--	--	--	--	--				
38	East San Bernardino Mountains	36001	5818	--	--	--	--	--	54	45.4	34.0	1(1.9)	0	10.4	--	--	--				
	DISTRICT MAXIMUM				146+	0+	66+	68.5+		82.9	68.4	33	3	21.0		732	111.0				
	SOUTH COAST AIR BASIN				142+	0+	79+	68.5+		82.9	68.4	48	8	21.0		732	111.0				

µg/m³ - Micrograms per cubic meter of air. AAM = Annual Arithmetic Mean -- - Pollutant not monitored.

* Less than 12 full months of data; may not be representative. ** Salton Sea Air Basin.

f) - PM10 samples were collected every 6 days at all sites except for Station Numbers 4144 and 4157 where samples were collected every 3 days.

g) - PM2.5 samples were collected every 3 days at all sites except for the following sites: Station Numbers 060, 072, 077, 087, 3176, and 4144 where samples were taken every day, and Station Number 5818 where samples were taken every 6 days.

h) - Total suspended particulates, lead, and sulfate were determined from samples collected every 6 days by the high volume sampler method, on glass fiber filter media.

i) - Federal annual PM10 standard (AAM > 50 µg/m³) was revoked effective December 17, 2006. State standard is annual average (AAM) > 20 µg/m³.

j) - U.S. EPA has revised the federal 24-hour PM2.5 standard from 65 µg/m³ to 35 µg/m³; effective December 17, 2006.

k) - Federal PM2.5 standard is annual average (AAM) > 15 µg/m³. State standard is annual average (AAM) > 12 µg/m³.

l) - Federal lead standard is quarterly average > 1.5 µg/m³; and state standard is monthly average ≥ 1.5 µg/m³. Lead and sulfate data analysis is incomplete and data is not available at this time.

\+ - The following PM10 data samples were excluded from compliance consideration in accordance with the EPA Exceptional Event Regulation: 210 and 157 ug/m3 on March 22 and April 6, respectively, at Coachella Valley 2 (high wind events); 167 ug/m3 on April 12 at Perris Valley (high wind event); 165 and 155 ug/m3 on July 5 at East San Gabriel 1 and Central San Bernardino Valley 1, respectively (fireworks displays); and high concentration throughout the District on October 21, with a maximum concentration of 559 ug/m3 at Metropolitan Riverside County 1 (high wind and wildfire event).

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Building Height and Coordinate Data

Table I-B-9 (18 pages)

59		
'H1A'	1	9.1105
10	18.288	
384776.0012	3742301.784	
384774.0181	3742308.867	
384774.0181	3742320.907	
384773.3098	3742323.032	
384773.3098	3742330.681	
384784.3586	3742330.681	
384784.3586	3742323.032	
384783.2254	3742321.049	
384783.2254	3742308.867	
384781.6672	3742301.784	
'H1B'	1	8.8392
4	8.8392	
384774.0181	3742330.539	
384774.0181	3742338.472	
384783.5087	3742338.472	
384783.5087	3742330.539	
'H1C'	1	8.8392
12	6.7056	
384773.1221	3742338.361	
384773.061	3742339.521	
384774.1598	3742339.521	
384775.9299	3742350.63	
384775.9299	3742353.621	
384777.3949	3742358.626	
384780.0196	3742358.687	
384781.5456	3742353.621	
384781.5456	3742350.752	
384783.3158	3742339.582	
384784.3535	3742339.521	
384784.3535	3742338.422	
'H2A'	1	8.5314
10	18.288	
384829.3412	3742301.784	
384827.3581	3742308.867	
384827.3581	3742320.907	
384826.6498	3742323.032	
384826.6498	3742330.681	
384837.6986	3742330.681	
384837.6986	3742323.032	
384836.5654	3742321.049	
384836.5654	3742308.867	
384835.0072	3742301.784	
'H2B'	1	8.5314
4	8.8392	
384827.3581	3742330.539	
384827.3581	3742338.472	
384836.8487	3742338.472	
384836.8487	3742330.539	
'H2C'	1	8.5314
12	6.7056	
384826.4621	3742338.361	
384826.401	3742339.521	
384827.4998	3742339.521	
384829.2699	3742350.63	
384829.2699	3742353.621	
384830.7349	3742358.626	
384833.3596	3742358.687	
384834.8856	3742353.621	
384834.8856	3742350.752	
384836.6558	3742339.582	
384837.6935	3742339.521	
384837.6935	3742338.422	
'H3A'	1	8.2296

10	18.288	
384882.6812	3742301.784	
384880.6981	3742308.867	
384880.6981	3742320.907	
384879.9898	3742323.032	
384879.9898	3742330.681	
384891.0386	3742330.681	
384891.0386	3742323.032	
384889.9054	3742321.049	
384889.9054	3742308.867	
384888.3472	3742301.784	
'H3B'	1	8.51
4	8.8392	
384880.6981	3742330.539	
384880.6981	3742338.472	
384890.1887	3742338.472	
384890.1887	3742330.539	
'H3C'	1	8.5314
12	6.7056	
384879.8021	3742338.361	
384879.741	3742339.521	
384880.8398	3742339.521	
384882.6099	3742350.63	
384882.6099	3742353.621	
384884.0749	3742358.626	
384886.6996	3742358.687	
384888.2256	3742353.621	
384888.2256	3742350.752	
384889.9958	3742339.582	
384891.0335	3742339.521	
384891.0335	3742338.422	
'H4A'	1	8.8087
10	18.288	
384936.0212	3742301.784	
384934.0381	3742308.867	
384934.0381	3742320.907	
384933.3298	3742323.032	
384933.3298	3742330.681	
384944.3786	3742330.681	
384944.3786	3742323.032	
384943.2454	3742321.049	
384943.2454	3742308.867	
384941.6872	3742301.784	
'H4B'	1	8.8392
4	8.8392	
384934.0381	3742330.539	
384934.0381	3742338.472	
384943.5287	3742338.472	
384943.5287	3742330.539	
'H4C'	1	8.8392
12	6.7056	
384933.1421	3742338.361	
384933.081	3742339.521	
384934.1798	3742339.521	
384935.9499	3742350.63	
384935.9499	3742353.621	
384937.4149	3742358.626	
384940.0396	3742358.687	
384941.5656	3742353.621	
384941.5656	3742350.752	
384943.3358	3742339.582	
384944.3735	3742339.521	
384944.3735	3742338.422	
'H5A'	1	9.269
10	18.288	
384722.6612	3742301.784	
384720.6781	3742308.867	
384720.6781	3742320.907	
384719.9698	3742323.032	
384719.9698	3742330.681	
384731.0186	3742330.681	

384731.0186	3742323.032	
384729.8854	3742321.049	
384729.8854	3742308.867	
384728.3272	3742301.784	
'H5B'	1	9.4488
4	8.8392	
384720.6781	3742330.539	
384720.6781	3742338.472	
384730.1687	3742338.472	
384730.1687	3742330.539	
'H5C'	1	9.4397
12	6.7056	
384719.7821	3742338.361	
384719.721	3742339.521	
384720.8198	3742339.521	
384722.5899	3742350.63	
384722.5899	3742353.621	
384724.0549	3742358.626	
384726.6796	3742358.687	
384728.2056	3742353.621	
384728.2056	3742350.752	
384729.9758	3742339.582	
384731.0135	3742339.521	
384731.0135	3742338.422	
'COOLT'	1	8.5314
4	10.0584	
385053	3742260	
385053	3742362.413	
385069.764	3742362.413	
385069.764	3742260	
'B1A'	1	8.8392
14	3.6576	
384790.0302	3742357.467	
384760.7309	3742357.711	
384760.7919	3742350.874	
384752.7957	3742350.935	
384752.6736	3742357.65	
384746.2643	3742357.772	
384746.1423	3742364.791	
384752.7346	3742364.914	
384752.7346	3742371.079	
384760.853	3742370.957	
384760.914	3742364.669	
384781.5456	3742364.791	
384781.5456	3742362.899	
384790.0302	3742362.777	
'B1B'	1	8.8392
4	13.4112	
384752.6736	3742351.057	
384752.6736	3742371.018	
384760.853	3742371.018	
384760.914	3742350.935	
'B1C'	1	8.8392
8	3.6576	
384781.5456	3742370.468	
384781.5456	3742375.229	
384782.4002	3742375.168	
384782.3391	3742376.633	
384788.6263	3742376.694	
384788.6263	3742375.229	
384789.4809	3742375.229	
384789.4809	3742370.468	
'B2A'	1	8.5314
14	3.6576	
384843.3702	3742357.467	
384814.0709	3742357.711	
384814.1319	3742350.874	
384806.1357	3742350.935	
384806.0136	3742357.65	
384799.6043	3742357.772	
384799.4823	3742364.791	

384806.0746	3742364.914	
384806.0746	3742371.079	
384814.193	3742370.957	
384814.254	3742364.669	
384834.8856	3742364.791	
384834.8856	3742362.899	
384843.3702	3742362.777	
'B2B'	1	8.8392
4	13.4112	
384806.0136	3742351.057	
384806.0136	3742371.018	
384814.193	3742371.018	
384814.254	3742350.935	
'B2C'	1	8.5314
8	3.6576	
384834.8856	3742370.468	
384834.8856	3742375.229	
384835.7402	3742375.168	
384835.6791	3742376.633	
384841.9663	3742376.694	
384841.9663	3742375.229	
384842.8209	3742375.229	
384842.8209	3742370.468	
'B3A'	1	8.5314
14	3.6576	
384896.7102	3742357.467	
384867.4109	3742357.711	
384867.4719	3742350.874	
384859.4757	3742350.935	
384859.3536	3742357.65	
384852.9443	3742357.772	
384852.8223	3742364.791	
384859.4146	3742364.914	
384859.4146	3742371.079	
384867.533	3742370.957	
384867.594	3742364.669	
384888.2256	3742364.791	
384888.2256	3742362.899	
384896.7102	3742362.777	
'B3B'	1	8.5314
4	13.4112	
384859.3536	3742351.057	
384859.3536	3742371.018	
384867.533	3742371.018	
384867.594	3742350.935	
'B3C'	1	8.5496
8	3.6576	
384888.2256	3742370.468	
384888.2256	3742375.229	
384889.0802	3742375.168	
384889.0191	3742376.633	
384895.3063	3742376.694	
384895.3063	3742375.229	
384896.1609	3742375.229	
384896.1609	3742370.468	
'B4A'	1	8.8392
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384912.8157	3742350.935	
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384920.873	3742370.957	
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'B4B'	1	8.8392
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385277.13	3742115.3	
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385212.67	3742129.21	
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385204.81	3742127.65	
385201.26	3742125.75	
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385201.26	3742091.61	
385204.81	3742089.71	
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385112.32	3742102.05	
385114.22	3742098.5	
385116.77	3742095.39	
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385123.43	3742090.94	
385127.29	3742089.77	
385131.29	3742089.38	
385135.3	3742089.77	
385139.15	3742090.94	
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385042.88	3742090.53	
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385054.74	3742089.36	
385058.59	3742090.53	
385062.14	3742092.43	
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384980.83	3742130.15	
384976.87	3742132.26	
384972.58	3742133.56	
384968.13	3742134.	
384963.67	3742133.56	
384959.38	3742132.26	
384955.42	3742130.15	
384951.96	3742127.31	
384949.12	3742123.84	
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384945.7	3742106.68	
384947.01	3742102.4	
384949.12	3742098.44	
384951.96	3742094.98	
384955.42	3742092.14	
384959.38	3742090.02	
384963.67	3742088.72	
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384972.58	3742088.72	
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384980.83	3742092.14	
384984.29	3742094.98	
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384877.87	3742128.16	
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384843.14	3742109.6	
384844.31	3742105.74	
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384859.31	3742093.43	
384863.32	3742093.04	
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384790.09	3742132.36	
384786.53	3742134.26	
384782.67	3742135.43	
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384774.64	3742135.43	
384770.78	3742134.26	
384767.23	3742132.36	
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384758.48	3742119.27	
384758.08	3742115.25	
384758.48	3742111.24	

384759.65	3742107.38	
384761.55	3742103.82	
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384770.78	3742096.25	
384774.64	3742095.08	
384778.66	3742094.68	
384782.67	3742095.08	
384786.53	3742096.25	
384790.09	3742098.15	
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384677.51	3742111.24	
384678.68	3742107.38	
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384693.68	3742095.08	
384697.69	3742094.68	
384701.7	3742095.08	
384705.56	3742096.25	
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384712.24	3742100.71	
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384602.	3742133.18	
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384609.42	3742095.9	
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384617.45	3742095.9	
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384591.28	3742224.63	
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384625.04	3742265.46	
384628.59	3742263.56	
384632.45	3742262.39	
384636.45	3742262.	
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384578.57	3742288.83	
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384579.09	3742283.55	
384579.94	3742281.97	
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384582.46	3742279.45	
384584.04	3742278.6	
384585.76	3742278.08	
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384592.62	3742279.45	
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384545.88	3742295.48	
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384542.52	3742291.37	
384541.99	3742289.66	
384541.82	3742287.87	
384541.99	3742286.09	
384542.52	3742284.37	
384543.36	3742282.79	
384544.5	3742281.41	
384545.88	3742280.27	
384547.46	3742279.43	
384549.18	3742278.9	
384550.96	3742278.73	
384552.75	3742278.9	
384554.46	3742279.43	
384556.04	3742280.27	
384557.43	3742281.41	
384558.57	3742282.79	
384559.41	3742284.37	
384559.93	3742286.09	
'73'	1	8.5192
32	17.6784	
385228.8	3742183.48	
385228.62	3742185.26	
385228.1	3742186.98	
385227.26	3742188.56	
385226.12	3742189.95	
385224.74	3742191.08	
385223.15	3742191.93	
385221.44	3742192.45	
385219.66	3742192.62	
385217.87	3742192.45	
385216.16	3742191.93	
385214.58	3742191.08	
385213.19	3742189.95	
385212.05	3742188.56	
385211.21	3742186.98	
385210.69	3742185.26	
385210.51	3742183.48	
385210.69	3742181.7	
385211.21	3742179.98	
385212.05	3742178.4	
385213.19	3742177.01	
385214.58	3742175.88	
385216.16	3742175.03	
385217.87	3742174.51	
385219.66	3742174.34	
385221.44	3742174.51	
385223.15	3742175.03	
385224.74	3742175.88	
385226.12	3742177.01	
385227.26	3742178.4	
385228.1	3742179.98	
385228.62	3742181.7	
'74'	1	7.6596

32	17.6784	
385190.58	3742183.07	
385190.4	3742184.85	
385189.88	3742186.57	
385189.04	3742188.15	
385187.9	3742189.53	
385186.51	3742190.67	
385184.93	3742191.52	
385183.22	3742192.04	
385181.43	3742192.21	
385179.65	3742192.04	
385177.93	3742191.52	
385176.35	3742190.67	
385174.97	3742189.53	
385173.83	3742188.15	
385172.98	3742186.57	
385172.46	3742184.85	
385172.29	3742183.07	
385172.46	3742181.29	
385172.98	3742179.57	
385173.83	3742177.99	
385174.97	3742176.6	
385176.35	3742175.47	
385177.93	3742174.62	
385179.65	3742174.1	
385181.43	3742173.93	
385183.22	3742174.1	
385184.93	3742174.62	
385186.51	3742175.47	
385187.9	3742176.6	
385189.04	3742177.99	
385189.88	3742179.57	
385190.4	3742181.29	
'75'	1	7.3213
32	17.6784	
385152.35	3742183.07	
385152.18	3742184.85	
385151.66	3742186.57	
385150.81	3742188.15	
385149.68	3742189.53	
385148.29	3742190.67	
385146.71	3742191.52	
385144.99	3742192.04	
385143.21	3742192.21	
385141.43	3742192.04	
385139.71	3742191.52	
385138.13	3742190.67	
385136.74	3742189.53	
385135.61	3742188.15	
385134.76	3742186.57	
385134.24	3742184.85	
385134.07	3742183.07	
385134.24	3742181.29	
385134.76	3742179.57	
385135.61	3742177.99	
385136.74	3742176.6	
385138.13	3742175.47	
385139.71	3742174.62	
385141.43	3742174.1	
385143.21	3742173.93	
385144.99	3742174.1	
385146.71	3742174.62	
385148.29	3742175.47	
385149.68	3742176.6	
385150.81	3742177.99	
385151.66	3742179.57	
385152.18	3742181.29	
'76'	1	7.3213
32	26.8224	
385121.17	3742183.07	
385120.91	3742185.74	

385120.13	3742188.32	
385118.86	3742190.69	
385117.15	3742192.77	
385115.07	3742194.47	
385112.7	3742195.74	
385110.13	3742196.52	
385107.45	3742196.79	
385104.78	3742196.52	
385102.2	3742195.74	
385099.83	3742194.47	
385097.75	3742192.77	
385096.05	3742190.69	
385094.78	3742188.32	
385094.	3742185.74	
385093.74	3742183.07	
385094.	3742180.39	
385094.78	3742177.82	
385096.05	3742175.45	
385097.75	3742173.37	
385099.83	3742171.66	
385102.2	3742170.4	
385104.78	3742169.62	
385107.45	3742169.35	
385110.13	3742169.62	
385112.7	3742170.4	
385115.07	3742171.66	
385117.15	3742173.37	
385118.86	3742175.45	
385120.13	3742177.82	
385120.91	3742180.39	
'78'	1	7.62
32	16.1544	
385041.44	3742179.78	
385041.28	3742181.42	
385040.81	3742182.99	
385040.03	3742184.44	
385038.99	3742185.71	
385037.72	3742186.75	
385036.27	3742187.52	
385034.7	3742188.	
385033.06	3742188.16	
385031.43	3742188.	
385029.85	3742187.52	
385028.41	3742186.75	
385027.14	3742185.71	
385026.09	3742184.44	
385025.32	3742182.99	
385024.84	3742181.42	
385024.68	3742179.78	
385024.84	3742178.15	
385025.32	3742176.57	
385026.09	3742175.12	
385027.14	3742173.85	
385028.41	3742172.81	
385029.85	3742172.04	
385031.43	3742171.56	
385033.06	3742171.4	
385034.7	3742171.56	
385036.27	3742172.04	
385037.72	3742172.81	
385038.99	3742173.85	
385040.03	3742175.12	
385040.81	3742176.57	
385041.28	3742178.15	
'79'	1	8.2296
32	14.6304	
384990.95	3742178.55	
384990.81	3742180.03	
384990.37	3742181.46	
384989.67	3742182.78	
384988.72	3742183.94	

384987.57	3742184.88	
384986.25	3742185.59	
384984.82	3742186.02	
384983.33	3742186.17	
384981.85	3742186.02	
384980.42	3742185.59	
384979.1	3742184.88	
384977.94	3742183.94	
384977.	3742182.78	
384976.29	3742181.46	
384975.86	3742180.03	
384975.71	3742178.55	
384975.86	3742177.06	
384976.29	3742175.63	
384977.	3742174.31	
384977.94	3742173.16	
384979.1	3742172.21	
384980.42	3742171.51	
384981.85	3742171.07	
384983.33	3742170.93	
384984.82	3742171.07	
384986.25	3742171.51	
384987.57	3742172.21	
384988.72	3742173.16	
384989.67	3742174.31	
384990.37	3742175.63	
384990.81	3742177.06	
'86'	1	10.0614
32	16.1544	
384537.97	3742190.47	
384537.81	3742192.1	
384537.34	3742193.67	
384536.56	3742195.12	
384535.52	3742196.39	
384534.25	3742197.44	
384532.8	3742198.21	
384531.23	3742198.69	
384529.59	3742198.85	
384527.96	3742198.69	
384526.38	3742198.21	
384524.93	3742197.44	
384523.66	3742196.39	
384522.62	3742195.12	
384521.85	3742193.67	
384521.37	3742192.1	
384521.21	3742190.47	
384521.37	3742188.83	
384521.85	3742187.26	
384522.62	3742185.81	
384523.66	3742184.54	
384524.93	3742183.5	
384526.38	3742182.72	
384527.96	3742182.25	
384529.59	3742182.09	
384531.23	3742182.25	
384532.8	3742182.72	
384534.25	3742183.5	
384535.52	3742184.54	
384536.56	3742185.81	
384537.34	3742187.26	
384537.81	3742188.83	
'87'	1	9.7506
32	16.1544	
384538.38	3742219.24	
384538.22	3742220.87	
384537.75	3742222.44	
384536.97	3742223.89	
384535.93	3742225.16	
384534.66	3742226.21	
384533.21	3742226.98	
384531.64	3742227.46	

384530.	3742227.62	
384528.37	3742227.46	
384526.79	3742226.98	
384525.35	3742226.21	
384524.08	3742225.16	
384523.03	3742223.89	
384522.26	3742222.44	
384521.78	3742220.87	
384521.62	3742219.24	
384521.78	3742217.6	
384522.26	3742216.03	
384523.03	3742214.58	
384524.08	3742213.31	
384525.35	3742212.27	
384526.79	3742211.49	
384528.37	3742211.02	
384530.	3742210.85	
384531.64	3742211.02	
384533.21	3742211.49	
384534.66	3742212.27	
384535.93	3742213.31	
384536.97	3742214.58	
384537.75	3742216.03	
384538.22	3742217.6	
'88'	1	9.8694
32	16.1544	
384512.08	3742191.7	
384511.92	3742193.34	
384511.44	3742194.91	
384510.67	3742196.36	
384509.63	3742197.63	
384508.36	3742198.67	
384506.91	3742199.44	
384505.33	3742199.92	
384503.7	3742200.08	
384502.06	3742199.92	
384500.49	3742199.44	
384499.04	3742198.67	
384497.77	3742197.63	
384496.73	3742196.36	
384495.95	3742194.91	
384495.48	3742193.34	
384495.32	3742191.7	
384495.48	3742190.06	
384495.95	3742188.49	
384496.73	3742187.04	
384497.77	3742185.77	
384499.04	3742184.73	
384500.49	3742183.96	
384502.06	3742183.48	
384503.7	3742183.32	
384505.33	3742183.48	
384506.91	3742183.96	
384508.36	3742184.73	
384509.63	3742185.77	
384510.67	3742187.04	
384511.44	3742188.49	
384511.92	3742190.06	
'89'	1	9.7506
32	16.1544	
384513.72	3742220.88	
384513.56	3742222.52	
384513.09	3742224.09	
384512.31	3742225.54	
384511.27	3742226.81	
384510.	3742227.85	
384508.55	3742228.62	
384506.98	3742229.1	
384505.34	3742229.26	
384503.71	3742229.1	
384502.13	3742228.62	

384500.69	3742227.85
384499.42	3742226.81
384498.37	3742225.54
384497.6	3742224.09
384497.12	3742222.52
384496.96	3742220.88
384497.12	3742219.24
384497.6	3742217.67
384498.37	3742216.22
384499.42	3742214.95
384500.69	3742213.91
384502.13	3742213.14
384503.71	3742212.66
384505.34	3742212.5
384506.98	3742212.66
384508.55	3742213.14
384510.	3742213.91
384511.27	3742214.95
384512.31	3742216.22
384513.09	3742217.67
384513.56	3742219.24

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'S1 '	9.32	30.48	384725.7	3742300.
'S2 '	9.32	30.48	384725.7	3742300.
'S3 '	9.32	30.48	384725.7	3742300.
'S4 '	9.32	30.48	384725.7	3742300.
'S5 '	9.32	30.48	384725.7	3742300.
'S6 '	9.32	30.48	384725.7	3742300.
'S7 '	9.32	30.48	384725.7	3742300.
'S8 '	9.32	30.48	384725.7	3742300.
'S9 '	9.32	30.48	384725.7	3742300.
'S10 '	9.32	30.48	384725.7	3742300.
'S11 '	9.32	30.48	384725.7	3742300.
'S12 '	9.32	30.48	384725.7	3742300.
'S13 '	9.32	30.48	384725.7	3742300.
'S14 '	9.32	30.48	384725.7	3742300.
'S15 '	9.32	30.48	384725.7	3742300.
'CT1 '	9.32	30.48	384779.	3742300.
'CT2 '	9.32	30.48	384832.34	3742300.
'CT3 '	9.32	30.48	384885.68	3742300.
'CLT1 '	9.32	16.1544	385061.38	3742272.8
'CLT2 '	9.32	16.1544	385061.38	3742285.6
'CLT3 '	9.32	16.1544	385061.38	3742298.41
'CLT4 '	9.32	16.1544	385061.38	3742311.21
'CLT5 '	9.32	16.1544	385061.38	3742324.01
'CLT6 '	9.32	16.1544	385061.38	3742336.81
'CLT7 '	9.32	16.1544	385061.38	3742349.61
'NEWCTLN '	9.32	14.9352	385061.38	3742369.88
'NEWCLTS '	9.32	14.9352	385061.38	3742252.53
'CT4 '	9.32	30.48	384939.02	3742300.

Table I-B-10 Modeling Results Summary (4 pages)

Watson AERMOD Screening Results for Short-term Averaging Times

Case	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	E13	E14	E15
Load	unfired	min	max	unfired	min	max	unfired	min	max	unfired	min	max	unfired	min	max
Comp Inlet Temp, °F	36.0	36.0	36.0	59.0	59.0	59.0	85.0	85.0	85.0	102.0	102.0	102.0	63.0	63.0	63.0
Stack Exit Temp (deg.K)	471.48	468.93	469.93	470.87	468.09	469.15	469.7	467.04	468.1	469.82	467.09	467.71	470.71	467.93	468.96
Stack Exit Velocity (m/s)	24.4	24.3	24.6	23.5	23.4	23.7	22.2	22.1	22.4	22.3	22.2	22.5	23.3	23.2	23.5
Stack Inside Diameter (m)	4.7244	4.7244	4.7244	4.7244	4.7244	4.7244	4.7244	4.7244	4.7244	4.7244	4.7244	4.7244	4.7244	4.7244	4.7244
1-Hr Unitized Conc (ug/m3)	1.08591	1.06954	1.05354	1.02030	1.02906	1.01761	1.07610	1.08855	1.07161	1.07118	1.08374	1.06687	1.02668	1.03522	1.02397
X(m)	385342.1	384210.0	385342.1	384210.0	384210.0	384210.0	384687.8	384697.8	384687.8	384687.8	384687.8	384687.8	384210.0	384210.0	384210.0
Y(m)	3742353.5	3742410.0	3742353.5	3742410.0	3742410.0	3742410.0	3742775.8	3742765.8	3742775.8	3742775.8	3742775.8	3742775.8	3742410.0	3742410.0	3742410.0
YYMMDDHH	04022717	03033012	04022717	03033012	03033012	03033012	06071713	06071713	06071713	06071713	06071713	06071713	03033012	03033012	03033012
3-Hr Unitized Conc (ug/m3)	0.83838	0.84549	0.83578	0.86322	0.87068	0.86073	0.90101	0.90867	0.89837	0.89829	0.90560	0.89591	0.86822	0.87610	0.86629
X(m)	384177.8	384177.8	384177.8	384177.8	384177.8	384177.8	384197.8	384197.8	384177.8	384177.8	384197.8	384177.8	384177.8	384177.8	384177.8
Y(m)	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8	3742055.8	3742055.8	3742045.8	3742045.8	3742055.8	3742045.8	3742045.8	3742045.8	3742045.8
YYMMDDHH	02021015	02021015	02021015	02021015	02021015	02021015	02021015	02021015	02021015	02021015	02021015	02021015	02021015	02021015	02021015
8-Hr Unitized Conc (ug/m3)	0.75023	0.75659	0.74782	0.77390	0.78086	0.77149	0.80943	0.81650	0.80692	0.80686	0.81371	0.80460	0.77914	0.78595	0.77676
X(m)	384177.8	384167.8	384177.8	384167.8	384167.8	384167.8	384167.8	384177.8	384167.8	384167.8	384167.8	384167.8	384167.8	384167.8	384167.8
Y(m)	3742055.8	3742045.8	3742055.8	3742045.8	3742045.8	3742045.8	3742045.8	3742055.8	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8
YYMMDDHH	02021016	02021016	02021016	02021016	02021016	02021016	02021016	02021016	02021016	02021016	02021016	02021016	02021016	02021016	02021016
24-Hr Unitized Conc (ug/m3)	0.26482	0.26713	0.26395	0.27324	0.27572	0.27239	0.28586	0.28837	0.28497	0.28494	0.28738	0.28414	0.27510	0.27752	0.27426
X(m)	384177.8	384167.8	384177.8	384167.8	384167.8	384167.8	384167.8	384177.8	384167.8	384167.8	384167.8	384167.8	384167.8	384167.8	384167.8
Y(m)	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8
YYMMDDHH	02021024	02021024	02021024	02021024	02021024	02021024	02021024	02021024	02021024	02021024	02021024	02021024	02021024	02021024	02021024
NOx(lb/hr/turbine)	8.22	8.59	11.94	7.95	8.33	11.47	7.49	7.87	10.71	7.48	7.85	10.72	7.88	8.26	11.35
CO(lb/hr/turbine)	10.01	10.46	14.54	9.68	10.14	13.96	9.13	9.58	13.04	9.1	9.56	13.06	9.6	10.05	13.82
SO2(lb/hr/turbine)	3.8	4.11	6.84	3.68	3.99	6.54	3.47	3.77	6.09	3.53	3.77	6.1	3.65	3.95	6.47
PM10(lb/hr/turbine)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
NOx(g/s/turb)	1.036	1.082	1.504	1.002	1.050	1.445	0.944	0.992	1.349	0.942	0.989	1.351	0.993	1.041	1.430
CO(g/s/turb)	1.261	1.318	1.832	1.220	1.278	1.759	1.150	1.207	1.643	1.147	1.205	1.646	1.210	1.266	1.741
SO2(g/s/turb)	0.479	0.518	0.862	0.464	0.503	0.824	0.437	0.475	0.767	0.445	0.475	0.769	0.460	0.498	0.815
PM10(g/s/turb)	1.260	1.260	1.260	1.260	1.260	1.260	1.260	1.260	1.260	1.260	1.260	1.260	1.260	1.260	1.260
1-Hr NOx(ug/m3)	1.125	1.158	1.585	1.022	1.080	1.471	1.016	1.079	1.446	1.010	1.072	1.441	1.019	1.077	1.464
1-Hr CO(ug/m3)	1.370	1.410	1.930	1.244	1.315	1.790	1.238	1.314	1.761	1.228	1.305	1.756	1.242	1.311	1.783
8-Hr CO(ug/m3)	0.946	0.997	1.370	0.944	0.998	1.357	0.931	0.986	1.326	0.925	0.980	1.324	0.942	0.995	1.353
1-Hr SO2(ug/m3)	0.520	0.554	0.908	0.473	0.517	0.839	0.470	0.517	0.822	0.476	0.515	0.820	0.472	0.515	0.835
3-Hr SO2(ug/m3)	0.401	0.438	0.720	0.400	0.438	0.709	0.394	0.432	0.689	0.400	0.430	0.689	0.399	0.436	0.706
24-Hr SO2(ug/m3)	0.127	0.138	0.227	0.127	0.139	0.224	0.125	0.137	0.219	0.127	0.137	0.218	0.127	0.138	0.224
24-Hr PM10(ug/m3)	0.334	0.337	0.333	0.344	0.347	0.343	0.360	0.363	0.359	0.359	0.362	0.358	0.347	0.350	0.346

watson AERMOD Screening Results for Annual Averaging Times

Case	s13	s14	s15
Load	**unfired**	**min**	**max**
Comp Inlet Temp, °F	63.0	63.0	63.0
Stack Exit Temp (deg.K)	470.71	467.93	468.96
Stack Exit Velocity (m/s)	23.3	23.2	23.5
Stack Inside Diameter (m)	4.7244	4.7244	4.7244
1-Hr Unitized Conc (ug/m3)	1.02668	1.03522	1.02397
X(m)	384210.0	384210.0	384210.0
Y(m)	3742410.0	3742410.0	3742410.0
YYMMDDHH	03033012	03033012	03033012
3-Hr Unitized Conc (ug/m3)	0.86822	0.87610	0.86629
X(m)	384177.8	384177.8	384177.8
Y(m)	3742045.8	3742045.8	3742045.8
YYMMDDHH	02021015	02021015	02021015
8-Hr Unitized Conc (ug/m3)	0.77914	0.78595	0.77676
X(m)	384167.8	384167.8	384167.8
Y(m)	3742045.8	3742045.8	3742045.8
YYMMDDHH	02021016	02021016	02021016
24-Hr Unitized Conc (ug/m3)	0.27510	0.27752	0.27426
X(m)	384167.8	384167.8	384167.8
Y(m)	3742045.8	3742045.8	3742045.8
YYMMDDHH	02021024	02021024	02021024
annual	0.0725	0.0735	0.0723
X(m)	384802	384802	384802
Y(m)	3742710	3742710	3742710
YYMMDDHH	2006	2006	2006
NOx(lb/hr/turbine)	7.88	8.26	9.1324
CO(lb/hr/turbine)	9.6	10.05	13.82
SO2(lb/hr/turbine)	3.65	3.95	6.838
PM10(lb/hr/turbine)	10	10	10
NOx(g/s/turb)	0.993	1.041	1.151
CO(g/s/turb)	1.210	1.266	1.741
SO2(g/s/turb)	0.460	0.498	0.862
PM10(g/s/turb)	1.260	1.260	1.260
Annual NOx(ug/m3)	0.072	0.077	0.083
Annual SO2(ug/m3)	0.033	0.037	0.062
Annual PM10(ug/m3)	0.091	0.093	0.091

Watson AERMOD Screening Results for Short-term Averaging Times Startup/Shutdown

Case	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12
Load	unfired	min	max	unfired	min	max	unfired	min	max	unfired	min	max
Comp Inlet Temp, °F	36.0	36.0	36.0	59.0	59.0	59.0	85.0	85.0	85.0	102.0	102.0	102.0
Stack Exit Temp (deg.K)	471.48	468.93	469.93	470.87	468.09	469.15	469.7	467.04	468.1	469.82	467.09	467.71
Stack Exit Velocity (m/s)	24.4	24.3	24.6	23.5	23.4	23.7	22.2	22.1	22.4	22.3	22.2	22.5
Stack Inside Diameter (m)	4.7244	4.7244	4.7244	4.7244	4.7244	4.7244	4.7244	4.7244	4.7244	4.7244	4.7244	4.7244
1-Hr Unitized Conc (ug/m3)	1.08591	1.06954	1.05354	1.02030	1.02906	1.01761	1.07610	1.08855	1.07161	1.07118	1.08374	1.06687
X(m)	385342.1	384210.0	385342.1	384210.0	384210.0	384210.0	384687.8	384697.8	384687.8	384687.8	384687.8	384687.8
Y(m)	3742353.5	3742410.0	3742353.5	3742410.0	3742410.0	3742410.0	3742775.8	3742765.8	3742775.8	3742775.8	3742775.8	3742775.8
YYMMDDHH	04022717	03033012	04022717	03033012	03033012	03033012	06071713	06071713	06071713	06071713	06071713	06071713
3-Hr Unitized Conc (ug/m3)	0.83838	0.84549	0.83578	0.86322	0.87068	0.86073	0.90101	0.90867	0.89837	0.89829	0.90560	0.89591
X(m)	384177.8	384177.8	384177.8	384177.8	384177.8	384177.8	384197.8	384197.8	384177.8	384177.8	384197.8	384177.8
Y(m)	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8	3742055.8	3742055.8	3742045.8	3742045.8	3742055.8	3742045.8
YYMMDDHH	02021015	02021015	02021015	02021015	02021015	02021015	02021015	02021015	02021015	02021015	02021015	02021015
8-Hr Unitized Conc (ug/m3)	0.75023	0.75659	0.74782	0.77390	0.78086	0.77149	0.80943	0.81650	0.80692	0.80686	0.81371	0.80460
X(m)	384177.8	384167.8	384177.8	384167.8	384167.8	384167.8	384167.8	384177.8	384167.8	384167.8	384167.8	384167.8
Y(m)	3742055.8	3742045.8	3742055.8	3742045.8	3742045.8	3742045.8	3742045.8	3742055.8	3742045.8	3742045.8	3742045.8	3742045.8
YYMMDDHH	02021016	02021016	02021016	02021016	02021016	02021016	02021016	02021016	02021016	02021016	02021016	02021016
24-Hr Unitized Conc (ug/m3)	0.26482	0.26713	0.26395	0.27324	0.27572	0.27239	0.28586	0.28837	0.28497	0.28494	0.28738	0.28414
X(m)	384177.8	384167.8	384177.8	384167.8	384167.8	384167.8	384167.8	384177.8	384167.8	384167.8	384167.8	384167.8
Y(m)	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8
YYMMDDHH	02021024	02021024	02021024	02021024	02021024	02021024	02021024	02021024	02021024	02021024	02021024	02021024
Typical Emisions												
NOx(lb/hr/turbine)	8.22	8.59	11.94	7.95	8.33	11.47	7.49	7.87	10.71	7.48	7.85	10.72
CO(lb/hr/turbine)	10.01	10.46	14.54	9.68	10.14	13.96	9.13	9.58	13.04	9.1	9.56	13.06
SO2(lb/hr/turbine)	3.8	4.11	6.84	3.68	3.99	6.54	3.47	3.77	6.09	3.53	3.77	6.1
PM10(lb/hr/turbine)	10	10	10	10	10	10	10	10	10	10	10	10
NOx(g/s/turb)	1.036	1.082	1.504	1.002	1.050	1.445	0.944	0.992	1.349	0.942	0.989	1.351
CO(g/s/turb)	1.261	1.318	1.832	1.220	1.278	1.759	1.150	1.207	1.643	1.147	1.205	1.646
SO2(g/s/turb)	0.479	0.518	0.862	0.464	0.503	0.824	0.437	0.475	0.767	0.445	0.475	0.769
PM10(g/s/turb)	1.260	1.260	1.260	1.260	1.260	1.260	1.260	1.260	1.260	1.260	1.260	1.260

		Conc (ug/m3)
COLD START		
NOx(lb/hr/turb) Startup 1-hr	175	
CO(lb/hr/turb) Startup 1-hr	210	
CO(lb/hr/turb) Startup 8-hr	210.00	
SO2(lb/hr/turbine) Startup 1-hr	6.84	
SO2(lb/hr/turbine) Startup 3-hr	6.840	
NOx(g/s/turb) Startup 1-hr	22.050	23.944316
CO(g/s/turb) Startup 1-hr	26.460	28.733179
CO(g/s/turb) Startup 8-hr	26.460	21.60459
SO2(g/s/turb) Startup 1-hr	0.862	0.9360544
SO2(g/s/turb) Startup 3-hr	0.862	0.7832735
WARM START		
NOx(lb/hr/turb) Startup 1-hr	21.324	
CO(lb/hr/turb) Startup 1-hr	58.721	
CO(lb/hr/turb) Startup 8-hr	25.445	
SO2(lb/hr/turb) Startup 1-hr	3.183	
SO2(lb/hr/turb) Startup 3-hr	5.324	
NOx(g/s/turb) Startup 1-hr	2.687	2.9178402
CO(g/s/turb) Startup 1-hr	7.399	8.0346481
CO(g/s/turb) Startup 8-hr	3.206	2.617699
SO2(g/s/turb) Startup 1-hr	0.401	0.4354499
SO2(g/s/turb) Startup 3-hr	0.671	0.6097176
SHUTDOWN		
NOx(lb/hr/turb) Shutdown 1-hr	12.848	
CO(lb/hr/turb) Shutdown 1-hr	57.601	
SO2(lb/hr/turb) Shutdown 1-hr	5.948	
NOx(g/s/turb) Shutdown 1-hr	1.619	1.7623625
CO(g/s/turb) Shutdown 1-hr	7.258	7.9006959
SO2(g/s/turb) Shutdown 1-hr	0.749	0.815324

Watson AERMOD Screening Result- Commisioning Emissions for Short-term Averaging Times

Case	E1	E4	E7	E10	E13
Load	unfired	unfired	unfired	unfired	unfired
Comp Inlet Temp, °F	36.0	59.0	85.0	102.0	63.0
Stack Exit Temp (deg.K)	471.48	470.87	469.7	469.82	470.71
Stack Exit Velocity (m/s)	24.4	23.5	22.2	22.3	23.3
Stack Inside Diameter (m)	4.7244	4.7244	4.7244	4.7244	4.7244
1-Hr Unitized Conc (ug/m3)	1.08591	1.02030	1.07610	1.07118	1.02668
X(m)	385342.1	384210.0	384687.8	384687.8	384210.0
Y(m)	3742353.5	3742410.0	3742775.8	3742775.8	3742410.0
YYMMDDHH	04022717	03033012	06071713	06071713	03033012
3-Hr Unitized Conc (ug/m3)	0.83838	0.86322	0.90101	0.89829	0.86822
X(m)	384177.8	384177.8	384197.8	384177.8	384177.8
Y(m)	3742045.8	3742045.8	3742055.8	3742045.8	3742045.8
YYMMDDHH	02021015	02021015	02021015	02021015	02021015
8-Hr Unitized Conc (ug/m3)	0.75023	0.77390	0.80943	0.80686	0.77914
X(m)	384177.8	384167.8	384167.8	384167.8	384167.8
Y(m)	3742055.8	3742045.8	3742045.8	3742045.8	3742045.8
YYMMDDHH	02021016	02021016	02021016	02021016	02021016
24-Hr Unitized Conc (ug/m3)	0.26482	0.27324	0.28586	0.28494	0.27510
X(m)	384177.8	384167.8	384167.8	384167.8	384167.8
Y(m)	3742045.8	3742045.8	3742045.8	3742045.8	3742045.8
YYMMDDHH	02021024	02021024	02021024	02021024	02021024
NOx(lb/hr/turbine)	211	211	211	211	211
CO(lb/hr/turbine)	255	255	255	255	255
SO2(lb/hr/turbine)	4	4	4	4	4
PM10(lb/hr/turbine)	12	12	12	12	12
NOx(g/s/turb)	26.586	26.586	26.586	26.586	26.586
CO(g/s/turb)	32.130	32.130	32.130	32.130	32.130
SO2(g/s/turb)	0.504	0.504	0.504	0.504	0.504
PM10(g/s/turb)	1.512	1.512	1.512	1.512	1.512
1-Hr NOx(ug/m3)	28.870	27.126	28.609	28.478	27.295
1-Hr CO(ug/m3)	34.890	32.782	34.575	34.417	32.987
8-Hr CO(ug/m3)	24.105	24.865	26.007	25.924	25.034
1-Hr SO2(ug/m3)	0.547	0.514	0.542	0.540	0.517
3-Hr SO2(ug/m3)	0.423	0.435	0.454	0.453	0.438
24-Hr SO2(ug/m3)	0.133	0.138	0.144	0.144	0.139
24-Hr PM10(ug/m3)	0.400	0.413	0.432	0.431	0.416

Table I-B-11 Modeling Inputs/Results for Watson Construction Impacts (Combustion Sources as 18 Point Sources)

Short Term Impacts (24 hrs and less)						Long Term Impacts (annual)					
	NOx	CO	SOx	PM10	PM2.5		NOx	CO	SOx	PM10	PM2.5
Combustion (lbs/day)	70.7	48.5	0.1	5.3	5.2	Combustion (tons/project)	10.0	6.9	0.01	0.75	0.74
						Combustion (days/project)**	440	440	440	440	440
Combustion (hrs/day)	10	10	10	10	10	Combustion (hrs/day)	10	10	10	10	10
Combustion (lbs/hr)	7.07	4.85	0.01	0.53	0.52	Combustion (lbs/hr)**	4.55	3.14	0.00	0.34	0.34
Combustion (g/sec)	8.91E-01	6.11E-01	1.26E-03	6.68E-02	6.55E-02	Combustion (g/sec)	5.73E-01	3.95E-01	5.73E-04	4.30E-02	4.24E-02
Construction Dust (lbs/day)				3.0	0.63	Construction Dust (tons/project)				0.27	0.09
						Construction Dust (days/project)				440	440
Construction Dust (hrs/day)				24	24	Construction Dust (hrs/day)				24	24
Construction Dust (lbs/hr)				0.13	0.03	Construction Dust (lbs/hr)**				0.051	0.017
Construction Dust (g/sec)				1.58E-02	3.31E-03	Construction Dust (g/sec)				6.44E-03	2.15E-03
AERMOD Inputs	**7,832 m^2**			**18 Pt.Srcs**							
Combustion (g/s/src)	4.949E-02	3.395E-02	7.000E-05	3.710E-03	3.640E-03	Combustion (g/s/src)	3.182E-02	2.195E-02	3.182E-05	2.386E-03	2.355E-03
Construction Dust (g/s/m^2)				2.011E-06	4.223E-07	Construction Dust (g/s/m^2)				8.227E-07	2.742E-07
AERMOD Results (ug/m^3)											
Combustion Only						Combustion Only					
1-hour Max	89.978	61.725	0.127	6.74516							
3-hour Max			0.080	4.25202							
8-hour Max		21.417		2.34041							
24-hour Max			0.022	1.17590	1.15371	Annual	1.991		0.002	0.14936	0.14737
All Particulate Sources						All Particulate Sources					
24-hour Max				4.54329	1.52524	Annual				0.39118	0.21707
1-hour NO2 w/ OLM	89.978	for Max 1-hr O3 (ppm)		0.111		Annual NO2 w/ ARM	1.494	based on ARM Ratio of:		75%	
Background (ug/m^3)						Background (ug/m^3)					
1-hour Max	264	9600	107								
3-hour Max			86								
8-hour Max		7315									
24-hour Max			28.6	131	48.5	Annual	58.9		7	45	17.5
Total + Background (ug/m^3)						Total + Background (ug/m^3)					
1-hour Max	354	9662	107.13								
3-hour Max			86.08								
8-hour Max		7336									
24-hour Max			28.62	135.5	50.0	Annual	60.4		7.002	45.4	17.7

**For long-term (annual) lb/hour construction emissions for construction projects taking less than 12-months or 7 days/wk, the hourly emissions for modeling are based on total tons occurring over the project schedule (12 months for this project) divided by 365 days since all days in the met dataset (i.e., 12 months or 365 days - i.e., 7 days/week) are modeled.

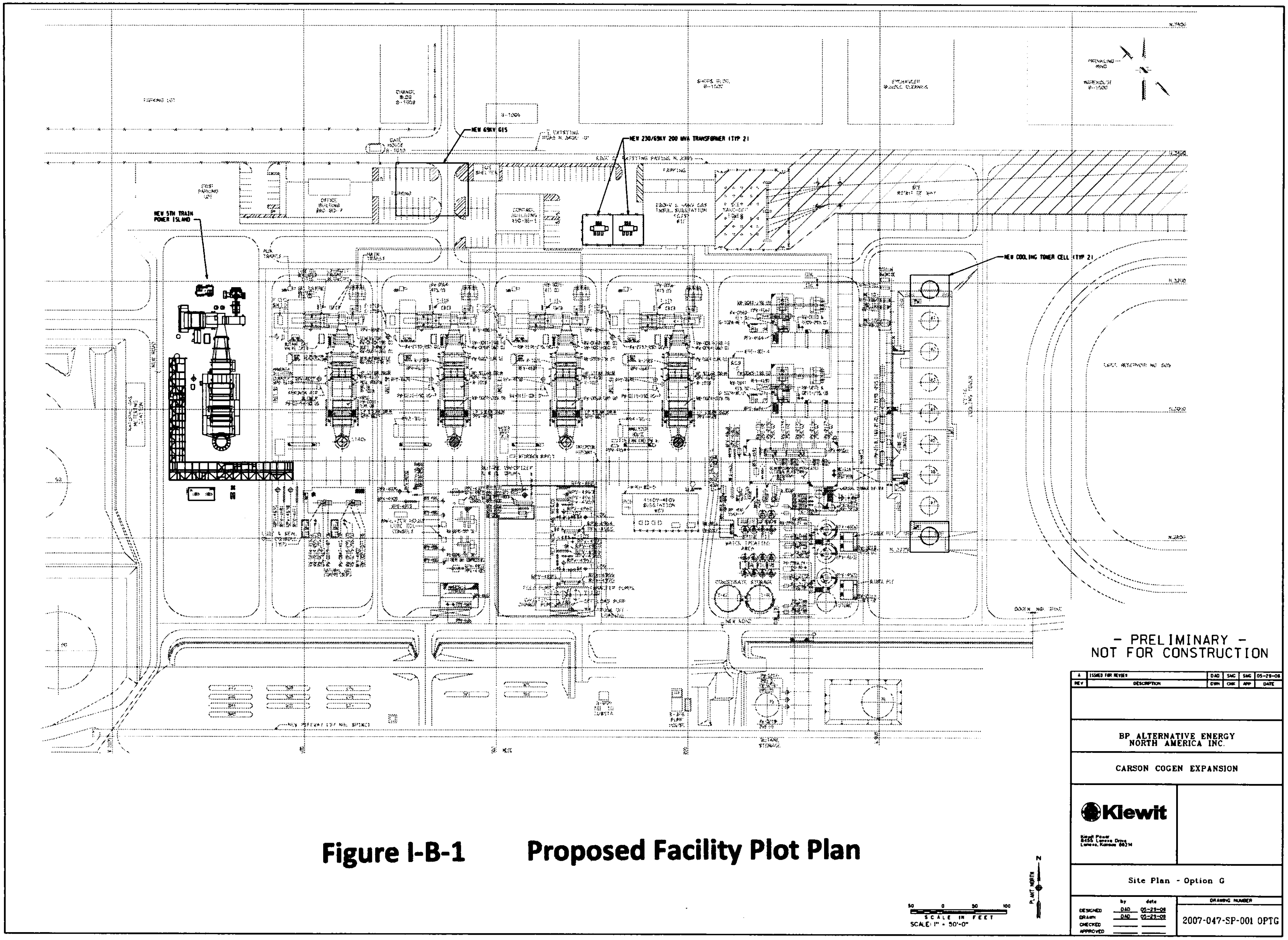


Figure I-B-1 Proposed Facility Plot Plan

Figure I-B-2 Coarse and Fine Receptor Grids

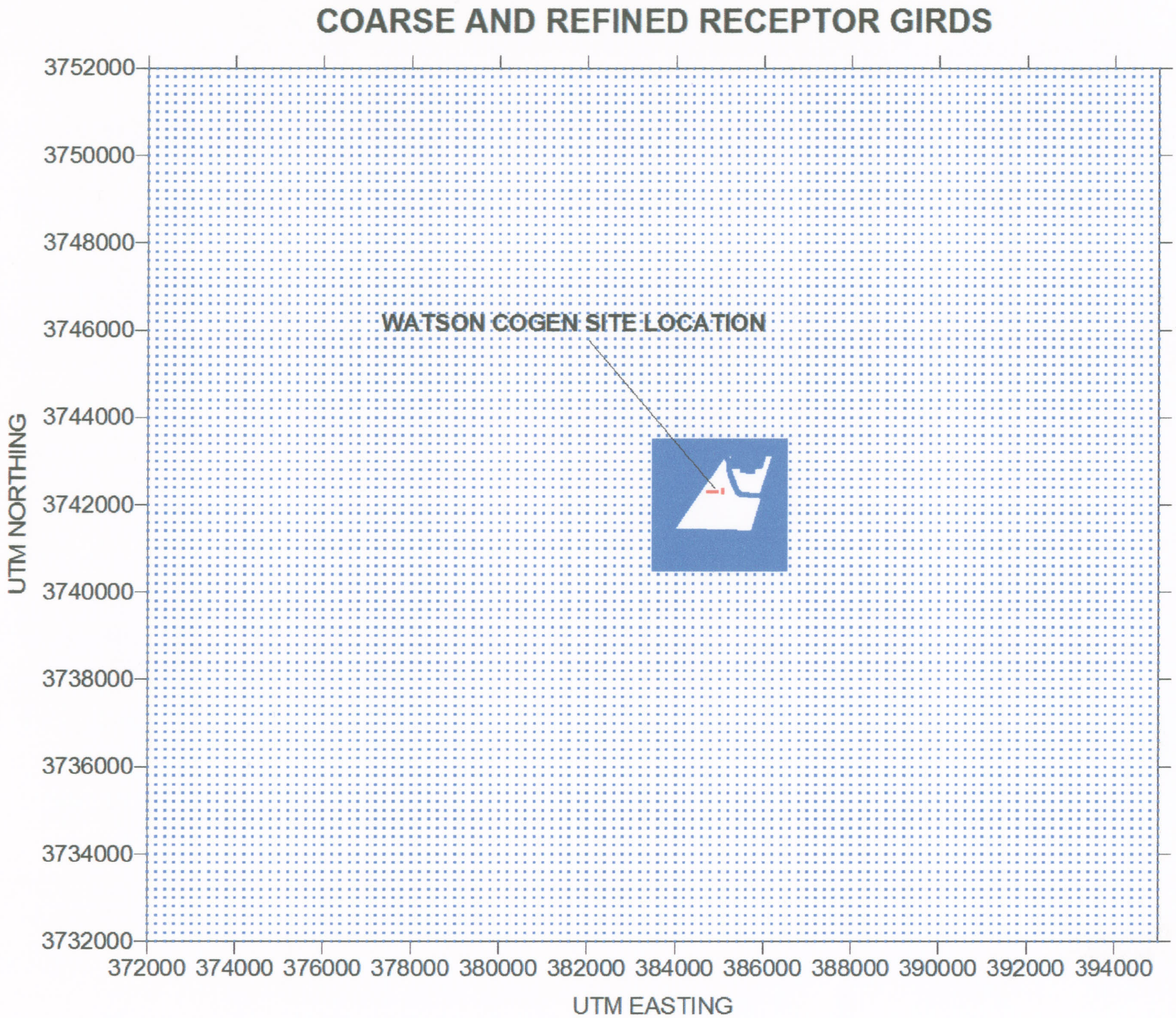


Figure I-B-3 Facility and Boundary Delineation (BPIP)

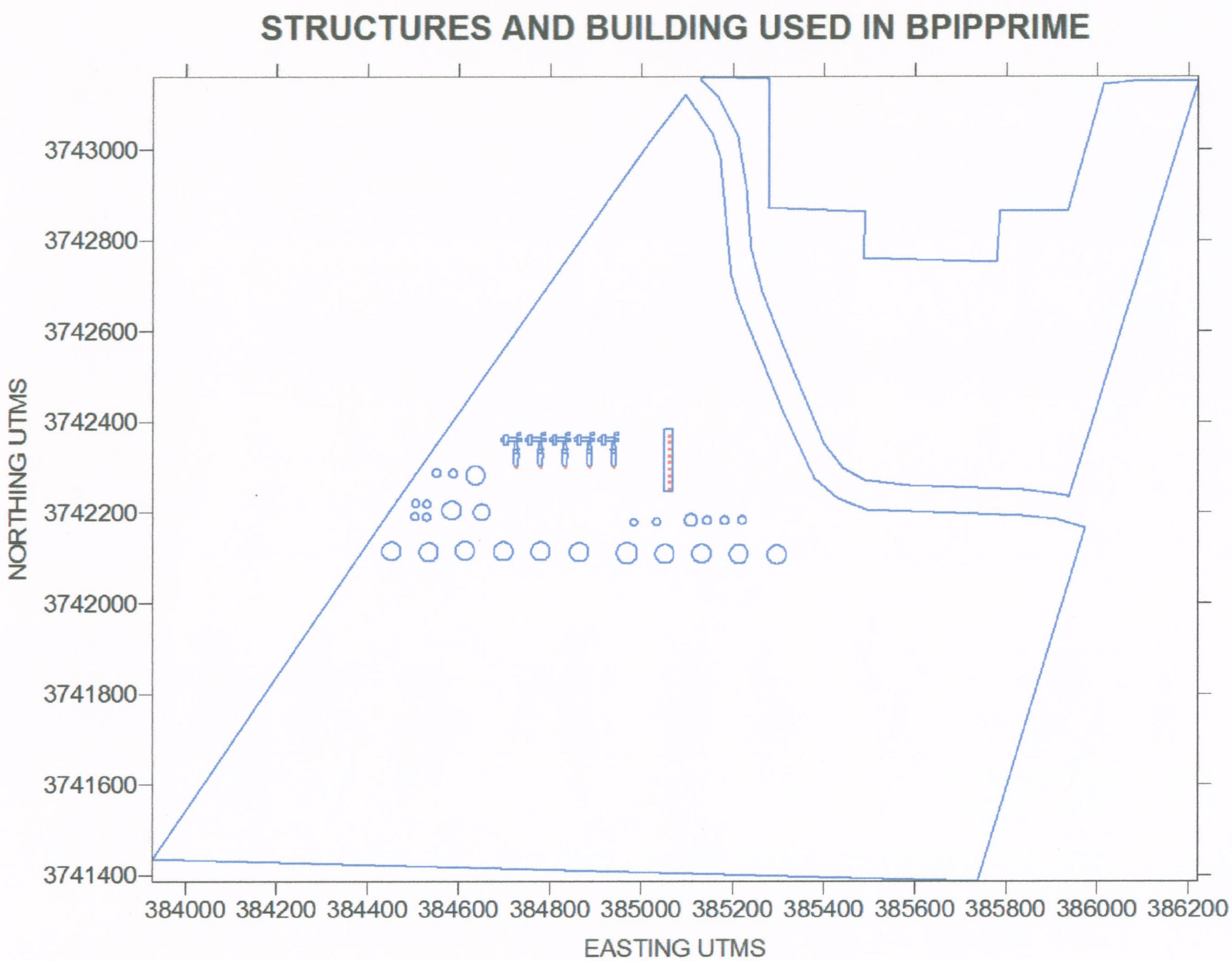


Figure I-B-4

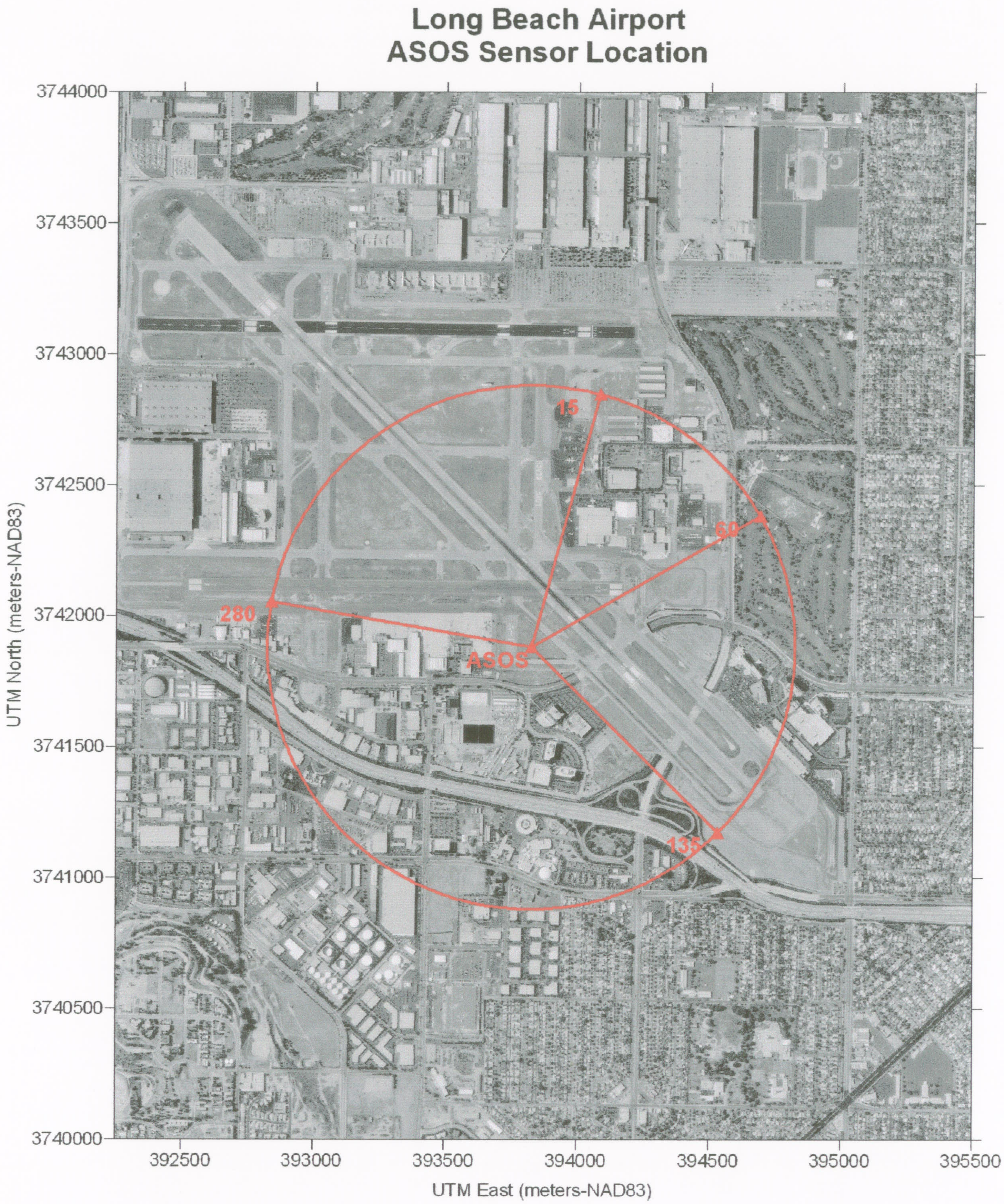

Long Beach Airport
ASOS Sensor Location
3744000
3743500
3743000
3742500
3742000
3741500
3741000
3740500
3740000
UTM North (meters-NAD83)
392500
393000
393500
394000
394500
395000
395500
UTM East (meters-NAD83)
15
60
280
ASOS
135

Figure I-B-5 South Coast Air Basin Monitoring Stations

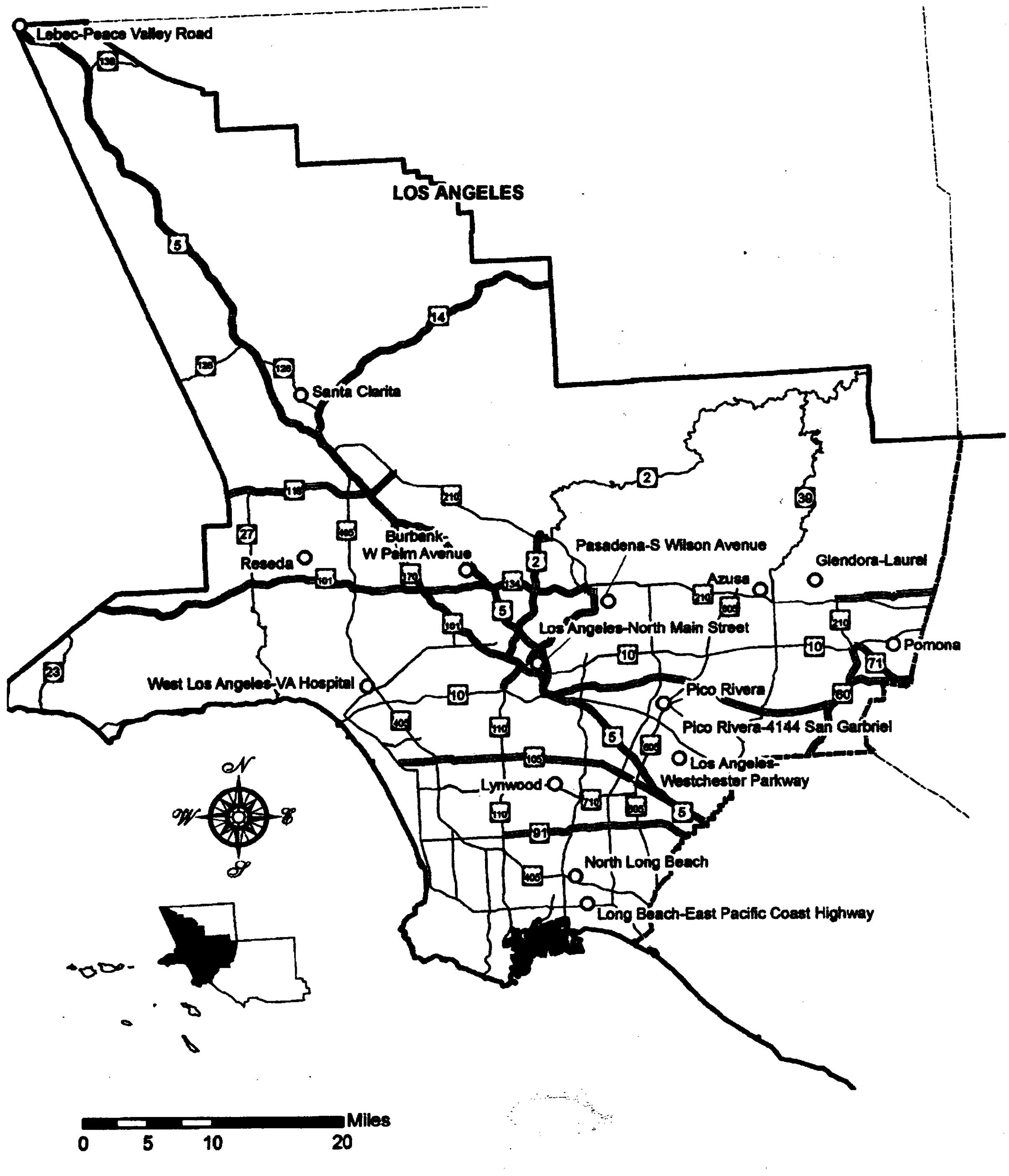


Figure I-B-6 Annual Composite Wind Rose

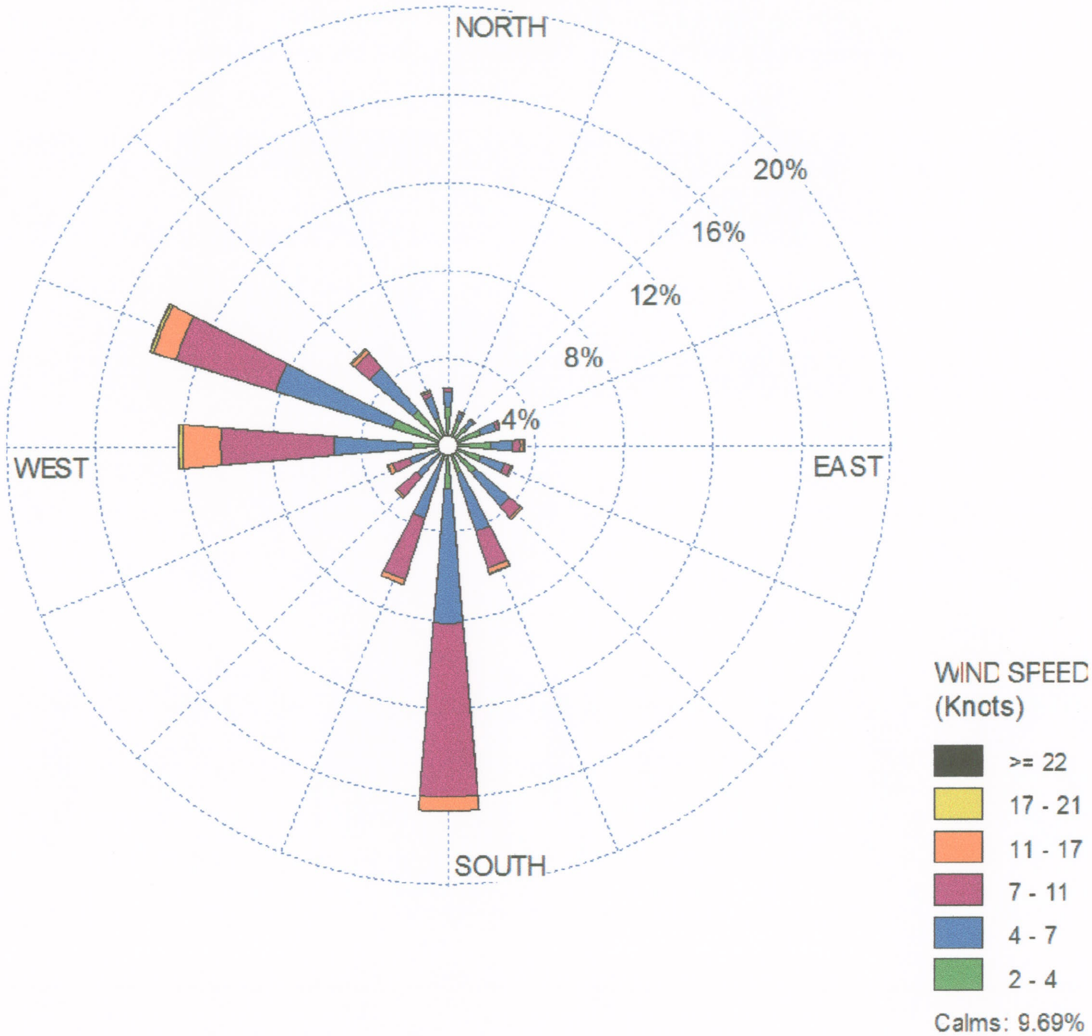


Figure I-B-7 Winter Quarter Composite Wind Rose

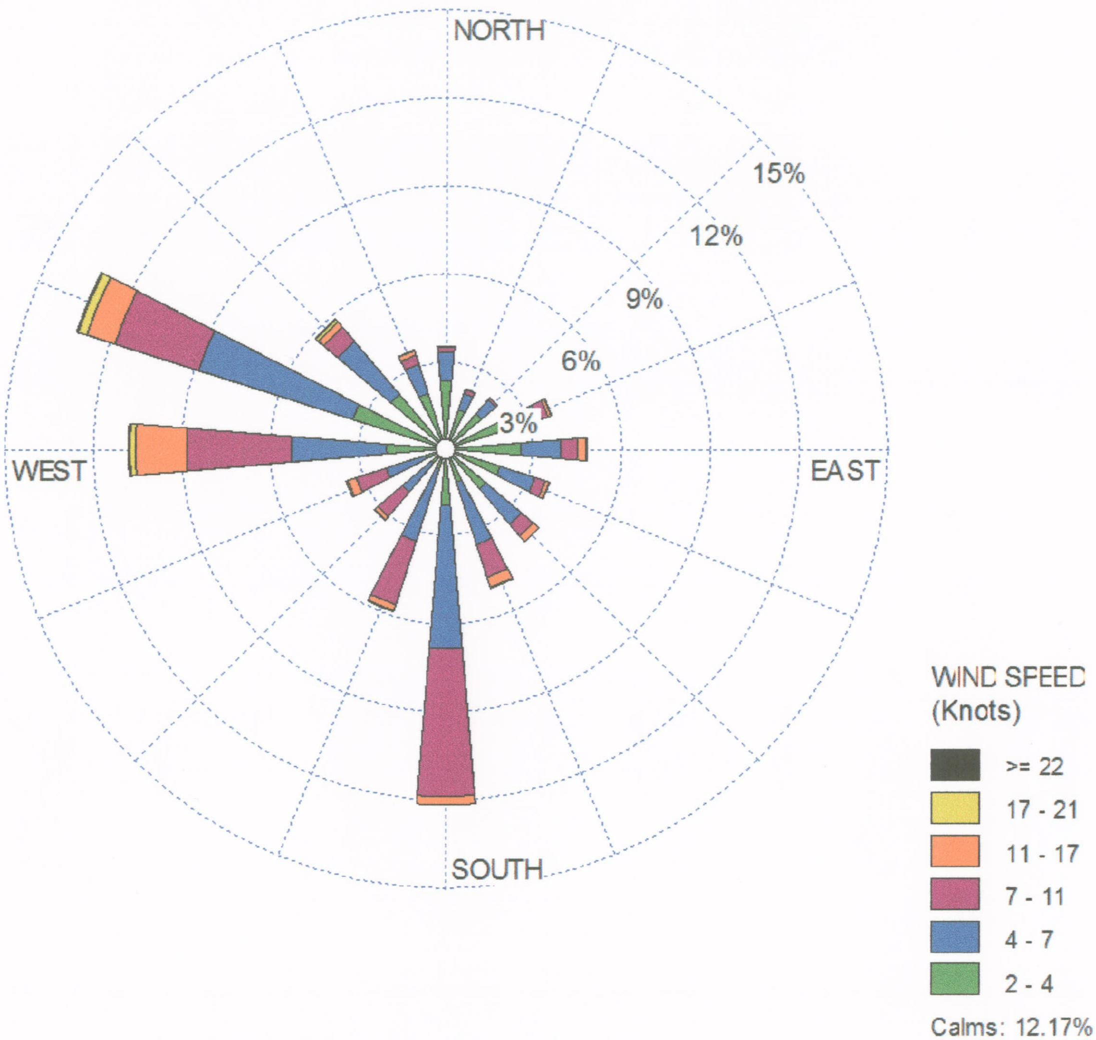


Figure I-B-8 Spring Quarter Composite Wind Rose

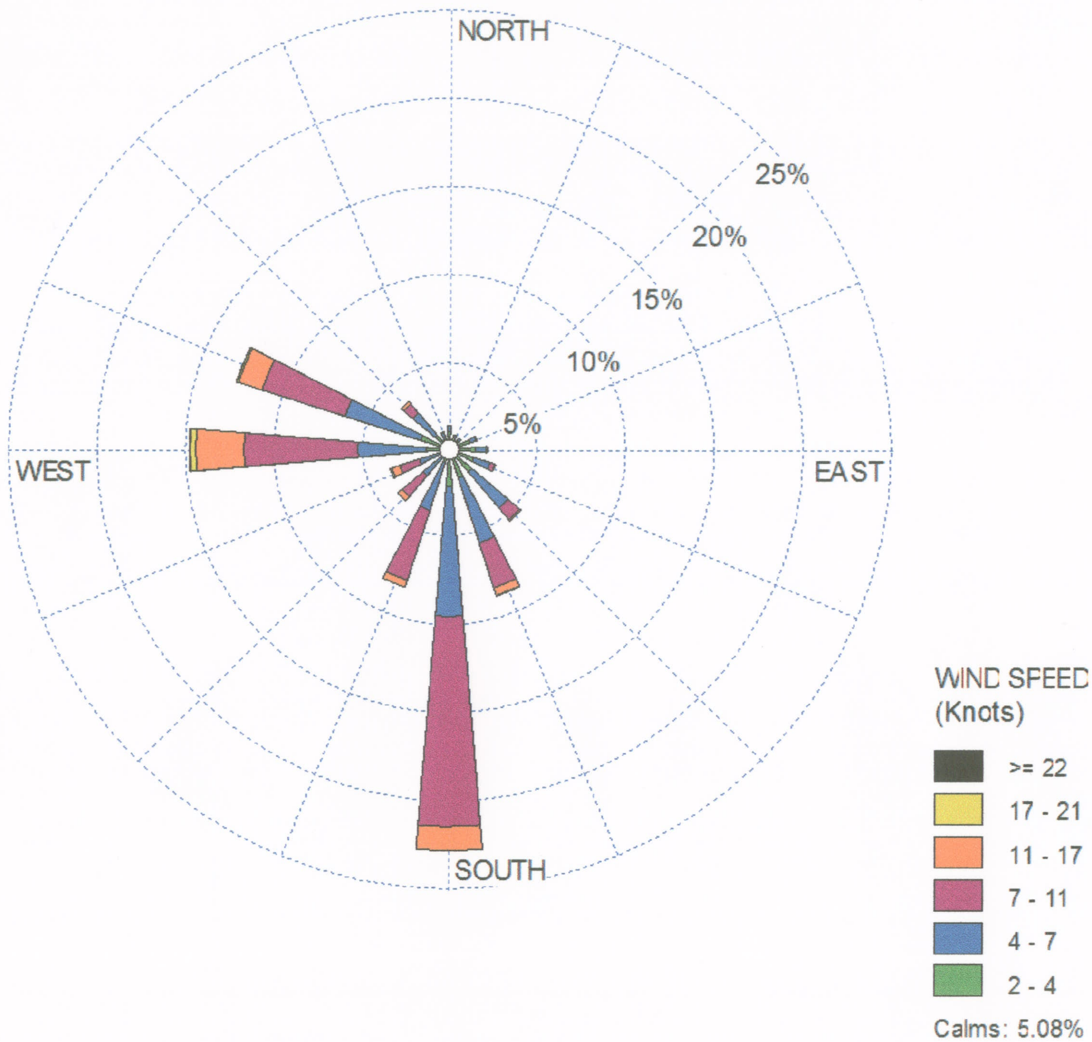


Figure I-B-9 Summer Quarter Composite Wind Rose

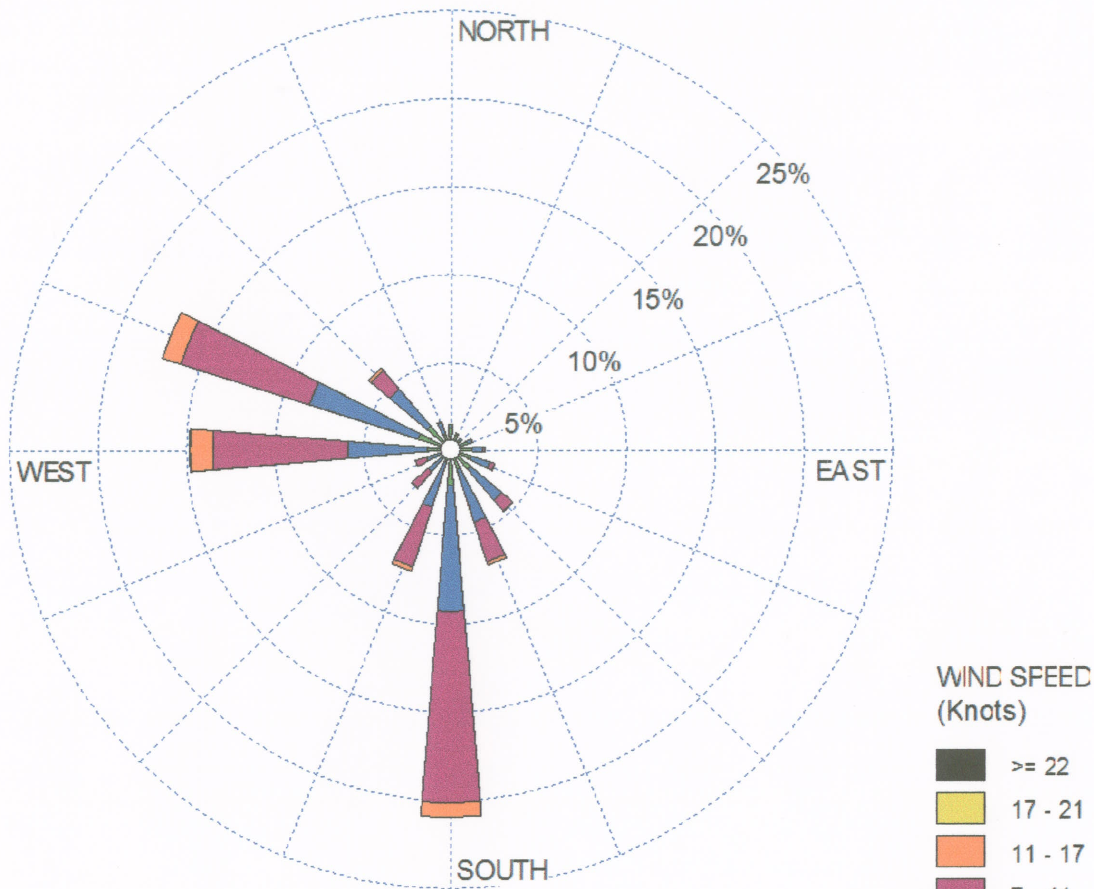
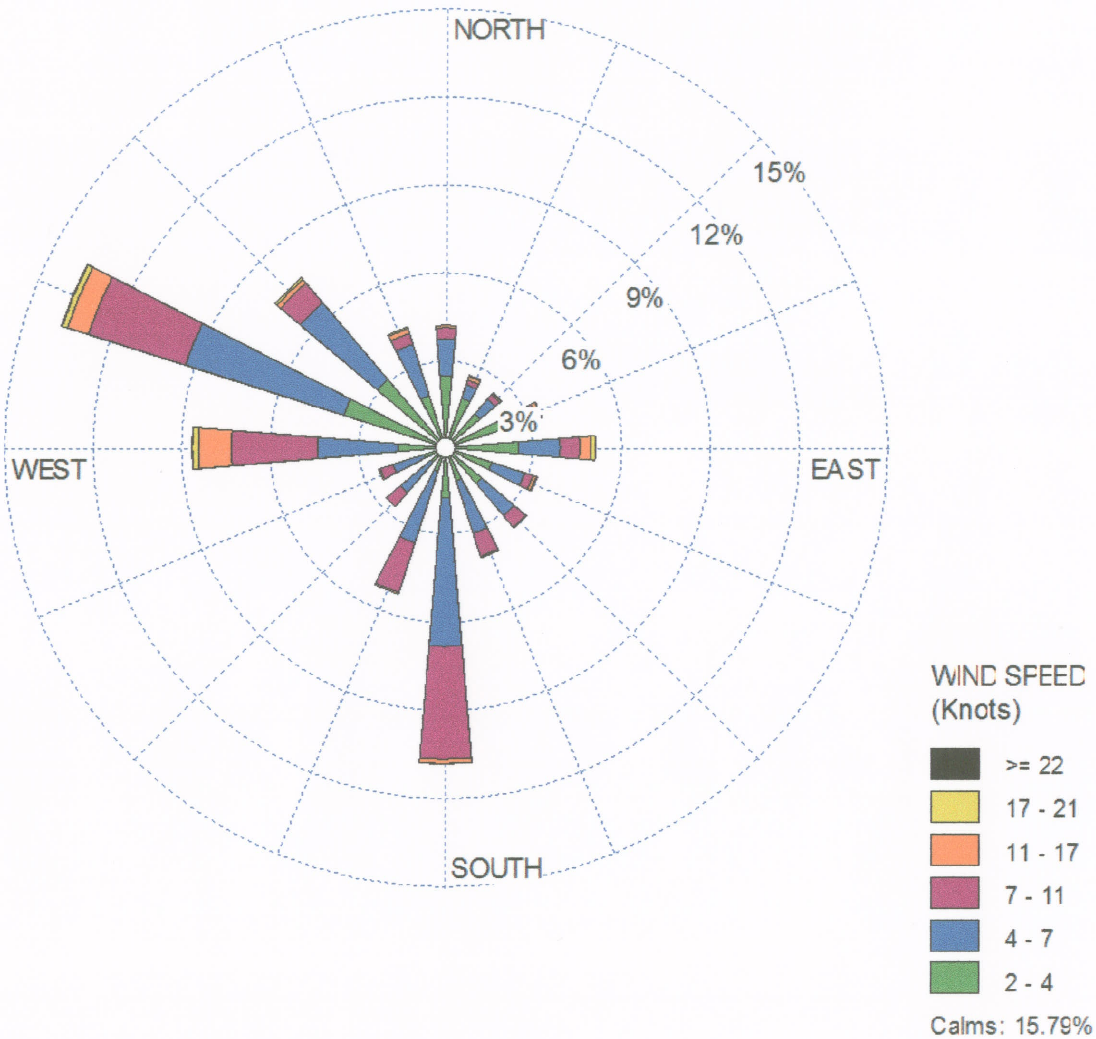


Figure I-B-10 Fall Quarter Composite Wind Rose



Attachment I-B-1

September 12, 2008

Mr. Tom Chico
South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Re: Air Quality Modeling Protocol for the Watson Cogeneration Project

Dear Tom:

Attached please find an Air Quality Modeling Protocol for the Watson Cogeneration Steam and Electric Reliability Project and ancillary systems (WCP or Project). The Project will complete the original design of Watson Cogeneration Facility (WCF) that has been in a continuous operation for more than 20 years (the Watson Cogeneration Company [WCC] site is located within the confines of the BP Carson refinery). The WCC is a joint partnership between BP Americas and Edison Mission Energy (EME).

The facility description herein is based on one (1) General Electric (GE) 7EA CTG, with an evaporative cooling system, one (1) duct fired heat recovery steam generator, a cooling tower expansion that adds two (2) new cells, and other necessary auxiliary equipment that will be described in the applications. The Project's primary objective is to provide additional process steam for the refinery's various operations, it is anticipated that the Project will typically operate at a minimally duct fired load while being able to respond to the refinery's process steam demand. Since the Project consists of adding a fifth CTG/HRSG to the existing configuration, it is also referred to as the "fifth train."

The proposed project will be a major new source as defined by the District's Siting Regulations, and will be subject to District requirements for emission offsets and air quality modeling analyses for criteria pollutants and toxics. However, the proposed project will only have emissions greater than the particulate matter Prevention of Significant Deterioration (PSD) significant emission rates, for which the area is already designated as non-attainment, so the project will not be subject to the PSD rules and regulations.

Concurrent with the submittal of the Application for Certification (AFC) to the California Energy Commission (CEC), the applicant will be applying to the South Coast

Air Quality Management District (SCAQMD) for an Authority to Construct and a Determination of Compliance for the proposed project. Attached for your review is a description of the analytical approach that will be used to comply with District modeling requirements for the project.

We look forward to working with you. If you have any questions, please do not hesitate to call me at (805) 569-6555. Thank you for your attention in this matter.

Sincerely,
Atmospheric Dynamics, Inc.

Gregory Darvin

Gregory S. Darvin
Principal

cc:
Keith Golden, California Energy Commission
Ross Metersky, BP
Connie Farmer, URS

Introduction and Facility Description

The Watson Cogeneration Steam and Electric Reliability Project and ancillary systems (WCP or Project) will complete the original design of Watson Cogeneration Facility (WCF) that has been in a continuous operation for more than 20 years by adding a nominal 85 megawatt (MW) combustion turbine generator (CTG) with a single-pressure heat recovery steam generator (HRSG) to provide additional process steam to the BP Carson refinery (the Watson Cogeneration Company [WCC] site is located within the confines of the BP Carson refinery). The original plant design has allocated sufficient space and included provisions to accommodate a new unit and other equipment additions at a later date.

The facility description herein is based on one (1) 88 MW General Electric (GE) 7EA CTG, with an evaporative cooling system, one (1) 450 MMBtu/hr duct fired heat recovery steam generator, a cooling tower expansion that adds two (2) new cells, and all other necessary auxiliary equipment that will be described in the applications. The Project's primary objective is to provide additional process steam for the refinery's various operations. It is anticipated that the Project will typically operate at a minimally duct fired load while being able to respond to the refinery's process steam demand. The Project is a joint partnership between BP Americas and Edison Mission Energy (EME). Since the Project consists of adding a fifth CTG/HRSG to the existing configuration, it is also referred to as the "fifth train."

The CTG is designed to be fueled with natural gas and refinery gas. Both gases will be provided from the existing refinery systems; however, the natural gas for the fifth train will be compressed by two new redundant dedicated gas compressors to the level as required by the manufacturer for DLN combustors. The use of refinery gas will be limited by the manufacturer's requirements for the gas quality and the ability of the existing refinery gas cleaning system to achieve the sulfur content below 32 ppm.

The source of natural gas for the refinery is pipeline quality gas from Southern California Gas Company (SoCalGas). The Project will obtain its gas from the existing refinery natural gas system at an interface point on the pipe rack. Refinery gas will be used in the combustion turbine and duct burners of the HRSG. Fuel consumption will vary based on refinery steam demand, but the Project is expected to be operated as a base load unit.

The applicant will submit the air quality impact analyses to both the South Coast Air Quality Management District (SCAQMD) and the California Energy Commission (CEC). The proposed project will be a major new source as defined by the District's Siting Regulations, and will be subject to District requirements for emission offsets and air quality modeling analyses for criteria pollutants and toxics. The proposed project will not be subject to the Prevention of Significant Deterioration (PSD) rules and regulations because the facility area is either non-attainment (PM_{10} and $PM_{2.5}$) or Project emissions are less than the PSD significant emission rates (NO_X, CO, VOC, SO_2, and non-criteria pollutants). The purpose of this document is to establish the procedure for meeting the SCAQMD and CEC air quality modeling requirements for the proposed project. The project will also trigger CEC modeling requirements for cumulative and construction-based impacts.

PROPOSED AIR QUALITY DISPERSION MODELS

United States Environmental Protection Agency (USEPA) dispersion models proposed for use to quantify pollutant impacts on the surrounding environment based on the emission sources operating parameters and their locations include the AERMOD modeling system (version 07026 with the associated meteorological and receptor processing programs AERMET and AERMAP versions 06341) for modeling most facility operational and construction impacts in both simple and complex terrain, the Building Profile Input Program for PRIME (BPIP-PRIME version 04274) for determining building dimensions for downwash calculations in the models, the SCREEN3 model (version 96043) for determining inversion breakup fumigation impacts, and the use of the California Health Risk Assessment models/protocols for determining toxic impacts, which includes the HARP On-Ramp program. These models, along with options for their use and how they are used, are discussed below. These models will be used for the following:

- Comparison of operational and construction impacts to significant impact levels (SILs), ambient monitoring significance thresholds, California Ambient Air Quality Standards (CAAQS), and National Ambient Air Quality Standards (NAAQS) using AERMOD;
- Cumulative impacts analyses with AERMOD in accordance with local/state/ USEPA/CEC requirements;
- Toxics analyses using ARB algorithms as incorporated into state/CEC requirements; and
- Assessment of impacts to soil and vegetation

EXISTING METEOROLOGICAL AND AIR QUALITY DATA

__Available Meteorological Data:__ Hourly observations of certain meteorological parameters are used to define the area's dispersion characteristics. These data are used in approved air dispersion models for defining a project's impact on air quality. These data must meet certain criteria established by the USEPA and the following discussion details the proposed data and its applicability to this project.

The nearest representative National Weather Bureau Army Navy sites (WBAN) in the general area of the proposed Project is the Long Beach Daugherty Field site. This WBAN site has used an Automated Surface Observing System (ASOS) since September 1996 to measure surface meteorological data that can be readily converted to a site dispersion database that is directly used by atmospheric dispersion models. We propose to use five (5) years of recent meteorological data collected from this ASOS site, which is located approximately 9 kilometers east of the Project, and believe use of this data would satisfy the definition of on-site data. The data will be pre-processed for direct use by the AERMET (version 06341) preprocessor model. Upper air data for the same time period will be taken from the closest representative NWS radiosonde station that, when combined with the proposed surface dataset, meet the USEPA required data recovery rates of 90%. This radiosonde station is Miramar Naval Air Station north of San Diego.

Any missing data will substituted as per USEPA recommended procedures, as discussed in the USEPA memorandum (Lee, R. & Atkinson, D., 1992). Periods with more than one consecutive missing hour of wind speed or wind direction will be set to calm/missing to ensure that worst case predicted impacts were resulting from actual rather than interpolated meteorological conditions.

Air Quality Modeling Meteorological Data Representativeness: The use the five (5) years of recent ASOS meteorological data collected at the Long Beach Airport (Daugherty Field) location are believed to satisfy the definition of on-site data. USEPA defines the term "on-site data" to mean data that would be representative of atmospheric dispersion conditions at the source and at locations where the source may have a significant impact on air quality. Specifically, the meteorological data requirement originates from the Clean Air Act in Section 165(e)(1), which requires an analysis "of the ambient air quality at the proposed site and in areas which may be affected by emissions from such facility for each pollutant subject to regulation under [the Act] which will be emitted from such facility." This requirement and USEPA's guidance on the use of on-site monitoring data are also outlined in the On-Site Meteorological Program Guidance for Regulatory Modeling Applications (US EPA, 1987). The representativeness of meteorological data is dependent upon: (a) the proximity of the meteorological monitoring site to the area under consideration; (b) the complexity of the topography of the area; (c) the exposure of the meteorological sensors; and (d) the period of time during which the data are collected.

First, the meteorological monitoring site and proposed project location are in close proximity, at approximately the same elevation and with roughly the same topography. The meteorological monitoring data are measured by ASOS equipment about 9 kilometers to the east of the proposed project site. Second, the meteorological monitoring site and proposed project location are located roughly about the same distance and in the same orientation to significant terrain features that might influence wind flow patterns. In addition, there are no nearby (localized) significant terrain features between or surrounding the proposed project site and the meteorological monitoring site that would limit the use of the meteorological monitoring data for the proposed project. Third, surface characteristics such as surface roughness, Bowen ratio, and albedo are relatively consistent throughout the area. Fourth and finally, five years of recent meteorological data will be used in the modeling analyses that will be representative of conditions at the start of proposed project operations.

Representativeness is defined in the document "Workshop on the Representativeness of Meteorological Observations" (Nappo et. al., 1982) as "the extent to which a set of measurements taken in a space-time domain reflects the actual conditions in the same or different space-time domain taken on a scale appropriate for a specific application." Judgments of representativeness should be made only when sites are climatologically similar, as is the case with the meteorological monitoring site and the proposed project location. In determining the representativeness of the meteorological data set for use in the dispersion models at the project site, the following considerations were addressed:

- The aspect ratio of significant terrain feature, (which is the ratio of height to width of hill at base) are similar for the meteorological dataset and the proposed project locations since both are located at about the same elevation and at about the same orientation to the same major terrain features.
- The slope of terrain is roughly the same for the proposed project site and the meteorological dataset (i.e., the distance to and height and length scales of large-scale terrain features that play a large role in the affect on the horizontal and vertical wind patterns are about the same for both locations).
- The ratio of terrain height to stack/plume height at the final plume height would be consistent at the two locations (i.e., the effects of terrain on the plume would disperse pollutants in an identical manner to the dispersion conditions monitored by the meteorological dataset).
- The correlation of terrain features to prevailing meteorological conditions, as discussed earlier, would be nearly identical to both locations since the orientation and aspect of terrain at the proposed project location correlates well with the prevailing wind fields as measured by and contained in the meteorological dataset. In other words, the same meso-scale and localized geographic and topographic features that influence wind flow patterns at the meteorological monitoring site also influence the wind flow patterns at the proposed project site.

For these reasons and also as discussed above, the meteorological data selected for the proposed project are expected to satisfy the definition of representative meteorological data. Thus, it is our assessment that the meteorological data collected at the Long Beach Airport are identical to the dispersion conditions at the project site and to the regional area. A graphical wind rose for a recent five-year period is attached. Five-year quarterly wind roses for the modeling data set will be provided in the application.

<u>Surface</u> Characteristics: As part of the AERMET input requirements, Albedo, Bowen Ratio, and Surface Roughness must be classified for the area around the meteorological monitoring site (as noted above, these surface characteristics are relatively consistent throughout the area, including the locations of the meteorological monitoring site and proposed project site). The AERSURFACE program (version 08009) was used to generate the surface characteristics for use in AERMET as specified in EPA's January 2008 AERMOD Guidance Document and AERSURFACE User's Guide using default settings where appropriate. AERSURFACE was executed for four sectors, as shown on an attached figure, to define surface roughness four areas around the Long Beach ASOS meteorological station. Other AERSURFACE inputs/outputs are listed below:

AERSURFACE INPUTS/OUTPUTS FOR USE IN AERMET

Month	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC
Seasonal Assumptions[1] for Surface Roughness (meters) and Albedo:												
Season	Fall	Fall	Fall	Spring	Spring	Spring	Summer	Summer	Summer	Fall	Fall	Fall
Arid	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Airport	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Surface Roughness (meters) for Sectors 1 (15°-60°) / 2 (60°-135°) / 3 (135°-280°) / 4 (280°-15°):												
Sector 1	0.132	0.132	0.132	0.124	0.124	0.124	0.133	0.133	0.133	0.132	0.132	0.132
Sector 2	0.122	0.122	0.122	0.107	0.107	0.107	0.125	0.125	0.125	0.122	0.122	0.122
Sector 3	0.164	0.164	0.164	0.144	0.144	0.144	0.164	0.164	0.164	0.164	0.164	0.164
Sector 4	0.127	0.127	0.127	0.110	0.110	0.110	0.127	0.127	0.127	0.127	0.127	0.127
Albedo	0.18	0.18	0.18	0.17	0.17	0.17	0.18	0.18	0.18	0.18	0.18	0.18
Bowen Ratio based on the following surface moisture contents:[2]												
2002	Dry	Dry	Dry	Avg	Avg	Avg	Avg	Avg	Avg	Dry	Avg	Avg
2003	Dry	Avg	Avg	Avg	Wet	Wet	Wet	Avg	Avg	Avg	Avg	Avg
2004	Dry	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Avg	Wet	Avg	Wet
2005	Wet	Wet	Avg	Wet	Avg	Avg	Avg	Avg	Wet	Wet	Dry	Avg
2006	Dry	Avg	Avg	Wet	Wet	Avg	Wet	Wet	Avg	Avg	Dry	Avg
Bowen Ratio by Year/Month:												
2002	2.94	2.94	2.94	1.09	1.09	1.09	1.14	1.14	1.14	2.94	1.36	1.36
2003	2.94	1.36	1.36	1.09	0.70	0.70	0.74	1.14	1.14	1.36	1.36	1.36
2004	2.94	1.36	1.36	1.09	1.09	1.09	1.14	1.14	1.14	0.79	1.36	0.79
2005	0.79	0.79	1.36	0.70	1.09	1.09	1.14	1.14	0.74	0.79	2.94	1.36
2006	2.94	1.36	1.36	0.70	0.70	1.09	0.74	0.74	1.14	1.36	2.94	1.36

[1]Assignment of seasons for each month based on USEPA modeling analyses for the Los Angeles area in the 2008 Draft Criteria Document for NO_2 (*"Risk and Exposure Assessment to Support the Review of the NO2 Primary National Ambient Air Quality Standard: First Draft,"* EPA-452/P-08-001, April 2008).
[2]Dry/Average/Wet designate total monthly rainfall amounts for the year and month shown that fall into the lower 30th percentiles / middle 40th percentiles / upper 30th percentiles for a standardized 30-year climatological period (in this case, 1971-2000) for the Long Beach Airport.

The area surrounding the Project site, within three (3) kilometers, can be characterized as urban in accordance with the Auer land use classification methodology (USEPA's *"Guideline on Air Quality Models"*), with mostly commercial/industrial and compact residential areas surrounding the project site. Therefore, in the modeling analyses supporting the permitting of the facility, all emissions will be modeled as urban sources.

Existing Baseline Air Quality Data: The nearest representative criteria pollutant air quality monitoring data are measured at the (North) Long Beach monitoring station, about 5.4 kilometers east of the proposed Project and measuring all criteria pollutants. The next nearest monitoring stations are South Long Beach, 7.1 km east-southeast of the Project measuring PM_{10} and $PM_{2.5}$, and Lynwood, 12.9 km north-northeast of the Project measuring ozone, $PM_{2.5}$, CO, NO_2, and sulfate. Ambient monitoring data for these sites for the most recent three (3) year period are summarized below:

Summary of Air Quality Monitoring Data for Most Recent 3 Year Period					
Pollutant	**Site**	**Avg. Time**	**2005**	**2006**	**2007**
Ozone, ppm	N. Long Beach	1 Hr Max	.091	.081	.099
	Lynwood		.111	.088	.102
	N. Long Beach	8 Hr Max	.068	.058	.073
	Lynwood		.081	.066	.077
PM_{10}, ug/m^3	N. Long Beach	24 Hr Max	66	78	75
	S. Long Beach		131	117	123
	N. Long Beach	Annual Arith.Mean	29.6	31.1	30.2
	S. Long Beach		43.4	45.0	41.7
$PM_{2.5}$, ug/m^3	N. Long Beach	24 Hr 98th Percentile	41.4	34.9	40.8
	S. Long Beach		37.8	35.3	33.7
	Lynwood		48.5	44.5	46.1
	N. Long Beach	Annual Arith.Mean	16.0	14.2	14.6
	S. Long Beach		14.7	14.5	13.7
	Lynwood		17.5	16.7	15.9
CO, ppm	N. Long Beach	1 Hr Max	4.2	4.2	3.3
	Lynwood		7.4	8.4	7.8
	N. Long Beach	8 Hr Max	3.5	3.4	2.6
	Lynwood		5.9	6.4	5.1
NO_2, ppm	N. Long Beach	1 Hr Max	.14	.10	.11
	Lynwood		.11	.14	.10
	N. Long Beach	Annual Arith.Mean	.0241	.0215	.0207
	Lynwood		.0312	.0306	.0291
SO_2, ppm	N. Long Beach	1 Hr Max	.041	.027	.037
	N. Long Beach	3 Hr Max	.033	.023	.028
	N. Long Beach	24 Hr Max	.010	.010	.011
	N. Long Beach	Annual AM	.002	.0012	.0027
Sulfate, ug/m^3	N. Long Beach	24 Hr Max	16.8	17.8	ND
	S. Long Beach		ND	18.8	ND
	Lynwood		17.3	24.1	ND

Note: Background values are taken primarily from the SCAQMD Annual Air Quality Data Tables accessible from http://www.aqmd.gov/smog/historicaldata.htm except 1-hr SO_2, 3-hr SO_2, and 2005 annual SO_2 and additional significant digits for 1-hr CO and 2006 1-hr ozone taken from USEPA at http://www.epa.gov/air/data/reports.html

For state and federal attainment pollutants with maximum modeled ground-level impacts greater than USEPA-defined significance levels, modeled concentrations will be added to these representative maximum background concentrations to determine compliance with all Ambient Air Quality Standards (AAQS). The maximum value for each pollutant and averaging time from the representative monitoring stations above will be used to represent ambient background concentrations of O_3, NO_2, CO, SO_2, PM_{10} and $PM_{2.5}$. These background values are compared below to the AAQS.

Comparison of Baseline Air Quality to AAQS **Ambient Air Quality Standards**

Pollutant/Avg.Time	Background Value, μg/m³	National USEPA	California State
Ozone - 1-hr	217	235 ug/m³ (0.12 ppm)	180 ug/m³ (0.09 ppm)
Ozone - 8-hr	159	147 ug/m³ (0.075 ppm)	137 ug/m³ (0.070 ppm)
PM_{10} - 24-hr	131	150 ug/m³	50 ug/m³
PM_{10} - Annual	45.0	N/A	20 ug/m³
$PM_{2.5}$ - 24-hr	48.5	35 ug/m³	N/A
$PM_{2.5}$ - Annual	17.5	15.0 ug/m³	12 ug/m³
CO - 1-hr	9600	40,000 ug/m³ (35 ppm)	23,000 ug/m³ (20 ppm)
CO - 8-hr	7315	10,000 ug/m³ (9 ppm)	10,000 ug/m³ (9.0 ppm)
NO_2 - 1-hr	264	N/A	339 ug/m³ (0.18 ppm)
NO_2 - Annual	58.9	100 ug/m³ (0.053 ppm)	57 ug/m³ (0.030 ppm)
SO_2 - 1-hr	107	N/A	655 ug/m³ (0.25 ppm)
SO_2 - 3-hr	86	1300 ug/m³ (0.5 ppm)	N/A
SO_2 - 24-hr	28.6	365 ug/m³ (0.14 ppm)	105 ug/m³ (0.04 ppm)
SO_2 - Annual	7.0	80 ug/m³ (0.030 ppm)	N/A
Sulfate, 24 -hr	24.1	N/A	25 ug/m³
Maximum value for all years and all applicable monitoring stations.			

The attainment status of the proposed project site is designated for the NAAQS and CAAQS as follows:

Pollutant	CAAQS	NAAQS
Ozone (1-hour)	Non attainment	Non attainment (Extreme)
Ozone (8-hour)	Non attainment	Non attainment (Severe)
PM_{10}	Non attainment	Non attainment (Serious)
$PM_{2.5}$	Non attainment	Non attainment
Carbon Monoxide (CO)	Attainment	Attainment**
Nitrogen Dioxide (NO_2)	Attainment	Unclassified/Attainment
Sulfur Dioxide (SO_2)	Attainment	Attainment
Sulfates	Attainment	---
Lead	Attainment	Attainment
**May 11, 2007 Federal Register (72 FR 26718) effective June 11, 2007.		

AIR QUALITY MODELING PROCEDURES WITH AERMOD/SCREEN3

Several dispersion models are proposed for use to quantify pollutant impacts on the surrounding environment based on the emission sources operating parameters and their locations as described above. AERMOD and SCREEN3 will be used to determine facility impacts on Class II areas in the immediate Project vicinity in simple, intermediate, and complex terrain areas during both Project operations and during construction of the Project. The AERMOD and SCREEN3 models will be used for comparison of impacts to significant impact levels, monitoring significance thresholds, and compliance with PSD Increments and AAQS.

Screening Modeling: A variety of facility operating conditions (e.g., minimum, maximum, and average ambient temperatures; a range of turbine loads, and duct firing on/off) will be conducted to identify which operating condition causes worst-case ambient air impacts. The modeling will be performed for stack characteristics and emissions for all applicable short-term averaging times (pollutants and averaging times with AAQS) using one or five years of the selected meteorological dataset (described above). The worst-case short-term operating condition(s) so identified will be used in the refined modeling described below. Source characteristics for annual average impacts will be based on average operating conditions (i.e., average annual temperature, average operating load and duct-firing conditions, and worst-case annual emissions based on permitted hours of operation for both normal and startup, shutdown, and malfunction conditions).

Refined Modeling: The purpose of the refined modeling analysis will be to demonstrate that air emissions from the Project will not cause or contribute to a NAAQS/CAAQS violation and will not cause a significant health risk impact. For modeling the project's operational impacts under normal and startup, shutdown, or malfunction conditions due to emissions from the proposed sources (as well as temporary project construction impacts) on nearby simple, complex, and intermediate terrain, the AERMOD model will be used with five (5) years of hourly meteorological data from the selected meteorological dataset (processed as described above). The federal rule adopting AERMOD as a preferred EPA model became effective December 9, 2005. Therefore, the most recent version of AERMOD will be used for the Project modeling analyses (AERMOD version 07026 and AERMAP version 06341). AERMOD is a steady-state plume dispersion model that simulates transport and dispersion from multiple point, area, or volume sources based on updated characterizations of the atmospheric boundary layer. AERMOD uses Gaussian distributions in the vertical and horizontal for stable conditions, and in the horizontal for convective conditions; the vertical distribution for convective conditions is based on a bi-Gaussian probability density function of the vertical velocity. For elevated terrain AERMOD incorporates the concept of the critical dividing streamline height, in which flow below this height remains horizontal, and flow above this height tends to rise up and over terrain.

AERMOD also uses the advanced PRIME algorithm to account for building wake effects.

For regulatory applications of AERMOD, the regulatory default option will be set (i.e., the parameter DFAULT will be employed in the MODELOPT record in the COntrol Pathway). The DFAULT option requires the use of terrain elevation data, stack-tip downwash, sequential date checking, and does not permit the use of the model in the SCREEN mode. In the regulatory default mode, pollutant half life or decay options will not be employed. AERMOD incorporates the PRIME algorithms for the simulation of aerodynamic downwash induced by buildings. These effects are important because many of the emission points may be below Good Engineering Practice (GEP) stack height. As noted earlier, the area around both the meteorological monitoring location and project site are urban so appropriate urban options in the COntrol or SOurce Pathways will be employed. Flagpole receptors are not expected to be used. AERMAP will be used to calculate receptor elevations and hill height scales for all receptors from DEM data in accordance with USEPA guidance.

Annual NO_2 concentrations will be calculated using the Ambient Ratio Method (ARM), adopted in Supplement C to the *Guideline on Air Quality Models* (USEPA, 1994). The Guideline allows a nationwide default conversion rate of 75% for annual NO_2/NO_x ratios.

Should NO_2 concentrations need to be examined in a more rigorous manner, the Ozone Limiting Method (OLM) will be used. Hourly ozone data collected at the appropriate monitoring station (most likely North Long Beach) will be used in the OLM analysis to calculate hourly NO_2 concentrations from hourly NO_x concentrations. The ozone data used will be for the same year as the meteorological data modeled. The OLM is incorporated into the AERMOD program and involves an initial comparison of the estimated maximum NO_x concentration and the ambient O_3 concentration to determine which is the limiting factor to NO_2 formation. If the O_3 concentration is greater than the maximum NO_x concentration, total conversion is assumed. If the NO_x concentration is greater than the O_3 concentration, the formation of NO_2 is limited by the ambient O_3 concentration. In this case, the NO_2 concentration is set equal to the O_3 concentration plus a correction factor that accounts for in-stack and near-stack thermal conversion (typically 10% is used).

Fumigation Modeling: The SCREEN3 model was used to evaluate inversion breakup fumigation impacts for all short-term averaging periods (24 hours or less). The methodology outlined in BAAQMD Modeling Guidance and EPA 454/R-92-019 (Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised) will be followed for this analysis. Combined impacts for all sources under fumigation conditions will be evaluated based on BAAQMD modeling guidelines. No nearby bodies of water to the Project exist that would require shoreline fumigation analyses.

For sources not subject to inversion breakup fumigation, their contributions to fumigation impacts will be determined using SCREEN3 with all meteorological conditions and ignoring terrain at the distance of the maximum fumigation concentration. The fumigation concentration is then combined with the maximum SCREEN3 concentration from the other sources. The combined fumigation concentrations are also compared to the maximum SCREEN3 concentrations under normal dispersion for all meteorological conditions. If fumigation impacts are less than SCREEN3 maxima under normal dispersion, no further analysis is required based on Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised (EPA-454/R-92-019). If fumigation impacts exceed SCREEN3 maxima, then fumigation impacts longer than 1-hour averages will be evaluated based on Section 4.5.3 of Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised (EPA-454/R-92-019) guidance on converting to 3-, 8- and 24-hour average concentrations. To estimate urban impacts under fumigation conditions, rural SCREEN3 impacts for fumigation conditions will be multiplied by the urban/rural ratio for SCREEN3 under normal dispersion conditions (as outlined by the BAAQMD modeling guidelines).

GEP Stack Height and Downwash: Stack locations and heights and building locations and dimensions will be input to BPIP-PRIME. The first part of BPIP-PRIME determines and reports on whether a stack is being subjected to wake effects from a structure or structures. The second part calculates direction-dependent "equivalent building dimensions" if a stack is being influenced by structure wake effects. The BPIP-PRIME output is formatted for use in AERMOD input files.

Receptor Selection: Receptor and source base elevations will be determined from US Geological Survey (USGS) Digital Elevation Model (DEM) data using the 7-1/2-minute format (*i.e.*, most likely 10-meter spacing between grid nodes for this area). All coordinates will be referenced to UTM North American Datum 1927 (NAD27), zone 11. The receptors from the DEM files will be placed exactly on the DEM nodes if possible. Every effort will be made to maintain receptor spacing across DEM file boundaries.

Cartesian coordinate receptor grids will be used to provide adequate spatial coverage surrounding the project area for assessing ground-level pollution concentrations, to identify the extent of significant impacts, and to identify maximum impact locations. The maximum extent of the significant impact isopleth for any pollutant will be used to represent the impact radius.

For the full impact analyses, a nested grid will be developed to fully represent the significance area(s) and maximum impact area(s). The downwash receptor grid will have a receptor spacing of 10-meters along the facility fence line and out to 500 meters from the Project. An intermediate receptor grid with 50-meter receptor spacing will extend from the downwash receptor grid out to 2000 meters from the Project. A coarse receptor grid with 200-meter receptor spacing will extend from the intermediate receptor grid outwards at least 10 km (or more as necessary to calculate the significant impact area). When maximum impacts occur in areas outside the 10-meter spaced receptor grid, additional refined receptor grids with 10-meter resolution will be placed around the maximum impacts and extended as necessary to determine maximum impacts. Ambient concentrations within the facility fence line will not be calculated. DEM receptor data will be input into AERMAP (version 06341) to calculate hill height scales as per EPA guidance.

Ambient Air Quality Impact Analyses: In evaluating the impacts of the proposed project on ambient air quality, the applicant will model the maximum ambient impacts of the projectand compare the results to the the USEPA/SCAQMD significance levels. For those pollutants exceeding the significance levels and which are designated attainment, modeled impacts will be added to background concentrations shown earlier for comparison to the CAAQS/NAAQS (i.e., for SO_2, NO_2, and CO). A multisource modeling assessment may be performed in consultation with the SCAQMD for impacts from the Project of attainment pollutants that are above PSD modeling significance levels.

The highest modeled concentration will be used to demonstrate compliance with all short-term and annual CAAQS, all annual NAAQS, and all significant impact levels. In all likelihood, maximum Project impacts will also be used to demonstrate compliance with short-term NAAQS. However, compliance with short-term NAAQS may also be demonstrated consistent with the format of the short-term NAAQS (see 40 CFR 50).

VISCREEN

The proposed project has the potential to emit over 15 tons per year of PM_{10} but less than 40 tons per year of NO_x. SCAQMD rules require that a coherent plume visibility analysis must be completed for the following Class I areas if they are within certain distances from the proposed project: Agua Tibia, Cucamonga, Joshua Tree, San Gabriel, San Gorgonio, and San Jacinto. Based on the distances listed in Table C-1 of SCAQMD Rule 1303, the no Class I areas are within the prescribed distances for coherent plume visibility impacts.

Preconstruction Monitoring Requirements: Maximum impacts from the air quality analysis will be compared to the USEPA *de minimis monitoring* levels to demonstrate that the applicant can be exempted from the requirement to collect preconstruction monitoring data (i.e., at this time, the applicant is relying on existing air quality monitoring data collected at District-approved monitoring stations to satisfy the requirement for preconstruction monitoring).

Site Description: The dispersion modeling analyses will include a description of the physical setting of the facility and surrounding terrain. A map showing the plant location, fence lines, and model receptors will be included, as well as a plot plan of the plant site indicating heights of nearby structures above a common reference point.

ADDITIONAL IMPACTS ANALYSIS REQUIRED FOR CEC ANALYSES

The additional impacts analysis is an assessment of the impacts of air pollution on soils and vegetation, which includes the potential impacts of deposition. Additionally, cumulative impacts and construction impacts will be assessed.

Screening Health Risk Assessment: A screening health risk assessment will be conducted to evaluate air toxics. The latest version of the Health Risk Assessment Program (HARP version 1.2a) and the HARP On-Ramp will be used to characterize risks from the proposed facility. These models, along with options for their use and how they are used, are discussed below. The screening health risk assessment will be conducted in accordance with the procedures developed by the California Air Resources Board and the Office of Environmental Health Hazard Analysis.

The HARP program is a tool that assists with the programmatic requirements of the Air Toxics Hot Spots Program, and it can be used for preparing health risk assessments for other related programs such as air toxic control measure development or facility permitting applications. HARP is a computer based risk assessment program, which combines the tools of emission inventory database, facility prioritization, air dispersion modeling, and risk assessment analysis. Use of HARP promotes statewide consistency in the area of risk assessment, increases the efficiency of evaluating potential health impacts, and provides a cost effective tool for developing facility health risk assessments. HARP may be used on single sources, facilities with multiple sources, or multiple facilities in close proximity to each other.

The HARP On-Ramp program will be used to convert the AERMOD output files into a form that can be used by HARP. The HARP On-Ramp program is basically a post-processor that will take ASCII post files from AERMOD and process these files to calculate acute, chronic, and cancer impacts, identical to the methods used in the current version of HARP.

The screening health risk assessment will be carried out in three steps. First, emissions of toxic air pollutants from the project will be calculated. Next, the HARP On-Ramp subroutine will be used to convert the maximum AERMOD concentration at each receptor due to the operation of the proposed project. A separate analysis will be conducted for construction generated PM_{10}, as per CEC requirements. The high-resolution receptor grids as derived from the facility AERMOD modeling will then be used in HARP. Finally, the HARP will be used to evaluate acute, chronic and cancer risks through inhalation and non-inhalation pathways based upon the maximum predicted concentration at each receptor. Some of the assumptions used in running the HARP program will be set as follows:

- Emission rates for non-criteria pollutants will be based upon the expected fuel use of the engines.
- Number of residents affected will be based upon the updated 2000 population data for those census tracts or portions of census tracts, which lie within the maximum impact receptor radius of the proposed facility.
- Number of workers affected will be based upon the county average percentage of non-farm workers as compared to the total county population in 2000. This average was applied to all affected census tracts.
- Deposition velocity is taken to be 0.02 m/s, as recommended by ARB for controlled sources.
- Fraction of residents with gardens is taken to be 0.15, which is probably conservatively high for the urban area.
- Fraction of produce grown at home is taken to be 0.05, which is also believed to be conservatively high.

The receptor grids used for the HARP risk analyses are similar to those used for the refined modeling, with the addition of discrete receptor annotations representing the 1^{st}, 2^{nd}, and 3^{rd} highest impact points, *i.e.*, MIR-1, MIR-2, and MIR-3. In addition, the point of maximum impact (PMI), maximally exposed individual resident (MEIR), and the maximally exposed individual worker (MEIW) will be shown. A complete list of the discrete sensitive receptors within 1 mile of the facility will be included in the application as well as census tract population data, census tract maps and affected tracts within 6 miles of the facility.

The HARP program results for acute and chronic inhalation and chronic non-inhalation exposures, cancer burden and individual cancer risk (workplace and residential) for the combustion sources will be summarized. Separate calculations will be shown for each type of exposure and risk.

<u>Cumulative Impacts</u>: Pursuant to CEC guidelines, a cumulative impacts analysis will be required and must consider the additional impacts of the following sources located within 8 miles of the project site.

- Sources with impacts on existing air quality that are not reflected in the ambient air quality data used to establish background. These sources are generally those which have received permits authorizing construction but are not yet in operation and sources which have commenced operations subsequent to the data used to establish background air quality levels. Data derived from the SCAQMD, CARB, and EPA AIRS monitoring data systems indicate that air quality data for the project region is available up to the end of year 2007. As such the cumulative analysis will concentrate on the above types of sources permitted or becoming operational after January 1, 2008.

Construction Impacts Analysis: The potential ambient impacts from air pollutant emissions during the construction of the project will be evaluated by air quality modeling that will account for the construction site location and the surrounding topography; the sources of emissions during construction, including vehicle and equipment exhaust emissions; and fugitive dust. Construction of the proposed project will be divided into three main construction phases: (1) site preparation; (2) construction of foundations; and (3) installation and assembly of mechanical and electrical equipment. The construction impacts analysis will include a schedule for construction operation activities. Site preparation is expected to include site excavation, excavation of footings and foundations, and backfilling operations. After site preparation is finished, the construction of the foundations will begin. Once the foundations are finished, the installation and assembly of the mechanical and electrical equipment will begin.

Fugitive dust emissions from the construction of the project result from (1) dust entrained during excavation and grading at the construction site; (2) dust entrained during onsite travel on paved and unpaved roads and across the unpaved construction site; (3) dust entrained during aggregate and soil loading and unloading operations; (4) dust entrained from raw material transfer to and from material stockpiles; and (5) wind erosion of areas disturbed during construction activities. Heavy equipment exhaust emissions result from (1) exhaust from the heavy equipment used for excavation, grading, and construction of onsite structures; (2) exhaust from a water truck used to control construction dust emissions; (3) exhaust from diesel welding machines, gasoline-powered generators, air compressors, and water pumps; and (4) exhaust from gasoline-powered pickup trucks and Diesel flatbed trucks used onsite to transport workers and materials around the construction site. Diesel and gasoline truck exhaust emissions will result from transport of mechanical and electrical equipment to the project site and transport of rubble and debris from the site to an appropriate landfill. Diesel exhaust emissions may also result from transport of raw materials to and from stockpiles.

Emissions from a worst-case day will be calculated for each of the three main construction phases and only the phase with the highest emissions will be modeled. As the construction impacts are expected to occur for a relatively short time compared with the lifetime of the project, only short-term averaging periods (24 hours or less) will be included in the construction modeling analysis.

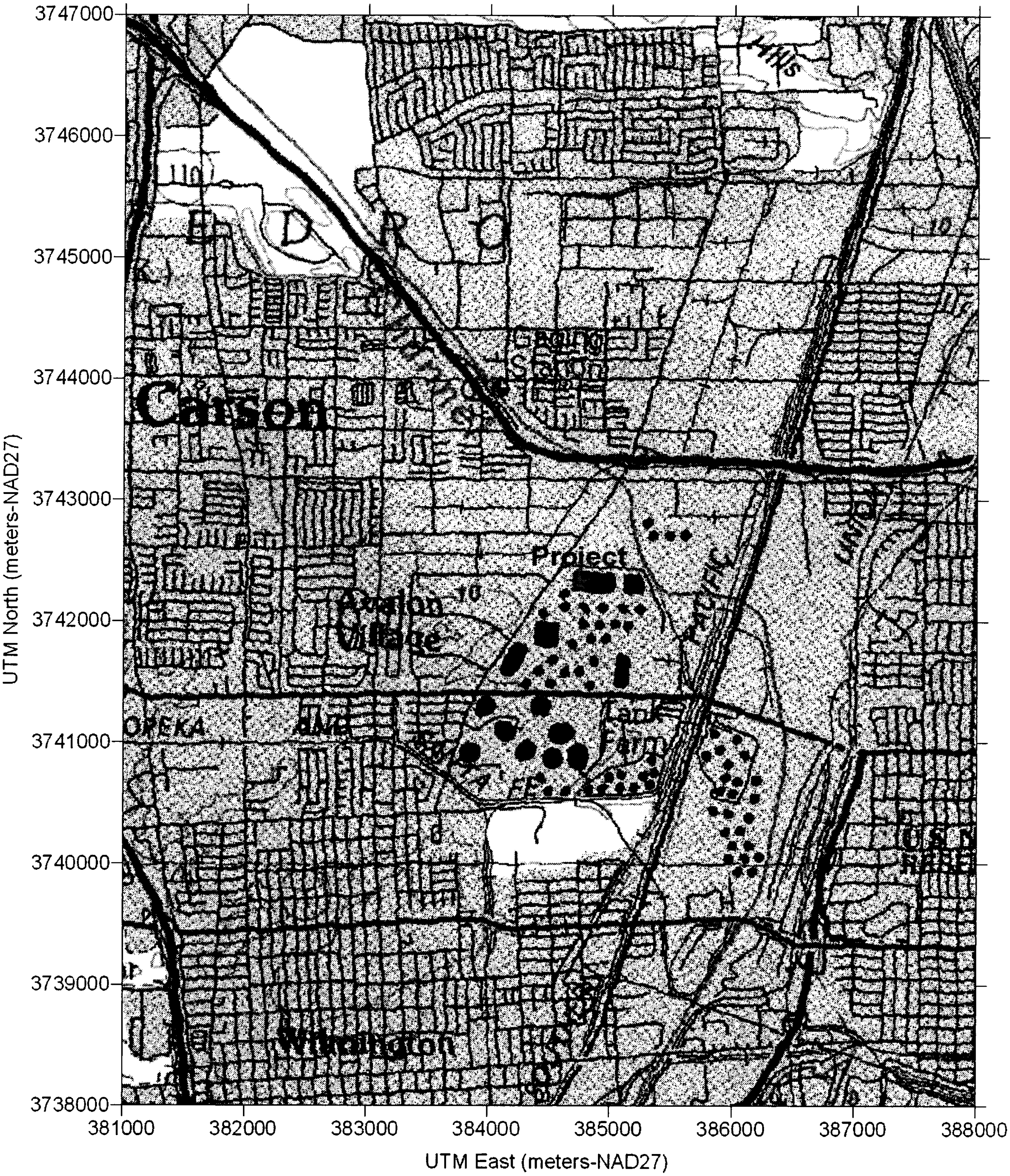
The same USEPA-approved model (AERMOD), receptor grids, modeling options, and meteorological data as described earlier for Project operations will be used to estimate ambient impacts from construction emissions. The construction site in the modeling analysis will be represented as either area or volume sources for fugitive dust emissions and as area, volume, or point sources for combustion emissions.

FINAL MODELING SUBMITTAL

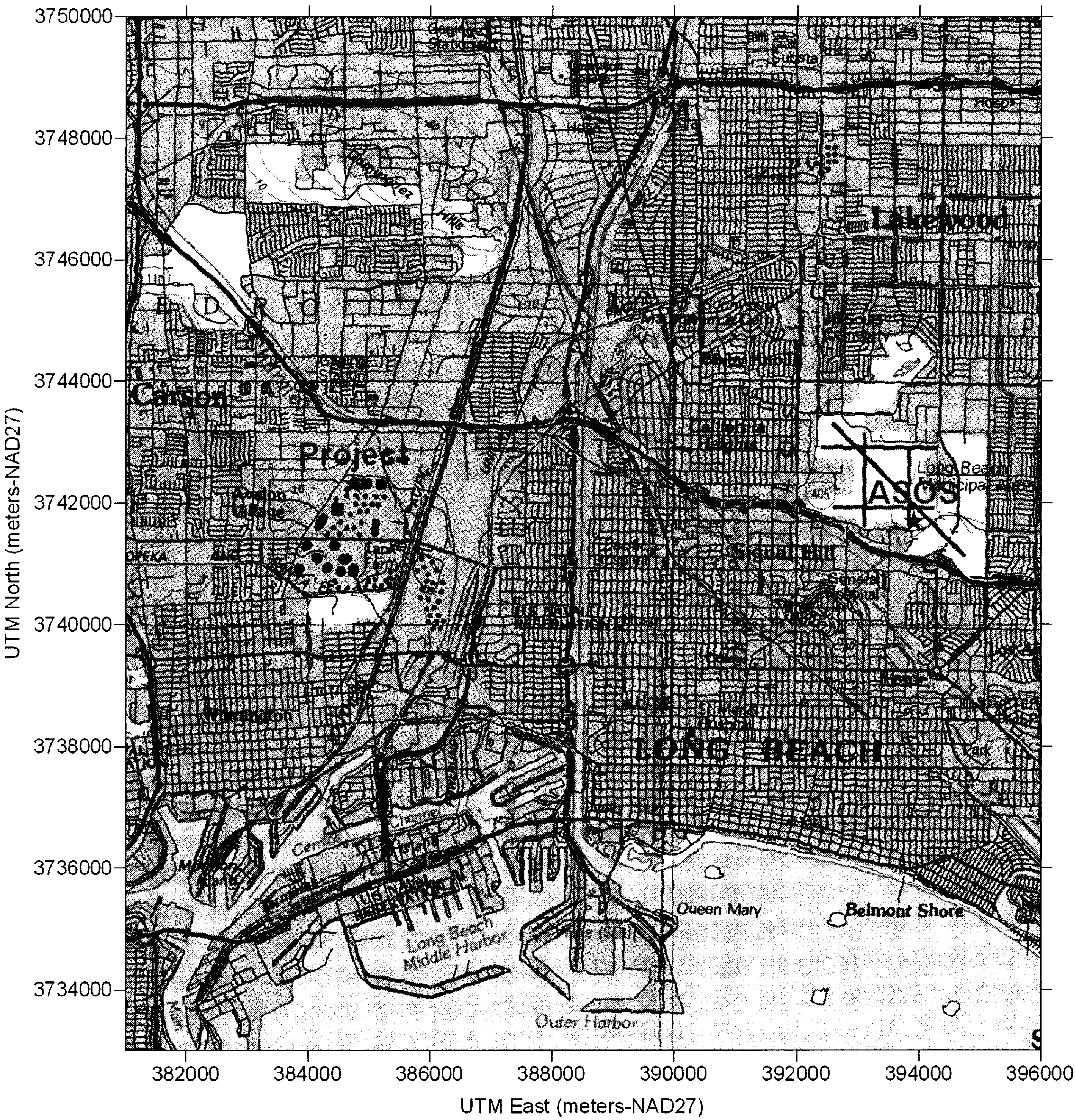
As part of the final modeling analyses, the SCAQMD and CEC agencies will be supplied with the following materials:

- Copies of sections of the US Geological Survey (USGS) 7-1/2-minute (1:24,000) map(s) showing the facility;
- Modeling summaries of maximum impacts for each air quality model showing meteorological conditions and receptor location and elevation;
- All modeling outputs (including BPIP and meteorological files) on CD-ROM disc, together with a description of all filenames;
- Plot plan showing emission points, nearby buildings (including dimensions), cross-section lines, property lines, fence lines, roads, and UTM coordinates; and
- Table showing the building identifiers in the BPIP run(s) and plot plan.

Project Vicinity

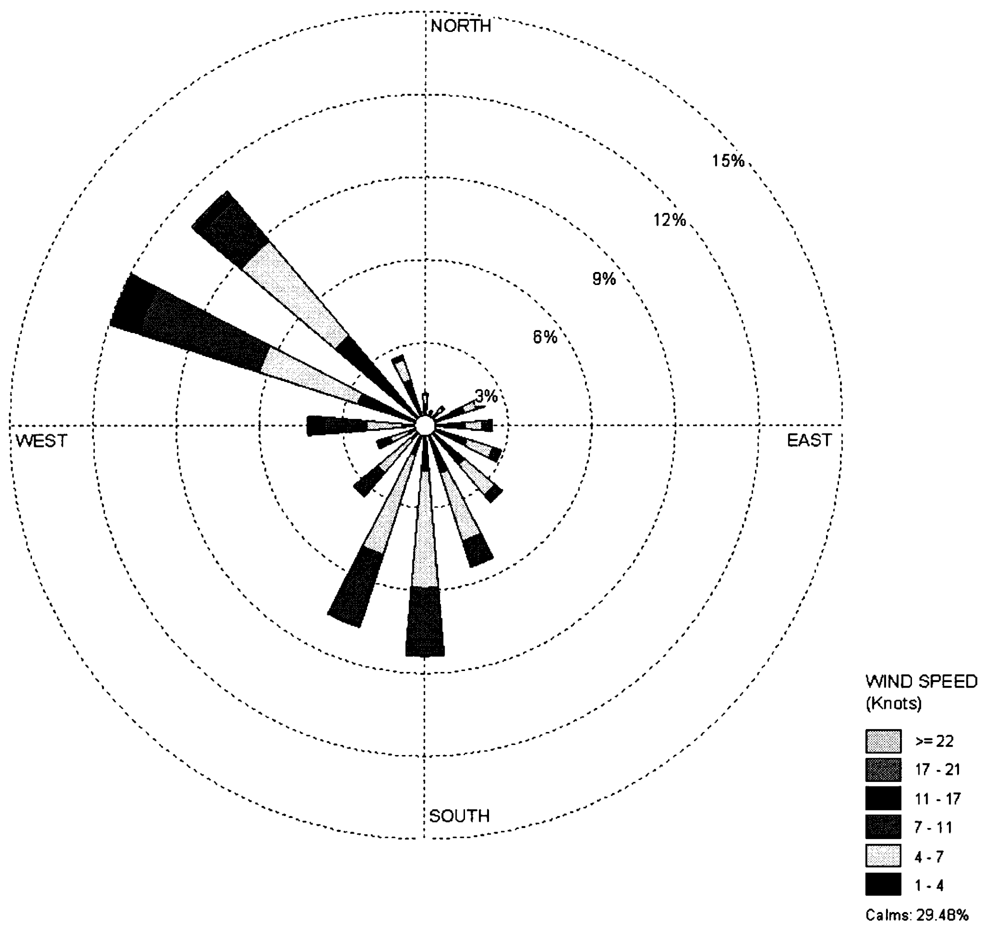


Project and Met Data Sites



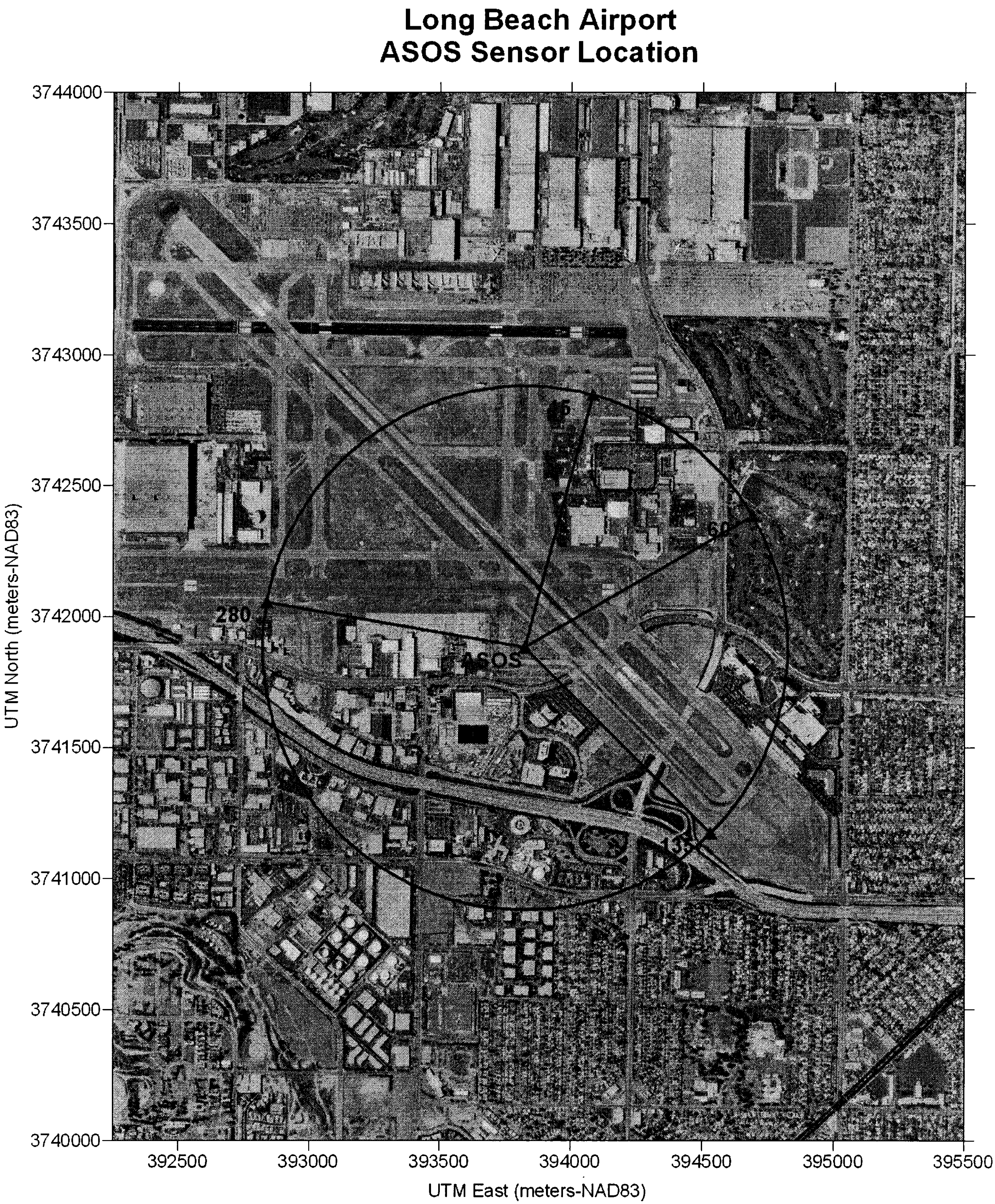
WIND ROSE PLOT:
Long Beach Daugherty Field Met Data 2002-2006

DISPLAY:
Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **2002 2003 2004 2005 2006** **Jan 1 - Dec 31** **00:00 - 23:00**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **29.48%**	TOTAL COUNT: **40865 hrs.**	
	AVG. WIND SPEED: **4.35 Knots**	DATE: **8/19/2008**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software


Long Beach Airport
ASOS Sensor Location
UTM North (meters-NAD83)
UTM East (meters-NAD83)
3744000
3743500
3743000
3742500
3742000
3741500
3741000
3740500
3740000
392500
393000
393500
394000
394500
395000
395500
ASOS
280
60
135

APPENDIX I-C

Protocol for Increments Analysis

Overview of Requirements for Increments Analysis

The federal Prevention of Significant Deterioration (PSD) program is intended to ensure that economic growth in areas with good air quality occurs without causing the deterioration of that air quality to unhealthful levels. The PSD program contains a number of requirements that apply to new or modified sources of air pollution that are located in clean air areas.

These PSD program requirements, applied on a pollutant-specific basis, include conducting an increments analysis to demonstrate that no increments will be exceeded as a result of the proposed new or modified source.

The WCP project is **not** expected to trigger the requirements of the PSD program. Therefore, an increment analysis is not proposed at this time. Should the PSD status change, a increment analysis protocol will be submitted to the CEC and District for review and approval.

APPENDIX I-D

Construction Emissions and Impact Analysis

Construction Phases

Construction of WCP is expected to last approximately 20 months. The construction will occur in the following four main phases:

- Site preparation;
- Foundation work;
- Construction/installation of major structures; and,
- Installation of major equipment.

The site is approximately 2.6 acres in size and is essentially flat. The site is currently used as a power generation site. The existing maintenance building will be demolished by WCP as part of its expansion plans. As such, the site will require only minimum grading and leveling prior to construction of the power block and cooling tower cell additions. Site preparation includes finish 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 WCP will result from:

- Dust entrained during site preparation and finish 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, and water pumps;
- Exhaust from pickup trucks and Diesel trucks used to transport workers and materials around the construction site;
- Exhaust from Diesel trucks used to deliver concrete, fuel, and construction supplies to the construction site; and,
- Exhaust from automobiles 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 emissions are expected to occur during the first 2-6 months of construction when site preparation occurs. The worst-case daily exhaust emissions are expected to occur during the middle of the construction schedule during the installation of the major mechanical equipment. Annual emissions are based on the average equipment mix during the 20 month construction period.

Available Mitigation Measures

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

- The applicant will have an on-site construction mitigation manager who will be responsible for the implementation and compliance of the construction mitigation program. The documentation of the ongoing implementation and compliance with the proposed construction mitigations will be provided on a periodic basis.

- All unpaved roads and disturbed areas in the project and laydown construction sites will be watered as frequently as necessary to control fugitive dust. The frequency of watering will be on a minimum schedule of four (4) times during the daily construction activity period. Watering may be reduced or eliminated during periods of precipitation.

- Onsite vehicle speeds will be limited to 5 miles per hour on unpaved areas within the project construction site.

- The construction site entrance(s) will be posted with visible speed limit signs.

- All construction equipment vehicle tires will be inspected and cleaned as necessary to be free of dirt prior to leaving the construction site via paved roadways.

- Gravel ramps will be provided at the tire cleaning area.

- All unpaved exits from the construction site will be graveled or treated to reduce track-out to public roadways.

- All construction vehicles will enter the construction site through the treated entrance roadways, unless an alternative route has been provided.

- Construction areas adjacent to any paved roadway will be provided with sandbags or other similar measures as specified in the construction Storm Water Pollution Prevention Plan (SWPPP) to prevent runoff to roadways.

- All paved roads within the construction site will be cleaned on a periodic basis (or less during periods of precipitation), to prevent the accumulation of dirt and debris.

- The first 500 feet of any public roadway exiting the construction site will be cleaned on a periodic basis (or less during periods of precipitation), using wet sweepers or air filtered dry vacuum sweepers, when construction activity occurs or on any day when dirt or runoff from the construction site is visible on the public roadways.

- Any soil storage piles and/or disturbed areas that remain inactive for longer than 10 days will be covered, or shall be treated with appropriate dust suppressant compounds.

- All vehicles that are used to transport solid bulk material on public roadways and that have the potential to cause visible emissions will be covered, or the materials shall be sufficiently wetted and loaded onto the trucks in a manner to minimize fugitive dust emissions. A minimum freeboard height of two (2) feet will be required on all bulk materials transport.

- Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) will be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition will remain in place until the soil is stabilized or permanently covered with vegetation.

- Disturbed areas will be re-vegetated as soon as practical.

To mitigate exhaust emissions from construction equipment, the applicant is proposing the following:

- The applicant will work with the construction contractor to utilize to the extent feasible, EPA-ARB Tier 2/Tier 3 engine compliant equipment for equipment over 100 horsepower.

- Insure periodic maintenance and inspections per the manufacturers specifications.

- Reduce idling time through equipment and construction scheduling.

- Use California low sulfur diesel fuels (<=15 ppmw S).

Estimation of Emissions with Mitigation Measures

Tables I-D-1 through I-D-3 show the estimated maximum daily and annual heavy equipment exhaust and fugitive dust emissions with recommended mitigation measures. Detailed emission calculations are included in Table I-D-5.

TABLE I-D-1 MAXIMUM DAILY EMISSIONS DURING CONSTRUCTION (FUGITIVE DUST), POUNDS PER DAY

	NO_x	CO	VOC	SO_x	PM_{10}
Onsite					
Construction Fugitive Dust	-	-	-	-	19.87
Offsite					
Worker Travel, Truck/Rail Deliveries	-	-	-	-	10.43
Total =	**0**	**0**	**0**	**0**	**30.3**

TABLE I-D-2 MAXIMUM DAILY EMISSIONS DURING CONSTRUCTION (EXHAUST EMISSIONS), POUNDS PER DAY

	NO_x	CO	VOC	SO_x	PM_{10}
Onsite and Offsite					
Construction Equipment, Worker Travel, Truck/Rail Deliveries					
Total =	**75.6**	**64.0**	**18.4**	**0.1**	**5.58**

TABLE I-D-3 ANNUAL EMISSIONS DURING CONSTRUCTION, TONS PER CONSTRUCTION PERIOD (20 MONTHS)

	NO_x	CO	VOC	SO_x	PM_{10}
Onsite and Offsite					
Construction Equipment, Fugitive Dust, Worker Travel, Truck/Rail Deliveries					
Total =	**11.1**	**10.3**	**2.79**	**0.02**	**3.4**
Construction Period Total Emissions (including offsite linears)	**11.1**	**10.3**	**2.79**	**0.02**	**3.4**
Total Per Average Year =	**6.6**	**6.2**	**1.68**	**0.01**	**2.04**

Analysis of Ambient Impacts from Facility Construction

Ambient air quality impacts from emissions during the construction of WCP 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.

Existing Ambient Levels

As with the modeling analysis of project operating impacts (Section 5.2), monitoring stations delineated in Section 5.2 were used to establish the ambient background levels for the construction impact modeling analysis. Table 5.2-17 showed the maximum concentrations of NO_x, SO_2, CO, $PM_{2.5}$, and PM_{10} recorded for 2005 through 2007 at those monitoring stations.

Dispersion Model

As in the analysis of project operating impacts, the USEPA-approved model AERMOD (version 07026) was used to estimate ambient impacts from construction activities. A detailed discussion of the AERMOD dispersion model and the associated processing programs AERSURFACE, AERMET, and AERMAP is included in Section 5.2.6.

The emission sources for the construction site were grouped into two categories: exhaust emissions and dust emissions. Combustion equipment exhaust emissions were modeled as eighteen (18) 3.048 meter high point sources (exhaust parameters of 750 Kelvins, 64.681 m/s exit velocity, and 0.1524 meter stack diameter) placed at regular 20-meter intervals around the construction area. Construction fugitive dust emissions were modeled as an area source covering the construction area with an effective plume height of 0.5 meters. Combustion emissions were assumed to occur for 10 hours/day (8 AM to 6 PM) while fugitive dust emissions were assumed to be continuous (24 hours/day). The construction impacts modeling analysis used the same receptor locations and meteorological data as used for the project operating impact analysis. A detailed discussion of the receptor locations and meteorological data is included in Section 5.2.6. For the construction impacts modeling involving area sources, the TOXICS keyword was used to minimize execution times.

To determine the construction impacts on short-term ambient standards (24 hours and less), the worst-case daily onsite construction emission levels shown in Tables I-D-1 and I-D-2 were used. For pollutants with annual average ambient standards, the annual onsite emission levels shown in Table I-D-3 were used.

Modeling Results

Based on the emission rates of NO_x, SO_2, CO, $PM_{2.5}$, and PM_{10}, the modeling options, receptor grids, and meteorological data, AERMOD calculates short-term 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, $PM_{2.5}$, and PM_{10} spread over the estimated daily hours of operation. The annual impacts are based on the annual emission rates of these pollutants.

The annual average concentrations of NO_2 were computed following the revised USEPA guidance for computing these concentrations (August 9, 1995 Federal Register, 60 FR 40465). The annual average was calculated using the ambient ratio method (ARM) with the national default value of 0.75 for the annual average NO_2/NO_x ratio.

The modeling analysis results are shown in Table I-D-4. Also included in the table are the maximum background levels that have occurred in the last three years and the resulting total ambient impacts. As shown in Table I-D-4, modeled construction impacts for all pollutants are expected to be below the most stringent state and Federal standards. However, the state annual NO_2 standard, the state 24-hour and annual PM_{10} standards, and the state and Federal $PM_{2.5}$ standards are exceeded by maximum background concentrations even in the absence of the modeled impacts due to construction emissions for WCP.

TABLE I-D-4 MODELED MAXIMUM CONSTRUCTION IMPACTS

Pollutant	Averaging Time	Maximum Construction Impacts (µg/m³)	Background (µg/m³)	Total Impact (µg/m³)	State Standards (µg/m³)	Federal Standards (µg/m³)
NO_2[a]	1-hour Annual	90 1.5	264 58.9	354 60.4	339 57	- 100
SO_2	1-hour 3-hour 24-hour Annual	0.13 0.08 0.02 0.002	107 86 28.6 7	107.13 86.08 28.62 7.002	655 - 105 -	- 1300 365 80
CO	1-hour 8-hour	62 21	9600 7315	9662 7336	23,000 10,000	40,000 10,000
PM_{10}	24-hour Annual[b]	4.5 0.39	131 45	135.5 45.4	50 20	150 -
$PM_{2.5}$	24-hour Annual	1.5 0.22	48.5 17.5	50.0 17.7	- 12	35 15

Notes:
[a]ARM applied for annual average, using national default 0.75 ratio.
[b]Annual Arithmetic Mean.

Standards are only exceeded for pollutants and averaging times where background concentrations are close to or already exceed the standards. The state 1-hour and annual NO_2 standards, the state 24-hour and annual PM_{10} standards, and the state and Federal $PM_{2.5}$ standards are exceeded by total modeled concentrations (i.e., maximum modeled impact plus maximum background concentration). WCP construction impacts are not unusual in comparison to most construction sites; construction sites that use good dust suppression techniques and low-emitting vehicles typically would not be expected to cause exceedances of air quality standards. The input and output modeling files are being provided electronically to the appropriate agencies.

Attachment - Detailed Emission Calculations

Table I-D-5 Construction Emissions Calculations

Attachment I-D-1 WCP Construction Support Data

Table I-D-5 Construction Emission Totals — Watson Cogen Expansion — 13 Pages

Construction Activity	lbs/day NOx	lbs/day CO	lbs/day VOC	lbs/day SOx	lbs/day PM10	lbs/day PM2.5	tons per const period NOx	tons per const period CO	tons per const period VOC	tons per const period SOx	tons per const period PM10	tons per const period PM2.5	tons per year NOx	tons per year CO	tons per year VOC	tons per year SOx	tons per year PM10	tons per year PM2.5
Main Site																		
Construction Equipment Exhaust	70.7	48.5	16.6	0.1	5.30	5.20	10.0	6.9	2.40	0.01	0.75	0.74	6.00	4.14	1.44	0.01	0.45	0.44
Construction Dust-Main Site	0.000	0.000	0.000	0.000	3.00	0.63	0.000	0.000	0.000	0.000	0.13	0.03	0.00	0.00	0.00	0.00	0.08	0.02
Construction Dust-Other Site	0.000	0.000	0.000	0.000	0.00	0.00	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Delivery Truck Exhaust	3.50	0.97	0.26	0.004	0.15	0.15	0.76	0.21	0.06	0.001	0.034	0.034	0.46	0.13	0.03	0.00	0.02	0.02
Site Support Vehicle Exhaust	0.340	3.100	0.303	0.004	0.030	0.030	0.075	0.680	0.067	0.001	0.007	0.007	0.05	0.41	0.04	0.00	0.00	0.00
Worker Travel Vehicle Exhaust	1.07	11.5	1.21	0.013	0.10	0.10	0.24	2.52	0.27	0.003	0.023	0.023	0.14	1.51	0.16	0.00	0.01	0.01
Track Out Fugitive Dust	0.000	0.000	0.000	0.000	8.97	1.883	0.000	0.000	0.000	0.000	1.75	0.37	0.00	0.00	0.00	0.00	1.05	0.22
Paved Road Fugitive Dust	0.000	0.000	0.000	0.000	1.460	0.210	0.000	0.000	0.000	0.000	0.290	0.040	0.00	0.00	0.00	0.00	0.17	0.02
Demolition Fugitive Dust	0.000	0.000	0.000	0.000	1.570	0.330	0.000	0.000	0.000	0.000	0.024	0.005	0.00	0.00	0.00	0.00	0.01	0.00
Unpaved Road Fugitive Dust	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
Other	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
Other	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
Other	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
Linears																		
Gas Line (Exhaust and Fugitives)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
Sewer Line (Exhaust and Fugitives)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
Water Line (Exhaust and Fugitives)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
T-Line (Exhaust and Fugitives)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00	0.00	0.00	0.00
TOTALS	**75.6**	**64.0**	**18.4**	**0.1**	**20.6**	**8.5**	**11.1**	**10.3**	**2.79**	**0.02**	**3.01**	**1.25**	**6.6**	**6.2**	**1.68**	**0.01**	**1.80**	**0.75**
Emissions included in modeling analysis:	*70.7*	*48.5*	*16.6*	*0.1*	*8.3*	*5.83*	*10*	*6.9*	*2.4*	*0.01*	*1.02*	*0.85*	*6.00*	*4.14*	*1.44*	*0.01*	*0.61*	*0.51*

Total Const Months: 20
Total Const Years: 1.67

CONSTRUCTION EQUIPMENT EXHAUST EMISSIONS

Project: Watson Cogen Expansion

Assumptions:

1. The average diesel engine employed in construction equipment use consumes fuel at a rate of: 0.06 gal/hp-hr

Ref: EPA, NR-009b Publication, November 2002.
Ref: Sacramento County APCD Const. Program Data, V. 6.0.3, 3/2007.
Ref: EPA, NR-009c Publication, EPA 420-P-04-009, April 2004.
Ref: Niland Energy Project, IID, AFC Vol 2, App A.
Ref: South Coast AQMD PR XXI, Draft Staff Report, 3-15-95, and SCAQMD CEQA Manual, 11/03.
The above noted references present fuel consumption values which range from 0.050 to 0.064 gal/hp-hr for diesel engines used in construction related equipment. The value of 0.060 gal/hp-hr was chosen as a reasonable upper mid-range value for construction emissions calculations.

2. Construction equipment exhaust emissions will be calculated on an annual basis using the site specific equipment list, HP ratings, hours of use, days of use, etc. Annual emissions will be apportioned to daily values based on the estimated construction period time on site.

3. The equipment list derived from the South Coast AQMD (12/2006) will be used to establish the various equipment categories. Data produced by the Sacramento APCD was used to establish the average HP ratings for each equipment category. HP rating data was supplemented by data from SCAQMD CEQA Handbook (Table A9-8-C) if not available from Sacramento APCD.

4. Construction Schedule:			Construction Totals:		
	10	hrs/day		220	hrs/month
	5	days/week		4400	hrs/const period
	22	days/month		440	days/const period
	20	months			

5. Anticipated Construction Start Year: 2009-2010 (earliest year that construction could commence is 2009)

BPAE has supplied the total project operating hours for the various const equipment categories as delineated below > > > > > > >

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^
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^

Equipment Category	Avg HP	# of Units Used for Project	Avg Use Rate Hrs/day	# of Days On Site (each)	Total Hrs/Day	Total Hp-Hrs per Day	Total Hrs per Const Period	Total Hp-Hrs per Const Period
Bore/Drill Rigs/Pile Drivers	217.7	0	0	0	0	0	360	78372
Cement Mixers	11	0	0	0	0	0	150	1650
Industrial/Concrete Saws	83.7	0	0	0	0	0	200	16740
Cranes	190.4	0	0	0	0	0	2960	563584
Crawler Tractors/Dozers	143.4	0	0	0	0	0	200	28680
Crushing/Processing Eq.	154.3	0	0	0	0	0	0	0
Dump and Tender Trucks	223	0	0	0	0	0	11235	2505405
Excavators	180	0	0	0	0	0	770	186000
Forklifts/Aerial Lifts/Booms	83	0	0	0	0	0	12770	1059910
Generators/Compressors	37	0	0	0	0	0	2610	96570
Graders	174	0	0	0	0	0	100	17400
Off Highway Tractors	255.1	0	0	0	0	0	0	0
Off Highway Trucks	417.2	0	0	0	0	0	0	0
Other Const. Eq.	240.3	0	0	0	0	0	0	0
Pavers	131.5	0	0	0	0	0	100	13150
Paving Eq./Surfacing Eq.	110.9	0	0	0	0	0	0	0
Plate Compactors	8	0	0	0	0	0	770	6160
Rollers/Compactors	113.9	0	0	0	0	0	230	26197
Rough Terrain Forklifts	94.2	0	0	0	0	0	0	0
Rubber Tired Dozers	352.5	0	0	0	0	0	0	0
Rubber Tired Loaders	165.3	0	0	0	0	0	1370	226461
Scrapers	313.2	0	0	0	0	0	0	0
Signal Boards/Light Sets	118.8	0	0	0	0	0	0	0
Skid Steer Loaders	62	0	0	0	0	0	750	46500
Tractors/Loaders/Backhoes	79.5	0	0	0	0	0	870	69165
Trenchers	28	0	0	0	0	0	120	3360
Welders	35	0	0	0	0	0	3905	136675

Total Const Period Hp-Hrs = 5081979

Total Const Period Fuel Use = 304919 gals

Equip. Type	HP	lbs/hp-hr CO	lbs/hp-hr VOC	lbs/hp-hr NOx	lbs/hp-hr SOx	lbs/hp-hr PM10
Bore/Drill Rigs/Pile Drivers	217.7	0.004310	0.000601	0.005835	0.000009	0.000302
Cement Mixers	11	0.002606	0.000550	0.003544	0.000007	0.000219
Industrial/Concrete Saws	83.7	0.006620	0.002648	0.006245	0.000008	0.000635
Cranes	190.4	0.002803	0.000729	0.005628	0.000005	0.000322
Crawler Tractors/Dozers	143.4	0.004233	0.001371	0.007932	0.000006	0.000717
Crushing/Processing Eq.	154.3	0.005004	0.001551	0.009092	0.000008	0.000832
Dump and Tender Trucks	223	0.001379	0.000455	0.002647	0.000004	0.000158
Excavators	180	0.003838	0.000894	0.006853	0.000007	0.000402
Forklifts/Aerial Lifts/Booms	83	0.003959	0.001597	0.004025	0.000005	0.000393
Generators/Compressors	37	0.005939	0.002363	0.006229	0.000008	0.000593
Graders	174	0.004253	0.001055	0.008224	0.000008	0.000470
Off Highway Tractors	255.1	0.006275	0.002149	0.012360	0.000009	0.001088
Off Highway Trucks	417.2	0.001621	0.000520	0.004964	0.000005	0.000185
Other Const. Eq.	240.3	0.003380	0.000719	0.006091	0.000007	0.000328
Pavers	131.5	0.004406	0.001440	0.008471	0.000007	0.000741
Paving Eq./Surfacing Eq.	110.9	0.003446	0.001127	0.006640	0.000005	0.000579
Plate Compactors	8	0.001756	0.000339	0.002143	0.000004	0.000118
Rollers/Compactors	113.9	0.003518	0.001066	0.006485	0.000006	0.000560
Rough Terrain Forklifts	94.2	0.003744	0.001088	0.006497	0.000006	0.000597
Rubber Tired Dozers	352.5	0.003241	0.001156	0.010246	0.000008	0.000450
Rubber Tired Loaders	165.3	0.003595	0.001077	0.006383	0.000006	0.000583
Scrapers	313.2	0.003100	0.001099	0.010462	0.000009	0.000426
Signal Boards/Light Sets	118.8	0.002511	0.000479	0.002998	0.000006	0.000123
Skid Steer Loaders	62	0.005223	0.001786	0.005010	0.000007	0.000475
Tractors/Loaders/Backhoes	79.5	0.007370	0.002787	0.006330	0.000008	0.000673
Trenchers	28	0.008921	0.003857	0.007331	0.000009	0.000843
Welders	35	0.006168	0.002585	0.005520	0.000007	0.000597

SCAQMD off-road emissions factor database, website, 12/2006. Load factor adjustments incorporated.
EFs are for equipment inventory year 2009 (earliest calendar year that construction could commence).

Construction Period Emissions, lbs

Equip. Type	**CO**	**VOC**	**NOx**	**SOx**	**PM10**
Bore/Drill Rigs/Pile Drivers	338	47	457	1	24
Cement Mixers	4	1	6	0	0
Industrial/Concrete Saws	111	44	105	0	11
Cranes	1580	411	3172	3	182
Crawler Tractors/Dozers	121	39	227	0	21
Crushing/Processing Eq.	0	0	0	0	0
Dump and Tender Trucks	3455	1139	6632	10	396
Excavators	714	166	1275	1	75
Forklifts/Aerial Lifts/Booms	4196	1692	4266	5	417
Generators/Compressors	574	228	602	1	57
Graders	74	18	143	0	8
Off Highway Tractors	0	0	0	0	0
Off Highway Trucks	0	0	0	0	0
Other Const. Eq.	0	0	0	0	0
Pavers	58	19	111	0	10
Paving Eq./Surfacing Eq.	0	0	0	0	0
Plate Compactors	11	2	13	0	1
Rollers/Compactors	92	28	170	0	15
Rough Terrain Forklifts	0	0	0	0	0
Rubber Tired Dozers	0	0	0	0	0
Rubber Tired Loaders	814	244	1446	1	132
Scrapers	0	0	0	0	0
Signal Boards/Light Sets	0	0	0	0	0
Skid Steer Loaders	243	83	233	0	22
Tractors/Loaders/Backhoes	510	193	438	1	47
Trenchers	30	13	25	0	3
Welders	843	353	754	1	82

Totals	**CO**	**VOC**	**NOx**	**SOx**	**PM10**	**PM2.5**	
lbs per const. period	13766	4722	20075	25	1499.55	1486.06	
tons per const. period	6.9	2.4	10.0	0.0	0.75	0.74	
Average lbs/day =	31.3	10.7	45.6	0.06	3.41	3.38	
Estimated Maximum lbs/day =	*48.5*	*16.6*	*70.7*	*0.1*	*5.3*	*5.2*	*note 3*
Average lbs/month =	688.3	236.1	1003.7	1.2	74.98	74.30	
Average tons/year =	4.13	1.42	6.02	0.01	0.45	0.45	

CARB-CEIDARS, Updated Size Fractions for PM Profiles: PM2.5 = 0.991 of PM10 : Diesel Vehicle Exhaust
CO2 EF: CCAR General Protocol, June 2006, for CA-Low Sulfur Diesel combustion.

	CO2
lbs per const period	6696016
tons per const period	3348

Other Assumptions and References:

1. Trench construction times per: Southern Regional Water Pipeline Alliance, 3/08.
   Optimum trench construction progress rate is 80m (260ft) per day.
   Non-optimum trench construction progress rate is 30m (100 ft) per day.
   An average progress of 180 ft/day is used where applicable.
2. Paving speeds can range from 3 to 15 m/min depending on asphalt delivery rates and required compaction thickness.
   A minium paving speed of 3 m/min (10 ft/min or 600 ft/hr) is used where applicable.
   The minimum speed is based upon a 3" compacted layer, 12 ft lane width, with an asphalt delivery rate of ~140 tons/hr.
   Ref: Asphalt Paving Speed, Pavement Worktip No. 31, AAPA, 11/2001.
3. Estimation of maximum daily emissions is extremely variable. Some projects provide estimated manpower and equipment use schedules, but even this data usually leads to a wide range of assumptions being made in order to estimate equipment exhaust emissions for a maximum work day. The methodology used in this analysis assumes that the estimated maximum day represents an activity level on the order of 55% greater than the average work day, with emissions adjusted accordingly.
   This value was derived by comparing estimated average and maximum calculated daily equipment emissions for a number of power plant construction projects subject to CEC review. The derived value is the average of the projects evaluated for the main 5 criteria pollutants. The overall average increase was 55%.

Sources: Inland Empire Energy Center AFC, 8/01.
Tesla Energy Facility AFC, 10/01
Rio Linda Elverta Energy Center AFC, 1/01
Salton Sea Unit 6 AFC, 7/02
GWF Tracy AFC, 8/01
Pastoria Energy Center AFC, 4/05
RGT Eastshore AFC, 2006

CONSTRUCTION PHASE-Main Project Site Fugitive Dust Emissions

MRI Level 2 Analysis

Acres Subject to Construction Disturbance Activites:	2.6	
Emissions Factor for PM10 Uncontrolled, tons/acre/month:	0.0144	
PM2.5 fraction of PM10 (per CARB CEIDARS Profiles):	0.21	
Activity Levels: Hrs/Day:	10	
Days/Wk:	5	
Days/Month:	22	
Const Period, Months:	20	1.67 years
Const Period, Days:	440	
Wet Season Adjustment (Per AP-42, Section 13.2.2, Figure 13.2.2-1, 12/03)		
Mean # days/year with rain > = 0.01 inch:	40	
Mean # months/yr with rain > = 0.01 inch:	1.33	
Adjusted Const Period, Months:	17.78	
Adjusted Const Period, Days:	373.33	
Controls for Fugitive Dust:	Watering	
Proposed watering schedule is eve	2	Hours

SCAQMD Mitigation Measures, Table XI-A, 4/07
3 hour watering interval yields 61% control of PM10/PM2.5

Calculated % control based on watering interval r	91.5	% control
Conservative control % used for emissions estimate	90	% control
	0.1	release fraction

Emissions: Controlled	PM10	PM2.5
tons/month	0.004	0.001
tons/period	0.067	0.014
Max lbs/day	0.3	0.071

Cut and Fill Data:

Total cu/yds (power block area)		10000
10^3 cu/yds:		10
MRI PM10 emissions factor, tons/1000 cu.yds:		0.059
PM10 uncontrolled emissions, tons/period:		0.59
Cut and Fill Activity Period, months:		2.0
Cut and Fill Activity Period, days:		44.0
PM10 Controlled Emissions:	tons/period	0.06
PM2.5 Controlled Emisisons:	tons/period	0.01
PM10 Controlled Emissions:	tons/month	0.03
PM2.5 Controlled Emisisons:	tons/month	0.01
PM10 Controlled Emissions:	max lbs/day	2.7
PM2.5 Controlled Emisisons:	max lbs/day	0.6

Emissions Totals:

	PM10	**PM2.5**
tons/period	**0.125560**	**0.03**
tons/month	**0.033244**	**0.01**
max lbs/day	**3.0**	**0.63**

Ref: MRI Report, South Coast AQMD Project No. 95040, March 1996, Level 2 Analysis Procedure.
MRI Report factor of 0.011 tons/acre/month is based on 168 hours per month of const activity.
For an activity rate of 220 hrs/month, the adjusted EF would be 0.0144 tons/acre/month.

Demolition Emissions

Data Input:

Total volume of all structures to be demolished:	160000	ft3	(1)
Demolition Schedule:	30	total days	

SCAQMD Demolition Emissions Factor (uncontrolle	0.00042	lbs PM10/ft3 demolished
Watering control efficiency (% as fraction):	0.3	
Controlled Emissions Factoı	0.000294	lbs PM10/ft3 demolished

Total Demolition Period Emissions:	**PM10**	**47.04**	**lbs**
		0.024	**tons**
		1.57	**lbs/day**
	PM2.5	**0.329**	**lbs/day**
		0.0049	**tons**

Ref: SCAQMD CEQA Manual, Section A9, Table A9-9-H
Ref: SCAQMD CEQA Manual, Mitigation Tables, Fugitive Dust, 4/2007.
PM2.5 fraction of PM10 (per CARB CEIDARS Profiles) = 0.21

(1) one structure on site to be demolished-maintenance shop, 80 x 80 x 25.

PAVED ROAD FUGITIVE DUST EMISSIONS
(associated with construction traffic)

Length of Paved Road used for/by Construction Access		0.58	miles, roundtrip distance		
Avg weight of vehicular equipment on road:		8.3	tons (range 2 - 42 tons)		
Road surface silt loading factor:		0.6	g/m2 (range 0.03 - 400 g/m2)		
Particle size multiplier factors:	PM10	0.016	lb/VMT		
	PM2.5	0.0024	lb/VMT		
C factors (brake and tire wear):	PM10	0.00047	lb/VMT		
	PM2.5	0.00036	lb/VMT		
Avg vehicle speed on road:		15	mph (range 10-55 mph)		
Number of vehicles per day:		76		VMT/day:	44.08
				VMT/montl	969.76
Number of construction work days per month:		22		VMT/perioc	17242.33
Total vehicles per n		1672			
Number of construction work months:		17.78	after wet season adjustment*		
Total vehicles per const per:		29728			

	PM10	PM2.5	
Calc 1	0.457	0.457	
Calc 2	4.602	4.602	
Calc 3	0.033	0.005	lb/VMT

Emissions	PM10	PM2.5
lbs/day	**1.46**	**0.21**
lbs/month	32.19	4.55
lbs/period	572.37	80.86
tons/period	**0.29**	**0.04**

* see main const dust site page for this value
EPA, AP-42, Section 13.2.1, March 2006.

*** Note: fugitive roadway emissions from construction traffic are based on the 0.34 miles of paved access roadway at the entrance to the site, broken down as follows: 0.05 miles are evaluated for trackout emis while the remaining 0.29 miles are evaluated form paved road fugitives. The roundtrip distances are 0. miles respectively for trackout and paved road emissions.

CONSTRUCTION PHASE - Truck Delivery and Site Support Vehicle Emissions

Ref: SCAQMD, Emfac 2007, V2.3, Nov 2006
On-Road Heavy Duty Diesels (1965-2009)

Avg # deliveries/day:	7.0		Emissions Factors (lbs/vmt)						
Avg Haul Distance (miles)	15	see note below	NOx	CO	VOC	SOx	PM10	CO2	
VMT/Day:	105.0		0.032994	0.0092	0.002489	0.000037	0.001465	4.086331	
Work days/yr:	264		Daily Emissions (lbs)						
Total Const Work Days:	440		**NOx**	**CO**	**VOC**	**SOx**	**PM10**	**CO2**	**PM2.5**
Total # of Deliveries:	3080		**3.464**	**0.966**	**0.261**	**0.004**	**0.154**	**429.065**	**0.152**
			Tons per Const Period						
			0.762	0.213	0.057	0.001	0.034	94.394	0.034

Site Support Vehicle Emissions

		NOx	CO	VOC	SOx	PM10	CO2			PM2.5
Total # of vehicles:	19									
# of Pickups (gas):	10	0.001112	0.010254	0.001008	0.000011	0.0001	0.846837	lbs/vmt*	gasoline	
# of Pickups (diesel):	9	0.000029	0.000012	0.000002	0.000001	0.000001	0.010455	lbs/vmt*	diesel	
Avg. pickup daily vmt:	30	**0.3336**	**3.0762**	**0.3024**	**0.0033**	**0.0300**	**254.0511**	**lbs/day**	**gasoline**	**0.02994**
Total Gas VMT:	300	**0.0078**	**0.0032**	**0.0005**	**0.0003**	**0.0003**	**2.8229**	**lbs/day**	**diesel**	**0.0003**
Total Diesel VMT:	270									
		0.0734	0.6768	0.0665	0.0007	0.0066	55.8912	**tons/period**	**gasoline**	0.0066
		0.0017	0.0007	0.0001	0.0001	0.0001	0.6210	**tons/period**	**diesel**	0.0001

Ref: SCAQMD, Emfac 2007, V2.3, Nov 2006
LDTs (gas and diesel), 1965-2009

Avg haul distance: one way distance from site to any industrial supply area or terminal in a 15 mile radius (including the Ports of Long Beach and
These trucks will not be dedicated to the site, so backhaul distances are not included.

CARB-CEIDARS, Updated Fractions for PM Profiles: PM2.5 = 0.991 of PM10 for Diesel Exhaust, and 0.998 for Gasoline Vehicles.

It should be noted that these emissions are not necessarily new emissions to the regional air shed. A significant portion of the truck services will be derived from the existing regional truck services vehicle pool, and as such these truck emissions would most likely be involved in deliveries in the area regardless of whether or not the proposed facility is constructed. As such, a major portion of the above estimated emissions would not be considered as additions to the air shed.

CONSTRUCTION PHASE - Worker Travel - Emissions

Ref: SCAQMD, Emfac 2007, V2.3, Nov 2006
On Road Vehicles (1965-2009)
LDP/LDT Weighted Avg Efs

Max # of Workers/Day:	80	
Avg # of Workers/Day:	50	
Avg Occupancy/Vehicle:	1.15	
Round Trips/Day:	43	
Avg Roundtrip Distance:	30	miles
VMT/Day:	1304	
VMT/Year:	344348	
VMT/Const Period:	573913	
Const Days/Yr:	264	
Total Const Days:	440	

Emissions Factors (lbs/VMT)

NOx	CO	VOC	SOx	PM10	CO2
0.00082	0.00878	0.00093	0.00001	0.00008	0.94335

Avg. Daily Emissions (lbs)

NOx	**CO**	**VOC**	**SOx**	**PM10**		**PM2.5**
1.070	**11.452**	**1.213**	**0.013**	**0.104**	**1230.457**	**0.104**

Tons per Const Period

0.2353	**2.5195**	**0.2669**	**0.0029**	**0.0230**	**270.7004**	**0.0229**

It should be noted that these emissions are not necessarily new emissions to the regional air shed. A significant portion of the workers will be derived from the existing work force pool in the urban regional area, and as such these workers would most likely be involved in projects in the area regardless of whether or not the proposed facility is constructed. As such, a major portion of the above estimated emissions would not be considered as additions to the air shed.

CONSTRUCTION PHASE - Trackout Emissions

Paved Road Length (miles):	0.1	estimated roundtrip trackout distance				
Daily # of Vehicles:	76					
Avg Vehicle Weight (tons):	8.3			PM10	PM2.5*	
Total Unadjusted VMT/day	7.6			0.382		
Particle Size Multipliers	PM10			2.257		
lb/VMT	0.023			0.019	0.0033	lb/VMT
C factor, lb/VMT	0.00047			**8.968**	1.8833	**lbs/day**
Road Sfc Silt Loading (g/m^2):	0.6			**0.099**	0.0207	**tons/month**
# of Active Trackout Points:	1			**1.75**	0.3683	**tons/period**
Added Trackout Miles:	PM10					
Trackout VMT/day:	456		*Default Silt Load Values for Paved Road Types*			
Final Adjusted VMT/day	464			Freeway	0.02 g/m2	
Final Adjusted VMT/month	10199			Arterial	0.036 g/m2	
Final Adjusted VMT/period	181342			Collector	0.036 g/m2	
Construction days/month:	22			Local	0.28 g/m2	
Construction months/period:	17.8			Rural	1.6 g/m2	
Control Applied to Trackout:	Sweeping and Cleaning (Water washing)					
Control Efficiency, %	90	0.9	Release Factor =		0.1	

* PM2.5 fraction of PM10 assumed to be 0.169 (CARB CEIDARS updated fraction values) for paved roads.

EPA, AP-42, Section 13.2.1, Proposed revisions dated 8/2008.
Use silt loading factor from default values for road type if no site specific data is available.
Trackout effects approximately 260 ft of roadway arriving and departing from the site access point.
See the mileage note on the paved road calculation sheet.

Average Vehicle Weight Estimate

Vehicle Type	Weight tons	# Vehicles per day	Frac. of total vehicles
Passenger Cars	3	43	0.566
LD Pickups	4	10	0.132
MD Pickups	5	9	0.118
HD Loaded*	40	7	0.092
HD Unloaded*	20	7	0.092
		76	1

Weighted Avg Vehicle Weight, tons : 8.3

* Ref: Liberty Energy XXIII DEIR, City of Banning, CA., Aspen Environmental Group, June 2

CO2e Emissions Estimates

Total CO2 emisisons from diesel combustion:	3443	tons/period
Total CO2 emissions from gasoline combustion:	327	tons/period
Approximate methane fraction of CO2 for diesel combustion:	0.000051	
Approximate N2O fraction of CO2 for diesel combustion:	0.000032	
Approximate methane fraction of CO2 for gasoline combustion:	0.000213	
Approximate N2O fraction of CO2 for gasoline combustion:	0.000113	
Estimated methane from diesel combustion:	0.175593	tons/period
Estimated N2O from diesel combustion:	0.110176	tons/period
Estimated methane from gasoline combustion:	0.069651	tons/period
Estimated N2O from diesel combustion:	0.036951	tons/period
Estimated methane CO2e from diesel combustion:	3.687453	tons/period
Estimated N2O CO2e from diesel combustion:	34.15456	tons/period
Estimated methane CO2e from gasoline combustion:	1.462671	tons/period
Estimated N2O CO2e from gasoline combustion:	11.45481	tons/period
Total CO2e emissions from construction	**3821**	**tons/period**
	3439	***metric tons/period***

CCAR General Protocol, June 2006, Version 2.1.
IPCC SAR values for methane and N2O.

Attachment I-D-1

WCP Construction Support Data

CONSTRUCTION EQUIPMENT OPERATING HOURS

The table provides a detailed listing of numbers and types of construction equipment and vehicles associated with construction of the plant. This includes equipment for each period of construction to enable worst-case daily and total construction emissions to be estimated.

No.	Equipment Type	Max No. On Site	Project Total Operating Hours	"Worst Case" Per Equipment Type, Hrs/day	"Worst Case" Total Daily Equipment Operating Time, Hrs/day
1	Air Compressor, Portable (750 cfm)	1	2240	10	10
2	Backhoe	1	300	10	10
3	Cement Mixer, Portable (0.3 cu. yd.)	2	150	10	20
4	Compactor, Portable	2	600	10	20
5	Concrete Saw	2	200	10	20
6	Dozer (250 - 750 hp)	1	200	0	0
7	Excavator, Mini- (0.1 - 0.3 cu. yds)	1	790	10	10
8	Excavator (2 - 5 cu. yds / 20 - 65 metric tons)	1	770	0	0
9	Forklift (articulating)	2	6270	10	20
10	Fusion Welding Machine - Electric (Not diesel)	1	N/A	0	0
11	Pile Driver (20,000 - 32,000 ft-lbs/blow)	1	360	0	0
12	Generator, Portable (50 - 200 kW)	1	370	10	10
13	Grader (13 - 16 ft blade)	1	100	0	0
14	Hydro Crane (50 - 200 tons)	2	2960	10	20
15	Impact Wrench & Other Air-operated Tools	11	N/A	0	0
16	Lifts, Manlift & Scissors Lift	6	6500	10	60
17	Loader, Front End Loader (6 - 15 cu. yds)	2	1370	0	0
18	Loader, Skip Loader (0.5 - 1.5 cu. yds)	1	570	10	10
19	Loader, Skid Steer Loader	1	750	10	10
20	Paver	1	100	0	0
21	Roller, Smooth Drum	1	230	0	0
22	Roller, Walk-Behind	1	170	0	0
23	Trencher, Portable	1	120	10	10
24	Truck, Water (4000 gal.)	1	870	10	10
25	Truck, Flatbed	1	9800	10	10
26	Truck, Dump	1	80	0	0
27	Truck, Pickup (gasoline and diesel mix)	18	18860	8	144
28	Truck, Lube (Single Axle)	1	485	10	10
29	Welder (250 - 500 amp)	5	3905	10	50
30	Van, Tool & Maintenance (gasoline)	1	20	0	0

Notes:

a. All equipment is diesel-powered unless notes otherwise.
b. Excludes operating time off construction site.
c. Fuel for pickup trucks is gasoline.
d. The "Total Daily Equipment Operating Time" is the "Worst Case" hours per day time the "Maximum No. On Site"

AVERAGE & PEAK VEHICLE TRAFFIC

Estimated average and peak construction vehicle traffic by delivery trucks.

Vehicle Type	**Average Daily Round Trips** [a]	**Peak Daily Round Trips** [a]
Delivery Truck/Van	7	14
Heavy Truck	3	14

Notes:

(a) Excludes the construction of linears (gas, water, sewer, transmission).

BP AE CARSON COGEN EXPANSION

Construction Workforce *

Provide a month-by-month tabular listing of the estimated number of required construction workers for each craft/skill type and staff based on a typical mix.

	Months After Site Mobilization																										
																					Startup and Commissioning						Subtotals
Crafts / Management	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	Man-months
Maintenance Supervisor	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	13
Carpenter	3	4	5	5	5	6	6	4	4	3	2	2	2	3	3	2	1	1	1	1	0	0	0	0	0	0	63
Electrician	1	2	2	2	2	2	3	3	4	4	6	7	9	7	5	3	2	1	1	1	2	1	1	0	0	0	71
Piledriver	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Ironworker	0	1	2	2	2	4	4	4	6	6	6	5	5	5	3	3	3	4	5	4	3	1	0	0	0	0	78
Laborer	4	7	4	4	3	4	4	4	4	3	3	4	4	4	4	4	3	4	3	3	2	3	1	1	1	0	85
Cement Mason	1	2	1	1	1	2	1	1	2	1	1	2	1	1	1	1	0	0	0	1	1	0	0	0	0	0	22
Operator	5	7	6	6	6	6	6	6	6	6	6	6	6	5	4	4	3	3	3	3	3	1	1	1	0	0	109
Pipefitter	2	3	4	4	3	4	5	7	11	15	22	28	24	16	13	7	4	3	3	3	2	1	0	0	0	0	184
Boilermaker	0	2	2	2	6	14	13	13	13	15	10	5	3	2	1	1	3	1	0	0	1	2	0	0	0	0	109
Teamster	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	20
Millwright	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	18
Insulation/Sheetmetal/Painters	0	0	0	0	0	0	0	0	0	0	0	0	3	9	8	10	9	12	10	6	5	0	0	0	0	0	72
Surveyors	1	2	2	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
Management	3	6	6	5	6	9	9	10	12	13	16	18	17	18	14	12	8	7	5	4	4	3	2	1	1	1	210
Total Workforce	22	38	37	35	38	55	55	56	66	70	75	80	77	72	58	49	38	38	33	28	23	12	5	3	2	1	13
																										Workweek, hr/wk	50
																										Total Manhours	231,000

* Excludes workforce for the construction of linears (gas pipelines & transmission lines).

Provide a month-by-month listing of the construction equipment needed to build the plant.

		Months After Site Mobilization																									
																						Startup and Commissioning					
	Equipment	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1	Air Compressor, Portable (750 cfm)	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
2	Backhoe	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
3	Cement Mixer, Portable (0.3 cu. yd.)	0	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
4	Compactor, Portable	0	1	1	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
5	Concrete Pump (30 - 150 cu. yds/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	Concrete Saw	0	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	0
7	Crane (200 - 400 tons)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	Dozer (250 - 750 hp)	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	Excavator, Mini- (0.1 - 0.3 cu. yds)	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
10	Excavator (2 - 5 cu. yds / 20 - 65 metric tons)	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	Forklift (articulating)	0	0	0	0	1	1	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	0	0	0
12	Fusion Welding Machine - Electric (Not diesel)	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	Pile Driver (20,000 - 32,000 ft-lbs/blow)	0	0	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	Generator, Portable (50 - 200 kW)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
15	Grader (13 - 16 ft blade)	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
16	Hydro Crane (50 - 200 tons)	0	0	0	0	0	0	1	1	1	2	2	2	2	2	2	2	1	1	1	1	0	0	0	0	0	0
17	Impact Wrench & Other Air-operated Tools	0	0	0	0	1	1	2	4	7	8	10	11	10	10	10	11	9	6	7	6	4	2	2	0	0	0
18	Lifts, Manlift & Scissors Lift	0	0	0	0	1	1	2	2	3	3	5	6	6	6	6	6	4	3	3	2	2	1	1	1	1	0
19	Loader, Front End Loader (6 - 15 cu. yds)	0	1	1	1	1	1	2	2	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	Loader, Skip Loader (0.5 - 1.5 cu. yds)	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	Loader, Skid Steer Loader	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
22	Paver	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
23	Roller, Smooth Drum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
24	Roller, Walk-Behind	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0
25	Trencher, Portable	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	Truck, Water (4000 gal.)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0
27	Truck, Flatbed	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
28	Truck, Dump	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	Truck, Pickup	3	6	6	5	6	9	9	10	12	13	16	18	17	18	14	12	8	7	5	4	4	3	2	1	1	1
30	Truck, Lube (Single Axle)	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	0
31	Welder (250 - 500 amp)	0	1	1	1	1	1	1	1	2	2	5	5	5	5	5	5	5	3	3	2	1	1	1	0	0	0
32	Van, Tool & Maintenance	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

APPENDIX I-E

Evaluation of Best Available Control Technology

To evaluate BACT for the proposed turbine, the guidelines for large combined or cogeneration cycle gas turbines (> 50 MW) as delineated in the District, state, and federal BACT listings were reviewed. The relevant BACT determinations for this analysis are shown in Tables I-E-1 and I-E-2.

TABLE I-E-1 BACT DATA FOR COGENERATION/COMBINED CYCLE GAS TURBINES (CARB)

Pollutant	BACT	Typical Technology
Nitrogen oxides (NO_x)	5 ppm dry @ 15% O_2, 1 or 3 hr avg	1. SCR + DLN, low NOx burners (HRSG) or, 2. SCR + water or steam injection, low NOx burners (HRSG)
Sulfur dioxide (SO_2)	Natural gas fuel	PUC regulated gas
Carbon monoxide (CO)	6 ppm dry @ 15% O_2, 1 or 3 hr avg	Catalytic oxidation
VOC	2 ppm dry @ 15% O_2	Catalytic oxidation
TSP/$PM_{10/2.5}$	Natural gas fuel	PUC regulated gas

Ref: CARB Power Plant Guidance for BACT, July 1999.

TABLE I-E-2 SCAQMD BACT DATA FOR COGENERATION/COMBINED CYCLE GAS TURBINES

Pollutant	BACT	Typical Technology
Nitrogen oxides (NO_x)	2.0-2.5 ppm dry @ 15% O_2, 1 or 3 hr avg	1. SCR + DLN, low NOx burners (HRSG) or, 2. SCR + water or steam injection low NOx burners (HRSG)
Sulfur dioxide (SO_2)	Natural gas fuel	PUC regulated gas
	Refinery Gas	<=40 ppm S in gas
Carbon monoxide (CO)	4.0-6.0 ppm dry @ 15% O_2, 1 or 3 hr avg	Catalytic oxidation
VOC	2.0 ppm dry @ 15% O_2	Catalytic oxidation
TSP/.$PM_{10/2.5}$	Natural gas fuel	PUC regulated gas
	Refinery Gas	<=40 ppm S in gas

Ref: Recent BACT decisions by SCAQMD (website).

Cooling Tower BACT

The new cooling tower cells will be equipped with high efficiency drift eliminators achieving BACT at 0.001% drift. This level of BACT differs from previous cooling tower determinations due to the "nitrified" water being used in the cooling tower. The use of nitrified water represents BACT at 0.001%.

APPENDIX I-F

Offset Listing-Mitigation Strategy

The South Coast AQMD maintains a listing of its current ERC bank for public review and inspection. The ERC bank listing can be obtained from the AQMD's website, and is not included herein. The WCP project, pursuant to the AQMD NSR rule is required to purchase or acquire sufficient emission reduction credits to offset the proposed project emissions due to its proposed status as a major modification to a major source. NSR rule required amounts of RTCs and ERCs are delineated in Table I-F-1.

It should be noted that due to a recent court decision which invalidated the SCAQMD rule specifying how the agency accounts for and calculates the amount of emissions reductions available to fund the Priority Reserve and other offset exemptions, the SCAQMD cannot at this time issue PTCs that rely upon credits from the Rule 1309.1 Priority Reserve, or that rely on a Rule 1304 offset exemption. PTCs can only be issued to applicants providing offsets in the form of ERC certificates that are owned by applicants or that are purchased from ERC holders in the open market. Should the issues addressed by the court decision be settled prior to the issuance of the facility PTC, WCP may amend its mitigation strategy to comply with the revised rule provisions.

TABLE I-F-1 SCAQMD EMISSIONS MITIGATION REQUIRED BY WCP

Emission Reduction Credits (lbs/yr or lbs/day)

	$PM_{10}/PM_{2.5}$ ERC	VOC ERC	NO_x RTC	SO_x RTC	CO ERC[1]
Total Emission Credits Required to Mitigate WCP Project Emissions Per District NSR and RECLAIM Rules	289.1 lbs/day	85.0 lbs/day	74,000 lbs/year	50,400 lbs/year	0
(1.2:1 ratio applied as required)					

* Values derived from Appendix I-A, Table I-A-2b.

[1] CO mitigation is not required due to attainment status of District.

NR=none required if emissions cap is approved as noted below.

WCP Proposed Mitigation Program

WCP is proposing the following mitigation strategy:

TABLE I-F-2 WCP MITIGATION STRATEGY

Pollutant	Strategy
PM10/PM2.5	PM10/PM2.5 mitigation will be achieved by accepting a cap on PM10/PM2/5 emissions as follows: the existing emission limit for PM10/PM2.5 on the existing 4 turbine/HRSG units will be applied as a cap for all five (5) units, i.e., existing plus proposed units. Operation of the 5 units in total will be limited to a PM10/PM2.5 emissions rate equal to the present limits on the existing 4 units.
	VOC ERCs will be supplied via existing refinery ERC holdings or

VOC	purchased on the open market.
NOx	NOx RTCs will be allocated to the facility from the existing refinery allocation, or additional RTCs will be acquired to cover the expansion project emissions.
SOx	SOx RTCs will be allocated to the facility from the existing refinery allocation, or additional RTCs will be acquired to cover the expansion project emissions.
CO	CO offsets or ERCs are not required at this time. Modeling indicates not significant impact from CO emissions on ambient air quality, standards, increments, or cumulative effects.

This strategy will be finalized and approved by the SCAQMD prior to the issuance of the authority to construct for the proposed project.

APPENDIX I-G

Cumulative Impacts Analysis Protocol

Potential cumulative air quality impacts that might be expected to occur resulting from WCP Project and other reasonably foreseeable projects are both regional and localized in nature. These cumulative impacts will be evaluated as follows.

Regional Impacts

Regional air quality impacts are possible for pollutants such as ozone, which involve photochemical processes that can take hours to occur. WCP is proposing to supply emissions mitigation per Appendix I-F. Additional mitigation for other pollutants may be required by the CEC.

Although the relative importance of VOC and NO_x emissions in ozone formation differs from region to region, and from day to day, most air pollution control plans in California require roughly equivalent controls (on a ton per year basis) for these two pollutants. The change in emissions of the sum of these pollutants, equally weighted, will be used to provide a reasonable estimate of the impact of WCP on ozone levels. The net change in emissions of ozone precursors from WCP will be compared with emissions from all sources within the South Coast Air Basin (Table I-G-1).

Table I-G-1 Estimated South Coast Air Basin Emissions Inventory for 2006 (tons/day)

Source Category	TOG	ROG	CO	NOx	SOx	PM10	PM2.5
Total Stationary Sources	221.3	101.9	55.4	58.3	19.3	20.9	13.7
Total Area Sources	250	148.3	110.3	25.6	0.8	210.3	51.2
Total Mobile Sources	468	425.8	3580	866.5	28.1	48.4	39
Total Natural Sources	100.6	86.5	164.2	5	1.5	16.6	14.1
County/Air Basin Total	1040	762.4	3909.9	955.4	49.8	296.2	117.9

Source: CARB

Air quality impacts of fine particulate, PM_{10} and/or $PM_{2.5}$, have the potential to be either regional or localized in nature. On a regional basis, an analysis similar to that proposed above for ozone will be performed, looking at the three pollutants that can form PM_{10} in the atmosphere, i.e., VOC, SO_x, and NO_x as well as at directly emitted particulate matter. SCAQMD regulations require offsets to be provided for $PM_{10,}$ NOx, SOx, and VOC emissions from the project, i.e., the net increase in emissions must be mitigated.

As in the case of ozone precursors, emissions of $PM_{10/2.5}$ precursors are expected to have approximately equivalent ambient impacts in forming $PM_{10/2.5}$, per ton of emissions on a regional basis. Table I-G-2 provides the comparison of emissions of the criteria pollutants from WCP with emissions from all sources within South Coast Air Basin as a whole.

Table I-G-2 Comparison of WCP Project Emissions to Estimated Inventory for 2006

Category	TOG	ROG[1]	CO	NOx	SOx	PM10	PM2.5
WCP Emissions (tons/yr)	-	18.21	64.81	39.90	29.95	45.24	45.20
WCP Emissions (tons/day)	-	0.05	0.178	0.11	0.082	0.124	0.124
SC Air Basin Total (tons/day)	1040	762.4	3909.9	955.4	49.8	296.2	117.9
WCP % of Air Basin Total Tons/day basis	-	**0.0066**	**0.00046**	**0.012**	**0.165**	**0.042**	**0.11**

[1] WCP VOC emissions compared to inventory ROG emissions.

Localized Impacts

Localized impacts from WCP could result from emissions of carbon monoxide, oxides of nitrogen, sulfur oxides, and directly emitted PM_{10}. A dispersion modeling analysis of potential cumulative air quality impacts will be performed for all four of these pollutants.

In evaluating the potential cumulative localized impacts of WCP in conjunction with the impacts of existing facilities and facilities not yet in operation but that are reasonably foreseeable, a potential impact area in which cumulative localized impacts could occur was identified as an area with a radius of 8 miles around the plant site. Based on the results of the proposed air quality modeling analyses described above, "significant" air quality impacts, as that term is defined in federal air quality modeling guidelines, will be determined. If the project's impacts do not exceed the significance levels, no cumulative impacts will be expected to occur, and no further analysis will be required. Otherwise, in order to ensure that other projects that might have significant cumulative impacts in conjunction with WCP are identified, a search area with a radius of 8 miles beyond the project's impact area will be used for the cumulative impacts analysis. Within this search area, three categories of projects with emissions sources will be used as criteria for identification:

- Projects that have been in operation for a sufficient time period, and whose emissions are included in the overall background air quality assessment.
- Projects which recently began operations whose emissions may not be reflected in the ambient monitoring background data.
- Projects for which air pollution permits to construct have not been issued, but that are reasonably foreseeable.

The applicable inclusion dates for each of the above source categories will be discussed and approved by the AQMD staff. The requested source listings will incorporate these dates. Projects that are existing, and that have been in operation such that their emissions are reflected in the ambient air quality data that has been used to represent background concentrations require no further analysis. The cumulative impacts analysis adds the modeled impacts of selected facilities to the maximum measured background air quality levels, thus ensuring that these existing projects are taken into account.

Projects for which air pollution permits to construct have been issued but that were not operational will be identified through a request of permit records from the SCAQMD. The search will be requested to be performed at two levels. For permits that are considered "major modifications" (i.e., emissions increases greater than 40 tons/year of NO_x or SO_2, 25 tons/year of total suspended particulate, 15 tons/year of PM_{10}), a region within 8 miles of the proposed project site will be evaluated. For projects that had smaller emissions changes, but still greater than 15 tons/year, a region within 8 miles of the proposed project site will also evaluated. Projects that satisfy either of these criteria and that had a permit to construct issued after the applicable inclusion date, will be included in the cumulative air quality impacts analysis. The inclusion date, as noted above, will be selected based on the typical length of time a permit to construct is valid and typical project construction times, to ensure that projects that are not reflected in the current ambient air quality data are included in the analysis. Projects for which the emissions change was smaller than 15 tons/year will be assumed to be *de minimus*, and will not be included in the dispersion modeling analysis.

A list of projects within the project region meeting the above noted criteria will be requested from the SCAQMD staff.

Given the potentially wide geographic area over which the dispersion modeling analysis is to be performed, the Aermod model will be used to evaluate cumulative localized air quality impacts. The detailed modeling procedures, Aermod options, and meteorological data used in the cumulative impacts dispersion analysis were the same as those described in Section 5.2. The receptor grid will be spaced at 100 meters and cover the area in which the detailed modeling analysis (described above) indicates that the project will have impacts that may exceed any significance levels.

Cumulative Impacts Dispersion Modeling

The dispersion modeling analysis of cumulative localized air quality impacts for the proposed project will be evaluated in combination with other reasonably foreseeable projects and air quality levels attributable to existing emission sources, and the impacts were compared to state or federal air quality standards for significant impact. As discussed above, the highest second-highest modeled concentrations will be used to demonstrate compliance with standards based on short-term averaging periods (24 hours or less).

Supporting information to be used in the analysis includes the following:

- 2006 estimated emissions inventory for South Coast Air Basin (Table I-G-1);
- List of projects resulting from the screening analysis of permit files by the SCAQMD;
- Table delineating location data of sources included in the cumulative air quality impacts dispersion modeling analysis;
- Stack parameters for sources included in the cumulative air quality impacts dispersion modeling analysis; and
- Output files for the dispersion modeling analysis.