

|

Appendix 8.1-2

Air Dispersion Modeling Protocol (Redline Version)

NOTE - PER AGREEMENT WITH THE CEC AQ STAFF, THIS VERSION IS TO BE USED (IN REDLINE TEXT) AS AN APPENDIX TO THE AQ SECTION OF THE AFC

Formatted: Font: Italic

MODELING PROTOCOL FOR A POWER GENERATION FACILITY LOCATED IN FRESNO COUNTY

1.0 INTRODUCTION

This air dispersion modeling protocol is being submitted for a baseload power generating facility, the Kings River Conservation District Community Power Plant (Project). The Project will be located within Fresno County between the towns of Parlier and Selma (see Figure 1). The proposed Project, which will be owned by the Kings River Conservation District (KRCD), will be a natural gas-fired, combustion turbine (CT)-based, combined-cycle power generation facility. It will consist of two large combustion turbine-generator sets (e.g., GE Frame 7F, Siemens 501F) and one condensing steam turbine along with ancillary balance of plant equipment. Depending on the CT type selected, the Project is anticipated to have a nominal electric generating capacity of approximately 510-565 megawatts (MW) (net).

Air dispersion modeling will be performed to calculate the pollutant concentrations of both criteria and non-criteria air contaminants resulting from the Project during construction and operation. Modeling results for criteria pollutant emissions from the turbines will be compared to the applicable National Ambient Air Quality Standards (NAAQS), California Ambient Air Quality Standard (CAAQS) and PSD increments. These standards are summarized in Table 1. Air quality analyses for Air Quality Related Values (AQRV) including a visibility analysis and impacts on vegetation will be performed. The Project's emissions also will be compared to New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAPS). A health risk assessment will be undertaken to assess the impacts of the Project's toxic air contaminant emissions on public health. Additionally, since the Project will include on-site storage of aqueous ammonia for nitrogen oxide emissions control, the Project will perform an offsite consequence analysis to assess the concentrations of ammonia in the event of an accidental spill.

2.0 SOURCE DATA

2.1 Emissions

Emissions data for nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO₂), particulate matter (PM₁₀), and fine particulate matter (PM_{2.5}) will be used to assess potential Project impacts. (Similarly, emissions data for PSD non-criteria pollutants will be used, as applicable, to assess potential impacts). Emissions will vary with season, depending on the ambient conditions (temperature and relative humidity affect turbine performance). Two separate cases of emissions data will be used to model the Project's potential impacts. The first case will consist of the peak hourly emissions, which occur during winter design conditions. The emissions estimated under these conditions will be the basis for the air quality modeling assessment of ambient concentration impacts for averaging times of 24 hours or less. The second

Deleted: 2

Deleted: September 11, 2006
<sp>

case will consist of emissions under the annual average ambient conditions. These average hourly emissions will be used for the annual average air quality impact assessment.

CT emissions from the appropriate number of startup and shutdown sequences (e.g., number of sequences per day and per year) will be factored into both the peak hourly and annual average emissions calculations to ensure that worst case emissions are used. Similarly, CT emissions during partial load operation, as applicable, will be included as will the Project's emissions during the initial commissioning period. Emissions from the Project's smaller sources, e.g., cooling tower PM10 emissions, standby equipment, will also be included.

2.2 *Stack Parameters*

Stack parameters will be identified for modeling. This will include the stack coordinates, elevation of the stack base, stack height, exit cross-sectional area, exit velocities, and exit temperatures.

2.3 *Building Downwash Parameters*

The U.S. EPA computer model BPIP (Building Profile Input Program), version 04112, will be run to develop wind-direction-specific building downwash parameters for input to the U.S. EPA Short-Term Industrial Source Complex (ISCST3) model.

2.4 *Topography*

USGS 7.5-minute topographic maps will be used to develop a base map of the Project site and surrounding area and to develop modeling receptor locations and elevations.

3.0 **DISPERSION MODELING METHODOLOGY**

Air dispersion modeling will be performed to assess the Project impacts on NAAQS, CAAQS, PSD increments, and AQRV. Different air quality models will be used to perform these analyses based on the distance from the source to the calculated impacts. For short-range impacts (< 50 km), air dispersion modeling will be performed for the Project using the ISCST3 model. For long-range impacts (>50 km) the CALPUFF model will be used.

Other increment consuming sources which may have impacts within the Project's significant impact area would be included in the PSD increment analysis. Coordination with the U.S. EPA and the San Joaquin Valley Air Pollution Control District (SJVAPCD) will be necessary to gather stack parameters and emissions from other increment consuming sources.

3.1 *Ambient Air Quality Standards and PSD Class II Increment*

The ISCST3 model (version 02035) will be used to compare Project impacts to NAAQS, CAAQS, and PSD Class II increments. The Guidelines on Air Quality Models (GAQM) established AERMOD as the preferred air dispersion model on November 9, 2005, effective December 9, 2005. However, as stated in the GAQM, during the one-year period following promulgation of this guideline, protocols for modeling with ISCST3 may be approved.

[The ISCST3 model was chosen for modeling of the Project's impacts because the inputs required for use of the AERMOD model are not yet available. The SJVAPCD has indicated that it wants to compile the necessary AERMOD meteorological data rather than having individual projects do](#)

Deleted: 2

Deleted: September 11, 2006
<sp>

this on their own. While this approach will impose uniformity on the AERMOD data set, the SJVAPCD will not have the necessary data ready until sometime in December 2006. In order for the Project to maintain its schedule (i.e., protocol approval and initiation of modeling prior to December 9, 2006), the SJVAPCD and CEC have agreed that the use of ISCST3 rather than AERMOD makes the most sense in these circumstances.

Initial review of Class I areas shows that all areas are 50 km or further from the Project. Consequently, Class I increments need to be assessed with a long-range model, as discussed in Section 3.2.

Since the final turbine vendor has not been chosen, separate ISCST3 runs will be performed for each turbine. Separate cumulative impacts analyses will also be performed for each turbine.

3.1.1 Modeling Options/Inputs

For pollutants with emissions greater than the Significant Emission Rates (see Table 1), the EPA ISCST3 (version 020305) will be used to calculate the concentrations of SO₂, NO₂, CO, PM₁₀, and PM_{2.5} as well as non-criteria air pollutants. The ISCST3 model has the ability to predict pollutant concentrations for numerous sources in simple and complex terrain.

Deleted: Only the turbine yielding the highest impacts will be used in the

Deleted: 2

Deleted: September 11, 2006¶
<sp>

TABLE 1
NAAQS and PSD: Regulatory Standards and Significance Levels

Pollutant	Averaging Period	SER	All Areas		Class II Areas		Class I Areas		Significant Monitoring Concentrations
			NAAQS	CAAQS	PSD Increment	SIL	PSD Increment	EPA SIL	
			ton/yr	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	
NO ₂	Annual	40	100		25	1	2.5	0.1	14
	1-hour			470					
SO ₂	Annual	40	80		20	1	2	0.1	
	24-hour		365	105	91	5	5	0.2	13
	3-hour		1300		512	25	25	1.0	
PM ₁₀	Annual	15	50	20	17	1	4	0.2	
	24-hour		150	50	30	5	8	0.3	10
PM _{2.5}	Annual		15	12					
	24-hour		65						
CO	8-hour	100	10000	10000		500			575
	1-hour		40000	23000		2000			
Lead	Calendar Quarter	0.6	1.5						0.1
	30-day			1.5					
Visibility Reducing Particles	8-hour			Extinction coefficient of 0.23 per kilometer — visibility of ten miles or more due to particles when relative humidity is less than 70 percent.					
Sulfates	24-hour			25					
Hydrogen sulfide	Annual	10							
	1-hour			42					0.2
Fluorides	Annual	3							
	24-hour								0.25
Sulfuric Acid Mist	Annual	7							
	1-hour								0.2
Total reduced sulfur	Annual	10							
	1-hour								
Reduced sulfur compounds	Annual	10							
	1-hour								

Deleted: 2
Deleted: September 11, 2006
<sp>

TABLE 1 NAAQS and PSD: Regulatory Standards and Significance Levels			
	All Areas	Class II Areas	Class I Areas
Notes: SER (Significant Emission Rate) NAAQS (National Ambient Air Quality Standards) CAAQS (California Ambient Air Quality Standards) PSD (Prevention of Significant Deterioration) SIL (Significant Impact Level)			

The ISCST3 model will be run with the regulatory default option. The model will include rural dispersion coefficients (CO MODELOPT RURAL).

The model will be used to predict airborne concentrations of criteria and non-criteria pollutants. Point source emission rates of 1 gm/second will be input to ISCST3. The Project's emissions rates for each pollutant of interest can be multiplied by the resulting "normalized" concentrations from the model to provide the Project's predicted pollutant concentrations.

3.1.2 Receptors

A Cartesian coordinate system will be used for receptor placement. Receptor locations and elevations will be gathered from the USGS 7.5-minute topographic maps from Digital Elevation Model (DEM) files. The smallest available spacing for 7.5-minute DEM files in STDS format for the Project region is at 30 meters. Initial runs will include spacing of ~~90 meters~~ out to 5 km from the facility ~~and 240 meter spacing from 5 km to 10 km from the facility~~. Fenceline receptors will be spaced at intervals of 25 meters.

If the peak concentrations are predicted in coarse grid areas, additional modeling runs will be conducted with a receptor grid spacing of 30 meters surrounding the peak concentration ~~extending out to the next grid point in flat terrain or extending two grid points in complex terrain. Alternatively, in complex terrain, 30 meter grid spacing will be located between the peak concentration (highest first high – H1H) and the next highest concentration (highest second high – H2H) if the H1H and H2H concentrations are located in close proximity to each other.~~

Figures will be provided that show the receptor locations relative to the Project.

3.1.3 Meteorological Data

Fresno meteorological data from 1989 will be input to the ISCST3 model. Data that are ready for input to the ISCST3 model will be obtained from the SJVAPCD web site. The SJVAPCD has identified 1989 as a worst-case meteorological data set.

3.1.4 Ambient Concentrations

The Project site will be located approximately 3.5 miles west-southwest of the Parlier air quality monitoring site. The Project and monitoring sites are both rural sites in agricultural areas. Data collected at the Parlier monitoring site include nitrogen dioxide (NO₂) and ozone (O₃). Data are available on the California Air Resources Board (CARB) website: (<http://www.arb.ca.gov/adam/welcome.html>) for the years 2003-2005.

Carbon monoxide (CO), sulfur dioxide (SO₂), particulate matter (PM₁₀), fine particulate (PM_{2.5}), and lead (Pb) are not measured at the Parlier monitor. Other monitoring sites have collected air

Formatted: Font: Italic

Deleted: of no more than 30 meters out to approximately 120 meters, 60 meter spacing out to 250 meters, and 240 meters spacing

Deleted: or until Project impacts fall below significance levels, if applicable

Formatted: Font: Bold, Italic

Deleted: 2

Deleted: September 11, 2006
<sp>

quality data that would be representative or conservative of conditions at the Project site. Figure 2 illustrates the location of the other monitoring sites, the 2001 emissions inventory, and Parlier. (Source CARB CHAPIS website: http://www.arb.ca.gov/gismo/chapis_v01_6_1_04/).

Carbon monoxide data from the Fresno-Drummond station will be used as a conservative representation of the site. This Fresno monitor is located 14 miles northwest of the Project site in the southern portion of Fresno in an urban setting, so CO concentrations from this site would be expected to be a conservative measure of CO background concentrations at the Project site. The most recent three years of data with 1- and 8-hour CO data available are 2002-2004. These data were obtained from the CARB CD "California Ambient Air Quality Data 1980-2004".

Background SO₂ concentrations are available in 2003 from two sites in Fresno, at Fremont School and Mobile. The other most recent SO₂ data were collected in Bakersfield in 1999-2001. Data from all of these sites would be conservative estimates of the existing SO₂ concentrations in the Project area. On the CARB Community Health Air Pollution System (CHAPIS) website, SO₂ emissions (based on 2001 emissions inventory) were greater in the Cities of Fresno and Bakersfield than around Parlier. Site monitoring data were obtained from the CARB CD "California Ambient Air Quality Data 1980-2004".

PM₁₀ data measured at the Fresno-Drummond station over the years 2003-2005 will be used to conservatively represent background PM₁₀ concentrations from the Project. Sources of particulate emissions would be greater around the Fresno-Drummond monitoring site than the Project site (see Figure 2 from CARB CHAPIS website).

PM_{2.5} data from 2003-2005 are available from the Fresno-Hamilton/Winery and Fresno-First Street stations. Based on data for PM₁₀ presented on the CHAPIS website, either of these sites would be a conservative representation of the background PM_{2.5} data at the Project site.

Monthly lead data are available at the Fresno-First Street monitor for the years 2000-2002. These data will be used to conservatively estimate the quarterly lead concentrations in the Project area.

3.1.5 Criteria Pollutant Emissions

ISCST3 modeling will be performed for SO₂, NO₂, PM₁₀, PM_{2.5}, and CO. Peak hourly emission rates, calculated from winter design conditions, will be used to calculate 1-hour average concentrations (CO impacts), 3-hour average impacts (SO₂), 8-hour average impacts (CO), and 24-hour concentration increases (SO₂, PM₁₀, and PM_{2.5}). Emissions derived for annual ambient conditions will be used to assess annual impacts (SO₂, NO₂, PM₁₀, and PM_{2.5}).

3.1.5.1 NO₂ Modeling

For the initial modeling run for NO_x, all emissions will be assumed to be emitted as NO₂. However, if the predicted NO₂ concentrations show significant impacts and violations of the AAQS, then the SJVAPCD "Oxides of Nitrogen (NO_x) Modeling" policy (L. Villalvazo, March 26, 2003) will be followed.

This policy has three levels of NO₂ analysis. The first level assumes all NO_x emissions will be emitted as NO₂. The second level assumes that 75 percent of the NO_x emissions are emitted as NO₂. The third step uses the ozone limiting method (OLM).

Deleted: 2
Deleted: September 11, 2006
<sp>

Two levels exist within the OLM calculations. The first of these calculations is applicable to annual NO₂ impact only. This method is described by the following equation:

$$[\text{NO}_2]_{\text{ann}} = \{(0.1) \times [\text{NO}_x]_{\text{pred}}\} + \text{MIN} \{ (0.9) \times [\text{NO}_x]_{\text{pred}}, \text{ or } (46/48) \times [\text{O}_3]_{\text{bkgd}} \}$$

where

- [NO₂]_{ann} is the predicted annual NO₂ concentration
- [NO_x]_{pred} is the model-predicted annual NO_x concentration
- MIN means the minimum of the two quantities within the brackets
- [O₃]_{bkgd} is the representative annual average ambient O₃ concentration
- (46/48) is the molecular weight of NO₂ divided by the molecular weight of O₃

If the annual NO₂ impacts are above the AAQS or the 1-hour NO₂ impacts are above the CAAQS, then the next step would be to use the ISC3_OLM model, which includes a concurrent set of hourly ozone data. This model is not an EPA guideline model, but its use is allowed by the SJVAPCD. Hourly ozone data from 1989 would be used. The SJVAPCD will be consulted prior to starting this analysis to confirm an acceptable choice of ozone data. The draft guidelines "Representative Ozone Data for Ozone Limiting Method" (OLM/ARM Work Group, 1997) will be followed in the preparation of the ozone data file.

3.1.6 Cumulative Impact Assessment

A cumulative impact assessment will be performed to calculate total criteria pollutant impacts of the Project, existing sources, and sources that are proposed but not yet constructed. The same modeling methodology as was performed for the Project will be used in the cumulative assessment, and as noted in Section 3.1, separate cumulative impact analyses will be performed for each of the two turbines. Pollutant concentrations from existing sources will be assumed to be represented by monitored background concentrations. The SJVAPCD will be consulted to obtain a list of locations, emission rates, and stack parameters of proposed facilities (i.e. permitted but not built) within 6 miles of the Project site.

Deleted: only the turbine yielding the highest impacts will be used in

3.2 PSD Class I Increment and AQRVs

The CALPUFF Lite model (version 5.711a) will be used to assess potential long range impacts from the Project including increment consumption, visibility, and AQRVs in Class I areas. Figure 3 provides a schematic of the flow of the CALPUFF modeling and its postprocessors to obtain concentrations, visibility impairment, and deposition.

3.2.1 Modeling Options/Inputs

The CALPUFF model (version 5.711a) will be run in a screening mode. The options listed in Tables 2 through 8 will be used as input to the CALPUFF model and its postprocessors, POSTUTIL, and CALPOST.

Deleted: 2

Deleted: September 11, 2006
<sp>

Table 2
CALPUFF Lite Options

Variable	Description	Default
BCKNH3	Ammonia background (ppb)	10
BCKO3	Ozone default (ppb) (Use only for missing data)	60
CSPEC	Names of species modeled (for MESOPUFF II chemistry)	SO2
		SO4
		NOx
		HNO3
		NO3
		PM10
ICON	Output concentrations? (1 = Yes)	1
IDRY	Output dry deposition flux? (1 = Yes)	1
ILANDUIN	Land use type for domain (20 = Urban; 40 = Forested)	
IVIS	Output RH for visibility calculations (1 = Yes)	1
IWET	Output wet deposition flux? (1 = Yes)	1
MCHEM	MESOPUFF-II Chemistry? (1 = Yes)	1
MCTADJ	Terrain adjustments to plume path (3 = Plume path)	3
MDISP	Method for dispersion coefficients (3 = PG & MP)	3
MDRY	Model dry deposition? (1 = Yes)	1
METFM	Format of input meteorology (1 = CALMET, 2 = ISC)	2
MPARTL	Model partial plume penetration? (0 = No)	1
MROUGH	Adjust PG for surface roughness? (0 = No)	0
MTIP	Treat stack tip downwash? (1 = Yes)	1
MTRANS	Model transitional plume rise? (1 = Yes)	1
MWET	Model wet deposition? (1 = Yes)	1
NSE	Number of species emitted	
NSPEC	Number of species modeled (for MESOPUFF II chemistry)	6
RNITE1	Nighttime SO2 loss rate (%/hr)	0.2
RNITE2	Nighttime NOx loss rate (%/hr)	2.0
RNITE3	Nighttime HNO3 loss rate (%/hr)	2.0
WSCALM	Minimum wind speed (m/s)	0.5
XMAXZI	Maximum mixing height (m)	3000
XMINZI	Minimum mixing height (m)	50

Deleted: 2

Deleted: September 11, 2006
<sp>

Table 3
Postutil Input Parameters - Concentration

Variable	Description	Default
NFILES	Number of CALPUFF data files	1
NSPECINP	Number of species to process from CALPUFF runs	6
NSPECOUT	Number of species to write to output file	6
NSPECCMP	Number of species to compute from those modeled	1
MNITRATE	Recompute the HNO3/NO3 partition for concentrations?	0
The following NSPECINP species will be processed		
ASPECI	SO2	SO2
	SO4	SO4
	NOX	NOX
	HNO3	HNO3
	NO3	NO3
	PM10	PM10
The following NSPECOUT species will be written out		
ASPECO	SO2	SO2
ASPECO	SO4	SO4
ASPECO	NOX	NOX
ASPECO	HNO3	HNO3
ASPECO	NO3	NO3
ASPECO	PMC	PMC
CSPECCMP	Following species computed from processed input species:	PMC
	SO2	0
	SO4	1.375
	NOX	0
	HNO3	0
	NO3	1.29
	PM10	1.0

Deleted: 2

Deleted: September 11, 2006
<sp>

Table 4 Postutil Input Parameters - Visibility		
Variable	Description	Default
NFILES	Number of CALPUFF data files	1
NSPECINP	Number of species to process from CALPUFF runs	6
NSPECOUT	Number of species to write to output file	8
NSPECCMP	Number of species to compute from those modeled	3
MNITRATE	Recompute the HNO3/NO3 partition for concentrations?	0
	The following NSPECINP species will be processed	
ASPECI	SO2	SO2
	SO4	SO4
	NOX	NOX
	HNO3	HNO3
	NO3	NO3
	PM10	PM10
	The following NSPECOUT species will be written out	
ASPECO	SO2	SO2
	SO4	SO4
	NOX	NOX
	HNO3	HNO3
	NO3	NO3
	SOA	SOA
	EC	EC
	SOIL	SOIL
CSPECCMP	Following species computed from processed input species:	
	SO2	0.0
	SO4	0.0
	NOX	0.0
	HNO3	0.0
	NO3	0.0
	PM10	0.25
CSPECCMP	Following species computed from processed input species:	
	EC	EC
	SO2	0.0
	SO4	0.0
	NOX	0.0
	HNO3	0.0
	NO3	0.0
	PM10	0.23
CSPECCMP	Following species computed from processed input species:	
	SOIL	SOIL
	SO2	0.0
	SO4	0.0
	NOX	0.0
	HNO3	0.0
	NO3	0.0
	PM10	0.52

Deleted: 2

Deleted: September 11, 2006
<sp>

Table 5 Postutil Input Parameters - Deposition		
Variable	Description	Default
NFILES	Number of CALPUFF data files	2
NSPECINP	Number of species to process from CALPUFF runs	6
NSPECOUT	Number of species to write to output file	2
ASPECI	The following NSPECINP species will be processed	SO2 SO4 NOX HNO3 NO3 PM10
ASPECO	The following NSPECOUT species will be written out Nitrogen Sulfur	N S
CSPECCMP	Following species computed from processed input species:	N
	SO2	0
	SO4	0.292
	NOX	0.304
	HNO3	0.222
	NO3	0.452
	PM10	
CSPECCMP	Following species computed from processed input species:	S
	SO2	0.500
	SO4	0.333
	NOX	0
	HNO3	0
	NO3	0
	PM10	0

Table 6 Calpost Input Parameters - Concentration		
Variable	Description	Default
ASPEC	Species to process (separate runs for PM10, NOx, SO2)	By species
ILAYER	Layer/deposition code (1 = CALPUFF concentrations; -3 = wet+dry deposition fluxes)	1
LBACK	Add Hourly Background Concentrations/Fluxes? Averaging time(s) reported	F
L1HR	1-hr averages	F
L3HR	3-hr averages	as required
L24HR	24-hr averages	as required
LRUNL	Run length (annual)	T
LT50	Top 50 table for each averaging time selected	T

Deleted: 2

Deleted: September 11, 2006
<sp>

**Table 7
Calpost Input Parameters - Visibility**

Variable	Description	Default
ASPEC	Species to process	VISIB
ILAYER	Layer/deposition code (1 = CALPUFF concentrations; -3 = wet+dry deposition fluxes)	1
RHMAX	Maximum relative humidity (%) used in particle growth curve	95
	Modeled species to be included in computing the light extinction	
LVS04	Include SO4?	T
LVNO3	Include NO3?	T
LVOC	Include Organic Carbon?	T
LVPMC	Include Coarse Particles?	F
LVPMF	Include Fine Particles?	T
LVEC	Include Elemental Carbon?	T
LVBK	when ranking for TOP-N, TOP-50, and Exceedance tables Include BACKGROUND?	T
SPECPMC	Species name used for particulates in MODEL.DAT file: COARSE =	PMC
SPECPMF	Species name used for particulates in MODEL.DAT file: FINE =	SOIL
	Extinction Efficiencies (1/Mm per ug/m**3)	
EEPMC	PM COARSE =	0.6
EEPMF	PM FINE =	1.0
EEPMCBK	Background PM COARSE	0.6
EESO4	SO4 =	3.0
EENO3	NO3 =	3.0
EEOC	Organic Carbon =	4.0
EESOIL	Soil =	1.0
EEEC	Elemental Carbon =	10.0
MVISBK	Method for background light extinction (2 = Hourly RH adjust; 6 = FLAG seasonal f(RH))	2
RHFAC	Monthly RH adjustment factors from FLAG (unique for each Class I area)	yes if 6
	Background monthly extinction coefficients (FLAG) unique for each Class I area	
BKSO4	All hygroscopic as SO4 (raw extinction value without scattering efficiency adjustment)	0.2
BKNO3		0
BKPMC		0
BKOC		0
BKSOIL	Assume all non-hygroscopic species as Soil	4.5
BKEC		0
BEXTRAY	Extinction due to Rayleigh scattering	10.0
	Averaging time(s) reported	
L1HR	1-hr averages	F
L3HR	3-hr averages	F
L24HR	24-hr averages	T
LRUNL	Run lengthh (annual)	F

Deleted: 2

Deleted: September 11, 2006
<sp>

Table 8 Calpost Input Parameters - Deposition		
Variable	Description	Default
ASPEC	Species to process (separate runs for S and N)	N or S
ILAYER	Layer/deposition code (1 = CALPUFF concentrations; -3 = wet+dry deposition flux)	-3
LBACK	Add Hourly Background Concentrations/Fluxes?	F
	Averaging time(s) reported	
L1HR	1-hr averages	F
L3HR	3-hr averages	F
L24HR	24-hr averages	F
LRUNL	Run length (annual)	T
LT50	Top 50 table for each averaging time selected	T

3.2.2 Receptors

The model will be used to predict the increment consumption at Class I areas within 100 km and slightly beyond 100 km. Table 9 lists the Class I areas within 200 km of the project. Initial PSD modeling will include Class I areas within 150 km. Based on these results, the additional Class I areas may be included up to 200 km. Receptor rings, each ring at distances equal to the distance to each Class I area will be entered as discrete receptor locations, with 2-degree spacing along each ring. Receptor elevations will be set to the highest elevation within the Class I area.

Table 9 Class I Wilderness Areas within 200 km from Project	
Wilderness Area	Distance and Direction from Source
Dome land Wilderness Area	120 km SE
Emigrant Wilderness Area	115 km N
Hoover Wilderness Area	150 km N
John Muir Wilderness Area	65 km NE
Kaiser Wilderness Area	70 km NNE
Kings Canyon NP	60 km E
Minarets Wilderness Area	110 km NNE
Mokelumme Wilderness Area	200 km NNW
Pinnacles Wilderness Area	135 km W
San Rafael Wilderness Area	180 km SSW
Sequoia NP	50 km ESE
Ventana Wilderness Area	160 km WSW
Yosemite NP	90 km N

3.2.3 Meteorological Data

As recommended in the Interagency Workbook on Air Quality Modeling (IWAQM, 1998), five years of meteorological data will be used as input to the CALPUFF model. The data will be input as an extended ISCST meteorological data set. Fresno Airport meteorological data (in SAMSON format) and corresponding upper air data from Oakland Airport for the years 1986-1990 will be

Deleted: 2

Deleted: September 11, 2006
<sp>

processed by CPRAMMET. Table 10 lists the input parameters and values that will be used by the preprocessor program.

Description	Value
Minimum Monin-Obukhov Length (L) stable conditions	15 m
Anemometer Height	10 m
Surface Roughness (Z0) at meteorological site	0.25 m
Surface Roughness (Z0) over domain (forested)	1.0 m
Noon-time Albedo (r) for forested-agricultural terrain	0.15
Bowen Ratio (B0) for forested-agricultural terrain	1.0
Anthropogenic Heat Flux	0.0 W/m ²
Fraction of Net Radiation Absorbed at Ground	0.15

3.3 Toxic Air Contaminants – Health Risk Assessment

The methodology described in *The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* in OEHHA (2003) [as applied in the Hotspots Analysis and Reporting Program \(HARP\) model \(version 1.2a\)](#) will be followed to calculate the potential health risks from the Project. The grid system used for modeling the criteria pollutants will also be used in the toxic air contaminant analysis. Table 11 lists the toxic air contaminants (TACs) that would be expected from the Project’s natural gas-fired CTs and the inhalation cancer potency, acute reference exposure levels (RELs), and chronic RELs associated with the combustion of natural gas. If additional emissions sources, which fire distillate oil (e.g., a diesel fire pump) are included as part of the Project, the necessary TACs will be included in the analyses.

Deleted: The “normalized” concentrations predicted by the ISCST3 model (x/Q) will be used as the basis for the calculation of inhalation cancer risk, the chronic hazard index (HI), and the acute hazard index. Only the turbine configuration and operating parameters which yielded the highest concentrations in the AAQS analysis will be analyzed in the health risk analysis.

Pollutant	Inhalation Cancer Potency	Acute Inhalation REL ²	Chronic Inhalation REL
	1/(mg/kg-day)	µg/m ³	µg/m ³
(TURBINE)			
Acetaldehyde	1.00E-02		9.00E+00
Acrolein		1.90E-01	6.00E-02
Ammonia		3.20E+03	2.00E+02
Benzene	1.00E-01	1.30E+03	6.00E+01
Benzo(a)anthracene*	3.90E-01		
Benzo(a)pyrene*	3.90E+00		
Benzo(b)fluoranthene*	3.90E-01		
Benzo(k)fluoranthene*	3.90E-01		

Deleted: Initially, the Point of Maximum Impact will be used to calculate the Maximum Exposed Individual (Residential and Worker). Maps depicting residential areas and business areas will be overlaid on the modeling grid. If initial results are unrealistically conservative, then more refined analyses will be performed based on actual residential and business areas.¶

¹ OEHHA (2003).

² 1-hour average for all pollutants except benzene, which uses 6-hour average.

* Polycyclic Aromatic Hydrocarbons (PAH).

Deleted: 2

Deleted: September 11, 2006¶
<sp>

1,3 Butadiene	6.00E-01		2.00E+01
Chrysene*	3.90E-02		
Dibenz(a,h)anthracene*	4.10E+00		
Ethylbenzene			2.00E+03
Formaldehyde	2.10E-02	9.40E+01	3.00E+00
Hexane			7.00E+03
Indeno(1,2,3-cd)pyrene*	3.90E-01		
Naphthalene*	1.20E-01		9.00E+00
Propylene			3.00E+03
Propylene oxide	1.30E-02	3.10E+03	3.00E+01
Toluene		3.70E+04	3.00E+02
Xylene		2.20E+04	7.00E+02
Carbon monoxide		2.30E+04	
Nitrogen dioxide		4.70E+02	4.70E+02
Sulfur dioxide		6.60E+02	6.60E+02

To calculate maximum residential cancer risk:

$$\text{Cancer risk} = \text{Dose} \times \text{Cancer Potency}$$

$$\text{Dose (inh)} = \sum_i C(\text{air}) * \text{DBR} * A * \text{EF} * \text{ED} * \text{ED} * 1 \text{ e-6} / \text{AT}$$

$$\text{And } C(\text{air}) = \chi / Q_{\text{max}} \times Q$$

Table 12 lists the variable definitions and the assumed inputs for the variables.

Table 12 Inhalation Dose Variables			
Variable		Unit	Definition
Dose (inh)		mg/kgBW-day	Inhalation dose
DBR	581	L/kgBW-day	Daily breathing rate (children / 9 yrs)
	149	L/kgBW-day	Daily breathing rate (Worker)
A	1		Inhalation absorption factor
EF	350	day/yr	Exposure frequency
ED	70	Yr	Exposure duration
AT	25550	days	Averaging time period
	1.00E-06		conversion of ug/mg & L/m3
\sum_i			Sum over pollutants (i...in)
χ/Q_{max}		$\mu\text{g}/\text{m}^3/\text{gm}/\text{sec}$	Maximum normalized annual concentration
Q		gm/sec	Emission rate

The chronic hazard index and acute hazard indices (HI) are calculated as:

$$\text{HI} = \sum_i (\chi/Q_{\text{max}} \times Q / \text{REL})$$

Where:

$$\sum_i \quad \text{Sum over pollutants (i...in)}$$

Deleted: 2

Deleted: September 11, 2006
<sp>

χ/Q_{\max}	Maximum normalized annual (chronic) or 1-hour (acute) concentrations ($\mu\text{g}/\text{m}^3/\text{gm}/\text{sec}$)
Q	Emission rate (gm/sec)
REL	Reference exposure level ($\mu\text{g}/\text{m}^3$)

3.4 Construction

The ISCST3 model will be used to estimate ambient impacts from construction activities. The same methodology as discussed in Section 3.1 above will be followed. The emission sources for the construction site will be grouped into three categories: exhaust emissions, construction dust emissions, and wind blown dust emissions.

The combustion portion of annual PM_{10} emissions will be modeled separately to determine the annual average diesel PM_{10} exhaust concentration. The potential carcinogenic inhalation risk will be calculated following the same methodology as discussed in the Section 3.3. The OEHHA/ARB-approved inhalation cancer risk potency of 1.1 (1/mg/kg-day) is equivalent to a unit risk of $3.0 \text{ E-}04 \text{ 1}/(\mu\text{g}/\text{m}^3)$. The exposure will be adjusted to correct for the projected duration of construction activities.

3.5 Data Bases and Other Files

All data used in performing the air quality modeling will be submitted in electronic format. These data will include meteorological data, input files, output files, and any other data bases included in the modeling. The data will be provided on CD-ROM. Documentation will be provided that identifies each file.

4.0 Modeling Results

4.1 Criteria Pollutants

The modeled concentrations will be added to the ambient concentrations. The resulting total concentrations will be compared to the applicable AAQS. These results will be summarized. If the existing concentrations already show a violation of the AAQS, the Project impacts will be compared to EPA-significant impact levels, as shown in Table 1. Isoleth drawings will be provided that show the areas of significant impact of the Project.

4.2 Non-Criteria Pollutants

For those non-criteria pollutants with significant emission rates, modeled concentrations will be compared to significant monitoring concentrations. The use of natural gas as a fuel is expected to minimize emissions of non-criteria pollutants.

4.3 Visibility and AQRVs

Although official standards are not available to assess the Project's impacts on visibility and other AQRVs, some recommendations are available. The Federal Land Managers' Air Quality Related Values Work Group (FLAG) has provided a framework for evaluation of these impacts in their Phase I Report (2000). For visibility, initially the Project will compare its change in extinction with a 5 percent threshold. If the change in extinction is below 5 percent no further analysis will be required. Deposition Analysis Thresholds (DATs) have been established for nitrogen and sulfur by the National Park and Fish and Wildlife Services. The DAT is the additional amount of

Deleted: 2

Deleted: September 11, 2006
<sp>

deposition that triggers a management concern, not necessarily the amount that constitutes an adverse impact to the environment. The Project will compare its deposition rates with the western Class I area DAT of 0.005 Kg/ha/yr for nitrogen and sulfur.

5.0 OFFSITE CONSEQUENCE ANALYSIS FOR AQUEOUS AMMONIA

Two emergency release scenarios will be evaluated to predict the downwind concentrations of ammonia and to assess the extent of the toxicity of the release. The complete failure of the main storage tank into a diked area would be the worst-case scenario. The alternate, more-likely scenario would be leakage from the delivery truck hose. This alternate release would be into a bermed area as well.

Emissions from each scenario will be calculated. The methodology contained in *Risk Management Program Guidance for Wastewater Treatment Plants (40 CFR Part 68)* (EPA, 2000) and the *Risk Management Program Guidance for Offsite Consequence Analysis* (EPA, 1999) will be used to calculate emissions. The wastewater treatment plant document contains data specific to aqueous ammonia releases. This document discusses appropriate emission calculations for worst-case and alternative scenarios.

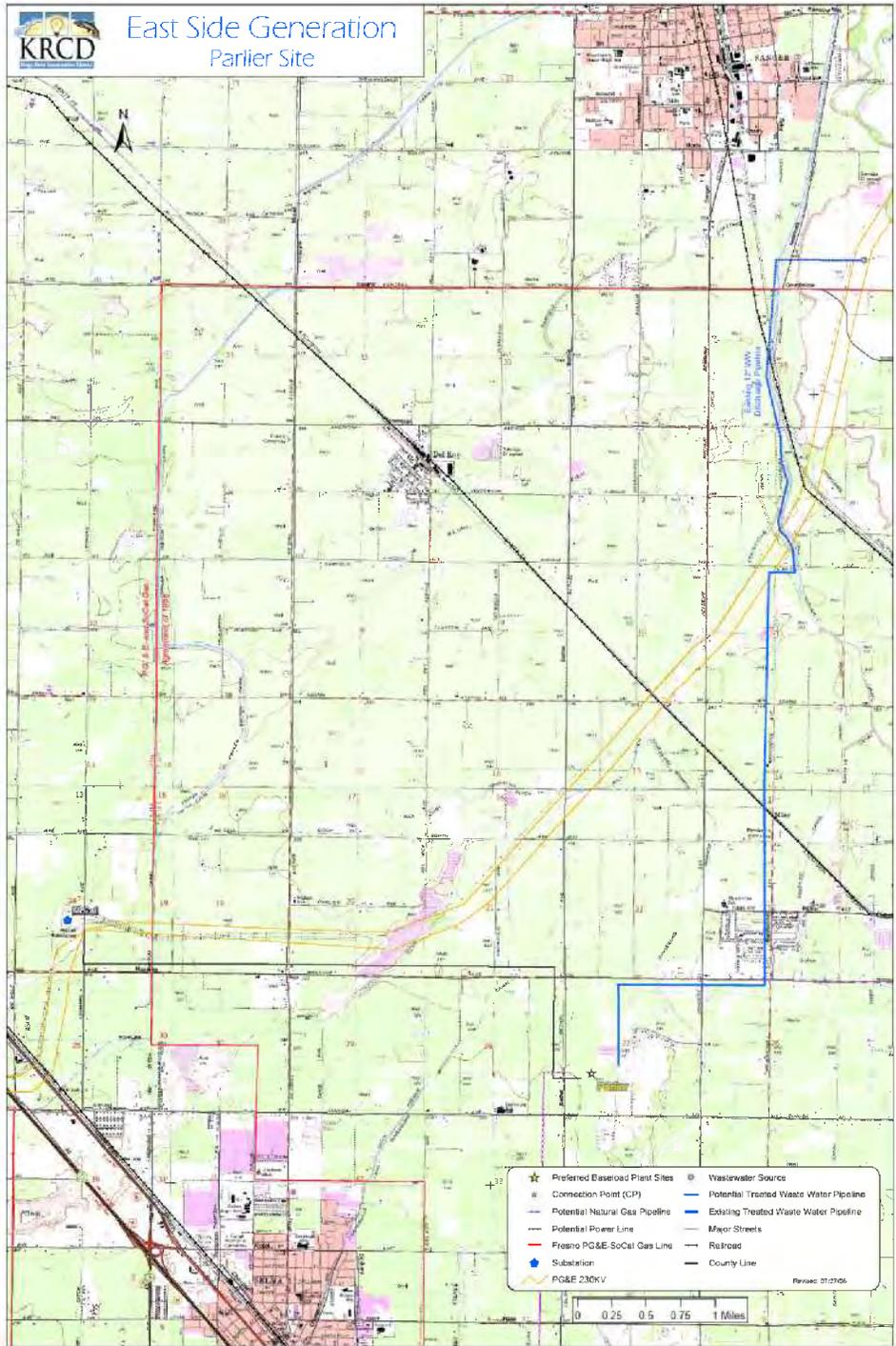
Meteorological conditions used in calculation of the emissions and concentration calculations will vary with each scenario. For the worst-case scenario, following EPA guidance (EPA, 1999, 2000) a wind speed of 1.5 meters/second and Pasquill-Gifford stability class F (most stable) will be used. For the alternative scenario, a wind speed of 3 meters/second, and stability class D (neutral stability) will be used. The temperature of the solution will be assumed to be 81°F (27°C), the average temperature of the hottest month over the last 30 years in Fresno.

The RMP*Comp program (version 1.07) (EPA, 2001: <http://yosemite.epa.gov/oswer/CeppoWeb.nsf/content/rmp-comp.htm>) will be used to estimate the emissions from this type of release. The SLAB model described in *SLAB: An Atmospheric Dispersion Model for Denser Than Air Releases* (Ermak, 1990) will be used to assess the distances from the evaporating pools to toxic thresholds for ammonia under the worst-case and alternative scenarios. The California Energy Commission de minimus level of 75 ppm and the toxic endpoint level for the EPA Offsite Consequence Analysis (EPA, 1999) of 200 ppm will be the endpoints evaluated in this analysis.

Deleted: 2

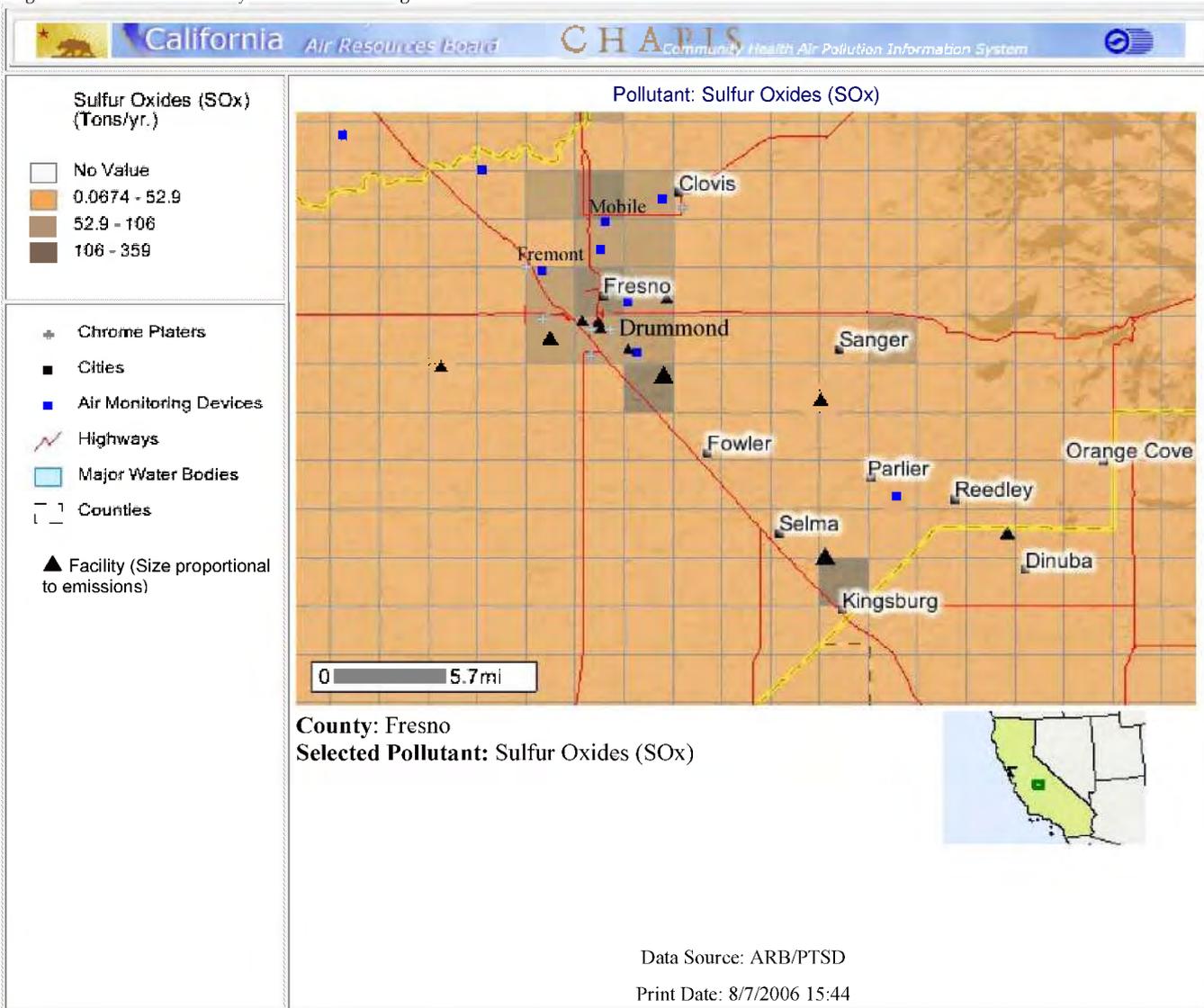
Deleted: September 11, 2006
<sp>

Figure 1. Project Location



Deleted: 2
Deleted: September 11, 2006
<sp>

Figure 2. Emissions Inventory and Air Monitoring Station Locations

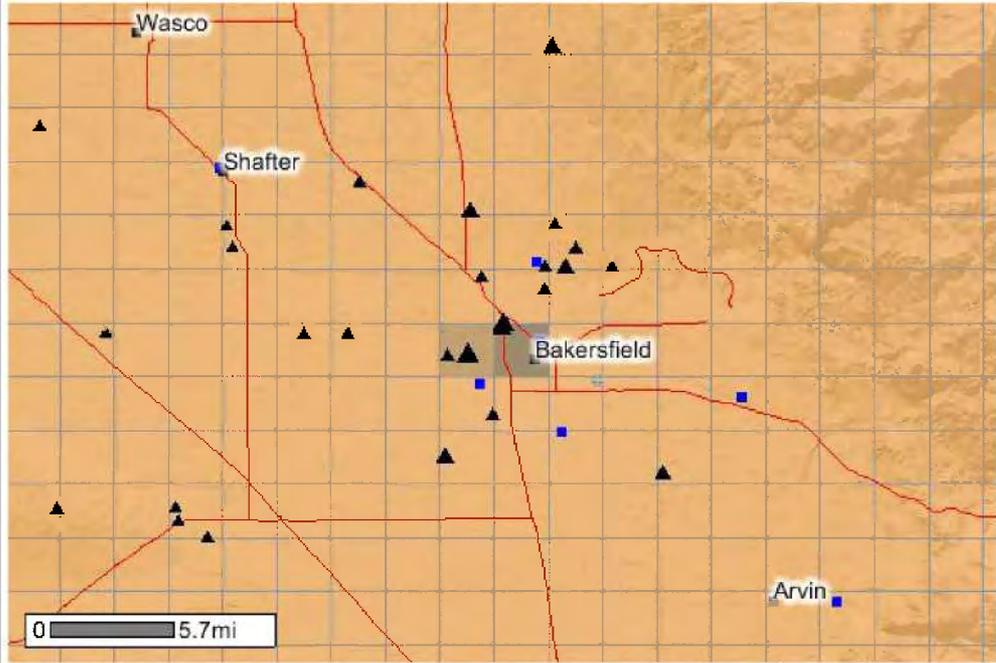


**Sulfur Oxides (SOx)
(Tons/yr.)**

- No Value
- 0.00529 - 115
- 115 - 231
- 231 - 346

- ◆ Chrome Platers
- Cities
- Air Monitoring Devices
- ⚡ Highways
- ▭ Major Water Bodies
- ▭ Counties
- ▲ Facility (Size proportional to emissions)

Pollutant: Sulfur Oxides (SOx)



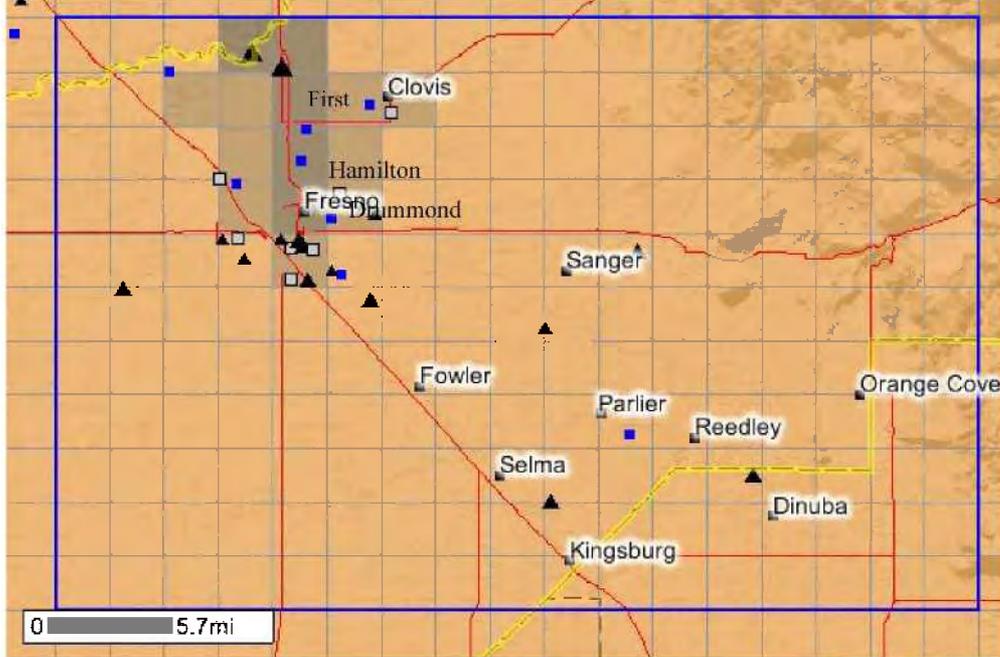
County: Kern
Selected Pollutant: Sulfur Oxides (SOx)



Data Source: ARB/PTSD
Print Date: 8/7/2006 15:58

Pollutant: Particulate Matter<=10 (PM10)

- Particulate Matter<=10 (PM10) (Tons/yr.)
- No Value
 - 0.64 - 62.9
 - 62.9 - 125
 - 125 - 187
- ▲ Facility (Size proportional to emissions)
- Chrome Platers
 - Cities
 - Air Monitoring Devices
 - ⚡ Highways
 - Major Water Bodies
 - Counties



County: Fresno
 Selected Pollutant: Particulate Matter<=10 (PM10)



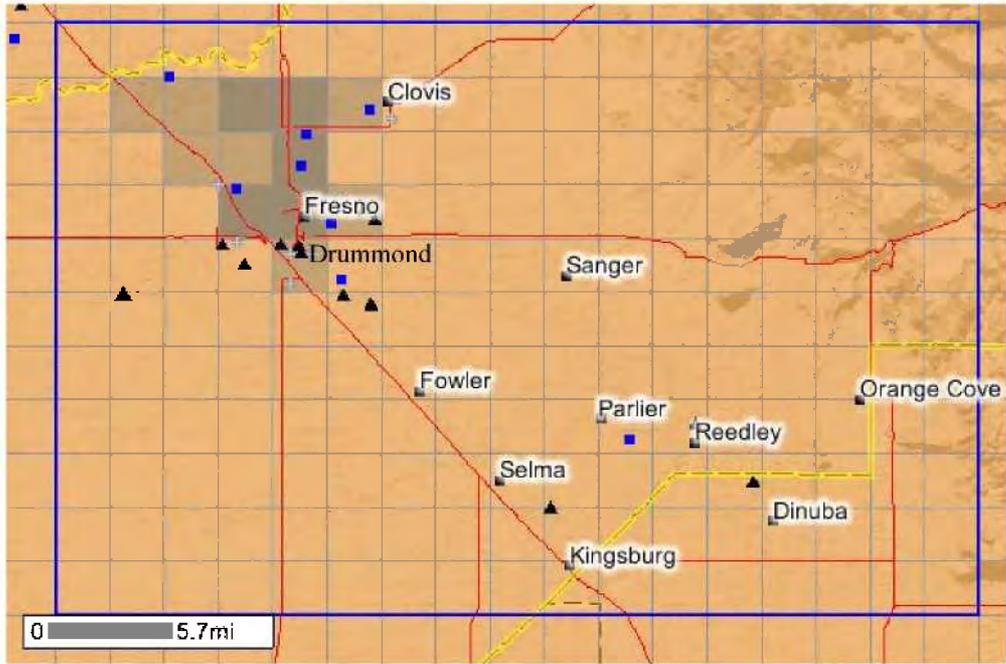
Data Source: ARB/PTSD
 Print Date: 8/7/2006 16:16

Pollutant: Carbon Monoxide (CO)

Carbon Monoxide (CO)
(Tons/yr.)

- No Value
- 6.27 - 3300
- 3300 - 6600
- 6600 - 9900

- ⊕ Chrome Platers
- Cities
- Air Monitoring Devices
- ⚡ Highways
- Major Water Bodies
- ▭ Counties
- ▲ Facility (Size proportional to emissions)



County: Fresno
Selected Pollutant: Carbon Monoxide (CO)



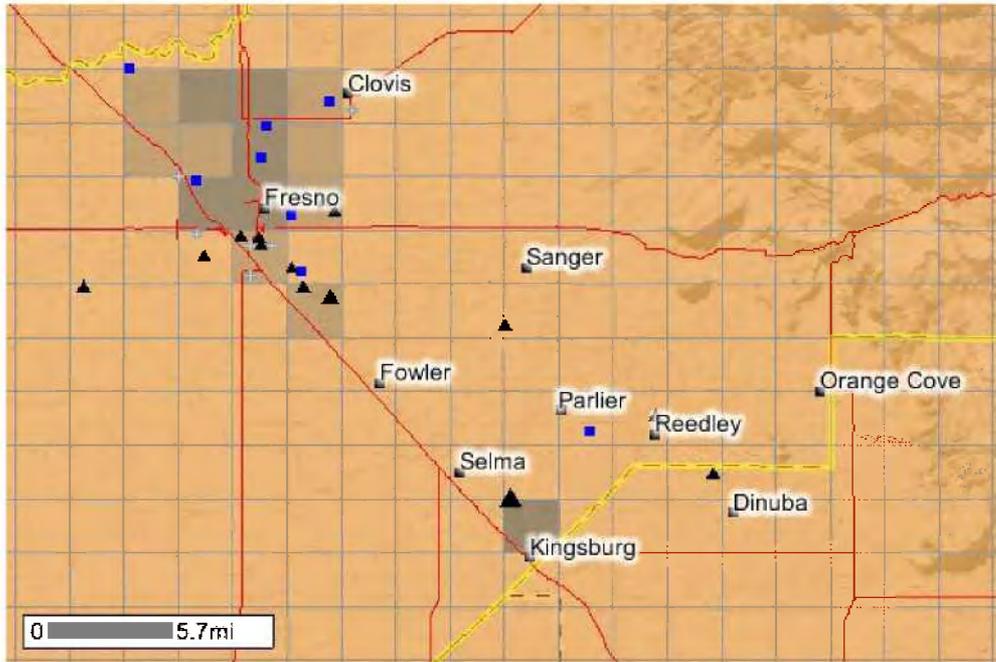
Data Source: ARB/PTSD
Print Date: 8/7/2006 16:21

Pollutant: Nitrogen Oxides (NOx)

Nitrogen Oxides (NOx)
(Tons/yr.)

- No Value
- 0.67 - 511
- 511 - 1020
- 1020 - 1530

- ◆ Chrome Platers
- Cities
- Air Monitoring Devices
- ⚡ Highways
- Major Water Bodies
- ▭ Counties
- ▲ Facility (Size proportional to emissions)



County: Fresno
Selected Pollutant: Nitrogen Oxides (NOx)



Data Source: ARB/PTSD
Print Date: 8/15/2006 08:39

Figure 3. Calpuff Lite: Class I PSD Increment and AQRV Analysis Visibility Analysis

