# EMISSION OFFSET CALCULATIONS

## CALCULATION OF ANNUAL EMISSIONS FOR GWF TRACY PEAKER PROJECT

**A. Normal Operations: 100% load, 59F, 60% RH case, Evaporative Cooler On**

| Pollutant | Hourly Emissions (lb/hr) |
|---|---|
| NOx | 18.37 |
| CO | 7.64 |
| VOC | 1.59 |
| SO2 | 0.55 |
| PM10 | 10.3 |

**B. Start-Up/Shutdown Emissions (Emissions per Startup or Shutdown Event)**

| Pollutant | Emissions (lb) |
|---|---|
| NOx | 13 |
| CO | 21 |
| VOC | 0.4 |
| SO2 | 0.08 |
| PM10 | 2.6 |

**Annual Emissions for Turbines**
(Assume 2 turbines, each 8000 base hours, plus 250 startups and 250 shutdowns each)

| Pollutant | | Annual Emissions |
|---|---|---|
| NOx | 2*((A*8000) + (B*500))/2000 | 153.5 tpy |
| CO | 2*((A*8000) + (B*500))/2000 | 71.62 tpy |
| VOC | 2*((A*8000) + (B*500))/2000 | 12.92 tpy |
| SO2 | 2*((A*8000) + (B*500))/2000 | 4.44 tpy |
| PM10 | 2*((A*8000) + (B*500))/2000 | 83.7 tpy |

**Annual Emissions for Emergency Generator**
(Assume 13 hours per year, and use 100% load emission values)

| Pollutant | | Annual Emissions |
|---|---|---|
| NOx | (4.29*13)/2000 | 0.028 tpy |
| CO | (0.95*13)/2000 | 0.0062 tpy |
| VOC | (0.12*13)/2000 | 0.00078 tpy |
| SO2 | Footnote | 0.00087 tpy |
| PM10 | (0.11*13)/2000 | 0.00072 tpy |

Footnote:
(18.9 gal/hr fuel*7.1 lb/gal*0.0005 lbS/lb fuel*2lbSO2/lbS)/2000

## CALCULATION OF QUARTERLY OFFSETS FOR GWF TRACY PEAKER PROJECT

**Tracy Peaker Plant (TPP)**

| Project Emissions 2x GE 7EA | Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 | Total |
|---|---|---|---|---|---|
| NOx | 76,764 | 76,764 | 76,764 | 76,764 | 307,056 |
| VOC | 10,098 | 10,098 | 10,098 | 10,098 | 40,392 |
| PM-10 | 41,850 | 41,850 | 41,850 | 41,850 | 167,400 |
| SO2 | 2,220 | 2,220 | 2,220 | 2,220 | 8,880 |
| CO | 61,040 | 61,040 | 61,040 | 61,040 | 244,160 |

(1) Project turbine emissions calculated from 59F, 100% load (annual average conditions) and include 250 starts/shutdown events
(2) Turbine is assumed to operate 8000 hours/yr
(3) Project emissions assumed with Evaporative Cooler on
(4) CO emissions from average conditions (3.52 ppmvd @ 15%02) ratioed up to permit limit of 6 ppmvd @15%O2 under all conditions for calculation of offsets burden.
(5) VOC emissions from average conditions (1.28 ppmvd @ 15%02) ratioed up to permit limit of 2 ppmvd @15%O2 under all conditions for calculation of offsets burden.
(6) Annual project emissions include planned emergency generator testing (13 hours/year).

**Emission Reduction Credits**

| NOx | Location of Reduction | How Created | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | **SJVUAPCD NSR NOx Offset Allowance per Rule 2201.6.8.2.2:** | **5,000.0** | **5,000.0** | **5,000.0** | **5,000.0** | **20,000** |
| C-278-2 | 29400 Whitesbridge Rd., Mendota | Process Modification | | 0.0 | 1,408.0 | 23,410.0 | 2,563.0 | |
| Source A* | Elk Hills (Kern County) | Process Modification | | 58,181.7 | 54,709.5 | 55,589.5 | 66,641.5 | |
| N-244-2 | 757 E. 11th Street, Tracy | Process Modification | | 0 | 0 | 38,207.0 | 0 | |
| Source B* | Oildale, CA | Process Modification/Add-On Control | | 6,119.0 | 24,384.0 | 14,386.0 | 6,858.0 | |
| Source C* | Coles Levee (Kern County) | Process Modification | | 3,614.0 | 4,047.0 | 3,267.0 | 3,646.0 | |
| | NOx Offset Credit Calculations | | | | | | | |
| C-278-2 | Distance Ratio 1.5 | | | 0.0 | 938.7 | 15,606.7 | 1,708.7 | |
| Source A | Distance Ratio 1.5 | | | 38,787.8 | 36,473.0 | 37,059.7 | 44,427.7 | |
| N-244-2 | Distance Ratio 1.2 | | | 0.0 | 0.0 | 31,839.2 | 0.0 | |
| Source B | Distance Ratio 1.5 | | | 4,079.3 | 16,256.0 | 9,590.7 | 4,572.0 | |
| Source C | Distance Ratio 1.5 | | | 2,409.3 | 2,698.0 | 2,178.0 | 2,430.7 | |
| | | | Subtotal | 45,276.5 | 56,365.7 | 96,274.2 | 53,139.0 | |
| | | | Distribute 24,524.2 lb toQ1,Q2,Q4 | 8,174.8 | 8,174.7 | -24,524.2 | 8,174.7 | |
| | | | Subtotal | **53,451.3** | **64,540.4** | **71,750.0** | **61,313.9** | **251,055.5** |
| | | | **Balance Required** | **18,298.7** | **7,209.6** | **0** | **10,436.1** | **35,944.5** |
| | | | Total | **71,750.0** | **71,750.0** | **71,750.0** | **71,750.0** | |
| | | | NOx Offsets Needed | 71,764.0 | 71,764.0 | 71,764.0 | 71,764.0 | 287,056.0 |
| **VOC** | **Location of Reduction** | **How Created** | | | | | | |
| S-1538-1 | 2512 Coffee Rd., Bakersfield | Source Shutdown | | 8,793.1 | 10,661.6 | 11,528.0 | 9,725.0 | |
| C-399-1 | 5778 W. Barstow, Fresno | Source Shutdown | | 5,480.0 | 6,496.0 | 4,696.0 | 6,616.0 | |
| | VOC Offset Credit Calculations | | | | | | | |
| S-1538-1 | Distance Ratio 1.5 | | | 5,862.1 | 7,107.7 | 7,685.3 | 6,483.3 | |
| C-399-1 | Distance Ratio 1.5 | | | 3,653.3 | 4,330.7 | 3,130.7 | 4,410.7 | |
| | | | Subtotal | **9,515.4** | **11,438.4** | **10,816.0** | **10,894.0** | **42,663.8** |
| | | | Distribute 579.6 lb from Q2 toQ1 | 579.6 | -579.6 | 0.0 | 0.0 | |
| | | | Total | **10,095.0** | **10,858.8** | **10,816.0** | **10,894.0** | |
| | | | VOC Offsets Needed | 10,098.0 | 10,098.0 | 10,098.0 | 10,098.0 | 40,392.0 |
| C-399-1 | ERC's Remaining on Certificate | | (Factor Back Applied 1.5 Ratio) | 0.0 | 1,141.2 | 1,077.0 | 1,194.0 | |
| **PM-10** | **Location of Reduction** | **How Created** | | | | | | |
| S-1505-4 | Devil's Den Gin, Hwy. 33 | Source Shutdown | | 0 | 0 | 0 | 1000.0 | |
| N-226-4 | Third & "C" St., Turlock | Source Shutdown | | 3,855.0 | 3,652.0 | 2,906.0 | 3,860.0 | |
| C-394-4 | 10833 S. Cornelia Ave., Rasin City | Source Shutdown | | 0 | 0 | 0 | 11,672.0 | |
| C-382-4 | 2691 S. Cedar, Fresno | Emissions Unit Shutdown | | 3,075.0 | 3,075.0 | 3,075.0 | 3,075.0 | |
| S-1452-4 | 217 West Terra Bella Ave, Pixley | Source Shutdown | | 0.0 | 0.0 | 0.0 | 12,372.0 | |
| S-1442-4 | 16351 Ave 40, Earlimart | Source Shutdown | | 0.0 | 0.0 | 0.0 | 5,078.0 | |
| N-183-4 | 4004 S. El Dorado St. Stockton | Source Shutdown | | 20,406.0 | 19,910.0 | 16,368.0 | 16,509.0 | |
| N-256-5 | 800 W. Church St., Stockton | Process Modification | | 25,000.0 | 25,000.0 | 25,000.0 | 25,000.0 | |
| Source D* | Stockton, CA | Process Modification | | 100,000.0 | 100,000.0 | 100,000.0 | 100,000.0 | |
| | PM-10 Offset Credit Calculations | | | | | | | |
| S-1505-4 | Distance Ratio 1.5 | | | 0.0 | 0.0 | 0.0 | 666.7 | |
| N-226-4 | Distance Ratio 1.5 | | | 2,570.0 | 2,434.7 | 1,937.3 | 2,573.3 | |
| C-394-4 | Distance Ratio 1.5 | | | 0.0 | 0.0 | 0.0 | 7,781.3 | |
| C-382-4 | Distance Ratio 1.5 | | | 2,050.0 | 2,050.0 | 2,050.0 | 2,050.0 | |
| S-1452-4 | Distance Ratio 1.5 | | | 0.0 | 0.0 | 0.0 | 8,248.0 | |
| S-1442-4 | Distance Ratio 1.5 | | | 0.0 | 0.0 | 0.0 | 3,385.3 | |
| N-183-4 | Distance Ratio 1.5 | | | 13,604.0 | 13,273.3 | 10,912.0 | 11,006.0 | |
| N-256-5** | Distance Ratio 1.5/Interpollutant Ratio 2.0 = 2.5 | | | 10,000.0 | 10,000.0 | 10,000.0 | 10,000.0 | |
| Source D** | Distance Ratio 1.5/Interpollutant Ratio 2.0 = 2.5 | | | 40,000.0 | 40,000.0 | 40,000.0 | 40,000.0 | |
| | | | Total | **68,224.0** | **67,758.0** | **64,899.3** | **85,710.7** | **286,592.0** |
| | | | PM-10 Offsets Needed | 41,850.0 | 41,850.0 | 41,850.0 | 41,850.0 | 167,400.0 |
| Source D | ERC's Remaining on Certificate | | (Factor Back Applied 2.5 Ratio) | 65,935.0 | 64,770.0 | 57,623.3 | 100,000.0 | |
| N-256-5 | ERC's Remaining on Certificate | | (Factor Back Applied 2.5 Ratio) | 0 | 0 | 0 | 9,651.7 | |

| SO2 | Location of Reduction | How Created | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Source D* | Stockton, CA | Process Modification | | 65,935.0 | 64,770.0 | 57,623.0 | 100,000.0 | |
| | SO2 Offset Credit Calculation | | | | | | | |
| Source D | Distance Ratio 1.5 | | | 43,956.7 | 43,180.0 | 38,415.3 | 66,666.7 | |
| | | | Total | **43,956.7** | **43,180.0** | **38,415.3** | **66,666.7** | **192,218.7** |
| | | | SO2 Offsets Needed | 2,220.0 | 2,220.0 | 2,220.0 | 2,220.0 | 8,880.0 |
| Source D | ERC's Remaining on Certificate | | (Factor Back Applied 1.5 Ratio) | 62,605.0 | 61,440.0 | 54,293.0 | 96,670.0 | |

| CO | Location of Reduction | How Created | | | | | | |
|---|---|---|---|---|---|---|---|---|
| N-101-3 | 18800 Spreckels Blvd., Manteca | Process Modification | | 40,709.0 | 187,781.0 | 134,692.0 | 100,474.0 | |
| Source E* | Oildale, CA (Kern County) | Process Modification/Add-On Control | | 2,127.0 | 5,050.0 | 3,470.0 | 2,277.0 | |
| | CO Offset Credit Calculation | | | | | | | |
| N-101-3 | Distance Ratio 1.2 | | | 33,924.2 | 156,484.2 | 112,243.3 | 83,728.3 | |
| Source E | Distance Ratio 1.5 | | | 1,418.0 | 3,366.7 | 2,313.3 | 1,518.0 | |
| | | | Subtotal | 35,342.2 | 159,850.8 | 114,556.7 | 85,246.3 | |
| | | | Distribute 24,206.3 lb from Q4 to Q1 | 24,206.3 | | | -24,206.3 | |
| | | | Subtotal | 59,548.5 | 159,850.8 | 114,556.7 | 61,040.0 | |
| | | | **Balance Required** | **1,491.5** | **0.0** | **0.0** | **0.0** | |
| | | | Total | **61,040.0** | **159,850.8** | **114,556.7** | **61,040.0** | **396,488** |
| | | | CO Offsets Needed | 61,040.0 | 61,040.0 | 61,040.0 | 61,040.0 | 244,160 |
| N-101-3 | ERC's Remaining on Certificate | | (Factor Back Applied 1.2 Ratio) | 0.0 | 113,523.0 | 60,750.0 | 0.0 | |
| Source E | ERC's Remaining on Certificate | | (Factor Back Applied 1.5 Ratio) | 0.0 | 5,050.0 | 3,470.0 | 0.0 | |

Footnotes:
* Certificate transfer to GWF is not completed at time of AFC submittal
** SO2 used for PM-10 at ratio of 2.5:1 (see analysis attached in Appendix)

August 3, 2001

Mr. Doug Wheeler
GWF Energy, LLC
4300 Railroad Avenue
Pittsburg, CA 94565
Fax: 925-431-0518

NOx ERC Acquisition Status

Dear Doug,

This letter provides you with a summary of our current efforts to acquire San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) nitrogen oxide (NOx) emission reduction credits (ERCs) for GWF Energy, LLC (GWF).

Per your direction, we are currently endeavoring to identify and assist you to secure the remaining 65 tons per year (tpy) of SJVUAPCD NOx ERCs that you require for your project. We have identified at least four different holders of NOx ERCs that have expressed some potential interest in entering into a potential transaction with GWF. Collectively, these sources own more than sufficient quantities of NOx ERCs to satisfy your needs should they elect to sell to GWF.

Cantor Fitzgerald is working to secure these NOx ERCs on a timely basis. We look forward to working with GWF in securing the remaining 65 tpy of NOx ERCs for your project in the SJVUAPCD.

Respectfully,

CANTOR FITZGERALD BROKERAGE, LP

Josh Margolis
Managing Director
Environmental Brokerage Services

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August 2, 2001

**Memo To:** Doug Wheeler
GWF Power Systems Company

**From:** David Deckman

**Subject:** Interpollutant Offset Ratio Analysis for GWF Tracy Project

As you requested, attached is an analysis of the interpollutant offset ratio for using sulfur oxides (SOx) Emission Reduction Credits to offset emissions of respirable particulate matter ($PM_{10}$). GWF Energy LLC is proposing to use SOx ERCs, which were purchased from Newark Sierra Paperboard Corporation in Stockton, to offset $PM_{10}$ from the proposed Tracy Peaker Plant (TPP). The distance between the Newark Sierra facility and the proposed power plant project is greater than 15 miles. Our analysis indicates that the appropriate interpollutant ratio is 2.0 to 1.0, and that the overall offset ratio, including the adjustment for distance between the proposed project and the source of the ERCs, would be 2.5 to 1.0. This analysis is consistent with those approved by the San Joaquin Valley Unified Air Pollution Control District for other projects.

Please be aware that Section 4.2.5.3 of SJVUAPCD Rule 2201 (New and Modified Stationary Source Review) allows the use of interpollutant offsets only if the project will not cause violations of the ambient air quality standards. Because ambient $PM_{10}$ concentrations in the San Joaquin Valley currently exceed the state and federal standards, the SJVUAPCD is accepting a demonstration that the project would not cause $PM_{10}$ ambient concentrations in excess of the significance criteria in Title 40 Code of Federal Regulations Part 51.165(b)(2). These thresholds are 5 micrograms per cubic meter ($\mu g/m^3$) and 1.0 $\mu g/m^3$ for the 24-hour and annual averaging periods, respectively. It is our understanding that an air quality impact analysis will be prepared for the Application for Certification for this project.

If you have any questions regarding this analysis, please feel free to contact us.

attachment

**INTERPOLLUTANT OFFSET RATIO ANALYSIS**
**FOR THE**
**GWF ENERGY LLC TRACY PEAKER PLANT**

GWF Energy LLC (GWF) proposes to use sulfur oxides (SOx) Emission Reduction Credits (ERCs) to offset emissions of respirable particulate matter ($PM_{10}$) from its proposed Tracy Peaker Plant in Tracy, California. GWF owns ERC Certificate No. N-256-5 and has an option to purchase additional ERCs from Certificate No. N-130-5 from Newark Sierra Paperboard Company. These certificates were issued by the San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) for SOx emission reductions that were originally generated at the Newark Sierra Paperboard Company's facility at 800 West Church Street in Stockton, California. SJVUAPCD Rule 2201, Section 4.2.5.3 provides:

> *Interpollutant offsets may be approved by the APCO on a case-by-case basis, provided that the applicant demonstrates to the satisfaction of the APCO, in accordance with the provisions of Section 4.3.2 of this rule, that the emission increases from the new or modified source will not cause or contribute to a violation of an ambient air quality standard. In such cases, the APCO shall, based on an air quality analysis, impose offset ratios equal to or greater than the requirements, of this rule.*

GWF will provide a demonstration that the emission increases associated with the project will not cause or contribute to a violation of an ambient air quality standard. This analysis does not address those impacts.

This analysis provides a technical rationale for an appropriate SOx-to-$PM_{10}$ interpollutant ratio, as well as the overall offset ratio to reflect the distance between the source providing the offsets and the proposed project.

## Interpollutant Ratio

To develop an interpollutant offset ratio for SOx and $PM_{10}$, this analysis uses (1) a speciated linear rollback analysis using ambient monitoring data from San Joaquin County, in which both the proposed GWF project and the Newark Sierra facility are located; (2) emission inventory data in San Joaquin County; and (3) the results of Chemical Mass Balance (CMB) modeling at a location in the northern region of the San Joaquin Valley Air Basin. The approach is based on a simple box model that ignores transport and deposition; assumes that the box is the size of San Joaquin County; and assumes that the ambient pollutant concentrations in the box (San Joaquin County) can be represented by the values reported for the Hazelton Street and Wagner-Holt School monitoring stations in San Joaquin County. These are the only monitoring stations in

San Joaquin County that have the data required for this analysis. The interpollutant ratio calculations described below are shown in Attachment 1.

The actual, annual average nitrate, sulfate, chloride, and total $PM_{10}$ ambient air measurements were used to partially speciate the $PM_{10}$. The ambient monitoring data were reported by the Air Resources Board (ARB) for monitoring stations located on Hazelton Street and at the Wagner-Holt School in Stockton for 1997 and 1998, the most recent years for which the speciated $PM_{10}$ were available. According to ARB staff, speciation of the $PM_{10}$ samples was discontinued at these monitoring stations at the end of 1998.

The unspeciated balance of the $PM_{10}$ (after subtracting the ammonium sulfate, ammonium nitrate, and ammonium chloride from total $PM_{10}$) is split between direct-combustion-related $PM_{10}$ (fuel combustion and mobile sources) and other direct $PM_{10}$ sources. The contribution from direct-combustion-related $PM_{10}$ is based on Chemical Mass Balance (CMB) modeling performed for the District's $PM_{10}$ Attainment Demonstration Plan. CMB modeling was conducted by the ARB for several locations within the San Joaquin Valley for annual average conditions and maximum 24-hour conditions in support of the District's attainment plan. Annual analyses were performed for locations in Bakersfield, Corcoran, Fresno, and Visalia. Analyses of 24-hour events were performed for locations in Bakersfield, Corcoran, Fresno, Hanford, Kettleman City, Modesto, and Oildale. The nearest modeled site to the proposed GWF project is Modesto. As indicated, an annual analysis was not performed for the Modesto site, and the annual sites are in the central and southern San Joaquin Valley. Thus, the results of the 24-hour analysis were to determine the contribution from direct-combustion-related $PM_{10}$. The CMB modeling evaluated the contribution of specific source categories. The "mobile" category represents the contribution from mobile and other combustion sources, such as those proposed for the GWF project. In this case, the CMB modeling found that the mobile category contributed 19.28 micrograms per cubic meter ($\mu g/m^3$) out of the total $PM_{10}$ concentration of 160 $\mu g/m^3$ for the January 20, 1994 design episode. A table from the attainment plan showing these values is attached (see Attachment 2). Thus, the direct-combustion contribution was assumed to be 12.1 percent (i.e., 19.28/160). Karen Magliano, Manager of the Particulate Matter Analysis Section of the ARB, confirmed that earlier CMB modeling for 1993 showed a similar result for an annual average analysis at Modesto. In this case, the "mobile" category contributed 4.73 $\mu g/m^3$ out of the total annual $PM_{10}$ concentration of 42 $\mu g/m^3$, or approximately 11 percent (see Attachment 2). The results of the annual modeling were discussed in the District's attainment plan, but these details are not presented in the plan.

Next, since direct $PM_{10}$ emissions from combustion sources (gas turbines) are being offset, it was determined how many $\mu g/m^3$ of ambient $PM_{10}$ are associated with 1 ton/year of direct combustion $PM_{10}$ emissions by dividing the annual average direct-combustion $PM_{10}$ concentration by the total annual $PM_{10}$ emissions in San Joaquin County. A similar calculation was performed for sulfur dioxide by dividing the annual average sulfate concentration by the annual $SO_2$ emissions in San Joaquin County. The inventory data were obtained from the ARB website (http://www.arb.ca.gov/app/emsinv/emssumcat.php). The daily values from this inventory were multiplied by 365 to compute the annual values. Total $PM_{10}$ and SOx inventories were calculated for the years considered in our

analysis. Inventory data were available from the ARB website for 1996 and 1998, but not for 1997. The 1997 inventory was computed by interpolating between 1996 and 1997. The inventory data for San Joaquin County are shown in Attachment 3. The ratio of the $\mu g/m^3$ per ton/year values indicates the number of tons of sulfur dioxide emissions that it takes to create the same number of $\mu g/m^3$ of $PM_{10}$ that would be created by 1 ton/year of direct-combustion $PM_{10}$ emissions. As shown in Attachment 1, this calculation results in a 2.0 to 1 interpollutant offset ratio. The results were relatively consistent between the two monitoring stations and the two calendar years of data on which these analyses were based.

## Offset Ratio

Rule 2201 does not indicate specifically how the interpollutant ratio (described above) and the distance ratio (pursuant to Section 4.2.4 of Rule 2201) should be applied. Leonard Scandura of the District's Southern Region office provided a description of how the District computes the overall offset ratio. The methodology provided by Mr. Scandura addresses sources of NOx offsets within 15 miles of the new source and more than 15 miles from the new source. Because the ERC source in this case is more than 15 miles from the GWF facility and is providing SOx ERCs, this description has been modified to address this case only. The methodology provided by Mr. Scandura is as follows (with revisions to reflect the distance relationship, transfer of SOx ERCs, and a 2.0 to 1 interpollutant offset ratio):

> *Rule 2201 includes provisions for including distance offset ratios and interpollutant offset ratios to determine the quantity of offsets required. These two offset ratios are applied independently to determine the quantity of offset required.*
>
> *The distance ratio specifies the excess amount of offsets required due to the distance between the increase in emissions and the location at which the emission reductions occurred. For example, if the distance offset ratio is 1.5:1, 100% of the fraction of the emission increase to be offset at this distance is required plus an additional 50% to account for the distance between the increase in emissions and the location of the emissions reductions.*
>
> *The interpollutant offset ratio specifies excess amount of offsets required when the emission increases and the offsets being provided are not the same pollutant. Specifically, the interpollutant offset ratio quantifies the relationship between the pollutant being emitted and the emission reductions being provided. In this case [the analysis described in this report], the interpollutant offset ratio is 2.0:1, i.e., 100% of the emission increase is required to be offset plus an additional 100% to account for the relationship between the pollutant being emitted and the emissions reduction.*
>
> *When both the distance and interpollutant offset ratios apply, the overall offset quantity required is equal to the sum of the amount being emitted and the excess amount(s) required due to the distance offset ratio plus the excess amount due to*

*the interpollutant offset ratio. The computation of the resulting overall SOx for $PM_{10}$ offset ratio is as follows:*

*SOx req'd ton/year = $PM_{10}$ ton/year + $PM_{10}$ ton/year to be offset by SOx ERCs >15 miles away * 0.5 + $PM_{10}$ ton/year to be offset by SOx reductions * 1.0*

*SOx req'd ton/year =$PM_{10}$ ton/year + $PM_{10}$ ton/year (0.5) + $PM_{10}$ ton/year (1.0)*

*SOx req'd ton/year = $PM_{10}$ ton/year (1 + 0.5 + 1.0)*

*Thus, the combined distance and interpollutant ratio is:*

*SOx/PM10 = 1 + 0.5 + 1.0*

Using this methodology, the overall distance and interpollutant offset ratio is as follows:

$SOx/PM_{10} = 1 + 0.5 + 1.0 = 2.5$

ATTACHMENT 1

INTERPOLLUTANT OFFSET RATIO
CALCULATIONS

## GWF - Tracy Peaker Plant
## PM10 Interpollutant Offset Ratio Analysis

01-Aug-01

### 1997 Annual Average Concentrations (AAM)

| Station | Total PM10 ug/m3 | PM10 Nitrate ug/m3 | PM10 Sulfate ug/m3 | PM10 Chloride ug/m3 |
|---|---|---|---|---|
| Stockton - Hazelton St. | 29.70 | 3.13 | 1.57 | 0.26 |
| Stockton - Wagner-Holt | 26.10 | 2.64 | 1.47 | 0.25 |

| | | | |
|---|---|---|---|
| Ion Form | NO3 | SO4 | Cl |
| Ion Molecular Weight | 62.005 | 96.062 | 35.453 |
| Combined Form | NH4NO3 | (NH4)2SO4 | NH4Cl |
| Combined Molecular Wt | 80.043 | 132.139 | 53.492 |

Direct Combustion PM10 fraction of total ambient PM10 (source apportionment): 12.1%

| Station | Total PM10 ug/m3 | PM10 NH4NO3 ug/m3 | PM10 (NH4)2SO4 ug/m3 | PM10 NH4Cl ug/m3 | PM10 Direct Combustion ug/m3 | PM10 Other ug/m3 |
|---|---|---|---|---|---|---|
| Stockton - Hazelton St. | 29.70 | 4.04 | 2.16 | 0.39 | 3.59 | 19.51 |
| Stockton - Wagner-Holt | 26.10 | 3.40 | 2.02 | 0.38 | 3.16 | 17.14 |

### 1997 Annual Emissions (tons/year) - San Joaquin County

| Total PM10 | NOx | SOx | Combustion PM10 | Other Direct PM10 |
|---|---|---|---|---|
| 17,540 | 32,522 | 2,378 | 1,911 | 15,629 |

| | | Stockton Hazelton | Stockton Wagner-Holt | |
|---|---|---|---|---|
| Direct Combustion PM10: | | | | |
| 1,911 | tons/yr = | 3.59 | 3.16 | |
| 1 | ton/yr = | 0.00188 | 0.00165 | |
| SO2 -> Sulfates: | | | | |
| 2,378 | tons/yr = | 2.16 | 2.02 | |
| 1 | ton/yr = | 0.00091 | 0.00085 | |
| | | | | Average |
| SO2:PM10 ratio = | | 2.07 | 1.94 | 2.01 |

## GWF - Tracy Peaker Plant
## PM10 Interpollutant Offset Ratio Analysis

01-Aug-01

**1998 Annual Average Concentrations (AAM)**

| Station | Total PM10 ug/m3 | PM10 Nitrate ug/m3 | PM10 Sulfate ug/m3 | PM10 Chloride ug/m3 |
|---|---|---|---|---|
| Stockton - Hazelton St. | 29.10 | 2.90 | 1.53 | 0.12 |
| Stockton - Wagner-Holt | 25.50 | 2.28 | 1.49 | 0.09 |
| Ion Form | | NO3 | SO4 | Cl |
| Ion Molecular Weight | | 62.005 | 96.062 | 35.453 |
| Combined Form | | NH4NO3 | (NH4)2SO4 | NH4Cl |
| Combined Molecular Wt | | 80.043 | 132.139 | 53.492 |

Direct Combustion PM10 fraction of total ambient PM10 (source apportionment): 12.1%

| Station | Total PM10 ug/m3 | PM10 NH4NO3 ug/m3 | PM10 (NH4)2SO4 ug/m3 | PM10 NH4Cl ug/m3 | PM10 Direct Combustion ug/m3 | PM10 Other ug/m3 |
|---|---|---|---|---|---|---|
| Stockton - Hazelton St. | 29.10 | 3.75 | 2.11 | 0.18 | 3.52 | 19.55 |
| Stockton - Wagner-Holt | 25.50 | 2.95 | 2.05 | 0.14 | 3.09 | 17.28 |

**1998 Annual Emissions (tons/year) - San Joaquin County**

| Total PM10 | NOx | SOx | Combustion PM10 | Other Direct PM10 |
|---|---|---|---|---|
| 17,699 | 32,211 | 2,354 | 1,854 | 15,845 |

| | | Stockton Hazelton | Stockton Wagner-Holt | Average |
|---|---|---|---|---|
| Direct Combustion PM10: | | | | |
| 1,854 | tons/yr = | 3.52 | 3.09 | |
| 1 | ton/yr = | 0.00190 | 0.00166 | |
| SO2 -> Sulfates: | | | | |
| 2,354 | tons/yr = | 2.11 | 2.05 | |
| 1 | ton/yr = | 0.00090 | 0.00087 | |
| SO2:PM10 ratio = | | 2.12 | 1.91 | 2.02 |

ATTACHMENT 2

CMB MODELING RESULTS FOR MODESTO

Modesto 24 Hour

| MODESTO<br>MOVESB,Soil29,BAMAJC | TOTAL | Geologic and Construction | Mobile | Organic Carbon | Vegetative Burning | Ammonium Nitrate | Associated Water | Ammonium Sulfate | Unassigned | Marine |
|---|---|---|---|---|---|---|---|---|---|---|
| 1/20/94 Concentrations | 160.00 | 10.35 | 19.28 | 5.44 | 14.45 | 66.99 | 8.00 | 6.84 | 27.68 | 0.97 |
| 1/20/94 Percents | | 6.47% | 12.05% | 3.40% | 9.03% | 41.87% | 5.00% | 4.27% | 17.30% | 0.61% |
| Natural Background % | | 5% | 0% | 0% | 0% | 0% | 0% | 0% | 10% | 100% |
| Natural Background Value | 4.26 | 0.52 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.77 | 0.97 |
| Regional Background % | | 5% | 10% | 10% | 10% | 10% | 10% | 5% | 10% | 0% |
| Regional Background Value | 15.04 | 0.52 | 1.93 | 0.54 | 1.44 | 6.70 | 0.80 | 0.34 | 2.77 | 0.00 |
| Total Background | 19.30 | 1.03 | 1.93 | 0.54 | 1.44 | 6.70 | 0.80 | 0.34 | 5.54 | 0.97 |
| Local Contribution (Adjusted Concentration - Background) | 140.70 | 9.31 | 17.35 | 4.89 | 13.00 | 60.29 | 7.20 | 6.49 | 22.15 | 0.00 |
| Ammonia Emission Estimate (%) | | | | | | 15% | | | | |
| Ammonia Emission Estimate (ug/m3) | 9.04 | | | | | 9.04 | | | | |
| Local Contribution (Without Ammonia) | 131.65 | 9.31 | 17.35 | 4.89 | 13.00 | 51.25 | 7.20 | 6.49 | 22.15 | 0.00 |
| | | | | | | | | | | |
| Base Year 1993 Seasonal Emission Inventory PM10 | 31.31 | 21.72 | 1.60 | | 4.82 | | | | 31.31 | |
| ROG | 52.88 | | | 52.88 | | | | | | |
| NOx | 54.23 | | | | | 54.23 | 54.23 | | | |
| SOx | 1.87 | | | | | | | 1.87 | | |
| Future year Seasonal Emission Inventory 2001 PM | 28.06 | 19.06 | 1.18 | | 4.00 | | | | 28.06 | |
| ROG | 40.96 | | | 40.96 | | | | | | |
| NOx | 40.98 | | | | | 40.98 | 40.98 | | | |
| SOx | 1.77 | | | | | | | 1.77 | | |
| Ef/Eb Ratio for Local Rollback Projection | 0.79 | 0.88 | 0.74 | 0.77 | 0.83 | 0.76 | 0.76 | 0.95 | 0.90 | 1.00 |
| Projected Local | 105.74 | 8.18 | 12.80 | 3.79 | 10.79 | 38.73 | 5.44 | 6.15 | 19.86 | 0.00 |
| Ef/Eb Ratio for Regional Rollback Projection | | 0.92 | 0.59 | 0.71 | 0.83 | 0.80 | 0.80 | 0.96 | 0.92 | 1.00 |
| Projected Regional Background | 12.10 | 0.48 | 1.14 | 0.38 | 1.20 | 5.38 | 0.64 | 0.33 | 2.55 | 0.00 |
| Natural Background | 4.26 | 0.52 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.77 | 0.97 |
| Ammonia Emission Estimate | 9.04 | | | | | 9.04 | | | | |
| 2001 Projected 24-Hour (Result) | 131.14 | 9.18 | 13.93 | 4.17 | 11.99 | 53.15 | 6.08 | 6.48 | 25.18 | 0.97 |
| | | | | | | | | | | |
| Future year Seasonal Emission Inventory 2006 PM | 29.71 | 19.98 | 1.13 | | 4.33 | | | | 29.71 | |
| ROG | 32.83 | | | 32.83 | | | | | | |
| NOx | 33.89 | | | | | 33.89 | 33.89 | | | |
| SOx | 1.88 | | | | | | | 1.88 | | |
| Ef/Eb Ratio for Local Rollback Projection | 0.70 | 0.92 | 0.71 | 0.62 | 0.90 | 0.62 | 0.62 | 1.01 | 0.95 | 1.00 |
| Projected Local | 99.61 | 8.57 | 12.26 | 3.04 | 11.68 | 32.03 | 4.50 | 6.53 | 21.01 | 0.00 |
| Ef/Eb Ratio for Regional Rollback Projection | | 0.95 | 0.57 | 0.59 | 0.89 | 0.72 | 0.72 | 1.01 | 0.96 | 1.00 |
| Projected Regional Background | 11.59 | 0.49 | 1.11 | 0.32 | 1.29 | 4.80 | 0.57 | 0.34 | 2.66 | 0.00 |
| Natural Background | 4.26 | 0.52 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.77 | 0.97 |
| Ammonia Emission Estimate | 9.04 | | | | | 9.04 | | | | |
| 2006 Projected 24-Hour (Result) | 124.50 | 9.58 | 13.36 | 3.36 | 12.97 | 45.87 | 5.07 | 6.87 | 26.44 | 0.97 |

## David Deckman

**From:** Karen Magliano [kmaglian@arb.ca.gov]
**Sent:** Monday, February 26, 2001 11:49 AM
**To:** ddeckman@sierraresearch.com
**Subject:** Modesto Annual CMB

Dave:

After a little digging, I finally managed to find a file with the annual average numbers. For Modesto in 1993, mobile sources contributed 4.73 ug/m3 out of an annual average of 42 ug/m3 (approximately 11%).

Let me know if there's anything else.

Regards, Karen

ATTACHMENT 3

EMISSIONS INVENTORY
FOR
SAN JOAQUIN COUNTY

## 1997 EMISSION INVENTORY FOR SAN JOAQUIN COUNTY

| CATEGORY | SUBCATEGORY | EMISSIONS (TONS PER DAY) TOG | ROG | CO | NOX | SOX | PM | PM10 |
|---|---|---|---|---|---|---|---|---|
| FUEL COMBUSTION | ELECTRIC UTILITIES | 0.17 | 0.07 | 0.96 | 0.80 | 0.65 | 0.20 | 0.12 |
| FUEL COMBUSTION | COGENERATION | 0.02 | 0.01 | 0.04 | 0.14 | 0.00 | 0.01 | 0.01 |
| FUEL COMBUSTION | OIL AND GAS PRODUCTION (COMBUSTION) | 0.15 | 0.03 | 0.06 | 0.28 | 0.17 | 0.02 | 0.01 |
| FUEL COMBUSTION | PETROLEUM REFINING (COMBUSTION) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| FUEL COMBUSTION | MANUFACTURING AND INDUSTRIAL | 0.10 | 0.05 | 1.93 | 7.71 | 0.90 | 0.23 | 0.13 |
| FUEL COMBUSTION | FOOD AND AGRICULTURAL PROCESSING | 0.21 | 0.17 | 1.28 | 4.17 | 0.27 | 0.29 | 0.27 |
| FUEL COMBUSTION | SERVICE AND COMMERCIAL | 0.14 | 0.06 | 0.36 | 1.27 | 0.02 | 0.14 | 0.13 |
| FUEL COMBUSTION | OTHER (FUEL COMBUSTION) | 0.07 | 0.01 | 0.03 | 0.18 | 0.02 | 0.02 | 0.02 |
| WASTE DISPOSAL | SEWAGE TREATMENT | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| WASTE DISPOSAL | LANDFILLS | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.18 | 0.02 |
| WASTE DISPOSAL | INCINERATORS | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 |
| WASTE DISPOSAL | SOIL REMEDIATION | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| WASTE DISPOSAL | OTHER (WASTE DISPOSAL) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.01 |
| CLEANING AND SURFACE COATINGS | LAUNDERING | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| CLEANING AND SURFACE COATINGS | DEGREASING | 2.35 | 1.81 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| CLEANING AND SURFACE COATINGS | COATINGS AND RELATED PROCESS SOLVENTS | 4.09 | 3.91 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| CLEANING AND SURFACE COATINGS | PRINTING | 0.28 | 0.28 | 0.00 | 0.00 | 0.00 | 0.05 | 0.04 |
| CLEANING AND SURFACE COATINGS | ADHESIVES AND SEALANTS | 0.29 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| CLEANING AND SURFACE COATINGS | OTHER (CLEANING AND SURFACE COATINGS) | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| PETROLEUM PRODUCTION AND MARKETING | OIL AND GAS PRODUCTION | 3.38 | 0.98 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| PETROLEUM PRODUCTION AND MARKETING | PETROLEUM REFINING | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| PETROLEUM PRODUCTION AND MARKETING | PETROLEUM MARKETING | 1.05 | 1.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| PETROLEUM PRODUCTION AND MARKETING | OTHER (PETROLEUM PRODUCTION AND MARKETING) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| INDUSTRIAL PROCESSES | CHEMICAL | 0.74 | 0.51 | 0.00 | 0.01 | 0.26 | 1.40 | 1.00 |
| INDUSTRIAL PROCESSES | FOOD AND AGRICULTURE | 1.69 | 1.56 | 0.00 | 0.01 | 0.02 | 1.82 | 0.89 |
| INDUSTRIAL PROCESSES | MINERAL PROCESSES | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 | 2.24 | 1.25 |
| INDUSTRIAL PROCESSES | METAL PROCESSES | 0.00 | 0.00 | 0.09 | 0.01 | 0.02 | 0.00 | 0.00 |
| INDUSTRIAL PROCESSES | WOOD AND PAPER | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.22 | 0.12 |
| INDUSTRIAL PROCESSES | GLASS AND RELATED PRODUCTS | 0.03 | 0.02 | 0.13 | 3.48 | 0.95 | 0.43 | 0.35 |
| INDUSTRIAL PROCESSES | ELECTRONICS | 0.03 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| INDUSTRIAL PROCESSES | OTHER (INDUSTRIAL PROCESSES) | 0.03 | 0.02 | 0.00 | 0.00 | 0.00 | 0.03 | 0.02 |
| SOLVENT EVAPORATION | CONSUMER PRODUCTS | 5.42 | 4.49 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| SOLVENT EVAPORATION | ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS | 2.02 | 1.96 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| SOLVENT EVAPORATION | PESTICIDES/FERTILIZERS | 2.93 | 2.93 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| SOLVENT EVAPORATION | ASPHALT PAVING / ROOFING | 0.33 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| SOLVENT EVAPORATION | REFRIGERANTS | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| SOLVENT EVAPORATION | OTHER (SOLVENT EVAPORATION) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| MISCELLANEOUS PROCESSES | RESIDENTIAL FUEL COMBUSTION | 2.12 | 0.93 | 12.22 | 1.21 | 0.06 | 2.05 | 1.92 |
| MISCELLANEOUS PROCESSES | FARMING OPERATIONS | 66.61 | 5.33 | 0.00 | 0.00 | 0.00 | 22.91 | 10.42 |
| MISCELLANEOUS PROCESSES | CONSTRUCTION AND DEMOLITION | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.40 | 3.13 |
| MISCELLANEOUS PROCESSES | PAVED ROAD DUST | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 19.48 | 8.91 |
| MISCELLANEOUS PROCESSES | UNPAVED ROAD DUST | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 19.31 | 11.47 |
| MISCELLANEOUS PROCESSES | FUGITIVE WINDBLOWN DUST | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.19 | 1.93 |
| MISCELLANEOUS PROCESSES | FIRES | 0.01 | 0.00 | 0.06 | 0.00 | 0.00 | 0.01 | 0.01 |

## 1997 EMISSION INVENTORY FOR SAN JOAQUIN COUNTY

| CATEGORY | SUBCATEGORY | EMISSIONS (TONS PER DAY) TOG | ROG | CO | NOX | SOX | PM | PM10 |
|---|---|---|---|---|---|---|---|---|
| MISCELLANEOUS PROCESSES | WASTE BURNING AND DISPOSAL | 3.51 | 2.00 | 19.58 | 0.55 | 0.00 | 3.13 | 3.07 |
| MISCELLANEOUS PROCESSES | UTILITY EQUIPMENT | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| MISCELLANEOUS PROCESSES | COOKING | 0.10 | 0.07 | 0.00 | 0.00 | 0.00 | 0.29 | 0.21 |
| MISCELLANEOUS PROCESSES | OTHER (MISCELLANEOUS PROCESSES) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ON-ROAD MOTOR VEHICLES | LIGHT DUTY PASSENGER (LDA) | 15.74 | 14.59 | 125.67 | 11.96 | 0.11 | 0.34 | 0.33 |
| ON-ROAD MOTOR VEHICLES | LIGHT AND MEDIUM DUTY TRUCKS | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ON-ROAD MOTOR VEHICLES | LIGHT DUTY TRUCKS - 1 (LDT1) | 4.24 | 3.94 | 42.43 | 3.76 | 0.02 | 0.07 | 0.07 |
| ON-ROAD MOTOR VEHICLES | LIGHT DUTY TRUCKS - 2 (LDT2) | 3.46 | 3.14 | 39.37 | 5.66 | 0.04 | 0.21 | 0.20 |
| ON-ROAD MOTOR VEHICLES | MEDIUM DUTY TRUCKS (MDV) | 3.21 | 2.95 | 33.91 | 3.73 | 0.04 | 0.11 | 0.11 |
| ON-ROAD MOTOR VEHICLES | HEAVY DUTY GAS TRUCKS (ALL) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ON-ROAD MOTOR VEHICLES | LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDV1) | 2.40 | 2.24 | 37.60 | 2.01 | 0.01 | 0.01 | 0.01 |
| ON-ROAD MOTOR VEHICLES | LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDV2) | 0.10 | 0.09 | 1.29 | 0.24 | 0.00 | 0.00 | 0.00 |
| ON-ROAD MOTOR VEHICLES | MEDIUM HEAVY DUTY GAS TRUCKS (MHDV) | 2.05 | 1.90 | 36.59 | 1.61 | 0.00 | 0.01 | 0.01 |
| ON-ROAD MOTOR VEHICLES | HEAVY HEAVY DUTY GAS TRUCKS (HHDV) | 0.77 | 0.71 | 14.46 | 0.48 | 0.00 | 0.00 | 0.00 |
| ON-ROAD MOTOR VEHICLES | HEAVY DUTY DIESEL TRUCKS (ALL) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ON-ROAD MOTOR VEHICLES | LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1) | 0.01 | 0.01 | 0.02 | 0.11 | 0.00 | 0.00 | 0.00 |
| ON-ROAD MOTOR VEHICLES | LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV2) | 0.02 | 0.02 | 0.05 | 0.29 | 0.01 | 0.01 | 0.01 |
| ON-ROAD MOTOR VEHICLES | MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV) | 0.13 | 0.11 | 0.68 | 2.99 | 0.10 | 0.11 | 0.11 |
| ON-ROAD MOTOR VEHICLES | HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV) | 0.92 | 0.81 | 3.65 | 14.02 | 0.49 | 0.46 | 0.46 |
| ON-ROAD MOTOR VEHICLES | MOTORCYCLES (MCY) | 0.50 | 0.48 | 2.15 | 0.07 | 0.00 | 0.00 | 0.00 |
| ON-ROAD MOTOR VEHICLES | HEAVY DUTY DIESEL URBAN BUSES (UB) | 0.01 | 0.01 | 0.03 | 0.18 | 0.01 | 0.00 | 0.00 |
| ON-ROAD MOTOR VEHICLES | HEAVY DUTY GAS URBAN BUSES (UB) | 0.03 | 0.03 | 0.73 | 0.06 | 0.00 | 0.00 | 0.00 |
| ON-ROAD MOTOR VEHICLES | SCHOOL BUSES (SB) | 0.04 | 0.03 | 0.77 | 0.12 | 0.00 | 0.00 | 0.00 |
| ON-ROAD MOTOR VEHICLES | MOTOR HOMES (MH) | 0.09 | 0.08 | 1.72 | 0.39 | 0.00 | 0.00 | 0.00 |
| ON-ROAD MOTOR VEHICLES | OTHER (ON-ROAD MOTOR VEHICLES) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| OTHER MOBILE SOURCES | AIRCRAFT | 0.47 | 0.42 | 4.24 | 0.22 | 0.03 | 0.02 | 0.02 |
| OTHER MOBILE SOURCES | TRAINS | 0.20 | 0.18 | 0.51 | 3.31 | 0.05 | 0.07 | 0.07 |
| OTHER MOBILE SOURCES | SHIPS AND COMMERCIAL BOATS | 0.09 | 0.08 | 0.23 | 0.28 | 0.41 | 0.05 | 0.05 |
| OTHER MOBILE SOURCES | RECREATIONAL BOATS | 6.94 | 6.40 | 52.29 | 1.88 | 0.04 | 0.23 | 0.21 |
| OTHER MOBILE SOURCES | OFF-ROAD RECREATIONAL VEHICLES | 0.41 | 0.38 | 2.46 | 0.04 | 0.00 | 0.00 | 0.00 |
| OTHER MOBILE SOURCES | OFF-ROAD EQUIPMENT | 2.21 | 1.94 | 18.82 | 6.42 | 0.66 | 0.42 | 0.42 |
| OTHER MOBILE SOURCES | FARM EQUIPMENT | 1.43 | 1.26 | 8.47 | 9.49 | 1.12 | 0.60 | 0.60 |
| OTHER MOBILE SOURCES | FUEL STORAGE AND HANDLING | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| OTHER MOBILE SOURCES | OTHER (OTHER MOBILE SOURCES) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| NATURAL SOURCES | GEOGENIC SOURCES | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| NATURAL SOURCES | WILDFIRES | 0.02 | 0.01 | 0.07 | 0.00 | 0.00 | 0.01 | 0.01 |
| NATURAL SOURCES | WINDBLOWN DUST | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| NATURAL SOURCES | OTHER (NATURAL SOURCES) | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ALL SOURCES | | 143.36 | 70.47 | 464.89 | 89.10 | 6.52 | 87.72 | 48.06 |
| | PM10 - FUEL COMBUSTION | | | | | | | 2.59 |
| | PM10 - MOBILE SOURCES | | | | | | | 2.65 |
| | PM10 - ALL SOURCES | | | | | | | 48.06 |

## 1998 EMISSION INVENTORY FOR SAN JOAQUIN COUNTY

| CATEGORY | SUBCATEGORY | EMISSIONS (TONS PER DAY) TOG | ROG | CO | NOX | SOX | PM | PM10 |
|---|---|---|---|---|---|---|---|---|
| FUEL COMBUSTION | ELECTRIC UTILITIES | 0.24 | 0.07 | 1.22 | 1.02 | 0.65 | 0.23 | 0.09 |
| FUEL COMBUSTION | COGENERATION | 0.02 | 0.01 | 0.03 | 0.14 | 0 | 0.01 | 0 |
| FUEL COMBUSTION | OIL AND GAS PRODUCTION (COMBUSTION) | 0.16 | 0.03 | 0.06 | 0.17 | 0.17 | 0.02 | 0.01 |
| FUEL COMBUSTION | PETROLEUM REFINING (COMBUSTION) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| FUEL COMBUSTION | MANUFACTURING AND INDUSTRIAL | 0.09 | 0.04 | 1.88 | 8.09 | 0.91 | 0.21 | 0.09 |
| FUEL COMBUSTION | FOOD AND AGRICULTURAL PROCESSING | 0.22 | 0.17 | 1.29 | 3.97 | 0.27 | 0.29 | 0.26 |
| FUEL COMBUSTION | SERVICE AND COMMERCIAL | 0.14 | 0.06 | 0.33 | 1.31 | 0.02 | 0.14 | 0.13 |
| FUEL COMBUSTION | OTHER (FUEL COMBUSTION) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WASTE DISPOSAL | SEWAGE TREATMENT | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WASTE DISPOSAL | LANDFILLS | 0 | 0 | 0 | 0 | 0 | 0.18 | 0 |
| WASTE DISPOSAL | INCINERATORS | 0 | 0 | 0 | 0.01 | 0 | 0 | 0 |
| WASTE DISPOSAL | SOIL REMEDIATION | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WASTE DISPOSAL | OTHER (WASTE DISPOSAL) | 0 | 0 | 0 | 0 | 0 | 0.03 | 0 |
| CLEANING AND SURFACE COATINGS | LAUNDERING | 0.09 | 0 | 0 | 0 | 0 | 0 | 0 |
| CLEANING AND SURFACE COATINGS | DEGREASING | 2.41 | 1.86 | 0 | 0 | 0 | 0 | 0 |
| CLEANING AND SURFACE COATINGS | COATINGS AND RELATED PROCESS SOLVENTS | 4.01 | 3.89 | 0 | 0 | 0 | 0 | 0 |
| CLEANING AND SURFACE COATINGS | PRINTING | 0.28 | 0.28 | 0 | 0 | 0 | 0.05 | 0.04 |
| CLEANING AND SURFACE COATINGS | ADHESIVES AND SEALANTS | 0.24 | 0.21 | 0 | 0 | 0 | 0 | 0 |
| CLEANING AND SURFACE COATINGS | OTHER (CLEANING AND SURFACE COATINGS) | 0.02 | 0.01 | 0 | 0 | 0 | 0 | 0 |
| PETROLEUM PRODUCTION AND MARKETING | OIL AND GAS PRODUCTION | 3.15 | 0.92 | 0 | 0 | 0 | 0 | 0 |
| PETROLEUM PRODUCTION AND MARKETING | PETROLEUM REFINING | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PETROLEUM PRODUCTION AND MARKETING | PETROLEUM MARKETING | 1.04 | 1.03 | 0 | 0 | 0 | 0 | 0 |
| PETROLEUM PRODUCTION AND MARKETING | OTHER (PETROLEUM PRODUCTION AND MARKETING) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| INDUSTRIAL PROCESSES | CHEMICAL | 0.71 | 0.48 | 0 | 0.01 | 0.24 | 2.43 | 1.68 |
| INDUSTRIAL PROCESSES | FOOD AND AGRICULTURE | 1.68 | 1.55 | 0 | 0.01 | 0.01 | 2.07 | 1.09 |
| INDUSTRIAL PROCESSES | MINERAL PROCESSES | 0 | 0 | 0 | 0 | 0.17 | 1.37 | 0.77 |
| INDUSTRIAL PROCESSES | METAL PROCESSES | 0 | 0 | 0.09 | 0.01 | 0.02 | 0 | 0 |
| INDUSTRIAL PROCESSES | WOOD AND PAPER | 0 | 0 | 0 | 0 | 0 | 0.21 | 0.12 |
| INDUSTRIAL PROCESSES | GLASS AND RELATED PRODUCTS | 0.03 | 0.02 | 0.14 | 4.32 | 0.81 | 0.43 | 0.29 |
| INDUSTRIAL PROCESSES | ELECTRONICS | 0.03 | 0.02 | 0 | 0 | 0 | 0 | 0 |
| INDUSTRIAL PROCESSES | OTHER (INDUSTRIAL PROCESSES) | 0.06 | 0.04 | 0 | 0 | 0 | 0.02 | 0.02 |
| SOLVENT EVAPORATION | CONSUMER PRODUCTS | 5.32 | 4.47 | 0 | 0 | 0 | 0 | 0 |
| SOLVENT EVAPORATION | ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS | 2.08 | 2 | 0 | 0 | 0 | 0 | 0 |
| SOLVENT EVAPORATION | PESTICIDES/FERTILIZERS | 2.77 | 2.77 | 0 | 0 | 0 | 0 | 0 |
| SOLVENT EVAPORATION | ASPHALT PAVING / ROOFING | 0.34 | 0.3 | 0 | 0 | 0 | 0 | 0 |
| SOLVENT EVAPORATION | REFRIGERANTS | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SOLVENT EVAPORATION | OTHER (SOLVENT EVAPORATION) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MISCELLANEOUS PROCESSES | RESIDENTIAL FUEL COMBUSTION | 2.16 | 0.95 | 12.11 | 1.22 | 0.06 | 2.03 | 1.9 |
| MISCELLANEOUS PROCESSES | FARMING OPERATIONS | 66.61 | 5.33 | 0 | 0 | 0 | 22.91 | 10.42 |
| MISCELLANEOUS PROCESSES | CONSTRUCTION AND DEMOLITION | 0 | 0 | 0 | 0 | 0 | 6.61 | 3.23 |
| MISCELLANEOUS PROCESSES | PAVED ROAD DUST | 0 | 0 | 0 | 0 | 0 | 20.01 | 9.15 |
| MISCELLANEOUS PROCESSES | UNPAVED ROAD DUST | 0 | 0 | 0 | 0 | 0 | 19.06 | 11.32 |
| MISCELLANEOUS PROCESSES | FUGITIVE WINDBLOWN DUST | 0 | 0 | 0 | 0 | 0 | 4.19 | 1.93 |
| MISCELLANEOUS PROCESSES | FIRES | 0.01 | 0 | 0.06 | 0 | 0 | 0.01 | 0.01 |

## 1998 EMISSION INVENTORY FOR SAN JOAQUIN COUNTY

| CATEGORY | SUBCATEGORY | EMISSIONS (TONS PER DAY) TOG | ROG | CO | NOX | SOX | PM | PM10 |
|---|---|---|---|---|---|---|---|---|
| MISCELLANEOUS PROCESSES | WASTE BURNING AND DISPOSAL | 3.57 | 2.03 | 19.97 | 0.55 | 0 | 3.19 | 3.13 |
| MISCELLANEOUS PROCESSES | UTILITY EQUIPMENT | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| MISCELLANEOUS PROCESSES | COOKING | 0.1 | 0.07 | 0 | 0 | 0 | 0.29 | 0.21 |
| MISCELLANEOUS PROCESSES | OTHER (MISCELLANEOUS PROCESSES) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ON-ROAD MOTOR VEHICLES | LIGHT DUTY PASSENGER (LDA) | 15.03 | 13.9 | 120.06 | 11.54 | 0.11 | 0.35 | 0.34 |
| ON-ROAD MOTOR VEHICLES | LIGHT AND MEDIUM DUTY TRUCKS | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ON-ROAD MOTOR VEHICLES | LIGHT DUTY TRUCKS - 1 (LDT1) | 4.1 | 3.81 | 40.53 | 3.6 | 0.02 | 0.07 | 0.07 |
| ON-ROAD MOTOR VEHICLES | LIGHT DUTY TRUCKS - 2 (LDT2) | 3.44 | 3.11 | 38.4 | 5.64 | 0.04 | 0.22 | 0.21 |
| ON-ROAD MOTOR VEHICLES | MEDIUM DUTY TRUCKS (MDV) | 3.16 | 2.9 | 33.01 | 3.8 | 0.04 | 0.11 | 0.11 |
| ON-ROAD MOTOR VEHICLES | HEAVY DUTY GAS TRUCKS (ALL) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ON-ROAD MOTOR VEHICLES | LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDV1) | 2.2 | 2.05 | 34.18 | 1.89 | 0.01 | 0.01 | 0.01 |
| ON-ROAD MOTOR VEHICLES | LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDV2) | 0.1 | 0.09 | 1.21 | 0.23 | 0 | 0 | 0 |
| ON-ROAD MOTOR VEHICLES | MEDIUM HEAVY DUTY GAS TRUCKS (MHDV) | 1.8 | 1.67 | 32.03 | 1.47 | 0 | 0 | 0 |
| ON-ROAD MOTOR VEHICLES | HEAVY HEAVY DUTY GAS TRUCKS (HHDV) | 0.64 | 0.59 | 12.01 | 0.4 | 0 | 0 | 0 |
| ON-ROAD MOTOR VEHICLES | HEAVY DUTY DIESEL TRUCKS (ALL) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ON-ROAD MOTOR VEHICLES | LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1) | 0.01 | 0.01 | 0.02 | 0.11 | 0 | 0 | 0 |
| ON-ROAD MOTOR VEHICLES | LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV2) | 0.02 | 0.02 | 0.05 | 0.29 | 0.01 | 0.01 | 0.01 |
| ON-ROAD MOTOR VEHICLES | MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV) | 0.12 | 0.11 | 0.65 | 2.84 | 0.09 | 0.1 | 0.1 |
| ON-ROAD MOTOR VEHICLES | HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV) | 0.84 | 0.73 | 3.26 | 13.4 | 0.46 | 0.41 | 0.41 |
| ON-ROAD MOTOR VEHICLES | MOTORCYCLES (MCY) | 0.39 | 0.37 | 1.74 | 0.06 | 0 | 0 | 0 |
| ON-ROAD MOTOR VEHICLES | HEAVY DUTY DIESEL URBAN BUSES (UB) | 0.01 | 0.01 | 0.03 | 0.19 | 0.01 | 0 | 0 |
| ON-ROAD MOTOR VEHICLES | HEAVY DUTY GAS URBAN BUSES (UB) | 0.03 | 0.03 | 0.8 | 0.06 | 0 | 0 | 0 |
| ON-ROAD MOTOR VEHICLES | SCHOOL BUSES (SB) | 0.03 | 0.03 | 0.72 | 0.12 | 0 | 0 | 0 |
| ON-ROAD MOTOR VEHICLES | MOTOR HOMES (MH) | 0.09 | 0.07 | 1.64 | 0.38 | 0 | 0 | 0 |
| ON-ROAD MOTOR VEHICLES | OTHER (ON-ROAD MOTOR VEHICLES) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| OTHER MOBILE SOURCES | AIRCRAFT | 0.48 | 0.43 | 4.38 | 0.22 | 0.03 | 0.02 | 0.02 |
| OTHER MOBILE SOURCES | TRAINS | 0.16 | 0.14 | 0.51 | 3.28 | 0.05 | 0.06 | 0.06 |
| OTHER MOBILE SOURCES | SHIPS AND COMMERCIAL BOATS | 0.08 | 0.07 | 0.23 | 0.28 | 0.41 | 0.05 | 0.05 |
| OTHER MOBILE SOURCES | RECREATIONAL BOATS | 7.09 | 6.54 | 53.16 | 1.9 | 0.04 | 0.23 | 0.21 |
| OTHER MOBILE SOURCES | OFF-ROAD RECREATIONAL VEHICLES | 0.42 | 0.39 | 2.36 | 0.04 | 0 | 0 | 0 |
| OTHER MOBILE SOURCES | OFF-ROAD EQUIPMENT | 2.13 | 1.87 | 18.48 | 6.32 | 0.67 | 0.42 | 0.41 |
| OTHER MOBILE SOURCES | FARM EQUIPMENT | 1.41 | 1.24 | 8.37 | 9.36 | 1.13 | 0.59 | 0.59 |
| OTHER MOBILE SOURCES | FUEL STORAGE AND HANDLING | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| OTHER MOBILE SOURCES | OTHER (OTHER MOBILE SOURCES) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NATURAL SOURCES | GEOGENIC SOURCES | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NATURAL SOURCES | WILDFIRES | 0.01 | 0 | 0.03 | 0 | 0 | 0 | 0 |
| NATURAL SOURCES | WINDBLOWN DUST | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NATURAL SOURCES | OTHER (NATURAL SOURCES) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ALL SOURCES | | 141.37 | 68.79 | 445.04 | 88.25 | 6.45 | 88.64 | 48.49 |

| | |
|---|---|
| PM10 - FUEL COMBUSTION | 2.48 |
| PM10 - MOBILE SOURCES | 2.60 |
| PM10 - ALL SOURCES | 48.49 |