SECTION 3.2

DEGREASING - INDUSTRIAL

(Updated February 1990; Reissued October 1997)

EMISSION INVENTORY SOURCE CATEGORY
Cleaning and Surface Coatings / Degreasing - Industrial

EMISSION INVENTORY CODES (CES CODES) AND DESCRIPTION
220-210-8150-0000 (46813) Manufacturing Degreasing - Petroleum Solvents

220-210-8102-0000 (46821) Manufacturing Degreasing - Synthetic Solvents

220-212-8100-0000 (46839) Maintenance Degreasing - All Solvents

METHODS AND SOURCES

These categories are used to inventory the total organic gas (TOG) emissions resulting from the use of solvents in the degreasing operations in the manufacturing and maintenance industries. ***Manufacturing Degreasing - Petroleum Solvents*** includes TOG emissions from the use of Stoddard solvent, ketones and alcohols in manufacturing. ***Manufacturing Degreasing - Synthetic Solvents*** includes TOG emissions from the use of all halogenated solvents in manufacturing. ***Maintenance Degreasing - All Solvents*** includes TOG emissions from the use of all solvents in the maintenance of oil wells, railroads, and civilian and military aircraft.

Emission estimates for 1983, described below, were updated to 1987 (Tables III, IV and V) by using growth factors ranging from 0.964 to 2.338. These growth factors are based on total dollar output, by county, of manufacturing industries in 1983 and 1987.[1] These growth factors are part of the ARB's Emission Data Forecasting System. This system contains county level data of historical growth factors for the manufacturing industries as developed by Data Resources, Inc.[2]

Emissions from the use of Stoddard Solvent, ketones and alcohols for ***Manufacturing Degreasing - Petroleum Solvents*** were based on the Eureka Laboratories 1978 report titled "Alternatives to Organic Solvent Degreasing."[3] Emission estimates for 1976 were updated to 1983 by using growth factors ranging from 1.010 to 1.349. These growth factors, used for

forecasting by the Emissions Inventory Branch, ARB, are assumed to be representative of the manufacturing industry growth.[4]

The data for all emission estimates for ***Manufacturing Degreasing - Synthetic Solvents*** were based on the Chemical Marketing Reporter[5,6,7,8] and the 1982 SAIC report[9] titled "Development and Improvement of Organic Compound Emission Inventories for California." The Chemical Marketing Reporter provided 1983 estimates of national production of halogenated solvents used in degreasing such as: trichloroethylene; 1,1,1 trichloroethane; perchloroethylene; methylene chloride; and trichlorotrifluoroethane.[9] The SAIC report provided for each halogenated solvent 1980 estimates of California's percent use of U. S. total production for industrial degreasing.

The statewide usage of each halogenated solvent used for degreasing was estimated by multiplying the 1983 national production by California's percent use. The amount recycled or incinerated was determined from 1980 data by SAIC[9] and 1983 data from the Department of Health Services.[10] It was assumed that the quantity of solvent produced minus the fraction recycled or incinerated is the quantity emitted into the ambient air. Emissions were estimated for each of the halogenated solvents, and are summarized in Table I. The economic index from the Bureau of Economic Analysis[11] (BEA) was used to distribute the emissions to California districts. These BEA district emissions were further distributed to counties based on population.

For ***Maintenance Degreasing - All Solvents***, the base data used were the 1976 estimates from the Eureka Laboratories report,[3] allocated to counties based on 1976, and grown to 1983 using emission forecast data. It was assumed that growth factors used for forecasting by the ARB's Emissions Inventory Branch, are representative of the maintenance industry growth. Growth factors ranged from 1.010 to 1.736, depending upon the growth in manufacturing in a given county.[4] The 1976 data taken from the Eureka Laboratory report[3] were updated to 1983 using these growth factors.

The Air Pollution Control Districts report degreasing solvent usage and emissions as a point source if a plant or facility emits more than 25 tons per year of any pollutant. The emissions in the point source inventory are subtracted from the updated emissions for these categories and the difference is reported as area source emissions.

ASSUMPTIONS

1. The data from the Chemical Marketing Reporter and the SAIC study are reasonable bases for estimating usage of synthetic degreasing solvents in the manufacturing industries.

2. The data from the Department of Health Services and the SAIC study account for the fraction of halogenated solvents being recycled or incinerated.

3. The method of distributing the synthetic degreasing emissions to districts by using the BEA index and then further distributing to counties by population for the manufacturing industry is valid.

4. The Eureka Laboratory study accounted for all degreasing emissions in the non-synthetic manufacturing degreasing and maintenance industries.

5. The annual growth factor of 1.0329 is representative of the growth of the manufacturing industries.[11]

6. The growth of the maintenance industry from 1976 to 1983 is represented by the ARB's forecasting growth factors based on the increase of manufacturing in each county.

COMMENTS AND RECOMMENDATIONS

The Chemical Marketing Reporter and the SAIC study were the best sources of data found on the amounts of halogenated solvents used in California for the manufacturing and maintenance industries. More accurate data may be obtained through a survey of users of degreasing solvents in a county or district. Where such data are available, they will be evaluated for incorporation into the inventory.

TEMPORAL ACTIVITY

The annual activity is uniform throughout the year. The weekly activity is uniform on weekdays, with minimal activity on weekends. Most daily activity occurs during daylight working hours (7:00 a.m. to 6:00 p.m.).

TABLE I

Amounts Available, Recycled, and Emitted of
Halogenated Solvents used for Manufacturing Degreasing in California, 1983

Chemical	Amount Available[a] (TPY)	Amount Recycled or Incinerated[b] (TPY)	Amount Emitted[c] (TPY)
Perchloroethylene	6.07×10^3 [d]	1.03×10^3	5.04×10^3
1,1,1 Trichloroethane	2.43×10^4 [e]	4.68×10^3	1.96×10^4
Trichloroethylene	1.09×10^3 [f]	7.64×10^1	1.01×10^3
Methylene Chloride	6.49×10^3 [g]	1.17×10^3	5.32×10^3
Trichlorotrifluoroethane	8.35×10^3 [e]	1.00×10^3	7.35×10^3
Total (TPY)			3.83×10^4

a) Rogozen, M.B., et al., Development and Improvement of Organic Compound Emission Inventories for California, Draft Final Report, Science Applications, Inc. for CARB Sacramento, CA contract no. A0-101-32 (1983).

b) Radimsky, J., et al, Recycling and/or Treatment Capacity for Hazardous Wastes Containing Halogenated Organic Compounds, Draft Final Report, Department of Health Services, Toxic Substances Control Division, Alternative Technology & Policy Development Section (1984).

c) Rogozen, M.B., et al., Development and Improvement of Organic Compound Emission Inventories for California, Draft Final Report, Science Applications, Inc. for CARB Sacramento, CA, contract no. A0-101-32 (1982).

d) Chemical Marketing Reporter, "Chemical Profile-Perchloroethylene," 223(11):54 (1983).

e) Chemical Marketing Reporter, "Chemical Profile-1,1,1 Trichloroethane," 223(12) (1983).

f) Chemical Marketing Reporter, "Chemical Profile-Trichloroethylene," 223(7):58 (1983).

g) Chemical Marketing Reporter, "Chemical Profile-Methylene Chloride," 223(8) (1983).

SAMPLE CALCULATIONS FOR *MANUFACTURING DEGREASING - PETROLEUM SOLVENTS*

1) Using a growth factor from 1976 to 1983 for Alameda County, the emission estimate from manufacturing degreasing - petroleum solvents is calculated as follows:

(Alameda County Emissions in 1983) = (Emissions from the 1976 data on non-synthetic manufacturing degreasing solvents in Alameda County) x (Growth Factor)

= (132.31 tons of solvent consumed in 1976) x (1.089)

= 144.09 tons of solvent consumed in 1983

SAMPLE CALCULATIONS FOR *MANUFACTURING DEGREASING - SYNTHETIC SOLVENTS*

The following calculations show the procedure of estimating perchloroethylene (perc) emissions in California and Contra Costa County.

1) Estimate Availability of perchloroethylene in California

The 1983 California availability of perchloroethylene is 8.59 percent of the national production value (see Table II). The percent availability of perchloroethylene in California is calculated as follows:

(1983 CA (%) use of U.S. total production for each process) x (National % use for for each process) x (100%) = (CA % availability of Perc for each process)

Example: Using dry cleaning process

(9.6%) x (63.4%) x (100%) = 6.086%

Repeat this estimation procedure for each process utilizing perc, then total the percent availability for all processes equivalent to 8.59% as shown in Table II.

TABLE II

Estimate of 1983 Perchloroethylene Availability in California

Process	CA Use Fraction (%) of U.S. Production	National Use Fraction (%) of U.S. Total Production	California % Availability
Dry Cleaning	9.6	63.4	6.086
Metal Cleaning	12.5	17.9	2.238
Miscellaneous	8.0	0.7	0.056
Grain Fumigant	5.8	3.6	0.209
Other (including Chemical Intermed.)	0.0	14.4	0.000
Total		100.0	8.589

The total amount of perchloroethylene available in California in 1983 is calculated by multiplying the national perc production by California's total percent availability. Data from the Chemical Marketing Reporter showed that in 1983, 679×10^6 lbs of perc were produced. Therefore, the total available amount of perc in California is equal to:

(National production of perc) x (% California availability) = (Total amount of perc available for California)

$$679 \times 10^6 \text{ lbs} \times 8.59\% / 2000 \text{ lbs/ton} = 2.92\% \times 10^4 \text{ TPY}$$

2) Estimate Amount Recycled & Incinerated

Two sources of data were used in estimating the amount of halogenated solvents recycled or incinerated. These are: 1) 1983 data from the Department of Health Services[10] and 2) 1980 data from the SAIC report.[9]

The estimated fraction of each halogenated solvent recycled or incinerated is calculated as follows:

Chemical	CA Availability (TPY)	Direct Industrial Solvent Use (%)*	Amount used in CA (TPY)
Perchloroethylene	2.92×10^4	81.3	2.37×10^4
1,1,1 Trichloroethane	3.44×10^4	70.6	2.43×10^4
Trichloroethylene	1.23×10^3	88.7	1.09×10^3
Methylene Chloride	2.95×10^4	22.0	6.49×10^3
Trichlorotrifluoroethane	9.60×10^3	90.0	8.64×10^3
Ethylene Dichloride (EDC)	1.24×10^2	100.0	1.24×10^2
Total			6.43×10^4

* Abstracted from SAIC report.

The Department of Health Services[10] estimated that about 2.18×10^4 tons of halogenated solvents were either recycled or incinerated in California in 1983. This value contained 45.8% oil and other compounds. The estimate of the quantity of halogenated solvents recycled or incinerated is corrected for impurities by multiplying 2.18×10^4 tons by 54.2%.

$$2.18 \times 10^4 \text{ TPY} \times 54.2\% = 1.18 \times 10^4 \text{ TPY}$$

Then the average amount of halogenated solvents recycled or incinerated for 1983 is calculated as follows:

$$\frac{1.18 \times 10^4 \text{ tons}}{6.43 \times 10^4 \text{ tons}} \times 100 = 18.0\%$$

SAIC[9] reported the following amounts of halogenated solvents recycled in California in 1980.

Chemical	Amount Used in CA (1000 lb)	Recycled Amt. (1000 lb)	% Recycled
Perchloroethylene	13,838	1,797	13.0
1,1,1 Trichloroethane	41,634	6,323	15.2
Trichloroethylene	1,193	28	2.35
Methylene Chloride	35,739	5,074	14.2
Trichlorotrifluoroethane	7,550		

Based on SAIC data on the amount of halogenated solvents recycled in 1980 and the average of 18.0% recycled or incinerated in 1983, the following estimates of percent recycled were made for each halogenated compound.

Chemical	SAIC 1980 % recycled	% of average value	1983 average % recycled or incinerated	1983 % recycled or incinerated
Perchloroethylene	13.0	92.0	18.0	17
1,1,1 Trichloro-ethane	15.2	107.6	18.0	19
Methylene Chloride	14.2	100.5	18.0	18
Average	14.13			

Dividing the sum of “SAIC 1980 % recycled” by three gives an average percent recycled of 14.13. Each 1980 SAIC percent recycle value is divided by the average, 14.13, and the result is placed in the column titled "% of Average Value." This new average value percentage is multiplied by the 1983 average percent recycled or incinerated value of 18.0 and the final result is found in the column titled "1983 % recycled or incinerated."

3) Calculate Emissions

a) The calculation of the amount of perchloroethylene availability in California follows:

(National Production of perc) x (California % Availability) = (Amount of perc Availability in CA)

$\frac{(679 \times 10^6 \text{ lbs})}{(2000 \text{ lbs/ton})} \times (8.59\%) = 2.92 \times 10^4 \text{ tons}$

The amount of perchloroethylene available for degreasing is calculated as follows:

(Amount of perc Available in CA) x (% Used for Manufacturing Degreasing) = (Amount Available in CA for Degreasing)

$(2.92 \times 10^4 \text{ tons}) \times (20.78\%) = 6.07 \times 10^3 \text{ tons}$

b) The amount of perchloroethylene recycled or incinerated

(Amount Available in CA for Degreasing) x (1983 % Recycled or Incinerated) = (1983 Recycled) or Incinerated)

$(6.07 \times 10^3 \text{ tons}) \times (17\%) = 1.03 \times 10^3 \text{ tons recycled or incinerated}$

c) The amount recycled or incinerated is subtracted from the total amount of perc available in California for degreasing and the result is the total amount emitted for degreasing in California.

(Amount Available) - (Amount Recycled or Incinerated) = (Total Amount Emitted for Degreasing)

$(6.07 \times 10^3 \text{ TPY}) - (1.03 \times 10^3 \text{ TPY}) = 5.04 \times 10^3 \text{ TPY}$

Table I shows the emission estimates for the halogenated solvents. The total emissions for California are 3.83×10^4 tons per year. These emissions are distributed to districts using BEA economic index and then distributed to counties by population.

4) Distribute emissions into District 176 using economic data.

The index from the BEA economic area is compared with the 1983 index for the state and the district BEA index. District 176 includes Mendocino, Vallejo, Fairfield, Napa, Santa Rosa, Bay Area, Salinas, San Benito, Seaside, and Monterey.

BEA Economic Area Index

	1978	1985	1983 Interpolated	% of CA Index
District 176	3,988,757	5,368,657	4,974,400	25.93%

By interpolation, we can estimate the 1983 District 176 index.

$$\frac{5{,}368{,}657 \quad 1985}{4{,}974{,}400 \quad 1983} = \frac{3{,}988{,}757 \quad 1978}{x}$$

$$x = (5/7)\,(1{,}379{,}900) + (3{,}988{,}757)$$

$$x = 4{,}974{,}400$$

The total California index is 19,181,841. The BEA District 176 percent of the California index is calculated by:

$$\frac{4{,}974{,}400}{19{,}181{,}841} = 25.93\% \text{ of the total CA index for 1983}$$

The 1983 manufacturing degreasing emissions for California are 38,300 TPY; therefore, 25.93% of the statewide emissions is for District 176.

25.93% x 38,300 TPY = 9,931.0 TPY

The emissions value for District 176 is distributed into the counties based on population. Contra Costa County contains 11.32% of the population in District 176; therefore,

11.32% x 9,931.0 TPY = 1,124.0 TPY.

The total emissions for Contra Costa County for synthetic solvent degreasing operations in 1983 are 1,124.0 tons.

SAMPLE CALCULATIONS FOR *MAINTENANCE DEGREASING - ALL SOLVENTS*

Using a growth factor from 1976 to 1983 for Fresno County, the emission estimate from maintenance degreasing solvents usage is calculated as follows:

(Fresno County Emissions in 1983) = (Emissions from the 1976 data on maintenance degreasing in Fresno County) x (Growth Factor)

= (127.80 tons of solvent consumed in 1976) x (1.281)

= 163.71 tons of solvent consumed in 1983

REFERENCES

1. Air Resources Board, Technical Support Division, Emission Inventory Branch, Projections and Gridding Section. Growth Scenario TND85, Control Scenario CS1985 (February 23, 1990).

2. Data Resources Inc. TREND25 DATA. CARB contract # A3-137-32 (August 1988).

3. Leung, Steve, et al, Alternatives to Organic Solvent Degreasing, Eureka Laboratories, Inc. (May 1978). (ARB A6-206-30).

4. Air Resources Board, Technical Support Division, Emission Inventory Branch Forecasting Section. Growth Scenario 4, Control Scenario 4. (June 13, 1986).

5. Chemical Marketing Reporter, "Chemical Profile - Perchloroethylene" 223(11):54 (1983).

6. Chemical Marketing Reporter, "Chemical Profile - 1,1,1-Trichloroethane" 223(12) (1983).

7. Chemical Marketing Reporter, "Chemical Profile - Trichloroethylene" 223(7):58 (1983).

8. Chemical Marketing Reporter, "Chemical Profile - Methylene Chloride" 223(8) (1983).

9. Rogozen. M.B., et al, Development and Improvement of Organic Compound Emission Inventories for California, Draft Final Report, Science Applications International Corporation for CARB Sacramento, CA contract no. A0-101-32 (1982).

10. Radimsky, J., et al., Recycling and/or Treatment Capacity for Hazardous Wastes Containing Halogenated Organic Compounds, Draft Final Report, Department Health Services, Toxic Substances Control Division, Alternative Technology & Policy Development Section (1984).

11. Bureau of Economic Analysis, U.S. Department of Commerce, Population, Personal Income, and Earnings, by State, Projections to 2000 (October 1977).

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Table III
1987 Area Source Emissions
Activity: Manufacturing & Industrial
Process: Degreasing
Entrainment: Non Synthetic-Evap
Dimn: Stoddard
CES: 46813
Process Rate Unit: Tons of Solvent Consumed

AB	County	Process Rate	TOG Emis. (Tons / Year)	CO Emis. (Tons / Year)	NOX Emis. (Tons / Year)	SOX Emis. (Tons / Year)	PM Emis. (Tons / Year)
GBV	ALPINE	0	0.00	0.00	0.00	0.00	0.00
	INYO	0	0.00	0.00	0.00	0.00	0.00
	MONO	0	0.00	0.00	0.00	0.00	0.00
LC	LAKE	0	0.00	0.00	0.00	0.00	0.00
LT	EL DORADO	0	0.00	0.00	0.00	0.00	0.00
	PLACER	0	0.00	0.00	0.00	0.00	0.00
MC	AMADOR	0	0.00	0.00	0.00	0.00	0.00
	CALAVERAS	0	0.00	0.00	0.00	0.00	0.00
	EL DORADO	39	0.00	0.00	0.00	0.00	0.00
	MARIPOSA	0	0.00	0.00	0.00	0.00	0.00
	NEVADA	0	0.00	0.00	0.00	0.00	0.00
	PLACER	0	0.00	0.00	0.00	0.00	0.00
	PLUMAS	0	0.00	0.00	0.00	0.00	0.00
	SIERRA	0	0.00	0.00	0.00	0.00	0.00
	TUOLUMNE	0	0.00	0.00	0.00	0.00	0.00
NC	DEL NORTE	0	0.00	0.00	0.00	0.00	0.00
	HUMBOLDT	0	0.00	0.00	0.00	0.00	0.00
	MENDOCINO	0	0.00	0.00	0.00	0.00	0.00
	SONOMA	0	0.00	0.00	0.00	0.00	0.00
	TRINITY	0	0.00	0.00	0.00	0.00	0.00
NCC	MONTEREY	0	0.00	0.00	0.00	0.00	0.00
	SAN BENITO	0	0.00	0.00	0.00	0.00	0.00
	SANTA CRUZ	0	0.00	0.00	0.00	0.00	0.00
NEP	LASSEN	0	0.00	0.00	0.00	0.00	0.00
	MODOC	0	0.00	0.00	0.00	0.00	0.00
	SISKIYOU	0	0.00	0.00	0.00	0.00	0.00
SC	LOS ANGELES	1834	1834.08	0.00	0.00	0.00	0.00
	ORANGE	446	445.58	0.00	0.00	0.00	0.00
	RIVERSIDE	25	24.63	0.00	0.00	0.00	0.00
	SAN BERNARDINO	62	62.12	0.00	0.00	0.00	0.00
SCC	SAN LUIS OBISPO	0	0.00	0.00	0.00	0.00	0.00
	SANTA BARBARA	33	33.25	0.00	0.00	0.00	0.00
	VENTURA	55	54.56	0.00	0.00	0.00	0.00
SD	SAN DIEGO	97	97.42	0.00	0.00	0.00	0.00
SED	IMPERIAL	0	0.00	0.00	0.00	0.00	0.00
	KERN	12	12.76	0.00	0.00	0.00	0.00
SF	ALAMEDA	185	184.87	0.00	0.00	0.00	0.00
	CONTRA COSTA	13	13.15	0.00	0.00	0.00	0.00
	MARIN	5	4.84	0.00	0.00	0.00	0.00
	NAPA	0	0.00	0.00	0.00	0.00	0.00
	SAN FRANCISCO	34	33.52	0.00	0.00	0.00	0.00
	SAN MATEO	152	152.03	0.00	0.00	0.00	0.00
	SANTA CLARA	202	202.34	0.00	0.00	0.00	0.00
	SOLANO	0	0.00	0.00	0.00	0.00	0.00
	SONOMA	0	0.00	0.00	0.00	0.00	0.00
SJV	FRESNO	41	40.66	0.00	0.00	0.00	0.00
	KERN	10	10.01	0.00	0.00	0.00	0.00
	KINGS	0	0.00	0.00	0.00	0.00	0.00
	MADERA	0	0.00	0.00	0.00	0.00	0.00
	MERCED	0	0.00	0.00	0.00	0.00	0.00
	SAN JOAQUIN	10	10.02	0.00	0.00	0.00	0.00
	STANISLAUS	0	0.00	0.00	0.00	0.00	0.00
	TULARE	6	5.75	0.00	0.00	0.00	0.00
SV	BUTTE	0	0.00	0.00	0.00	0.00	0.00
	COLUSA	0	0.00	0.00	0.00	0.00	0.00
	GLENN	0	0.00	0.00	0.00	0.00	0.00
	PLACER	0	0.00	0.00	0.00	0.00	0.00
	SACRAMENTO	0	0.00	0.00	0.00	0.00	0.00
	SHASTA	0	0.00	0.00	0.00	0.00	0.00
	SOLANO	0	0.00	0.00	0.00	0.00	0.00
	SUTTER	0	0.00	0.00	0.00	0.00	0.00
	TEHAMA	0	0.00	0.00	0.00	0.00	0.00
	YOLO	0	0.00	0.00	0.00	0.00	0.00
	YUBA	0	0.00	0.00	0.00	0.00	0.00
TOTAL		3261	3221.59	0.00	0.00	0.00	0.00

Fraction of Reactive Organic Gases (FROG): 1.0000
(Reactive Organic Gases (ROG) Emissions = TOG X FROG)
Fraction of PM10 (FRPM10): .9600
(PM10 Emissions = PM X FRPM10)

Table IV
1987 Area Source Emissions
Activity: Manufacturing & Industrial
Process: Degreasing
Entrainment: Synthetic-Evap
Dimn: Manufacturing
CES: 46821
Process Rate Unit: Tons of Solvent Consumed

AB	County	Process Rate	TOG Emis. (Tons / Year)	CO Emis. (Tons / Year)	NOX Emis. (Tons / Year)	SOX Emis. (Tons / Year)	PM Emis. (Tons / Year)
GBV	ALPINE	1	0.60	0.00	0.00	0.00	0.00
	INYO	38	38.45	0.00	0.00	0.00	0.00
	MONO	28	29.03	0.00	0.00	0.00	0.00
LC	LAKE	84	83.82	0.00	0.00	0.00	0.00
LT	EL DORADO	12	13.16	0.00	0.00	0.00	0.00
	PLACER	6	6.07	0.00	0.00	0.00	0.00
MC	AMADOR	13	13.10	0.00	0.00	0.00	0.00
	CALAVERAS	15	15.72	0.00	0.00	0.00	0.00
	EL DORADO	30	30.47	0.00	0.00	0.00	0.00
	MARIPOSA	6	6.76	0.00	0.00	0.00	0.00
	NEVADA	32	33.22	0.00	0.00	0.00	0.00
	PLACER	10	9.54	0.00	0.00	0.00	0.00
	PLUMAS	27	28.04	0.00	0.00	0.00	0.00
	SIERRA	1	1.53	0.00	0.00	0.00	0.00
	TUOLUMNE	23	23.78	0.00	0.00	0.00	0.00
NC	DEL NORTE	45	45.86	0.00	0.00	0.00	0.00
	HUMBOLDT	277	276.76	0.00	0.00	0.00	0.00
	MENDOCINO	142	143.04	0.00	0.00	0.00	0.00
	SONOMA	107	107.94	0.00	0.00	0.00	0.00
	TRINITY	33	34.11	0.00	0.00	0.00	0.00
NCC	MONTEREY	560	559.50	0.00	0.00	0.00	0.00
	SAN BENITO	50	50.54	0.00	0.00	0.00	0.00
	SANTA CRUZ	488	488.48	0.00	0.00	0.00	0.00
NEP	LASSEN	34	33.75	0.00	0.00	0.00	0.00
	MODOC	13	13.98	0.00	0.00	0.00	0.00
	SISKIYOU	63	62.42	0.00	0.00	0.00	0.00
SC	LOS ANGELES	17792	17791.80	0.00	0.00	0.00	0.00
	ORANGE	6033	6032.75	0.00	0.00	0.00	0.00
	RIVERSIDE	362	361.83	0.00	0.00	0.00	0.00
	SAN BERNARDINO	1877	1876.80	0.00	0.00	0.00	0.00
SCC	SAN LUIS OBISPO	416	416.27	0.00	0.00	0.00	0.00
	SANTA BARBARA	709	708.72	0.00	0.00	0.00	0.00
	VENTURA	1550	1550.38	0.00	0.00	0.00	0.00
SD	SAN DIEGO	2673	2672.63	0.00	0.00	0.00	0.00
SED	IMPERIAL	109	108.77	0.00	0.00	0.00	0.00
	KERN	39	39.34	0.00	0.00	0.00	0.00
	LOS ANGELES	493	439.43	0.00	0.00	0.00	0.00
	RIVERSIDE	140	139.80	0.00	0.00	0.00	0.00
	SAN BERNARDINO	447	447.13	0.00	0.00	0.00	0.00
SF	ALAMEDA	2448	2448.44	0.00	0.00	0.00	0.00
	CONTRA COSTA	1253	1272.58	0.00	0.00	0.00	0.00
	MARIN	455	454.99	0.00	0.00	0.00	0.00
	NAPA	184	184.24	0.00	0.00	0.00	0.00
	SAN FRANCISCO	1239	1239.43	0.00	0.00	0.00	0.00
	SAN MATEO	332	116.43	0.00	0.00	0.00	0.00
	SANTA CLARA	4070	4069.54	0.00	0.00	0.00	0.00
	SOLANO	308	308.40	0.00	0.00	0.00	0.00
	SONOMA	538	537.81	0.00	0.00	0.00	0.00
SJV	FRESNO	358	358.39	0.00	0.00	0.00	0.00
	KERN	2	2.47	0.00	0.00	0.00	0.00
	KINGS	51	52.06	0.00	0.00	0.00	0.00
	MADERA	50	50.75	0.00	0.00	0.00	0.00
	MERCED	79	80.24	0.00	0.00	0.00	0.00
	SAN JOAQUIN	207	207.47	0.00	0.00	0.00	0.00
	STANISLAUS	174	174.34	0.00	0.00	0.00	0.00
	TULARE	186	186.56	0.00	0.00	0.00	0.00
SV	BUTTE	74	74.05	0.00	0.00	0.00	0.00
	COLUSA	5	5.57	0.00	0.00	0.00	0.00
	GLENN	9	9.83	0.00	0.00	0.00	0.00
	PLACER	71	71.79	0.00	0.00	0.00	0.00
	SACRAMENTO	365	365.17	0.00	0.00	0.00	0.00
	SHASTA	183	183.72	0.00	0.00	0.00	0.00
	SOLANO	111	112.10	0.00	0.00	0.00	0.00
	SUTTER	22	22.37	0.00	0.00	0.00	0.00
	TEHAMA	56	56.49	0.00	0.00	0.00	0.00
	YOLO	53	53.49	0.00	0.00	0.00	0.00
	YUBA	19	19.57	0.00	0.00	0.00	0.00
TOTAL		47680	47453.61	0.00	0.00	0.00	0.00

Fraction of Reactive Organic Gases (FROG): .2500
(Reactive Organic Gases (ROG) Emissions = TOG X FROG)
Fraction of PM10 (FRPM10): .9600
(PM10 Emissions = PM X FRPM10)

Table V
1987 Area Source Emissions
Activity: Manufacturing & Industrial
Process: Degreasing
Entrainment: Solvent - Evap
Dimn: Maintenance
CES: 46839
Process Rate Unit: Tons of Solvent Consumed

AB	County	Process Rate	TOG Emis. (Tons / Year)	CO Emis. (Tons / Year)	NOX Emis. (Tons / Year)	SOX Emis. (Tons / Year)	PM Emis. (Tons / Year)
NCC	MONTEREY	70	70.76	0.00	0.00	0.00	0.00
SC	LOS ANGELES	433	407.73	0.00	0.00	0.00	0.00
	ORANGE	252	237.34	0.00	0.00	0.00	0.00
	VENTURA	242	242.07	0.00	0.00	0.00	0.00
SCC	SAN LUIS OBISPO	15	15.94	0.00	0.00	0.00	0.00
	SANTA BARBARA	118	118.78	0.00	0.00	0.00	0.00
SD	SAN DIEGO	243	243.00	0.00	0.00	0.00	0.00
SED	KERN	272	271.75	0.00	0.00	0.00	0.00
	LOS ANGELES	10	9.80	0.00	0.00	0.00	0.00
SF	ALAMEDA	55	55.11	0.00	0.00	0.00	0.00
	CONTRA COSTA	11	10.95	0.00	0.00	0.00	0.00
	MARIN	4	4.38	0.00	0.00	0.00	0.00
	NAPA	2	1.46	0.00	0.00	0.00	0.00
	SAN FRANCISCO	12	12.04	0.00	0.00	0.00	0.00
	SAN MATEO	22	21.90	0.00	0.00	0.00	0.00
	SANTA CLARA	50	49.64	0.00	0.00	0.00	0.00
	SOLANO	3	2.92	0.00	0.00	0.00	0.00
	SONOMA	5	4.74	0.00	0.00	0.00	0.00
SJV	FRESNO	178	177.94	0.00	0.00	0.00	0.00
	KERN	1416	1416.11	0.00	0.00	0.00	0.00
	KINGS	10	10.63	0.00	0.00	0.00	0.00
SV	SACRAMENTO	669	669.63	0.00	0.00	0.00	0.00
TOTAL		4092	4054.62	0.00	0.00	0.00	0.00

Fraction of Reactive Organic Gases (FROG): .6000
(Reactive Organic Gases (ROG) Emissions = TOG X FROG)
Fraction of PM10 (FRPM10): .9600
(PM10 Emissions = PM X FRPM10)