

## SECTION 6.2

### SOLVENT USE - AEROSOL CONSUMER PRODUCTS

*(Updated May 1989)*

<b>EMISSION INVENTORY SOURCE CATEGORY</b>
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Solvent Evaporation / Consumer Products
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<b>EMISSION INVENTORY CODES (CES CODES) AND DESCRIPTION</b>
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<b>510-510-8000-0000 (83196)</b> Aerosol Propellants
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<b>510-512-8000-0000 (83204)</b> Aerosol Solvents
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#### METHODS AND SOURCES

These categories are used to inventory the total organic gas (TOG) emissions from the use of propellants and solvents in aerosol consumer products including paints and finishes, household products, personal products, automotive products, animal products, and food products. These products may be used in residential, institutional, and commercial establishments. Some major aerosol consumer products include paints and primers, room deodorants, oven cleaners, glass cleaners, laundry products, waxes and polishes, hair care products, antiperspirants and deodorants, automotive refrigerants, engine degreasers, automotive lubricants and sealants, and carburetor and choke cleaners.

The term solvent is used in this document to specify organic compounds that are contained in the ingredients of a consumer product and that give rise to organic gas emissions.

The total organic gas emissions from the propellants contained in these aerosol products are inventoried under CES 83196, while the total organic gas emissions from the solvents contained in these products are inventoried under CES 83204. Solvent emissions from aerosol consumer product pesticides are not included in these categories, but are inventoried under CES 83238 and 83246; emissions from non-aerosol consumer product pesticides will be inventoried under CES 83253 when data are available to estimate emissions. Solvent emissions from all other non-aerosol consumer products are inventoried separately under CES 83089.

Propellant and solvent emissions from aerosol consumer products were calculated for 1983 and grown to 1987 using national production data, based on the following methodology. Nationwide totals for the number of aerosol product units filled in 1983 were reported by the Chemical Specialties Manufacturers Association (CSMA).<sup>1</sup> The CSMA surveyed its member companies and estimated the number of aerosol cans for each product type filled by its

members in 1983. The adjusted values reported by the CSMA as "estimated totals" were taken to best represent 1983 U.S. totals. It was assumed that the number of units filled or distributed was equal to the number of units sold and that usage was proportional to population. The California portion of the nationwide estimate of aerosol usage was based on population distribution, with the California population estimated to be 10.8 percent of the U.S. population in 1983.<sup>2,3</sup>

Data published in 1981 by the Western Aerosol Information Bureau (WAIB)<sup>4</sup> were used for the average size of product unit for each subcategory and for the percent by weight of each product unit that is propellant volatile organic compound (VOC) or solvent VOC. Because the WAIB<sup>4</sup> is the only available source of data on fractions of propellant vs. solvent in these products, ARB staff has assumed that WAIB VOC fractions can be used to estimate total organic gas (TOG) emissions. For these aerosol products, the difference between volatile organic compounds and the compounds comprising total organic gases is assumed to be negligible.

The amount of propellant VOC contained in a given aerosol product was calculated by multiplying the product unit weight by the number of units filled and by the concentration (weight percent) of propellant VOC in the product. Most of these propellants are non-synthetic LPGs such as propane, butane and isobutane. Synthetic propellants such as chlorofluorocarbons were not used significantly as propellants in 1983 except in small quantities in pharmaceuticals.

The amount of solvent VOC was calculated by multiplying the product unit weight by the number of units filled and by the concentration of solvent VOC in the product. A sample calculation follows.

Sample Calculation for Aerosol Room Deodorants and Disinfectants:

$$\begin{aligned}
 \text{(A) CSMA estimated total units for room deod/} & \text{CSMA estimated total units} & \text{CSMA reported} \\
 \text{disinf. in U.S.} & \text{for Household Products} & \text{total units for} \\
 & \text{CSMA reported total units} & \text{room deod/disinf.} \\
 & \text{for Household Products} & \\
 & = \frac{586,032,000 \text{ units}}{489,108,000 \text{ units}} & \times 122,429,000 \text{ units} \\
 & = 146,690,000 \text{ units in U.S.} &
 \end{aligned}$$

$$\begin{aligned}
 \text{(B) Tons of Product used in Calif. in 1983} & \\
 & = (\text{CSMA estimated total units in U.S.}) (\text{Ratio of 1983 CA} \\
 & \text{population to U.S. population}) (\text{Avg. oz/unit}) (1 \text{ lb}/16 \text{ oz}) \\
 & (1 \text{ ton}/2,000 \text{ lb})
 \end{aligned}$$

$$= (146,690,000 \text{ units}) (0.108) (8 \text{ oz/unit}) (1 \text{ lb}/16 \text{ oz}) \\ (1 \text{ ton}/2,000 \text{ lb})$$

$$= 3,961 \text{ tons of product used in 1983}$$

$$(C) \text{ Tons propellant VOC} = (\text{Tons product used}) (\text{WAIB \% propellant VOC}/100)$$

$$= (3,961 \text{ tons}) (0.15)$$

$$= 594 \text{ tons propellant VOC}$$

$$(D) \text{ Tons solvent VOC} = (\text{Tons product used}) (\text{WAIB \% solvent VOC}/100)$$

$$= (3,961 \text{ tons}) (0.60)$$

$$= 2,376 \text{ tons solvent VOC}$$

Table I contains detailed usage estimates for 1983 calculated for the propellant and solvent compounds in the aerosol product groupings listed by the CSMA.<sup>1</sup> It was assumed that all of the propellant and solvent VOCs contained in the can are eventually used and emitted into the atmosphere. Usage estimates of tons of propellant and solvent VOCs used in these aerosol products are assumed to be equivalent to tons of total organic gas (TOG) emitted. As previously mentioned, these estimates are grown to 1987 using CSMA national data cited in Chemical and Engineering News.<sup>5</sup>

The notes for Table I further explain the basic methodology used for estimating usage and emissions and indicate exceptions to the general methodology where applicable. A discussion of specific exceptions follows.

Aerosol antiperspirants and deodorants. Emission estimates for 1985 were provided by the Stationary Source Division, ARB.<sup>6</sup> SSD obtained nationwide totals on the number of aerosol product units filled from CSMA; these data were apportioned to California on the basis of population. SSD also obtained data on average unit size from WAIB, market share data for antiperspirants and deodorants, and weight percents of volatile organic gases (refer to the notes to Table I). Based on these data, SSD staff estimated 1985 emissions to be: aerosol antiperspirants: 1,619 tons propellant and 367 tons solvent; aerosol deodorants: 161.9 tons propellant and 375.1 tons solvent.

The change in production of personal care products from 1985 to 1987, reported by CSMA and cited in Chemical and Engineering News,<sup>5</sup> is used to grow 1985 emissions to 1987.

Automotive refrigerants. The WAIB<sup>4</sup> provides no data on this aerosol product category. ARB staff used the number of units filled as reported by the CSMA,<sup>1</sup> and assumed an average unit

size of 10 ounces and a composition of 100 percent solvent VOC. Total organic gas emissions from aerosol automotive refrigerants for California for 1983 are estimated to be 1,442 tons solvent.

The change in production of automotive and industrial products from 1983 to 1987, reported by CSMA and cited in Chemical and Engineering News,<sup>5</sup> is used to grow 1983 emissions to 1987.

Brake cleaner. The CSMA<sup>1</sup> did not report number of units filled for brake cleaner. ARB staff therefore used 1981 WAIB<sup>4</sup> data on aerosol units filled to calculate the fraction that brake cleaner units represent of the automotive subgroup. This fraction was applied to the estimated total for the CSMA<sup>1</sup> automotive subgroup and apportioned to the remaining automotive products accordingly. (The footnotes for Table I give further detail.) Total organic gas emissions for California from aerosol brake cleaner for 1983 are estimated to be 37 tons propellant and 332 tons solvent.

The change in production of automotive and industrial products from 1983 to 1987, reported by CSMA and cited in Chemical and Engineering News,<sup>5</sup> is used to grow 1983 emissions to 1987.

#### Summary of Solvent Usage and Countywide Emissions

The statewide process rate and emissions are apportioned to the counties based on relative population in 1987. The countywide process rates and total organic gas emissions (tons/year) for aerosol consumer products are reported in Tables II and III.

Total organic gas emissions in California from aerosol consumer products are estimated to be 13,628 tons of propellants and 33,725 tons of solvents in 1987.

### **ASSUMPTIONS**

1. The 1983 CSMA national data on number of aerosol product units filled are representative of U.S. totals.
2. The 1981 WAIB data on product size and on concentration of propellant and solvent VOCs in the aerosol products are representative of 1983 values and can be used to estimate emissions for total organic gases.
3. All of the aerosol units filled or distributed were used.
4. All the propellant and solvent VOCs in the can are emitted eventually into the outdoor atmosphere.

5. The propellants used are mostly non-synthetic; use of synthetic propellants is negligible.
6. Nationwide usage can be disaggregated statewide using population proportioning.
7. 1983 usage estimates may be updated to 1987 on the basis of national production data.
8. Emission estimates can be disaggregated to counties based on population proportioning.

## **COMMENTS AND RECOMMENDATIONS**

Emissions from the use of aerosol consumer products contribute significantly to the total organic gas inventory. Surveys should be taken to obtain more accurate total, spatial, and temporal usage data for California. Surveys should be conducted to separate commercial and institutional usage of aerosol products (especially cleaners) from uses in homes.

For products that are used indoors, more study is needed to determine what proportion of the organic gases is ultimately emitted into the outdoor air.

Because many of the organic compounds in consumer products may be potential toxic air contaminants, further study is recommended to improve product composition data for this source category.

## **CHANGES IN METHODOLOGY**

There are no changes in methodology.

## **DIFFERENCES BETWEEN 1987 AND 1983 EMISSION ESTIMATES**

The 1987 emission estimates are larger than the 1983 estimates due to increased production.

## **TEMPORAL ACTIVITY**

Annual activity is nearly uniform. The daily activity occurs primarily during daylight hours.

## **REFERENCES**

1. Chemical Specialties Manufacturers Association, Inc., Pressurized Products Survey United States 1983, (1984).
2. U.S. Department of Commerce, Bureau of the Census, Current Population Reports - Population Estimates and Projections, Series P-25, No. 1025, (April 1988).
3. California Department of Finance, Population Research Unit, "Projected Total Population for California by Race/Ethnicity, July 1, 1970 to July 1, 2020", Report 88 P-4, (February 1988).
4. Western Aerosol Information Bureau, VOC Emissions Distribution From Aerosol Spray Products During 1981, (1981).
5. "Production by the U.S. Chemical Industry", Chemical and Engineering News, 66(25):44, (June 20, 1988).
6. California Air Resources Board, Stationary Source Division, Draft Technical Support Document for Reducing Organic Compound Emissions from Antiperspirants and Deodorants, (December 1988).

## **PREPARED BY**

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May 1989

**TABLE I**  
**Estimates of Statewide Solvent Usage for Aerosol Consumer Products (tons/year)**  
**Estimates Calculated by ARB Only - No District Estimates**

Product Category <sup>(1)</sup>	1983 Usage <sup>(2)</sup>		1987 Usage <sup>(3)</sup>	
	Propellant	Solvent	Propellant	Solvent
<b>A. <u>Paints and Finishes</u></b>				
1. Aerosol Paints, Primers, Varnishes	3805	6197	3894	6342
2. Other Related Aerosol Products (strippers, graffiti removers, snow and other decorative products)	94	154	96	158
<b>SUBTOTAL</b>	<b>3899</b>	<b>6351</b>	<b>3990</b>	<b>6500</b>
<b>B. <u>Household Products</u> <sup>(4)</sup></b>				
1. Room Deodorants and Disinfectants	594	2376	649	2595
2. Aerosol Cleaners (glass, oven, rug, fabric, wall and tile, etc.)	863	1554	942	1697
3. Aerosol Laundry Products (starch, fabric finish, pre-wash, etc.)	191	1832	209	2001
4. Aerosol Waxes and Polishes		Merged with "Other Household Products" <sup>(5)</sup>		
5. Other Aerosol Household Products (shoe polishes, dyes, leather dressings, fuels, drain openers, anti-stats, caulking & sealing compounds). NOTE: Aerosol Waxes and Polishes have been merged into this category.	802 <sup>(5)</sup>	481 <sup>(5)</sup>	876	525
<b>SUBTOTAL</b>	<b>2450</b>	<b>6243</b>	<b>2676</b>	<b>6818</b>
<b>C. <u>Personal Care Products</u></b>				
1. Aerosol Shaving Lather	224	0	289	0
2. Aerosol Hair Sprays	1873	5319	2417	6864
3. All Other Aerosol Hair Products (incl. mousses)	73	263	94	339
4. Medicinals and Pharmaceuticals (vaporizers, fungicides, burn treatments, antiseptics, contraceptives, etc.)	57	272	74	351
5. Aerosol Colognes, Perfumes, and After Shave	23	133	30	172
6. Personal Deodorants, Antiperspirants, Powders, and Deodorant Colognes				
a. Aerosol Antiperspirants	1619 <sup>(6)</sup>	367 <sup>(6)</sup>	1776 <sup>(7)</sup>	402 <sup>(7)</sup>
b. Aerosol Deodorants	161.9 <sup>(6)</sup>	375.1 <sup>(6)</sup>	178 <sup>(7)</sup>	411 <sup>(7)</sup>

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Product Category <sup>(1)</sup>	1983 Usage <sup>(2)</sup>		1987 Usage <sup>(3)</sup>	
	Propellant	Solvent	Propellant	Solvent
7. Other Aerosol Products (suntan preparations, lotions, breath fresheners, depilatories)	13	72	17	93
<b>SUBTOTAL</b>	<b>4044</b>	<b>6801</b>	<b>4875</b>	<b>8632</b>
<b>D. <u>Automotive and Industrial</u></b>				
1. Refrigerants	0 <sup>(8)</sup>	1442 <sup>(8)</sup>	0	1804
2. Aerosol Windshield and Lock Spray De-icer	0	395	0	494
3. Cleaners (automotive upholstery, leather, vinyl, dressing, tire cleaners, etc.)	29 <sup>(9)</sup>	63 <sup>(9)</sup>	36	79
4. Engine Degreaser	120	1035	150	1295
5. Lubricants and Silicones (penetrating oils, demoisturizers, rust proofing, mold releasers, etc.)	470 <sup>(10)</sup>	1904 <sup>(10)</sup>	588	2382
6. Spray Undercoating	76	46	95	57
7. Tire Inflatant and Sealant	124	29	155	36
8. Carburetor and Choke Cleaner	171	1255	214	1570
9. Brake Cleaner	37 <sup>(11)</sup>	332 <sup>(11)</sup>	46	415
10. Engine Starting Fluid	0	741	0	927
11. Other Aerosol Automotive and Industrial Products (adhesives, etc.) From CSMA category	129 <sup>(12)</sup>	740 <sup>(12)</sup>	161	926
<b>SUBTOTAL</b>	<b>1156</b>	<b>7982</b>	<b>1445</b>	<b>9985</b>
<b>E. <u>Animal Products</u></b>				
1. Veterinarian and Pet Products (shampoos, insecticides, repellents, etc.)	32	231	37	267
<b>SUBTOTAL</b>	<b>32</b>	<b>231</b>	<b>37</b>	<b>267</b>
<b>F. <u>Food Products</u></b>				
1. All Types (including pan sprays)	53	400	56	424
<b>SUBTOTAL</b>	<b>53</b>	<b>400</b>	<b>56</b>	<b>424</b>

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Product Category <sup>(1)</sup>	1983 Usage <sup>(2)</sup>		1987 Usage <sup>(3)</sup>	
	Propellant	Solvent	Propellant	Solvent
G. <u>Miscellaneous</u>				
1. Other Aerosol Products Not Listed Above	103	206	549	1099
<b>SUBTOTAL</b>	<b>103</b>	<b>206</b>	<b>549</b>	<b>1099</b>
<b>GRAND TOTALS</b>			<b>13628</b>	<b>33725</b>

NOTES:

- Product categories for most aerosol products are based on CSMA categories. The level of detail reflected in the categories on this table greatly exceeds that in the actual Categories of Emission Source (CES) codes in the Emission Data System Inventory and is provided for information only.
- Propellant and solvent emissions for aerosol products are calculated based on a methodology developed in conjunction with SSD. Number of aerosol units filled (assumed equal to number used) is taken from the "Estimated Totals" reported in the 1983 CSMA pressurized products survey. Estimated totals for subcategories are derived as follows:

$$\text{Estimated Total for subcategory} = \frac{\text{Estimated Total for category}}{\text{Reported Total for category}}$$

$$\times \text{Reported Total for subcategory}$$

WAIB data from 1981 are used for the average size of unit for each subcategory and for the percent propellant VOC and percent solvent VOC. Where the subcategories listed by WAIB are more disaggregated than those listed by CSMA, a weighted average is calculated for size of unit, percent propellant VOC, and percent solvent VOC based on the relative number of units reported for the subcategories in the 1981 WAIB table.

- The 1983 usage estimates are updated to 1987 on the basis of CSMA national data cited in Chemical and Engineering News. This publication lists for each product category 1987 and 1983 production, in millions of units. To derive 1987 usage estimates, then, the 1983 usage estimates within each product category are multiplied by the appropriate ratio of 1987 to 1983 production. These ratios are listed below:

<u>Product Category</u>	<u>Ratio (1987/1983)</u>
A. Paints and Finishes	307/300
B. Household Products	640/586
C. Personal Care Products	964/747
D. Automotive and Industrial	379/303
E. Animal Products	22/19
F. Food Products	140/132
G. Miscellaneous	80/15

4. For a number of household products (including disinfectants, cleaners, laundry products, and polishes), the emission estimates may include some commercial uses of these products as well as strictly consumer uses.
5. WAIB provides no data on average unit size and percent VOC for a distinct subcategory of Waxes and Polishes. We therefore have aggregated the CSMA estimates of number of units filled for the subcategory Waxes and Polishes with the number of units of All Other Household Products, for which WAIB provides data on unit size and percent VOC.
6. We used 1985 CSMA data for number of aerosol units and WAIB data for the average size of unit. Based on data obtained by the Stationary Source Division, Air Resources Board from CSMA, we assumed that antiperspirants comprise 80 percent of the aerosol market and deodorants comprise 20 percent, and that the respective percent VOC content are as follows: antiperspirants: 75 percent propellant VOC, 0 percent solvent VOC, 17 percent non-propellant and non-solvent VOC; deodorants: 30 percent propellant VOC, 65 percent solvent VOC, 4.5 percent non-propellant and non-solvent VOC. The non-propellant and non-solvent VOC emissions are included under solvent emissions.
7. For the Aerosol Antiperspirants and Deodorants subcategory, 1987 usage estimates are derived from 1985 usage estimates (see note 6). According to the CSMA national data cited in the Chemical and Engineering News publication, production of personal care products grew from 879 million units in 1985 to 964 million units in 1987. Thus, the 1985 usage estimates are multiplied by the ratio 964/879 to derive 1987 usage.
8. WAIB provides no data for the Automotive Refrigerants subcategory. We used the number of units filled as reported by CSMA, and we assumed an average unit size of 10 ounces, and a composition of 100 percent solvent VOC.
9. For the Automotive Cleaners subcategory we use unit size and percent VOC values from WAIB that are a weighted average of 3 WAIB subcategories.
10. For the Automotive Lubricants subcategory we use unit size and percent VOC values from WAIB that are a weighted average of 2 WAIB subcategories.

11. CSMA did not report number of units filled for brake cleaner. To apportion the CSMA estimated total among the CSMA automotive aerosol subcategories, we calculated the fraction that brake cleaner units filled represented of the WAIB automotive total (which does not explicitly include refrigerants). We applied this fraction to the CSMA estimated total for the automotive category (although CSMA appears to include aerosol refrigerant as an additional subcategory) to derive an estimated total for brake cleaner. We then subtracted this estimated total for brake cleaner from the CSMA estimated total for all automotive products. The remaining CSMA estimated value was then apportioned among the other CSMA automotive subcategories as described in note 2.
12. We assume that the CSMA subcategory Other Automotive and Industrial corresponds to the WAIB subcategory Other Automotive. CSMA lists no subcategory that corresponds directly to the WAIB Industrial Products subcategory, so we have made no estimates for this subcategory.

Table II  
 1987 Area Source Emissions  
 Activity: Domestic  
 Process: Solvent Use  
 Entrainment: Solvent-Evap  
 Dimn: Aerosol - Propellant Consumer Products  
 CES: 83196  
 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	0.59	0.00	0.00	0.00	0.00
	INYO	9	8.87	0.00	0.00	0.00	0.00
	MONO	5	4.53	0.00	0.00	0.00	0.00
LC	LAKE	25	25.03	0.00	0.00	0.00	0.00
LT	EL DORADO	15	15.39	0.00	0.00	0.00	0.00
	PLACER	5	5.36	0.00	0.00	0.00	0.00
MC	AMADOR	13	12.51	0.00	0.00	0.00	0.00
	CALAVERAS	15	14.58	0.00	0.00	0.00	0.00
	EL DORADO	40	40.38	0.00	0.00	0.00	0.00
	MARIPOSA	7	6.90	0.00	0.00	0.00	0.00
	NEVADA	36	36.36	0.00	0.00	0.00	0.00
	PLACER	8	7.80	0.00	0.00	0.00	0.00
	PLUMAS	10	9.75	0.00	0.00	0.00	0.00
	SIERRA	2	1.67	0.00	0.00	0.00	0.00
	TUOLUMNE	22	22.07	0.00	0.00	0.00	0.00
NC	DEL NORTE	10	9.56	0.00	0.00	0.00	0.00
	HUMBOLDT	56	56.01	0.00	0.00	0.00	0.00
	MENDOCINO	37	36.95	0.00	0.00	0.00	0.00
	SONOMA	29	28.52	0.00	0.00	0.00	0.00
	TRINITY	7	6.70	0.00	0.00	0.00	0.00
NCC	MONTEREY	169	169.03	0.00	0.00	0.00	0.00
	SAN BENITO	16	16.36	0.00	0.00	0.00	0.00
	SANTA CRUZ	110	109.81	0.00	0.00	0.00	0.00
NEP	LASSEN	13	13.06	0.00	0.00	0.00	0.00
	MODOC	5	4.58	0.00	0.00	0.00	0.00
	SISKIYOU	21	21.13	0.00	0.00	0.00	0.00
SC	LOS ANGELES	157	157.00	0.00	0.00	0.00	0.00
	ORANGE	42	42.00	0.00	0.00	0.00	0.00
	RIVERSIDE	13	13.00	0.00	0.00	0.00	0.00
	SAN BERNARDINO	18	18.00	0.00	0.00	0.00	0.00
SCC	SAN LUIS OBISPO	99	99.47	0.00	0.00	0.00	0.00
	SANTA BARBARA	169	168.93	0.00	0.00	0.00	0.00
	VENTURA	309	309.43	0.00	0.00	0.00	0.00
SD	SAN DIEGO	1127	1127.30	0.00	0.00	0.00	0.00
SED	IMPERIAL	54	53.80	0.00	0.00	0.00	0.00
	KERN	34	34.22	0.00	0.00	0.00	0.00
	LOS ANGELES	3	3.00	0.00	0.00	0.00	0.00
	RIVERSIDE	5	5.00	0.00	0.00	0.00	0.00
	SAN BERNARDINO	115	114.90	0.00	0.00	0.00	0.00
SF	ALAMEDA	603	603.34	0.00	0.00	0.00	0.00
	CONTRA COSTA	364	363.54	0.00	0.00	0.00	0.00
	MARIN	112	112.42	0.00	0.00	0.00	0.00
	NAPA	52	52.19	0.00	0.00	0.00	0.00
	SAN FRANCISCO	361	361.35	0.00	0.00	0.00	0.00
	SAN MATEO	305	305.14	0.00	0.00	0.00	0.00
	SANTA CLARA	703	702.99	0.00	0.00	0.00	0.00
	SOLANO	109	108.40	0.00	0.00	0.00	0.00
	SONOMA	150	149.65	0.00	0.00	0.00	0.00
SJV	FRESNO	294	294.01	0.00	0.00	0.00	0.00
	KERN	214	214.46	0.00	0.00	0.00	0.00
	KINGS	43	43.30	0.00	0.00	0.00	0.00
	MADERA	39	39.46	0.00	0.00	0.00	0.00
	MERCED	82	81.88	0.00	0.00	0.00	0.00
	SAN JOAQUIN	219	218.88	0.00	0.00	0.00	0.00
	STANISLAUS	161	161.00	0.00	0.00	0.00	0.00
	TULARE	144	143.61	0.00	0.00	0.00	0.00
SV	BUTTE	83	83.40	0.00	0.00	0.00	0.00
	COLUSA	7	7.29	0.00	0.00	0.00	0.00
	GLENN	11	11.33	0.00	0.00	0.00	0.00
	PLACER	60	59.95	0.00	0.00	0.00	0.00
	SACRAMENTO	467	466.73	0.00	0.00	0.00	0.00
	SHASTA	67	66.70	0.00	0.00	0.00	0.00
	SOLANO	42	41.70	0.00	0.00	0.00	0.00
	SUTTER	30	29.71	0.00	0.00	0.00	0.00
	TEHAMA	23	22.61	0.00	0.00	0.00	0.00
	YOLO	64	63.55	0.00	0.00	0.00	0.00
	YUBA	27	27.44	0.00	0.00	0.00	0.00
TOTAL		7667	7665.59	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 III  
 1987 Area Source Emissions  
 Activity: Domestic  
 Process: Solvent Use  
 Entrainment: Solvent-Evap  
 Dimn: Aerosol Prods - Solvents Consumer Products  
 CES: 83204  
 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	1.46	0.00	0.00	0.00	0.00
	INYO	22	21.94	0.00	0.00	0.00	0.00
	MONO	11	11.22	0.00	0.00	0.00	0.00
LC	LAKE	62	61.93	0.00	0.00	0.00	0.00
LT	EL DORADO	38	38.07	0.00	0.00	0.00	0.00
	PLACER	13	13.26	0.00	0.00	0.00	0.00
MC	AMADOR	31	30.97	0.00	0.00	0.00	0.00
	CALAVERAS	36	36.09	0.00	0.00	0.00	0.00
	EL DORADO	100	99.93	0.00	0.00	0.00	0.00
	MARIPOSA	17	17.07	0.00	0.00	0.00	0.00
	NEVADA	90	89.97	0.00	0.00	0.00	0.00
	PLACER	19	19.30	0.00	0.00	0.00	0.00
	PLUMAS	24	24.14	0.00	0.00	0.00	0.00
	SIERRA	4	4.15	0.00	0.00	0.00	0.00
	TUOLUMNE	55	54.62	0.00	0.00	0.00	0.00
NC	DEL NORTE	24	23.65	0.00	0.00	0.00	0.00
	HUMBOLDT	139	138.62	0.00	0.00	0.00	0.00
	MENDOCINO	91	91.44	0.00	0.00	0.00	0.00
	SONOMA	71	70.59	0.00	0.00	0.00	0.00
	TRINITY	17	16.58	0.00	0.00	0.00	0.00
NCC	MONTEREY	418	418.29	0.00	0.00	0.00	0.00
	SAN BENITO	40	40.48	0.00	0.00	0.00	0.00
	SANTA CRUZ	272	271.75	0.00	0.00	0.00	0.00
NEP	LASSEN	32	32.31	0.00	0.00	0.00	0.00
	MODOC	11	11.34	0.00	0.00	0.00	0.00
	SISKIYOU	52	52.30	0.00	0.00	0.00	0.00
SC	LOS ANGELES	5070	5070.00	0.00	0.00	0.00	0.00
	ORANGE	1350	1350.00	0.00	0.00	0.00	0.00
	RIVERSIDE	415	415.00	0.00	0.00	0.00	0.00
	SAN BERNARDINO	597	597.00	0.00	0.00	0.00	0.00
SCC	SAN LUIS OBISPO	246	246.14	0.00	0.00	0.00	0.00
	SANTA BARBARA	418	418.04	0.00	0.00	0.00	0.00
	VENTURA	766	765.74	0.00	0.00	0.00	0.00
SD	SAN DIEGO	2790	2789.80	0.00	0.00	0.00	0.00
SED	IMPERIAL	133	133.13	0.00	0.00	0.00	0.00
	KERN	85	84.69	0.00	0.00	0.00	0.00
	LOS ANGELES	98	98.00	0.00	0.00	0.00	0.00
	RIVERSIDE	151	151.00	0.00	0.00	0.00	0.00
	SAN BERNARDINO	284	284.30	0.00	0.00	0.00	0.00
SF	ALAMEDA	1493	1493.00	0.00	0.00	0.00	0.00
	CONTRA COSTA	900	899.72	0.00	0.00	0.00	0.00
	MARIN	278	278.13	0.00	0.00	0.00	0.00
	NAPA	129	129.21	0.00	0.00	0.00	0.00
	SAN FRANCISCO	894	893.88	0.00	0.00	0.00	0.00
	SAN MATEO	755	754.82	0.00	0.00	0.00	0.00
	SANTA CLARA	1740	1740.00	0.00	0.00	0.00	0.00
	SOLANO	269	268.64	0.00	0.00	0.00	0.00
	SONOMA	371	370.47	0.00	0.00	0.00	0.00
SIV	FRESNO	728	727.58	0.00	0.00	0.00	0.00
	KERN	531	530.73	0.00	0.00	0.00	0.00
	KINGS	107	107.16	0.00	0.00	0.00	0.00
	MADERA	98	97.65	0.00	0.00	0.00	0.00
	MERCED	203	202.62	0.00	0.00	0.00	0.00
	SAN JOAQUIN	542	541.66	0.00	0.00	0.00	0.00
	STANISLAUS	398	398.42	0.00	0.00	0.00	0.00
	TULARE	355	355.38	0.00	0.00	0.00	0.00
SV	BUTTE	206	206.40	0.00	0.00	0.00	0.00
	COLUSA	18	18.04	0.00	0.00	0.00	0.00
	GLENN	28	28.04	0.00	0.00	0.00	0.00
	PLACER	148	148.36	0.00	0.00	0.00	0.00
	SACRAMENTO	1155	1155.02	0.00	0.00	0.00	0.00
	SHASTA	165	165.10	0.00	0.00	0.00	0.00
	SOLANO	103	103.10	0.00	0.00	0.00	0.00
	SUTTER	74	73.51	0.00	0.00	0.00	0.00
	TEHAMA	56	55.96	0.00	0.00	0.00	0.00
	YOLO	157	157.27	0.00	0.00	0.00	0.00
	YUBA	68	67.91	0.00	0.00	0.00	0.00
TOTAL		26061	26062.10	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)