SECTION 3-4

ASPHALT PAVING

(Statewide Methodology)

CES NUMBERS AND DESCRIPTIONS

46870 A612.P340.E230.26D30

Road Construction • Asphalt Paving • Petroleum-Evap. • Cutback Asphalt

46888 A612.P340.E230.26D31

Road Construction • Asphalt Paving • Petroleum-Evap. • Road Oil

46896 A612.P340.E230.26D32

Road Construction • Asphalt Paving • Petroleum-Evap. • Paving Asphalt

46904 A612.P340.E230.26D33

Road Construction • Asphalt Paving • Petroleum-Evap. • Emulsified Asphalt

OLD AREA SOURCE NUMBERS AND DESCRIPTIONS

1902.01 Cutback Asphalt

1902.02 Road Oil

1902.03 Paving Asphalt

1902.04 Emulsified Asphalt

SOURCE DEFINITION

These categories are used to inventory organic gas emissions from the application of various forms of asphalt in the construction and maintenance of roads, streets, parking lots, shopping center grounds, driveways, industrial pavements, etc.

Cutback asphalt refers to asphalt cements liquefied with petroleum solvents such as naptha or kerosene; specification types include Medium Cure (MC) and Rapid Cure (RC). Road oils are also liquefied asphalts but of the Slow Cure (SC) type. Paving asphalt refers to the basic asphalt cement heated to a liquid form and transported to the application site. Emulsified asphalt refers to asphalt cement liquefied with water containing an emulsifying agent.

DESCRIPTION OF METHODOLOGY

The annual sales of each type of asphalt for paving and other purposes are contained in an Energy Data Report [1], published periodically by the U.S. Department of Energy. The 1979 sales shown for California, as listed below, were assumed to be the actual usage for the state in 1979 in the respective categories:

| | |
|---|---|
| Cutback asphalt | 134,699 tons/year |
| Road Oils | 86,742 tons/year |
| Paving asphalt cement | 2,878,308 tons/year |
| Emulsified asphalt | 159,821 tons/year |

Total organic gas (TOG) emission factors for these four types of asphalt are the same as those used in the 1977 inventory [2]. For a tabulation, please see Table A in the Appendix.

The method of apportionment of the 1979 state total usage of each type of asphalt to the individual counties has been revised from the 1977 method and is described below.

1. Cutback Asphalt And Road Oils

For the previous (1977) inventory, it was assumed that cutback asphalt's usage was greater than that of road oils in the northern part of the state, and that road oils were used more than cutback asphalt in the southern part of the state. However, communications with CALTRANS personnel [3] revealed that the relative usage between cutback asphalt and road oils is dependent on such factors as personal discretion of the user (e.g. engineer, contractor), type of asphalt available in the local area, and ambient temperature at the time of application. Thus, the same assumption is not used for this inventory.

The assumption that cutback asphalt and road oils are used primarily in the rural areas (i.e. away from hot-mixed asphalt plants) is supported by several sources [3, 4, 5]. In populated areas, heated asphalt cement is used in preference to liquid asphalts for much of road maintenance operations because it is readily available. Cutback asphalt and road oils are used principally in: a) the agricultural areas of the California Central Valley (low availability of hot-mix); and b) the mountainous areas in northern California, where heavy precipitation causes recurrent damage to the road surfaces [3, 4]. In addition, one source [3] indicated that the frequency of road maintenance is directly related to the travel by heavy-duty trucks, cold climate, and high precipitation, which are the typical characteristics of the sparsely populated areas in California. Therefore, the use of population for apportioning the state's total consumption to the individual counties does not appear to be

appropriate for cutback asphalt and road oils.

Since cutback asphalt and road oils are used primarily for maintaining existing roads (as opposed to building new roads), the state's total usage of each of these liquid asphalts is apportioned to the counties according to the ratio of each county's existing mileage of asphalt-paved roads to the state's total, as tabulated in Table B. Asphalt-paved road mileage data by county as of the end of each year are available from CALTRANS [6]. Mileage data for portions of each split-county (a county belonging in more than one air basin) are derived based on their respective populations [9].

2. Paving Asphalt

Paving asphalt is used primarily in the construction of new roads and streets, but is also used for the paving of shopping centers, parking lots, driveways, industrial areas, etc. The assumption that usage of paving asphalt is simply proportional to the mileage of new asphalt-paved roadway is not complete, and thus the use of only road mileage increases may underestimate the paving activity for a given county.

Since heated asphalt cement is used mainly for paving new surfaces, its use may also be correlated to the population growth in an area. However, changes in the estimated population for a given county may not accurately represent the true increases in population or the amount of paving activity for a number of reasons. First, the population change from the start of 1979 to the end of 1979 for most counties is in the range of 1 to 2 percent, while the accuracy of the population estimates

for most counties is plus or minus two to five percent [8]. Second, there may be a gain in population in one part of a county with a loss in another part. Third, there may be paving of new roads in an area without any increase in population, such as for agricultural activities. Therefore, the use of only the increase in estimated population may also tend to underestimate the paving activity in a given county.

It is concluded that both the change in recorded road mileage and change in estimated population are each related to the consumption of paving asphalt, but neither is adequate for use as the sole indicator of consumption. It appears reasonable, however, to assume that the use of both items in conjunction may help correct the inherent deficiencies of each. The state's total usage of paving asphalt is therefore apportioned to the counties according to the simple average of the following two ratios: a) each county's asphalt-paved road mileage increase to the state's increase (see Table C); and b) each county's population increase to the state's increase (see Table D). Asphalt-paved road mileage data by county as of the turn of each year are available from CALTRANS [6]. Population estimates by whole county as of the turn of each year are available from Report #80 E-1 of the California Department of Finance [8]. Populations for the respective portions of split counties are obtained from an individual staff member [9] of the same department.

3. Emulsified Asphalt

The method for apportioning the state's total consumption of emulsified asphalt is the same as that for the 1977 inventory. CALTRANS' publication, "Contract Cost Data" [10], shows the amounts of emulsified

asphalt used by that department in each of its eleven districts in the state. (CALTRANS' usage of emulsified asphalt is only a portion of the total amount used in California, but is also the only available source of information on the usage pattern of emulsified asphalt in the state.) It is thus assumed that the usage pattern of all emulsified asphalt is similar to that of CALTRANS'. The state's total consumption of emulsified asphalt (from "Energy Data Report") is apportioned to the CALTRANS' districts according to the ratio of CALTRANS' usage in each district to its total usage. Each CALTRANS district's usage is in turn apportioned to the component counties according to the ratio of the county's population to that of the district (see Table E for these data).

COLLECTION OF DATA

Primary data (and source of data) used with the described methodology are summarized as follows:

- State's sales of each type of asphalt in 1979. (Source: "Energy Data Report" by the U.S. Department of Energy.)
- Mileage of asphalt-paved roads by county as of 12/31/78 and 12/31/79. (Source: California Department of Transportation.)
- Population by county and county portions as of 1/1/79 and 1/1/80. (Source: Population Research Unit, California Department of Finance.)
- CALTRANS' usage of emulsified asphalt by district in 1979. (Source: "Contract Cost Data" by the California Department of Transportation.)

## SUMMARY OF ASSUMPTIONS

1. The sales of each type of asphalt as reported in the "Energy Data Report" are equal to the actual usage in the state.

2. Cutback asphalt consists of 20% solvent by volume or 16.5% by weight; 75% of which is released to the atmosphere.

3. Road oil consists of 12% solvent by volume or 11.6% by weight; 25% of which is released to the atmosphere.

4. Cutback asphalt and road oils are used primarily in the rural areas in California.

5. The consumption of cutback asphalt and road oils is proportional to the existing mileage of asphalt-paved roads in an area.

6. The consumption of paving asphalt for a given county is adequately indicated by the average of the increase in asphalt-paved road mileage and increase in population.

7. The geographical consumption pattern of emulsified asphalt in the state is similar to that by the California Department of Transportation, and the consumption in the component counties of each CALTRANS district is proportional to the population fraction.

## TEMPORAL VARIATIONS

Annual variation in paving and maintenance activity is dependent on the

local climate. In general, most activity is in late spring, all of summer, and early fall; however, some areas may require winter maintenance. It may be assumed for a typical county that emissions in the winter are slightly lower than in the rest of the year.

Although the paving and maintenance activity itself occurs mainly during daylight hours, Monday through Friday, emissions may be considered to be uniform throughout the week and the day, because the evaporation of volatile organics from the asphalt products is nearly a continuous process for up to several months after application.

Therefore, the temporal codes [12] for a given county (in the absence of more specific information) are:

Annual: 23

Weekly: 07

Daily : 24

SAMPLE CALCULATIONS

1. Cutback Asphalt and Road Oil

For Alameda County:

Alameda County's asphalt-paved roads (as of 12/31/79) = 2,910.73 miles (See Table B)

State of California's asphalt-paved roads (as of 12/31/79) = 124,835.71 miles

Hence, Alameda's fraction of state usage = $\frac{2,910.73}{124,835.71}$ = 0.02332

a) State's total usage of cutback asphalt in 1979 = 134,699 tons/year

Alameda County's usage of cutback asphalt = 134,699 X 0.02332

= 3,141 tons/year

Alameda County's TOG emissions from cutback asphalt = PR X EF

= 3,141 tons/year X 250 lb/ton ÷ 2000 lb/ton

= 392.6 tons/year

b) State's total usage of road oils in 1979 = 86,742 tons/year

Alameda County's usage of road oils = 86,742 X 0.02332 =

= 2,023 tons/year

Alameda County's TOG emissions from road oils = PR X EF

= 2,023 tons/year X 58 lb/ton ÷ 2000 lb/ton

= 58.7 tons/year

Emissions from cutback asphalt and road oils are tabulated by county in Tables F and G, respectively.

2. Paving Asphalt

For Orange County:

Orange County's asphalt-paved roads (as of 12/31/78) = 4,716.03 miles (See Table C).

Orange County's asphalt-paved roads (as of 12/31/79) = 5,032.42 miles

Orange County's increase in asphalt-paved roads

= 5,032.42 - 4,716.03

= 316.39 miles

State's asphalt-paved roads (as of 12/31/78) = 110,416.44 miles

State's asphalt-paved roads (as of 12/31/79) = 124,835.71 miles

State's increase in asphalt-paved roads

= 124,835.71 - 110,416.44

= 14,419.27 miles

Thus, Orange County's fraction of State's mileage increase

$$= \frac{316.39}{14,419.27} = 0.021942$$

Orange County's population (as of 1/1/79) = 1,854,800 (See Table D).

Orange County's population (as of 1/1/80) = 1,896,200

Orange County's increase in population = 1,896,200 - 1,854,800 = 41,400

State's population increase = sum of all county increases = 393,432

(Note: This increase is <u>not</u> equal to the difference between the state's total populations of the two dates, because counties with a negative increase are considered to have a zero increase.)

Thus, Orange County's fraction of state's population increase

$$= \frac{41,400}{393,432} = 0.105228$$

Therefore, Orange County's fraction of state's usage

$$= \text{average of the two fractions} = \frac{0.021942 + 0.105228}{2} = 0.063585$$

State's total usage of paving asphalt in 1979 = 2,878,308 tons/year

Orange County's usage of paving asphalt = 2,878,308 X 0.063585

= 183,017 tons/year

Orange County's TOG emissions from paving asphalt = PR X EF

= 183,017 tons/year X 0.8 lb/ton ÷ 2000 lb/ton

= <u>73.2 tons/year</u>

Emissions from paving asphalt are tabulated by county in Table H.

3. <u>Emulsified Asphalt</u>

For Sacramento County:

Sacramento County is in CALTRANS' District III (along with ten other counties).

CALTRANS' usage of emulsified asphalt in District III in 1979

= 734 tons/year

CALTRANS' total usage of emulsified asphalt in 1979

= 12,747.5 tons/year

District III's fraction of CALTRANS' usage

$$= \frac{734}{12,747.5} = 0.05758 \quad \text{(See Table E)}$$

Sacramento County's population (as of the end of 1979) = 770,200 (See Table D)

District III's population (as of the end of 1979) = 1,412,500

Sacramento County's fraction of District III's usage

$$= \frac{770,200}{1,412,500} = 0.54527 \quad \text{(See Table E)}$$

Thus, Sacramento County's fraction of state's usage

= 0.05758 X 0.54527 = 0.031397

State's total usage of emulsified asphalt in 1979 = 159,821 tons/year

Sacramento County's usage of emulsified asphalt = 159,821 X 0.031397

= 5,018 tons/year

Sacramento County's TOG emissions from emulsified asphalt = PR X EF

= 5,018 tons/year X 20 lb/ton ÷ 2000 lb/ton

= 50.2 tons/year

Emissions from emulsified asphalt are tabulated by county in Table J.

## ASSESSMENT OF METHOD AND OTHER COMMENTS

TOG emissions from asphalt use as calculated using the described methodology would probably be relatively accurate at the state level, since the sales of asphalts to California are known. However, the accuracy of the emissions by county is uncertain, because no actual usage data are available for any county or region of the state, and other data have to be used as surrogates for the apportionment of state consumption to the counties.

It is recommended that usage data be collected locally by the respective air pollution control agencies. Information on the amounts and locations of use of various types of asphalt (or their use relative to each other) may be obtained by surveying the major users (such as paving contractors and county road departments) [11] and the suppliers (such as the hot-mixed asphalt plants). The use of such locally specific data, if coordinated statewide, should improve the accuracy of the emission estimates by county.

## REFERENCES

1. Energy Data Report: Sales of Asphalt in 1979, U.S. Dept. of Energy,

Washington, D.C. (October 14, 1980).

2. Documentation - 1977 Area Source Emissions, CARB, Sacramento, CA. (November, 1979).

3. Kelly, Roy, California Dept. of Transportation, Sacramento, CA. (322-7780), personal communication (May, 1981).

4. Consideration of a Model Rule for the Control of Volatile Organic Emissions from Cutback Asphalt Paving Materials, CARB, Sacramento, CA. (May, 1979).

5. Craft, David, Stationary Source Control Division, CARB, Sacramento, CA. (322-6005), personal communications (May/June, 1981).

6. Delevan, Gerald, California Dept. of Transportation, Sacramento, CA. (322-5499), computer tape and unpublished data (1981).

7. McCormack, James, Stationary Source Control Division, CARB, Sacramento, CA. (322-7048), personal communication (April, 1981).

8. Population Estimates of California Cities and Counties, Report #80E-1, Population Research Unit, California Dept. of Finance, Sacramento, CA. (May 1, 1980).

9. Torres-gil, Vince, Population Research Unit, California Dept. of Finance, Sacramento, CA. (322-4651), personal communication (May, 1981).

10. 1979 Contract Cost Data, California Dept. of Transportation, Sacramento, CA. (1979).

11. Pearring, Jack, Pacific Coast Division, The Asphalt Institute, Sacramento, CA. (922-6507), personal communication (May, 1981).

12. Instructions for Emission Data System Review and Update Reporting, CARB, Sacramento, CA. (April, 1981).

PREPARER, AGENCY, AND DATE

David Ipps, CARB
July, 1981

## APPENDIX

Table A

### TABULATION OF EMISSION FACTORS

| Type of Asphalt | TOG Emission Factor (Pounds of TOG/Ton of Asphalt Applied) |
|---|---|
| Cutback Asphalt | 250 |
| Road Oil | 58 |
| Paving Asphalt | 0.8 |
| Emulsifield Asphalt | 20 |

Source: Documentation for 1977 Area Source Emissions, CARB (November, 1979). [2]

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# TABLE B

## MILES OF ASPHALT PAVED ROADS

| COUNTY | AIRBASIN | ASPHALT PAVED ROADS | FRACTION OF STATE TOTAL |
|---|---|---|---|
| ALA | SF | 2,910.73 | .0233 |
| ALP | GBV | 132.72 | .0011 |
| AMA | MC | 467.85 | .0037 |
| BUT | SV | 1,580.10 | .0127 |
| CAL | MC | 705.38 | .0057 |
| CC | SF | 2,599.93 | .0208 |
| COL | SV | 680.18 | .0054 |
| DN | NC | 373.94 | .0030 |
| ED | LT | 413.43 | .0033 |
| | NC | 762.99 | .0061 |
| FRE | SJV | 4,595.38 | .0368 |
| GLE | SV | 927.55 | .0074 |
| HUM | NC | 1,623.08 | .0130 |
| IMP | SED | 2,246.59 | .0180 |
| INY | GBV | 1,326.75 | .0106 |
| KER | SED | 779.79 | .0062 |
| | SJV | 4,094.77 | .0328 |
| KIN | SJV | 912.86 | .0073 |
| LA | SC | 18,776.99 | .1504 |
| | SED | 210.18 | .0017 |
| LAK | LC | 721.33 | .0058 |
| LAS | NEP | 1,202.11 | .0096 |
| MAD | SJV | 1,786.81 | .0143 |
| MEN | MC | 1,253.98 | .0100 |
| MER | SJV | 1,914.90 | .0153 |
| MNO | GBV | 582.90 | .0047 |
| MOD | NEP | 1,087.22 | .0087 |
| MON | NCC | 1,582.60 | .0127 |
| MPA | MC | 656.07 | .0053 |
| MRN | SF | 1,095.78 | .0088 |
| NAP | SF | 749.25 | .0060 |
| NEV | MC | 758.51 | .0061 |
| ORA | SC | 5,032.42 | .0403 |
| PLA | LT | 80.55 | .0006 |
| | MC | 825.52 | .0066 |
| PLU | MC | 789.22 | .0063 |
| RIV | SC | 3,767.89 | .0302 |
| | SED | 1,540.58 | .0123 |
| SAC | SV | 3,274.24 | .0262 |
| SB | SCC | 1,634.28 | .0131 |
| SBD | SC | 5,979.37 | .0479 |
| | SED | 1,252.63 | .0100 |
| SBT | NCC | 538.78 | .0043 |
| SCL | SF | 4,078.35 | .0327 |
| SCR | NCC | 827.09 | .0066 |
| SD | SC | 6,441.46 | .0516 |
| SF | SF | 894.21 | .0072 |
| SHA | NEP | 124.25 | .0010 |
| | SV | 1,798.22 | .0144 |
| SIE | MC | 338.99 | .0027 |
| SIS | NEP | 2,550.24 | .0204 |
| SJ | SJV | 2,572.23 | .0206 |
| SLO | SCC | 1,723.87 | .0138 |
| SM | SF | 1,850.55 | .0148 |
| SOL | SF | 1,028.38 | .0082 |
| | SV | 329.58 | .0026 |
| SON | NC | 259.78 | .0021 |
| | SF | 1,919.52 | .0154 |
| STA | SJV | 2,399.52 | .0192 |
| SUT | SV | 877.02 | .0070 |
| TEH | SV | 885.32 | .0071 |
| TRI | NC | 765.52 | .0061 |
| TUL | SJV | 4,197.62 | .0336 |
| TUO | NC | 723.29 | .0058 |
| VEN | SCC | 2,207.71 | .0177 |
| YOL | SV | 1,216.74 | .0097 |
| YUB | SV | 598.11 | .0048 |
| TOTAL | | 124,835.71 | 1.0000 |

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# TABLE C

## ASPHALT PAVED ROAD MILEAGE INCREASE AND OTHER DATA

| COUNTY | AIRBASIN | MILEAGE (12/31/78) | MILEAGE (12/31/79) | MILEAGE INCREASE | FRACTION OF STATE INCREASE | AVERAGE OF MILEAGE CHANGE AND POPULATION CHANGE |
|---|---|---|---|---|---|---|
| ALA | SF | 2,550.67 | 2,910.73 | 360.06 | .0250 | .0125 |
| ALP | GBV | 131.10 | 132.72 | 1.62 | .0001 | .0001 |
| AMA | MC | 384.58 | 467.85 | 83.27 | .0058 | .0042 |
| BUT | SV | 1,452.29 | 1,580.10 | 127.81 | .0089 | .0119 |
| CAL | MC | 595.38 | 705.38 | 110.00 | .0076 | .0056 |
| CC | SF | 2,365.44 | 2,599.93 | 234.49 | .0163 | .0253 |
| COL | SV | 597.00 | 680.18 | 83.18 | .0058 | .0030 |
| DN | NC | 340.51 | 373.94 | 33.43 | .0023 | .0016 |
| ED | LT | 377.82 | 413.43 | 35.61 | .0025 | .0039 |
| | MC | 727.33 | 762.99 | 35.66 | .0025 | .0062 |
| FRE | SJV | 3,745.24 | 4,595.38 | 850.14 | .0590 | .0403 |
| GLE | SV | 832.88 | 927.55 | 94.67 | .0066 | .0042 |
| HUM | NC | 1,375.10 | 1,623.08 | 247.98 | .0172 | .0090 |
| IMP | SED | 1,875.01 | 2,246.59 | 371.58 | .0258 | .0162 |
| INY | GBV | 1,152.22 | 1,326.75 | 174.53 | .0121 | .0066 |
| KER | SED | 705.20 | 779.79 | 74.59 | .0052 | .0042 |
| | SJV | 3,735.62 | 4,094.77 | 359.15 | .0249 | .0245 |
| KIN | SJV | 681.03 | 912.86 | 231.83 | .0161 | .0080 |
| LA | SC | 16,138.39 | 18,776.99 | 2,638.60 | .1830 | .1351 |
| | SED | 184.45 | 210.18 | 25.73 | .0018 | .0039 |
| LAK | LC | 634.90 | 721.33 | 86.43 | .0060 | .0059 |
| LAS | NEP | 1,063.84 | 1,202.11 | 138.27 | .0096 | .0059 |
| MAD | SJV | 1,716.17 | 1,786.81 | 70.64 | .0049 | .0070 |
| MEN | NC | 1,091.59 | 1,253.98 | 162.39 | .0113 | .0084 |
| MER | SJV | 1,627.04 | 1,914.90 | 287.86 | .0200 | .0128 |
| MNO | GBV | 543.38 | 582.90 | 39.52 | .0027 | .0024 |
| MOD | NEP | 928.73 | 1,087.22 | 158.49 | .0110 | .0056 |
| MON | NCC | 1,269.66 | 1,582.60 | 312.94 | .0217 | .0138 |
| MPA | MC | 587.33 | 656.07 | 68.74 | .0048 | .0035 |
| MRN | SF | 962.43 | 1,095.78 | 133.35 | .0092 | .0055 |
| NAP | SF | 690.49 | 749.25 | 58.76 | .0041 | .0020 |
| NEV | MC | 651.82 | 758.51 | 106.69 | .0074 | .0085 |
| ORA | SC | 4,716.03 | 5,032.42 | 316.39 | .0219 | .0635 |
| PLA | LT | 52.34 | 80.56 | 28.22 | .0020 | .0016 |
| | MC | 539.79 | 825.52 | 285.73 | .0198 | .0172 |
| PLU | MC | 751.95 | 789.22 | 37.27 | .0026 | .0028 |
| RIV | SC | 3,535.78 | 3,767.89 | 232.11 | .0161 | .0298 |
| | SED | 1,496.64 | 1,540.58 | 43.94 | .0030 | .0188 |
| SAC | SV | 2,747.33 | 3,274.24 | 526.91 | .0365 | .0451 |
| SB | SCC | 1,448.89 | 1,634.28 | 185.39 | .0129 | .0097 |
| SBD | SC | 5,596.24 | 5,979.37 | 383.13 | .0266 | .0527 |
| | SED | 1,177.23 | 1,252.63 | 75.40 | .0052 | .0117 |
| SBT | NCC | 469.21 | 538.78 | 69.57 | .0048 | .0030 |
| SCL | SF | 3,800.75 | 4,078.35 | 277.60 | .0193 | .0361 |
| SCR | NCC | 653.96 | 827.09 | 173.13 | .0120 | .0099 |
| SD | SD | 5,459.94 | 6,441.46 | 981.52 | .0681 | .0839 |
| SF | SF | 503.98 | 894.21 | 390.23 | .0271 | .0135 |
| SHA | NEP | 114.81 | 124.25 | 9.44 | .0007 | .0007 |
| | SV | 1,646.03 | 1,798.22 | 152.19 | .0106 | .0098 |
| STE | MC | 293.35 | 338.99 | 45.64 | .0032 | .0016 |
| SIS | NEP | 2,341.03 | 2,550.24 | 209.21 | .0145 | .0090 |
| SJ | SJV | 2,261.60 | 2,572.23 | 310.63 | .0215 | .0211 |
| SLO | SCC | 1,546.62 | 1,723.87 | 177.25 | .0123 | .0128 |
| SM | SF | 1,721.71 | 1,850.55 | 128.84 | .0089 | .0045 |
| SOL | SF | 906.34 | 1,028.38 | 122.04 | .0085 | .0143 |
| | SV | 296.18 | 329.58 | 33.40 | .0023 | .0058 |
| SON | NC | 233.17 | 259.78 | 26.61 | .0018 | .0020 |
| | SF | 1,741.20 | 1,919.52 | 178.32 | .0124 | .0179 |
| STA | SJV | 2,156.25 | 2,399.52 | 243.27 | .0169 | .0150 |
| SUT | SV | 834.67 | 877.02 | 42.35 | .0029 | .0025 |
| TEH | SV | 623.25 | 885.32 | 262.07 | .0182 | .0116 |
| TRI | NC | 713.97 | 765.52 | 51.55 | .0036 | .0023 |
| TUL | SJV | 3,943.62 | 4,197.62 | 254.00 | .0176 | .0166 |
| TUO | MC | 669.48 | 723.29 | 53.81 | .0037 | .0053 |
| VEN | SCC | 2,035.29 | 2,207.71 | 172.42 | .0120 | .0300 |
| YOL | SV | 1,086.72 | 1,216.74 | 130.02 | .0090 | .0067 |
| YUB | SV | 586.45 | 598.11 | 11.66 | .0008 | .0016 |
| TOTAL | | 110,416.44 | 124,835.71 | 14,419.27 | 1.0000 | 1.0000 |

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# TABLE D

## POPULATION INCREASE

| COUNTY | AIRBASIN | POPULATION (1/1/79) | POPULATION (1/1/80) | POPULATION * CHANGE | FRACTION OF STATE INCREASE |
|---|---|---|---|---|---|
| ALA | SF | 1,098,800 | 1,098,500 | 0 | .0000 |
| ALP | GSV | 1,100 | 1,110 | 10 | .0000 |
| AMA | MC | 18,050 | 19,050 | 1,000 | .0025 |
| BUT | SV | 135,300 | 141,200 | 5,900 | .0150 |
| CAL | MC | 19,900 | 21,300 | 1,400 | .0036 |
| CC | SF | 631,800 | 645,300 | 13,500 | .0343 |
| COL | SV | 13,050 | 13,150 | 100 | .0003 |
| DN | NC | 17,300 | 17,650 | 350 | .0009 |
| ED | LT | 27,751 | 29,844 | 2,093 | .0053 |
| | MC | 51,214 | 57,451 | 6,237 | .0159 |
| FRE | SJV | 482,300 | 490,800 | 8,500 | .0216 |
| GLE | SV | 21,050 | 21,800 | 750 | .0019 |
| HUM | NC | 107,200 | 107,500 | 300 | .0008 |
| IMP | SED | 91,900 | 94,500 | 2,600 | .0066 |
| INY | GSV | 18,450 | 18,850 | 400 | .0010 |
| KER | SED | 59,589 | 60,883 | 1,294 | .0033 |
| | SJV | 312,909 | 322,419 | 9,510 | .0242 |
| KIN | SJV | 71,700 | 71,700 | 0 | .0000 |
| LA | SC | 7,046,783 | 7,081,905 | 35,122 | .0893 |
| | SED | 78,879 | 81,210 | 2,331 | .0059 |
| LAK | LC | 32,950 | 35,200 | 2,250 | .0057 |
| LAS | NEP | 20,600 | 21,500 | 900 | .0023 |
| MAD | SJV | 55,900 | 59,500 | 3,600 | .0092 |
| MEN | MC | 64,500 | 66,700 | 2,200 | .0056 |
| MER | SJV | 126,500 | 128,700 | 2,200 | .0056 |
| MNO | GBV | 8,300 | 9,075 | 775 | .0020 |
| MOD | NEP | 8,550 | 8,650 | 100 | .0003 |
| MON | NCC | 279,000 | 281,300 | 2,300 | .0058 |
| MPA | MC | 10,300 | 11,150 | 850 | .0022 |
| MRN | SF | 224,400 | 225,200 | 800 | .0020 |
| NAP | SF | 93,600 | 93,400 | 0 | .0000 |
| NEV | MC | 45,500 | 49,300 | 3,800 | .0097 |
| ORA | SC | 1,854,600 | 1,896,200 | 41,400 | .1052 |
| PLA | LT | 9,769 | 10,262 | 493 | .0013 |
| | MC | 100,112 | 105,870 | 5,758 | .0146 |
| PLU | MC | 16,200 | 17,350 | 1,150 | .0029 |
| RIV | SC | 440,010 | 457,139 | 17,129 | .0435 |
| | SED | 179,907 | 193,468 | 13,561 | .0345 |
| SAC | SV | 749,100 | 770,200 | 21,100 | .0536 |
| SB | SCC | 292,500 | 295,100 | 2,600 | .0066 |
| SD | SC | 657,800 | 688,779 | 30,979 | .0787 |
| | SED | 137,804 | 144,924 | 7,120 | .0181 |
| SBT | NCC | 21,900 | 22,400 | 500 | .0013 |
| SCL | SF | 1,244,400 | 1,265,200 | 20,800 | .0529 |
| SCR | NCC | 175,200 | 178,300 | 3,100 | .0079 |
| SD | SD | 1,769,000 | 1,808,200 | 39,200 | .0996 |
| SF | SF | 647,400 | 642,900 | 0 | .0000 |
| SHA | NEP | 7,211 | 7,522 | 311 | .0008 |
| | SV | 104,363 | 107,900 | 3,537 | .0090 |
| SIE | MC | 3,240 | 3,270 | 30 | .0001 |
| SIS | NEP | 39,950 | 40,350 | 1,400 | .0036 |
| SJ | SJV | 317,000 | 325,100 | 8,100 | .0206 |
| SLO | SCC | 144,400 | 149,600 | 5,200 | .0132 |
| SM | SF | 590,500 | 589,200 | 0 | .0000 |
| SOL | SF | 162,011 | 169,970 | 7,959 | .0202 |
| | SV | 51,923 | 55,539 | 3,616 | .0092 |
| SON | NC | 32,703 | 33,589 | 886 | .0023 |
| | SF | 241,645 | 250,826 | 9,181 | .0233 |
| STA | SJV | 249,900 | 255,100 | 5,200 | .0132 |
| SUT | SV | 49,600 | 50,400 | 800 | .0020 |
| TEH | SV | 36,250 | 38,200 | 1,950 | .0050 |
| TRI | NC | 11,800 | 12,200 | 400 | .0010 |
| TUL | SJV | 228,700 | 234,800 | 6,100 | .0155 |
| TUO | MC | 34,150 | 35,300 | 1,150 | .0029 |
| VEN | SCC | 491,400 | 510,300 | 18,900 | .0480 |
| YOL | SV | 108,700 | 110,400 | 1,700 | .0043 |
| YUB | SV | 48,500 | 49,450 | 950 | .0024 |
| TOTAL | | 22,523,973 | 22,911,105 | 393,432 | 1.0000 |

* NEGATIVE = 0

01/06/82

# TABLE E

## EMULSIFIED ASPHALT USAGE

| COUNTY | AIRBASIN | CALTRANS DISTRICT # | DISTRICTS EMULSIFIED AS A FRACTION OF CALTRANS | COUNTY FRACTION OF DISTRICTS POPULATION | COUNTY FRACTION OF STATES USE OF EMULSIFIED |
|---|---|---|---|---|---|
| ALA | SF | 4 | .0343 | .2187 | .0075 |
| ALP | GBV | 10 | .0582 | .0011 | .0001 |
| AMA | MC | 10 | .0582 | .0186 | .0011 |
| BUT | SV | 3 | .0576 | .0999 | .0058 |
| CAL | MC | 10 | .0582 | .0208 | .0012 |
| CC | SF | 4 | .0343 | .1285 | .0044 |
| COL | SV | 3 | .0576 | .0093 | .0005 |
| DN | NC | 1 | .0764 | .0762 | .0058 |
| ED | LT | 3 | .0576 | .0211 | .0012 |
| | MC | 3 | .0576 | .0407 | .0023 |
| FRE | SJV | 6 | .1421 | .4165 | .0592 |
| GLE | SV | 3 | .0576 | .0154 | .0009 |
| HUM | NC | 1 | .0764 | .0464 | .0354 |
| IMP | SED | 11 | .1311 | .0497 | .0065 |
| INY | GBV | 9 | .0498 | .2103 | .0105 |
| KER | SED | 9 | .0498 | .6884 | .0116 |
| | SJV | 6 | .1421 | .2729 | .0515 |
| KIN | SJV | 6 | .1421 | .0609 | .0087 |
| LA | SC | 7 | .0578 | .7400 | .0428 |
| | SED | 7 | .0578 | .0085 | .0005 |
| LAK | LC | 1 | .0764 | .1517 | .0116 |
| LAS | NEP | 2 | .0467 | .0864 | .0040 |
| MAD | SJV | 6 | .1421 | .0505 | .0072 |
| MEN | NC | 1 | .0764 | .2875 | .0220 |
| MER | SJV | 10 | .0582 | .1259 | .0073 |
| MNO | GBV | 9 | .0498 | .1013 | .0050 |
| MOD | NEP | 2 | .0467 | .0348 | .0016 |
| MON | NCC | 5 | .1117 | .3758 | .0420 |
| MPA | MC | 10 | .0582 | .0109 | .0006 |
| MRN | SF | 4 | .0343 | .0448 | .0015 |
| NAP | SF | 4 | .0343 | .0186 | .0006 |
| NEV | MC | 3 | .0576 | .0349 | .0020 |
| ORA | SC | 7 | .0578 | .1981 | .0115 |
| PLA | LT | 3 | .0576 | .0073 | .0004 |
| | MC | 3 | .0576 | .0749 | .0043 |
| PLU | MC | 2 | .0467 | .0698 | .0033 |
| RIV | SC | 8 | .2342 | .3080 | .0721 |
| | SED | 8 | .2342 | .1303 | .0305 |
| SAC | SV | 3 | .0576 | .5433 | .0314 |
| SB | SCC | 5 | .1117 | .3943 | .0440 |
| SBD | SC | 8 | .2342 | .4640 | .1087 |
| | SED | 8 | .2342 | .0976 | .0229 |
| SBT | NCC | 5 | .1117 | .0299 | .0033 |
| SCL | SF | 4 | .0343 | .2519 | .0086 |
| SCR | NCC | 4 | .0343 | .0355 | .0012 |
| SD | SD | 11 | .1311 | .9503 | .1246 |
| SF | SF | 4 | .0343 | .1280 | .0044 |
| SHA | NEP | 2 | .0467 | .0302 | .0014 |
| | SV | 2 | .0467 | .4337 | .0203 |
| STE | MC | 3 | .0576 | .0023 | .0001 |
| SIS | NEP | 2 | .0467 | .1622 | .0076 |
| SJ | SJV | 10 | .0582 | .3180 | .0185 |
| SLO | SCC | 5 | .1117 | .2000 | .0223 |
| SM | SF | 4 | .0343 | .1173 | .0040 |
| SOL | SF | 10 | .0582 | .1663 | .0097 |
| | SV | 10 | .0582 | .0543 | .0032 |
| SON | NC | 4 | .0343 | .0067 | .0002 |
| | SF | 4 | .0343 | .0499 | .0017 |
| STA | SJV | 10 | .0582 | .2495 | .0145 |
| SUT | SV | 3 | .0576 | .0357 | .0021 |
| TEH | SV | 2 | .0467 | .1535 | .0072 |
| TRI | NC | 1 | .0764 | .0210 | .0030 |
| | | 2 | .0467 | .0294 | .0000 |
| TUL | SJV | 6 | .1421 | .1993 | .0283 |
| TUO | MC | 10 | .0582 | .0345 | .0020 |
| VEN | SCC | 7 | .0578 | .0533 | .0031 |
| YOL | SV | 3 | .0576 | .0781 | .0045 |
| YUB | SV | 3 | .0576 | .0350 | .0020 |
| TOTAL | | | | | 1.0000 |

# TABLE F

1979 PROCESS RATES AND EMSISSIONS BY COUNTY
CES: 46870
ACTN: ROAD CONSTRUCTION
PRON: ASPHALT PAVING
EAMN: PETROLEUM-EVAP
DIMN: CUTBACK ASPHALT
PROCESS RATE UNITS: TONS PROCESSED

| AB | COUNTY | PROCESS RATE | CO EMISSIONS (TONS/YEAR) | NOX EMISSIONS (TONS/YEAR) | SOX EMISSIONS (TONS/YEAR) | TOG EMISSIONS (TONS/YEAR) | TSP EMISSIONS (TONS/YEAR) |
|---|---|---|---|---|---|---|---|
| GBV | ALP | 143.00 | .00 | .00 | .00 | 17.85 | .00 |
| | INY | 1,432.00 | .00 | .00 | .00 | 178.98 | .00 |
| | MNO | 629.00 | .00 | .00 | .00 | 78.63 | .00 |
| LC | LAK | 779.00 | .00 | .00 | .00 | 97.32 | .00 |
| LT | ED | 446.00 | .00 | .00 | .00 | 55.73 | .00 |
| | PLA | 88.00 | .00 | .00 | .00 | 10.94 | .00 |
| MC | AMA | 505.00 | .00 | .00 | .00 | 63.14 | .00 |
| | CAL | 761.00 | .00 | .00 | .00 | 95.13 | .00 |
| | ED | 823.00 | .00 | .00 | .00 | 102.88 | .00 |
| | MPA | 709.00 | .00 | .00 | .00 | 88.56 | .00 |
| | NEV | 819.00 | .00 | .00 | .00 | 102.37 | .00 |
| | PLA | 890.00 | .00 | .00 | .00 | 111.30 | .00 |
| | PLU | 851.00 | .00 | .00 | .00 | 106.41 | .00 |
| | SIE | 366.00 | .00 | .00 | .00 | 45.60 | .00 |
| | TUO | 780.00 | .00 | .00 | .00 | 97.49 | .00 |
| NC | DN | 404.00 | .00 | .00 | .00 | 50.51 | .00 |
| | HUM | 1,751.00 | .00 | .00 | .00 | 218.89 | .00 |
| | MEN | 1,354.00 | .00 | .00 | .00 | 169.22 | .00 |
| | SON | 280.00 | .00 | .00 | .00 | 35.02 | .00 |
| | TRI | 826.00 | .00 | .00 | .00 | 103.21 | .00 |
| NCC | MON | 1,708.00 | .00 | .00 | .00 | 213.50 | .00 |
| | SBT | 582.00 | .00 | .00 | .00 | 72.74 | .00 |
| | SCR | 893.00 | .00 | .00 | .00 | 111.63 | .00 |
| NEP | LAS | 1,297.00 | .00 | .00 | .00 | 162.14 | .00 |
| | MOD | 1,173.00 | .00 | .00 | .00 | 146.65 | .00 |
| | SHA | 135.00 | .00 | .00 | .00 | 16.84 | .00 |
| | SIS | 2,752.00 | .00 | .00 | .00 | 343.99 | .00 |
| SC | LA | 20,260.00 | .00 | .00 | .00 | 2,532.51 | .00 |
| | ORA | 5,430.00 | .00 | .00 | .00 | 678.71 | .00 |
| | RIV | 4,065.00 | .00 | .00 | .00 | 508.15 | .00 |
| | SBD | 6,452.00 | .00 | .00 | .00 | 806.51 | .00 |
| SCC | SB | 1,763.00 | .00 | .00 | .00 | 220.40 | .00 |
| | SLO | 1,860.00 | .00 | .00 | .00 | 232.52 | .00 |
| | VEN | 2,381.00 | .00 | .00 | .00 | 297.63 | .00 |
| SD | SD | 6,950.00 | .00 | .00 | .00 | 868.81 | .00 |
| SED | IMP | 2,425.00 | .00 | .00 | .00 | 303.07 | .00 |
| | KER | 842.00 | .00 | .00 | .00 | 105.23 | .00 |
| | LA | 226.00 | .00 | .00 | .00 | 28.29 | .00 |
| | RIV | 1,662.00 | .00 | .00 | .00 | 207.78 | .00 |
| | SBD | 1,351.00 | .00 | .00 | .00 | 168.88 | .00 |
| SF | ALA | 3,141.00 | .00 | .00 | .00 | 392.65 | .00 |
| | CC | 2,806.00 | .00 | .00 | .00 | 350.72 | .00 |
| | MRN | 1,183.00 | .00 | .00 | .00 | 147.83 | .00 |
| | NAP | 808.00 | .00 | .00 | .00 | 101.02 | .00 |
| | SCL | 4,401.00 | .00 | .00 | .00 | 550.08 | .00 |
| | SF | 964.00 | .00 | .00 | .00 | 120.56 | .00 |
| | SM | 1,996.00 | .00 | .00 | .00 | 249.53 | .00 |
| | SOL | 1,110.00 | .00 | .00 | .00 | 138.74 | .00 |
| | SON | 2,072.00 | .00 | .00 | .00 | 258.96 | .00 |
| SJV | FRE | 4,958.00 | .00 | .00 | .00 | 619.76 | .00 |
| | KER | 4,418.00 | .00 | .00 | .00 | 552.27 | .00 |
| | KIN | 985.00 | .00 | .00 | .00 | 123.08 | .00 |
| | MAD | 1,928.00 | .00 | .00 | .00 | 240.94 | .00 |
| | MER | 2,066.00 | .00 | .00 | .00 | 258.29 | .00 |
| | SJ | 2,775.00 | .00 | .00 | .00 | 346.85 | .00 |
| | STA | 2,589.00 | .00 | .00 | .00 | 323.61 | .00 |
| | TUL | 4,530.00 | .00 | .00 | .00 | 566.24 | .00 |
| SV | BUT | 1,705.00 | .00 | .00 | .00 | 213.16 | .00 |
| | COL | 734.00 | .00 | .00 | .00 | 91.76 | .00 |
| | GLE | 1,001.00 | .00 | .00 | .00 | 125.10 | .00 |
| | SAC | 3,533.00 | .00 | .00 | .00 | 441.64 | .00 |
| | SHA | 1,940.00 | .00 | .00 | .00 | 242.46 | .00 |
| | SOL | 356.00 | .00 | .00 | .00 | 44.45 | .00 |
| | SUT | 947.00 | .00 | .00 | .00 | 118.37 | .00 |
| | TEH | 955.00 | .00 | .00 | .00 | 119.38 | .00 |
| | YOL | 1,313.00 | .00 | .00 | .00 | 164.16 | .00 |
| | YUB | 645.00 | .00 | .00 | .00 | 80.65 | .00 |
| *TOTAL 46870 | | 134,702.00 | .00 | .00 | .00 | 16,837.69 | .00 |

# TABLE G

1979 PROCESS RATES AND EMSISSIONS BY COUNTY
CES: 46888
ACTN: ROAD CONSTRUCTION
PRON: ASPHALT PAVING
EAMN: PETROLEUM-EVAP
DIMN: ROAD OIL
PROCESS RATE UNITS: TONS PROCESSED

| AB | COUNTY | PROCESS RATE | CO EMISSIONS (TONS/YEAR) | NOX EMISSIONS (TONS/YEAR) | SOX EMISSIONS (TONS/YEAR) | TOG EMISSIONS (TONS/YEAR) | TSP EMISSIONS (TONS/YEAR) |
|---|---|---|---|---|---|---|---|
| GBV | ALP | 92.00 | .00 | .00 | .00 | 2.67 | .00 |
| | INY | 922.00 | .00 | .00 | .00 | 26.74 | .00 |
| | MNO | 405.00 | .00 | .00 | .00 | 11.75 | .00 |
| LC | LAK | 501.00 | .00 | .00 | .00 | 14.54 | .00 |
| LT | ED | 287.00 | .00 | .00 | .00 | 8.33 | .00 |
| | PLA | 56.00 | .00 | .00 | .00 | 1.64 | .00 |
| MC | AMA | 325.00 | .00 | .00 | .00 | 9.43 | .00 |
| | CAL | 490.00 | .00 | .00 | .00 | 14.21 | .00 |
| | ED | 530.00 | .00 | .00 | .00 | 15.37 | .00 |
| | MPA | 456.00 | .00 | .00 | .00 | 13.23 | .00 |
| | NEV | 527.00 | .00 | .00 | .00 | 15.29 | .00 |
| | PLA | 573.00 | .00 | .00 | .00 | 16.63 | .00 |
| | PLU | 548.00 | .00 | .00 | .00 | 15.90 | .00 |
| | SIE | 236.00 | .00 | .00 | .00 | 6.84 | .00 |
| | TUO | 502.00 | .00 | .00 | .00 | 14.56 | .00 |
| NC | DN | 260.00 | .00 | .00 | .00 | 7.55 | .00 |
| | HUM | 1,128.00 | .00 | .00 | .00 | 32.70 | .00 |
| | MEN | 672.00 | .00 | .00 | .00 | 25.28 | .00 |
| | SON | 180.00 | .00 | .00 | .00 | 5.23 | .00 |
| | TRI | 532.00 | .00 | .00 | .00 | 15.42 | .00 |
| NCC | MON | 1,100.00 | .00 | .00 | .00 | 31.90 | .00 |
| | SBT | 375.00 | .00 | .00 | .00 | 10.87 | .00 |
| | SCR | 575.00 | .00 | .00 | .00 | 16.68 | .00 |
| NEP | LAS | 835.00 | .00 | .00 | .00 | 24.22 | .00 |
| | MOD | 756.00 | .00 | .00 | .00 | 21.91 | .00 |
| | SHA | 87.00 | .00 | .00 | .00 | 2.52 | .00 |
| | SIS | 1,772.00 | .00 | .00 | .00 | 51.39 | .00 |
| SC | LA | 13,047.00 | .00 | .00 | .00 | 378.36 | .00 |
| | ORA | 3,497.00 | .00 | .00 | .00 | 101.40 | .00 |
| | RIV | 2,618.00 | .00 | .00 | .00 | 75.92 | .00 |
| | SBD | 4,155.00 | .00 | .00 | .00 | 120.49 | .00 |
| SCC | SB | 1,135.00 | .00 | .00 | .00 | 32.93 | .00 |
| | SLO | 1,198.00 | .00 | .00 | .00 | 34.74 | .00 |
| | VEN | 1,534.00 | .00 | .00 | .00 | 44.47 | .00 |
| SD | SD | 4,476.00 | .00 | .00 | .00 | 129.80 | .00 |
| SED | IMP | 1,561.00 | .00 | .00 | .00 | 45.28 | .00 |
| | KER | 542.00 | .00 | .00 | .00 | 15.72 | .00 |
| | LA | 146.00 | .00 | .00 | .00 | 4.23 | .00 |
| | RIV | 1,070.00 | .00 | .00 | .00 | 31.04 | .00 |
| | SBD | 870.00 | .00 | .00 | .00 | 25.23 | .00 |
| SF | ALA | 2,023.00 | .00 | .00 | .00 | 58.66 | .00 |
| | CC | 1,807.00 | .00 | .00 | .00 | 52.40 | .00 |
| | MRN | 762.00 | .00 | .00 | .00 | 22.09 | .00 |
| | NAP | 520.00 | .00 | .00 | .00 | 15.09 | .00 |
| | SCL | 2,834.00 | .00 | .00 | .00 | 82.18 | .00 |
| | SF | 621.00 | .00 | .00 | .00 | 18.01 | .00 |
| | SM | 1,286.00 | .00 | .00 | .00 | 37.28 | .00 |
| | SOL | 715.00 | .00 | .00 | .00 | 20.73 | .00 |
| | SON | 1,334.00 | .00 | .00 | .00 | 38.69 | .00 |
| SJV | FRE | 3,193.00 | .00 | .00 | .00 | 92.60 | .00 |
| | KER | 2,845.00 | .00 | .00 | .00 | 82.51 | .00 |
| | KIN | 634.00 | .00 | .00 | .00 | 18.39 | .00 |
| | MAD | 1,241.00 | .00 | .00 | .00 | 36.00 | .00 |
| | MER | 1,331.00 | .00 | .00 | .00 | 38.59 | .00 |
| | SJ | 1,787.00 | .00 | .00 | .00 | 51.82 | .00 |
| | STA | 1,667.00 | .00 | .00 | .00 | 48.35 | .00 |
| | TUL | 2,917.00 | .00 | .00 | .00 | 84.60 | .00 |
| SV | BUT | 1,098.00 | .00 | .00 | .00 | 31.85 | .00 |
| | COL | 473.00 | .00 | .00 | .00 | 13.71 | .00 |
| | GLE | 644.00 | .00 | .00 | .00 | 18.69 | .00 |
| | SAC | 2,275.00 | .00 | .00 | .00 | 65.98 | .00 |
| | SHA | 1,249.00 | .00 | .00 | .00 | 36.22 | .00 |
| | SOL | 229.00 | .00 | .00 | .00 | 6.64 | .00 |
| | SUT | 610.00 | .00 | .00 | .00 | 17.68 | .00 |
| | TEH | 615.00 | .00 | .00 | .00 | 17.84 | .00 |
| | YOL | 846.00 | .00 | .00 | .00 | 24.53 | .00 |
| | YUB | 415.00 | .00 | .00 | .00 | 12.05 | .00 |
| *TOTAL 46888 | | 86,742.00 | .00 | .00 | .00 | 2,515.59 | .00 |

01/11/82

# TABLE H

1979 PROCESS RATES AND EMSISSIONS BY COUNTY
CES: 46896
ACTN: ROAD CONSTRUCTION
PRON: ASPHALT PAVING
EAMN: PETROLEUM-EVAP
DIMN: PAVING ASPHALT
PROCESS RATE UNITS: TONS PROCESSED

| AB | COUNTY | PROCESS RATE | CO EMISSIONS (TONS/YEAR) | NOX EMISSIONS (TONS/YEAR) | SOX EMISSIONS (TONS/YEAR) | TOG EMISSIONS (TONS/YEAR) | TSP EMISSIONS (TONS/YEAR) |
|---|---|---|---|---|---|---|---|
| GBV | ALP | 199.00 | .00 | .00 | .00 | .08 | .00 |
| | INY | 18,885.00 | .00 | .00 | .00 | 7.55 | .00 |
| | MNO | 6,781.00 | .00 | .00 | .00 | 2.71 | .00 |
| LC | LAK | 16,858.00 | .00 | .00 | .00 | 6.74 | .00 |
| LT | ED | 11,211.00 | .00 | .00 | .00 | 4.48 | .00 |
| | PLA | 4,620.00 | .00 | .00 | .00 | 1.85 | .00 |
| MC | AMA | 11,971.00 | .00 | .00 | .00 | 4.79 | .00 |
| | CAL | 16,101.00 | .00 | .00 | .00 | 6.44 | .00 |
| | ED | 26,374.00 | .00 | .00 | .00 | 10.55 | .00 |
| | MPA | 9,970.00 | .00 | .00 | .00 | 3.99 | .00 |
| | NEV | 24,549.00 | .00 | .00 | .00 | 9.82 | .00 |
| | PLA | 49,582.00 | .00 | .00 | .00 | 19.83 | .00 |
| | PLU | 7,927.00 | .00 | .00 | .00 | 3.17 | .00 |
| | SIE | 4,666.00 | .00 | .00 | .00 | 1.87 | .00 |
| | TUO | 9,579.00 | .00 | .00 | .00 | 3.83 | .00 |
| NC | DN | 4,617.00 | .00 | .00 | .00 | 1.85 | .00 |
| | HUM | 25,850.00 | .00 | .00 | .00 | 10.34 | .00 |
| | MEN | 24,256.00 | .00 | .00 | .00 | 9.70 | .00 |
| | SON | 5,898.00 | .00 | .00 | .00 | 2.36 | .00 |
| | TRI | 6,609.00 | .00 | .00 | .00 | 2.64 | .00 |
| NCC | MON | 39,649.00 | .00 | .00 | .00 | 15.86 | .00 |
| | SBT | 8,773.00 | .00 | .00 | .00 | 3.51 | .00 |
| | SCR | 28,619.00 | .00 | .00 | .00 | 11.45 | .00 |
| NEP | LAS | 17,094.00 | .00 | .00 | .00 | 6.84 | .00 |
| | MOD | 16,185.00 | .00 | .00 | .00 | 6.47 | .00 |
| | SHA | 2,081.00 | .00 | .00 | .00 | .83 | .00 |
| | SIS | 26,003.00 | .00 | .00 | .00 | 10.40 | .00 |
| SC | LA | 391,827.00 | .00 | .00 | .00 | 156.73 | .00 |
| | ORA | 183,017.00 | .00 | .00 | .00 | 73.21 | .00 |
| | RIV | 85,823.00 | .00 | .00 | .00 | 34.33 | .00 |
| | SBD | 151,560.00 | .00 | .00 | .00 | 60.62 | .00 |
| SCC | SB | 28,015.00 | .00 | .00 | .00 | 11.21 | .00 |
| | SLO | 36,713.00 | .00 | .00 | .00 | 14.69 | .00 |
| | VEN | 85,346.00 | .00 | .00 | .00 | 34.54 | .00 |
| SD | SD | 241,355.00 | .00 | .00 | .00 | 96.54 | .00 |
| SED | IMP | 46,600.00 | .00 | .00 | .00 | 18.64 | .00 |
| | KER | 12,178.00 | .00 | .00 | .00 | 4.87 | .00 |
| | LA | 11,096.00 | .00 | .00 | .00 | 4.44 | .00 |
| | RIV | 53,991.00 | .00 | .00 | .00 | 21.60 | .00 |
| | SBD | 33,570.00 | .00 | .00 | .00 | 13.43 | .00 |
| SF | ALA | 35,939.00 | .00 | .00 | .00 | 14.38 | .00 |
| | CC | 72,787.00 | .00 | .00 | .00 | 29.11 | .00 |
| | MRN | 16,237.00 | .00 | .00 | .00 | 6.49 | .00 |
| | NAP | 5,866.00 | .00 | .00 | .00 | 2.35 | .00 |
| | SCL | 103,792.00 | .00 | .00 | .00 | 41.52 | .00 |
| | SF | 38,949.00 | .00 | .00 | .00 | 15.58 | .00 |
| | SM | 12,860.00 | .00 | .00 | .00 | 5.14 | .00 |
| | SOL | 41,295.00 | .00 | .00 | .00 | 16.52 | .00 |
| | SON | 51,384.00 | .00 | .00 | .00 | 20.55 | .00 |
| SJV | FRE | 115,944.00 | .00 | .00 | .00 | 46.38 | .00 |
| | KER | 70,634.00 | .00 | .00 | .00 | 28.25 | .00 |
| | KIN | 23,139.00 | .00 | .00 | .00 | 9.26 | .00 |
| | MAD | 20,220.00 | .00 | .00 | .00 | 8.09 | .00 |
| | MER | 36,779.00 | .00 | .00 | .00 | 14.71 | .00 |
| | SJ | 60,634.00 | .00 | .00 | .00 | 24.25 | .00 |
| | STA | 43,301.00 | .00 | .00 | .00 | 17.32 | .00 |
| | TUL | 47,665.00 | .00 | .00 | .00 | 19.07 | .00 |
| SV | BUT | 34,344.00 | .00 | .00 | .00 | 13.74 | .00 |
| | COL | 8,669.00 | .00 | .00 | .00 | 3.47 | .00 |
| | GLE | 12,193.00 | .00 | .00 | .00 | 4.88 | .00 |
| | SAC | 129,774.00 | .00 | .00 | .00 | 51.91 | .00 |
| | SHA | 28,130.00 | .00 | .00 | .00 | 11.25 | .00 |
| | SOL | 16,562.00 | .00 | .00 | .00 | 6.62 | .00 |
| | SUT- | 7,153.00 | .00 | .00 | .00 | 2.86 | .00 |
| | TEH | 33,291.00 | .00 | .00 | .00 | 13.32 | .00 |
| | YOL | 19,195.00 | .00 | .00 | .00 | 7.68 | .00 |
| | YUB | 4,640.00 | .00 | .00 | .00 | 1.86 | .00 |
| *TOTAL 46896 | | 2,878,374.00 | .00 | .00 | .00 | 1,151.36 | .00 |

# TABLE J

1979 PROCESS RATES AND EMSISSIONS BY COUNTY
CES: 46904
ACTN: ROAD CONSTRUCTION
PRON: ASPHALT PAVING
EAMN: PETROLEUM-EVAP
DIMN: EMULSIFIED ASPHALT
PROCESS RATE UNITS: TONS PROCESSED

| AB | COUNTY | PROCESS RATE | CO EMISSIONS (TONS/YEAR) | NOX EMISSIONS (TONS/YEAR) | SOX EMISSIONS (TONS/YEAR) | TOG EMISSIONS (TONS/YEAR) | TSP EMISSIONS (TONS/YEAR) |
|---|---|---|---|---|---|---|---|
| GBV | ALP | 10.00 | .00 | .00 | .00 | .10 | .00 |
| | INY | 1,674.00 | .00 | .00 | .00 | 16.74 | .00 |
| | MNO | 806.00 | .00 | .00 | .00 | 8.06 | .00 |
| LC | LAK | 1,853.00 | .00 | .00 | .00 | 18.53 | .00 |
| LT | ED | 195.00 | .00 | .00 | .00 | 3.74 | .00 |
| | PLA | 67.00 | .00 | .00 | .00 | .67 | .00 |
| MC | AMA | 173.00 | .00 | .00 | .00 | 1.73 | .00 |
| | CAL | 194.00 | .00 | .00 | .00 | 1.94 | .00 |
| | ED | 374.00 | .00 | .00 | .00 | 3.74 | .00 |
| | MPA | 101.00 | .00 | .00 | .00 | 1.01 | .00 |
| | NEV | 321.00 | .00 | .00 | .00 | 3.21 | .00 |
| | PLA | 690.00 | .00 | .00 | .00 | 6.90 | .00 |
| | PLU | 520.00 | .00 | .00 | .00 | 5.20 | .00 |
| | SIE | 21.00 | .00 | .00 | .00 | .21 | .00 |
| | TUO | 321.00 | .00 | .00 | .00 | 3.21 | .00 |
| NC | DN | 931.00 | .00 | .00 | .00 | 9.31 | .00 |
| | HUM | 5,662.00 | .00 | .00 | .00 | 56.62 | .00 |
| | MEN | 3,511.00 | .00 | .00 | .00 | 35.11 | .00 |
| | SCN | 37.00 | .00 | .00 | .00 | .37 | .00 |
| | TRI | 476.00 | .00 | .00 | .00 | 4.76 | .00 |
| NCC | MON | 6,707.00 | .00 | .00 | .00 | 67.07 | .00 |
| | SBT | 535.00 | .00 | .00 | .00 | 5.35 | .00 |
| | SCR | 195.00 | .00 | .00 | .00 | 1.95 | .00 |
| NEP | LAS | 645.00 | .00 | .00 | .00 | 6.45 | .00 |
| | MOD | 260.00 | .00 | .00 | .00 | 2.60 | .00 |
| | SHA | 226.00 | .00 | .00 | .00 | 2.26 | .00 |
| | SIS | 1,210.00 | .00 | .00 | .00 | 12.10 | .00 |
| SC | LA | 6,842.00 | .00 | .00 | .00 | 68.42 | .00 |
| | ORA | 1,832.00 | .00 | .00 | .00 | 18.32 | .00 |
| | RIV | 11,529.00 | .00 | .00 | .00 | 115.29 | .00 |
| | SBD | 17,370.00 | .00 | .00 | .00 | 173.70 | .00 |
| SCC | SB | 7,037.00 | .00 | .00 | .00 | 70.37 | .00 |
| | SLO | 3,569.00 | .00 | .00 | .00 | 35.69 | .00 |
| | VEN | 493.00 | .00 | .00 | .00 | 4.93 | .00 |
| SD | SD | 19,911.00 | .00 | .00 | .00 | 199.11 | .00 |
| SED | IMP | 1,040.00 | .00 | .00 | .00 | 10.40 | .00 |
| | KER | 1,855.00 | .00 | .00 | .00 | 18.55 | .00 |
| | LA | 78.00 | .00 | .00 | .00 | .78 | .00 |
| | RIV | 4,879.00 | .00 | .00 | .00 | 48.79 | .00 |
| | SBD | 3,655.00 | .00 | .00 | .00 | 36.55 | .00 |
| SF | ALA | 1,198.00 | .00 | .00 | .00 | 11.98 | .00 |
| | CC | 704.00 | .00 | .00 | .00 | 7.04 | .00 |
| | MRN | 246.00 | .00 | .00 | .00 | 2.46 | .00 |
| | NAP | 102.00 | .00 | .00 | .00 | 1.02 | .00 |
| | SCL | 1,380.00 | .00 | .00 | .00 | 13.80 | .00 |
| | SF | 701.00 | .00 | .00 | .00 | 7.01 | .00 |
| | SM | 642.00 | .00 | .00 | .00 | 6.42 | .00 |
| | SOL | 1,548.00 | .00 | .00 | .00 | 15.48 | .00 |
| | SON | 273.00 | .00 | .00 | .00 | 2.73 | .00 |
| SJV | FRE | 9,462.00 | .00 | .00 | .00 | 94.62 | .00 |
| | KER | 9,825.00 | .00 | .00 | .00 | 98.25 | .00 |
| | KIN | 1,384.00 | .00 | .00 | .00 | 13.84 | .00 |
| | MAD | 1,147.00 | .00 | .00 | .00 | 11.47 | .00 |
| | MER | 1,172.00 | .00 | .00 | .00 | 11.72 | .00 |
| | SJ | 2,961.00 | .00 | .00 | .00 | 29.61 | .00 |
| | STA | 2,323.00 | .00 | .00 | .00 | 23.23 | .00 |
| | TUL | 4,528.00 | .00 | .00 | .00 | 45.28 | .00 |
| SV | BUT | 920.00 | .00 | .00 | .00 | 9.20 | .00 |
| | COL | 86.00 | .00 | .00 | .00 | .86 | .00 |
| | GLE | 142.00 | .00 | .00 | .00 | 1.42 | .00 |
| | SAC | 5,018.00 | .00 | .00 | .00 | 50.18 | .00 |
| | SHA | 3,237.00 | .00 | .00 | .00 | 32.37 | .00 |
| | SOL | 506.00 | .00 | .00 | .00 | 5.06 | .00 |
| | SUT | 328.00 | .00 | .00 | .00 | 3.28 | .00 |
| | TEH | 1,145.00 | .00 | .00 | .00 | 11.45 | .00 |
| | YOL | 719.00 | .00 | .00 | .00 | 7.19 | .00 |
| | YUB | 322.00 | .00 | .00 | .00 | 3.22 | .00 |
| *TOTAL 46904 | | 159,824.00 | .00 | .00 | .00 | 1,600.03 | .00 |