

**Appendix B**

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**Emissions Inventory**

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## **Appendix B: Emissions Inventory**

### **B.1 INTRODUCTION**

This Appendix includes summer average emissions inventories for the San Joaquin Valley Air Basin for the years 2002, 2008, 2011, and 2012, which are the milestone years for serious areas. The baseyear (the year from which the inventory is projected forward and backward) for these inventories is 2002. The year 2005 has been included for control measure development. The years 2014, 2017, 2018, 2020, and 2023 are milestone or modeling years for classifications higher than serious. Table B-3 contains NO<sub>x</sub>, and Table B-4 contains VOC. This Appendix concludes with an overview of emissions inventory calculations and revisions. These summer average (May-October) inventories reflect emissions during the ozone season. Results from EMFAC 2007 have been incorporated into the mobile source portion of the inventories.

The official ARB inventories shown in Tables B-3 and B-4 do not yet include projected reductions for several important recent District rules shown in Table B-1. ARB's adjustments are presented in Table B-2.

**Table B-1 Reductions from District Rules Not Reflected in the Emissions Inventory  
(to be subtracted from O3SIP inventories provided by ARB)**

District Rule		Projected Reductions for Selected Years								
		2002	2005	2008	2011	2012	2014	2017	2020	2023
<b>NOx Reductions</b>										
Rule 4103	Open Burning	0	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Rule 4307 & 4308	Boilers, Steam Generators, and Process Heaters	0	0.00	0.21	0.53	0.64	0.85	1.19	1.53	1.53
Rule 4309	Dryers, Dehydrators, and Ovens	0	0.00	0.60	0.90	0.95	1.00	1.00	1.10	1.10
Rule 4702	Internal Combustion Engines - Phase II	0	-0.97	7.38	12.51	13.62	15.75	15.34	13.03	10.56
Rule 9510	Indirect Source Mitigation – On road	0	0.00	2.70	1.30	1.10	0.40	0.20	0.15	0.10
Rule 9510	Indirect Source Mitigation – Off road	0	0.00	1.10	4.60	5.2	3.80	1.90	1.25	1.00
Rule 9310	School Bus Fleets	0	0.00	0.11	0.35	0.35	0.58	1.35	1.31	1.27
	On-Road Sub-Total for Conformity Budgets	NA	NA	2.81	1.65	NA	0.98	1.55	1.46	1.37
<b>NOx Increases – due to new inventory information</b>										
Rule 4702	Internal Combustion Engines - Phase II	5.53	5.48	5.44	5.40	5.39	5.36	5.32	5.28	5.25
<b>NET DISTRICT NOx ADJUSTMENT To be subtracted from O3SIP inventory</b>		<b>-5.53*</b>	<b>-6.40</b>	<b>6.71</b>	<b>14.84</b>	<b>16.53</b>	<b>17.07</b>	<b>15.71</b>	<b>13.14</b>	<b>10.36</b>
<b>VOC Reductions</b>										
Rule 4570	Confined Animal Feeding Operations	0	0.00	8.88	19.09	19.63	20.70	22.31	23.92	25.52
Rule 4694	Wine Fermentation and Storage	0	0.00	1.23	1.26	1.27	1.29	1.32	1.35	1.38
Rule 4103	Open Burning	0	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Rule 4602 & 4612	Automotive coatings	0	0.00	0	0.83	0.84	0.85	0.86	0.87	0.88
Rule 4401	Steam Enhanced Crude Oil Production Well Vents	0	0.00	1.13	1.08	1.07	1.04	1.00	0.97	0.95
<b>VOC Increases – due to new inventory information</b>										
	Composting Greenwaste	46.6	51.0	53.0	55.0	55.4	62.0	64.0	67.0	70.0
	Composting Biosolids	8.5	9.1	9.8	9.9	10.2	10.1	10.2	10.3	10.4
<b>NET DISTRICT VOC ADJUSTMENT To be subtracted from O3SIP inventory</b>		<b>-55.1*</b>	<b>-60.2*</b>	<b>-51.5*</b>	<b>-42.6*</b>	<b>-42.8*</b>	<b>-48.2*</b>	<b>-48.7*</b>	<b>-50.1*</b>	<b>-51.6*</b>

\* Please note that subtracting a negative number from O3SIP indicates an increase in the emissions inventory.

Table B-2 ARB Adjustments to Emissions Inventory Baseline

Description	2002	2008	2011	2014	2017	2020	2023
<b>NOx</b>							
Reflash	0.7	11.9	8.9	6.1	3.6	1.7	0.8
Idling	0.0	10.0	11.1	12.2	13.1	14.0	14.8
On-road Moyer	0.4	0.3	0.5	0.5	0.3	0.0	0.0
Off-road Moyer	0.4	0.3	0.6	0.6	0.4	0.0	0.0
On-Road Sub-Total for Conformity Budgets	NA	22.2	20.5	18.8	17.0	15.7	15.6
Off-road (Transportation Refrigeration Unit (TRU), Portable Diesel Engine, and Large Spark Ignition Regulation)	0.0	0.8	2.0	2.0	1.5	1.1	0.7
Ships	0.0	0.0	0.0	0.0	0.1	0.1	0.1
LSI (Large Spark Ignition)	0.0	0.0	0.0	0.2	0.2	0.2	0.3
<b>TOTAL STATE STRATEGY (to be subtracted from O3SIP)</b>	<b>1.5</b>	<b>23.3</b>	<b>23.1</b>	<b>21.6</b>	<b>19.2</b>	<b>17.1</b>	<b>16.7</b>
<b>VOC</b>							
On-road Moyer	0.0	0.0	0.05	0.05	0.0	0.0	0.0
Off-road Moyer	0.0	0.0	0.06	0.06	0.0	0.0	0.0
Off-road (Transportation Refrigeration Unit (TRU), Portable Diesel Engine, and Large Spark Ignition Regulation)	0.8	1.4	1.4	1.4	1.4	1.5	1.4
Consumer Products	0.0	1.0	1.0	1.1	1.2	1.2	1.3
<b>TOTAL STATE STRATEGY (to be subtracted from O3SIP)</b>	<b>0.8</b>	<b>2.4</b>	<b>2.5</b>	<b>2.6</b>	<b>2.6</b>	<b>2.7</b>	<b>2.7</b>

**B.2 EMISSIONS INVENTORY TABLES**

**Table B-3 Summer Average Nitrogen Oxides (NOx) Emissions Inventory, tons per day**  
(O3SIP (v1.06\_RF980))

<b>SUMMARY CATEGORY NAME</b>	<b>2002</b>	<b>2005</b>	<b>2008</b>	<b>2011</b>	<b>2012</b>	<b>2014</b>	<b>2017</b>	<b>2018</b>	<b>2020</b>	<b>2023</b>
<b>STATIONARY SOURCES</b>										
<b>FUEL COMBUSTION</b>										
ELECTRIC UTILITIES	3.1	3.3	3.0	3.2	3.2	3.2	3.3	3.4	3.5	3.6
COGENERATION	10.6	10.0	7.1	7.3	7.4	7.5	7.8	7.9	8.2	8.4
OIL AND GAS PRODUCTION (COMBUSTION)	15.5	11.2	10.2	9.9	9.9	9.8	9.7	9.7	9.7	9.7
PETROLEUM REFINING (COMBUSTION)	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
MANUFACTURING AND INDUSTRIAL	36.6	37.7	39.4	41.3	42.0	43.5	45.3	45.8	46.9	47.5
FOOD AND AGRICULTURAL PROCESSING	25.0	24.1	21.7	20.0	19.4	18.1	16.0	15.3	13.7	11.2
SERVICE AND COMMERCIAL	4.6	4.4	4.5	4.5	4.5	4.6	4.6	4.6	4.6	4.6
OTHER (FUEL COMBUSTION)	1.9	1.6	1.4	1.3	1.2	1.2	1.1	1.0	1.0	1.0
<b>* TOTAL FUEL COMBUSTION</b>	<b>97.6</b>	<b>92.5</b>	<b>87.4</b>	<b>87.7</b>	<b>87.8</b>	<b>87.9</b>	<b>87.9</b>	<b>87.8</b>	<b>87.6</b>	<b>86.1</b>
<b>WASTE DISPOSAL</b>										
SEWAGE TREATMENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LANDFILLS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INCINERATORS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOIL REMEDIATION	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (WASTE DISPOSAL)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>* TOTAL WASTE DISPOSAL</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>
<b>CLEANING AND SURFACE COATINGS</b>										
LAUNDERING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DEGREASING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
COATINGS AND RELATED PROCESS SOLVENTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PRINTING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ADHESIVES AND SEALANTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (CLEANING AND SURFACE COATINGS)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>* TOTAL CLEANING AND SURFACE COATINGS</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
<b>PETROLEUM PRODUCTION AND MARKETING</b>										
OIL AND GAS PRODUCTION	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PETROLEUM REFINING	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
PETROLEUM MARKETING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (PETROLEUM PRODUCTION AND MARKETING)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

<b>SUMMARY CATEGORY NAME</b>	<b>2002</b>	<b>2005</b>	<b>2008</b>	<b>2011</b>	<b>2012</b>	<b>2014</b>	<b>2017</b>	<b>2018</b>	<b>2020</b>	<b>2023</b>
<b>* TOTAL PETROLEUM PRODUCTION AND MARKETING</b>	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
<b>INDUSTRIAL PROCESSES</b>										
CHEMICAL	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4
FOOD AND AGRICULTURE	9.4	9.3	9.1	9.0	9.0	9.0	8.9	8.9	8.8	8.7
MINERAL PROCESSES	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2
METAL PROCESSES	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
WOOD AND PAPER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GLASS AND RELATED PRODUCTS	9.6	9.4	8.0	8.6	8.7	9.1	9.6	9.8	10.1	10.6
OTHER (INDUSTRIAL PROCESSES)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
<b>* TOTAL INDUSTRIAL PROCESSES</b>	21.8	21.5	20.2	20.8	21.0	21.5	22.1	22.3	22.7	23.3
<b>** TOTAL STATIONARY SOURCES</b>	119.8	114.5	108.0	108.9	109.3	109.9	110.5	110.6	110.8	109.9
<b>AREA-WIDE SOURCES</b>										
<b>SOLVENT EVAPORATION</b>										
CONSUMER PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES/FERTILIZERS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ASPHALT PAVING / ROOFING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>* TOTAL SOLVENT EVAPORATION</b>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>MISCELLANEOUS PROCESSES</b>										
RESIDENTIAL FUEL COMBUSTION	3.2	3.1	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
FARMING OPERATIONS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CONSTRUCTION AND DEMOLITION	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAVED ROAD DUST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UNPAVED ROAD DUST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FUGITIVE WINDBLOWN DUST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIRES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MANAGED BURNING AND DISPOSAL	8.3	8.2	8.2	8.1	8.1	8.0	8.0	7.9	7.9	7.9
COOKING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER (MISCELLANEOUS PROCESSES)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>* TOTAL MISCELLANEOUS PROCESSES</b>	11.5	11.3	11.1	11.1	11.1	11.0	11.0	11.0	11.0	10.9
<b>** TOTAL AREA-WIDE SOURCES</b>	11.5	11.3	11.1	11.1	11.1	11.0	11.0	11.0	11.0	10.9
<b>MOBILE SOURCES</b>										
<b>ON-ROAD MOTOR VEHICLES</b>										
LIGHT DUTY PASSENGER (LDA)	31.3	21.8	16.7	13.1	11.8	9.7	7.3	6.7	5.7	4.7
LIGHT DUTY TRUCKS - 1 (LDT1)	13.2	9.7	7.4	5.9	5.5	4.6	3.5	3.1	2.7	2.1
LIGHT DUTY TRUCKS - 2 (LDT2)	24.4	19.2	15.1	12.5	11.5	9.9	7.8	7.3	6.4	5.4
MEDIUM DUTY TRUCKS (MDV)	14.7	13.1	10.3	8.6	8.1	7.1	5.8	5.4	4.7	3.8

<b>SUMMARY CATEGORY NAME</b>	<b>2002</b>	<b>2005</b>	<b>2008</b>	<b>2011</b>	<b>2012</b>	<b>2014</b>	<b>2017</b>	<b>2018</b>	<b>2020</b>	<b>2023</b>
LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDV1)	4.9	4.5	3.8	3.7	3.7	3.6	3.6	3.6	3.5	3.5
LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDV2)	1.0	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8
MEDIUM HEAVY DUTY GAS TRUCKS (MHDV)	2.3	2.1	1.7	1.5	1.4	1.3	1.0	0.9	0.8	0.7
HEAVY HEAVY DUTY GAS TRUCKS (HHDV)	2.7	2.4	2.0	1.8	1.7	1.6	1.5	1.4	1.4	1.3
LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1)	0.4	5.4	3.9	3.2	3.0	2.7	2.3	2.2	1.9	1.6
LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV2)	2.3	3.3	2.9	2.5	2.4	2.1	1.7	1.6	1.4	1.1
MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	19.9	21.5	18.4	15.8	14.6	12.2	9.2	8.4	7.1	5.6
HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	199.1	224.2*	237.3	198.6	184.1	156.2	121.0	111.5	96.1	81.8
MOTORCYCLES (MCY)	0.7	1.3	1.3	1.4	1.4	1.4	1.5	1.5	1.5	1.6
HEAVY DUTY DIESEL URBAN BUSES (UB)	2.1	2.2	2.2	2.4	2.4	2.4	2.5	2.5	2.5	2.5
HEAVY DUTY GAS URBAN BUSES (UB)	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4
SCHOOL BUSES (SB)	2.2	2.4	2.4	2.5	2.5	2.4	2.4	2.3	2.3	2.2
OTHER BUSES (OB)	0.9	1.1	1.0	0.9	0.9	0.8	0.6	0.6	0.5	0.4
MOTOR HOMES (MH)	1.3	1.1	1.0	0.9	0.9	0.8	0.6	0.6	0.5	0.4
<b>* TOTAL ON-ROAD MOTOR VEHICLES</b>	<b>323.5</b>	<b>336.5</b>	<b>328.4</b>	<b>276.4</b>	<b>256.9</b>	<b>219.8</b>	<b>173.3</b>	<b>160.7</b>	<b>140.1</b>	<b>120.1</b>
<b>OTHER MOBILE SOURCES</b>										
AIRCRAFT	2.9	3.0	4.1	4.5	4.6	4.8	5.0	5.1	5.2	5.3
TRAINS	28.5	23.6	21.1	20.4	20.5	20.7	21.0	21.2	21.5	22.0
SHIPS AND COMMERCIAL BOATS	1.2	1.3	1.3	1.3	1.3	1.3	1.4	1.5	1.6	1.8
RECREATIONAL BOATS	3.9	5.0	5.6	5.5	5.5	5.6	5.7	5.7	5.7	5.8
OFF-ROAD RECREATIONAL VEHICLES	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3
OFF-ROAD EQUIPMENT	75.6	70.5	62.6	54.9	52.1	46.5	38.5	36.3	32.4	28.1
FARM EQUIPMENT	71.2	64.0	55.4	48.1	44.7	38.5	30.4	27.9	23.4	18.0
FUEL STORAGE AND HANDLING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>* TOTAL OTHER MOBILE SOURCES</b>	<b>183.5</b>	<b>167.6</b>	<b>150.2</b>	<b>134.9</b>	<b>128.9</b>	<b>117.5</b>	<b>102.2</b>	<b>97.8</b>	<b>90.0</b>	<b>81.1</b>
<b>** TOTAL MOBILE SOURCES</b>	<b>507.0</b>	<b>504.2</b>	<b>478.6</b>	<b>411.3</b>	<b>385.9</b>	<b>337.3</b>	<b>275.5</b>	<b>258.5</b>	<b>230.2</b>	<b>201.3</b>
<b>GRAND TOTAL FOR SAN JOAQUIN VALLEY</b>	<b>638.3</b>	<b>629.9*</b>	<b>597.8</b>	<b>531.4</b>	<b>506.2</b>	<b>458.2</b>	<b>397.0</b>	<b>380.1</b>	<b>351.9</b>	<b>322.1</b>

\* The 2005 value for HHDDV includes a factor to correct an EMFAC2007 error.



**Table B-4 Summer Average Volatile Organic Compounds (VOC), tons per day  
(O3SIP (v1.06\_RF980))**

<b>SUMMARY CATEGORY NAME</b>	<b>2002</b>	<b>2005</b>	<b>2008</b>	<b>2011</b>	<b>2012</b>	<b>2014</b>	<b>2017</b>	<b>2018</b>	<b>2020</b>	<b>2023</b>
<b>STATIONARY SOURCES</b>										
<b>FUEL COMBUSTION</b>										
ELECTRIC UTILITIES	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6
COGENERATION	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5
OIL AND GAS PRODUCTION (COMBUSTION)	3.1	3.3	3.3	3.2	3.2	3.2	3.3	3.3	3.3	3.4
PETROLEUM REFINING (COMBUSTION)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MANUFACTURING AND INDUSTRIAL	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5
FOOD AND AGRICULTURAL PROCESSING	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.3
SERVICE AND COMMERCIAL	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
OTHER (FUEL COMBUSTION)	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
<b>* TOTAL FUEL COMBUSTION</b>	<b>7.3</b>	<b>7.6</b>	<b>7.6</b>	<b>7.5</b>	<b>7.5</b>	<b>7.5</b>	<b>7.6</b>	<b>7.6</b>	<b>7.6</b>	<b>7.7</b>
<b>WASTE DISPOSAL</b>										
SEWAGE TREATMENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LANDFILLS	1.5	1.6	1.7	1.8	1.8	1.8	1.9	2.0	2.0	2.1
INCINERATORS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SOIL REMEDIATION	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
OTHER (WASTE DISPOSAL)	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7
<b>* TOTAL WASTE DISPOSAL</b>	<b>2.1</b>	<b>2.2</b>	<b>2.3</b>	<b>2.4</b>	<b>2.5</b>	<b>2.6</b>	<b>2.7</b>	<b>2.7</b>	<b>2.8</b>	<b>2.9</b>
<b>CLEANING AND SURFACE COATINGS</b>										
LAUNDERING	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
DEGREASING	8.7	1.5	1.5	1.5	1.5	1.5	1.6	1.6	1.6	1.6
COATINGS AND RELATED PROCESS SOLVENTS	7.8	7.7	8.2	8.8	9.0	9.5	10.0	10.2	10.5	11.0
PRINTING	1.6	1.7	1.7	1.8	1.9	2.0	2.1	2.1	2.2	2.3
ADHESIVES AND SEALANTS	3.0	3.2	3.3	3.5	3.6	3.7	3.9	3.9	4.1	4.3
OTHER (CLEANING AND SURFACE COATINGS)	3.0	3.4	3.7	4.1	4.2	4.4	4.7	4.8	5.0	5.3
<b>* TOTAL CLEANING AND SURFACE COATINGS</b>	<b>24.2</b>	<b>17.4</b>	<b>18.5</b>	<b>19.8</b>	<b>20.2</b>	<b>21.2</b>	<b>22.3</b>	<b>22.7</b>	<b>23.4</b>	<b>24.6</b>
<b>PETROLEUM PRODUCTION AND MARKETING</b>										
OIL AND GAS PRODUCTION	29.8	27.9	27.5	26.5	26.1	25.5	24.7	24.5	24.0	23.4
PETROLEUM REFINING	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
PETROLEUM MARKETING	7.2	7.5	7.9	8.3	8.5	8.7	9.1	9.2	9.5	9.9
OTHER (PETROLEUM PRODUCTION AND MARKETING)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>* TOTAL PETROLEUM PRODUCTION AND MARKETING</b>	<b>37.7</b>	<b>36.1</b>	<b>36.1</b>	<b>35.5</b>	<b>35.3</b>	<b>34.9</b>	<b>34.5</b>	<b>34.4</b>	<b>34.2</b>	<b>34.1</b>
<b>INDUSTRIAL PROCESSES</b>										
CHEMICAL	2.2	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.4
FOOD AND AGRICULTURE	12.8	12.7	13.0	13.3	13.4	13.7	14.0	14.1	14.4	14.7
MINERAL PROCESSES	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5

<b>SUMMARY CATEGORY NAME</b>	<b>2002</b>	<b>2005</b>	<b>2008</b>	<b>2011</b>	<b>2012</b>	<b>2014</b>	<b>2017</b>	<b>2018</b>	<b>2020</b>	<b>2023</b>
METAL PROCESSES	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.6
WOOD AND PAPER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GLASS AND RELATED PRODUCTS	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5
OTHER (INDUSTRIAL PROCESSES)	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
<b>* TOTAL INDUSTRIAL PROCESSES</b>	<b>16.3</b>	<b>16.5</b>	<b>17.0</b>	<b>17.5</b>	<b>17.7</b>	<b>18.1</b>	<b>18.7</b>	<b>18.9</b>	<b>19.3</b>	<b>20.1</b>
<b>** TOTAL STATIONARY SOURCES</b>	<b>87.6</b>	<b>79.8</b>	<b>81.5</b>	<b>82.8</b>	<b>83.2</b>	<b>84.3</b>	<b>85.8</b>	<b>86.3</b>	<b>87.3</b>	<b>89.4</b>
<b>AREA-WIDE SOURCES</b>										
SOLVENT EVAPORATION										
CONSUMER PRODUCTS	25.1	23.5	24.0	25.1	25.6	26.6	28.1	28.6	29.6	31.2
ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	13.6	11.1	11.4	11.7	11.8	12.0	12.4	12.5	12.8	13.3
PESTICIDES/FERTILIZERS	23.3	22.9	22.2	21.7	21.6	21.4	21.2	21.1	21.0	20.9
ASPHALT PAVING / ROOFING	2.9	3.0	3.0	3.0	3.0	3.1	3.1	3.1	3.1	3.1
<b>* TOTAL SOLVENT EVAPORATION</b>	<b>65.0</b>	<b>60.4</b>	<b>60.6</b>	<b>61.5</b>	<b>62.0</b>	<b>63.1</b>	<b>64.8</b>	<b>65.4</b>	<b>66.5</b>	<b>68.5</b>
MISCELLANEOUS PROCESSES										
RESIDENTIAL FUEL COMBUSTION	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
FARMING OPERATIONS	62.0	65.4	68.7	72.5	74.0	76.9	81.4	82.9	85.9	90.3
CONSTRUCTION AND DEMOLITION	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAVED ROAD DUST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
UNPAVED ROAD DUST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FUGITIVE WINDBLOWN DUST	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIRES	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
MANAGED BURNING AND DISPOSAL	13.7	13.6	13.5	13.5	13.4	13.4	13.3	13.2	13.2	13.1
COOKING	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6
OTHER (MISCELLANEOUS PROCESSES)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>* TOTAL MISCELLANEOUS PROCESSES</b>	<b>76.8</b>	<b>80.0</b>	<b>83.3</b>	<b>86.9</b>	<b>88.4</b>	<b>91.3</b>	<b>95.7</b>	<b>97.2</b>	<b>100.1</b>	<b>104.5</b>
<b>** TOTAL AREA-WIDE SOURCES</b>	<b>141.8</b>	<b>140.5</b>	<b>143.9</b>	<b>148.4</b>	<b>150.4</b>	<b>154.4</b>	<b>160.5</b>	<b>162.5</b>	<b>166.6</b>	<b>173.0</b>
<b>MOBILE SOURCES</b>										
ON-ROAD MOTOR VEHICLES										
LIGHT DUTY PASSENGER (LDA)	40.0	31.1	23.9	19.1	17.5	14.6	11.6	10.8	9.6	8.4
LIGHT DUTY TRUCKS - 1 (LDT1)	14.2	11.6	9.1	7.4	6.9	6.0	4.8	4.5	4.0	3.6
LIGHT DUTY TRUCKS - 2 (LDT2)	17.7	15.8	13.2	12.0	11.5	10.4	9.1	8.8	8.3	7.8
MEDIUM DUTY TRUCKS (MDV)	9.5	8.6	7.2	6.7	6.5	6.1	5.6	5.4	5.1	4.7
LIGHT HEAVY DUTY GAS TRUCKS - 1 (LHDV1)	6.1	5.1	3.4	2.8	2.7	2.5	2.3	2.3	2.2	2.0
LIGHT HEAVY DUTY GAS TRUCKS - 2 (LHDV2)	1.3	1.2	0.9	0.8	0.7	0.6	0.5	0.5	0.5	0.4
MEDIUM HEAVY DUTY GAS TRUCKS (MHDV)	3.6	2.9	2.2	1.7	1.5	1.2	0.8	0.7	0.5	0.4
HEAVY HEAVY DUTY GAS TRUCKS (HHDV)	1.5	1.2	0.9	0.7	0.7	0.6	0.4	0.4	0.3	0.3
LIGHT HEAVY DUTY DIESEL TRUCKS - 1 (LHDV1)	0.0	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1
LIGHT HEAVY DUTY DIESEL TRUCKS - 2 (LHDV2)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
MEDIUM HEAVY DUTY DIESEL TRUCKS (MHDV)	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3
HEAVY HEAVY DUTY DIESEL TRUCKS (HHDV)	14.6	16.0*	17.1	14.8	14.0	12.3	10.0	9.4	8.4	7.3
MOTORCYCLES (MCY)	3.6	6.1	5.5	5.3	5.3	5.3	5.4	5.5	5.6	5.9

<b>SUMMARY CATEGORY NAME</b>	<b>2002</b>	<b>2005</b>	<b>2008</b>	<b>2011</b>	<b>2012</b>	<b>2014</b>	<b>2017</b>	<b>2018</b>	<b>2020</b>	<b>2023</b>
HEAVY DUTY DIESEL URBAN BUSES (UB)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
HEAVY DUTY GAS URBAN BUSES (UB)	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2
SCHOOL BUSES (SB)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
OTHER BUSES (OB)	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
MOTOR HOMES (MH)	0.5	0.4	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.0
<b>* TOTAL ON-ROAD MOTOR VEHICLES</b>	<b>113.9</b>	<b>101.7</b>	<b>85.2</b>	<b>73.1</b>	<b>68.9</b>	<b>61.1</b>	<b>52.1</b>	<b>49.6</b>	<b>45.7</b>	<b>41.9</b>
<b>OTHER MOBILE SOURCES</b>										
AIRCRAFT	6.6	6.8	8.7	9.5	9.7	9.9	10.4	10.5	10.8	10.9
TRAINS	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
SHIPS AND COMMERCIAL BOATS	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
RECREATIONAL BOATS	20.3	20.5	19.2	17.9	17.6	17.1	16.8	16.7	16.6	16.8
OFF-ROAD RECREATIONAL VEHICLES	5.8	7.2	7.8	8.4	8.6	9.2	10.1	10.5	11.3	12.5
OFF-ROAD EQUIPMENT	22.1	22.0	18.9	16.3	15.6	14.2	12.7	12.3	11.7	11.5
FARM EQUIPMENT	14.6	13.3	11.2	9.5	8.7	7.2	5.5	5.0	4.2	3.5
FUEL STORAGE AND HANDLING	5.2	5.1	3.6	3.0	2.8	2.5	2.3	2.2	2.1	2.0
<b>* TOTAL OTHER MOBILE SOURCES</b>	<b>76.3</b>	<b>76.6</b>	<b>70.9</b>	<b>66.2</b>	<b>64.6</b>	<b>61.9</b>	<b>59.4</b>	<b>58.9</b>	<b>58.4</b>	<b>58.8</b>
<b>** TOTAL MOBILE SOURCES</b>	<b>190.2</b>	<b>178.3</b>	<b>156.1</b>	<b>139.3</b>	<b>133.5</b>	<b>123.0</b>	<b>111.5</b>	<b>108.5</b>	<b>104.2</b>	<b>100.7</b>
<b>GRAND TOTAL FOR SAN JOAQUIN VALLEY</b>	<b>419.6</b>	<b>398.6*</b>	<b>381.5</b>	<b>370.6</b>	<b>367.2</b>	<b>361.7</b>	<b>357.7</b>	<b>357.3</b>	<b>358.1</b>	<b>363.0</b>

\* The 2005 value for HHDDV includes a factor to correct an EMFAC2007 error.

### B.3 EMISSIONS INVENTORY CALCULATIONS AND REVISIONS

Emissions are estimated in a variety of ways. Some point and mobile sources may have emissions source tests or continuous emissions monitoring, which can provide direct tabulation of emission rates. Data from source-specific emission tests or continuous emission monitors are usually preferred for estimating a source's emissions because those data provide the best representation of the source's emissions.

Typically, the mobile source inventory is based on population, activity rates, fuel specifications, and emissions of typical vehicles. For area sources, estimates are made based on 'surrogate' data that is assumed to be proportional to emissions, such as population, employment, economic data or some type of human activity. If no emissions data are available for a particular source, the District may send a survey to businesses that are identified as producing emissions from that source. The survey typically requests data that are used to estimate emissions. Each of the local air districts estimates the emissions for the stationary sources within its jurisdiction.

Emissions from natural sources are typically estimated by conducting a scientific study. ARB estimates emissions of biogenic volatile organic compounds (BVOCs) from vegetation for natural areas, crops, and urban vegetation. BVOC emissions are functions of the species leaf mass, emission factors, temperature, and light conditions. Other pollutants (e.g. NO<sub>x</sub>) also have biogenic sources.

#### B.3.1 Emission Factors and Emission Equations

The general equation for emission estimation is:

$$E = A \times EF \times (1 - ER/100)$$

where:

E = emissions

A = activity rate

EF = emission factor

ER = overall emission reduction efficiency, percent

An emission factor relates the quantity of a pollutant emitted into the atmosphere to an activity associated with the pollutant's release. Such factors may be used in equations to estimate emissions from a process where source specific data is not available. Emission factors are typically expressed as the weight of pollutant divided by a unit weight, area, volume, distance, or duration of the activity emitting the pollutant. In most cases, these factors are simply averages of all available data of acceptable quality, and are generally assumed to be representative of long-term averages for all facilities in the source category. EPA publishes emission factors for many emissions categories in the document entitled AP-42.

Once an emission factor is determined, the next step is to determine the population (number of sources) and extent of each source. Population data is collected directly and indirectly. For example, vehicle registration data are gathered by the state. Stationary sources must obtain a permit from the District; therefore, populations of permitted equipment are directly obtained and are reasonably accurate. The number of fireplaces is not reported and must be estimated indirectly using housing statistics and surveys. Each source category has its own methodology.

The next step is to determine an activity rate. Activity data is reported in hours of operation, gallons of fuel used, miles traveled, and other units. Stationary sources of emissions permitted by the District are required to report actual emissions to ensure that they remain below their emission limits. This provides detailed activity data that is used in the emissions inventory. In other cases, facility operators can inform the District of their actual production figures or fuel burned. A survey is often carried out to determine usage rates.

### **B.3.2 Emissions Inventory Updates**

The District, in cooperation with the ARB, is committed to continually updating the emissions inventory as research, emission factor updates, and other information become available. When emissions data change dramatically, the District is committed to revising the inventory and ensuring that any impact is reflected in the control strategy and the attainment demonstration.

The District re-evaluates the emissions inventory on a regular basis to ensure that the inventory is accurate and current. Major point sources are typically re-evaluated every year. Area sources are scheduled to be re-evaluated every one to five years. Seventy-five area source categories were updated during the period from 2003 to 2006.

The District updates emissions growth estimates on a periodic basis. Ten source categories are being examined in 2006 to reevaluate growth trends. The District also revises emissions estimates based on the effects of District prohibitory rules on an emissions source category. Approximately sixty-eight District prohibitory rules will be examined in 2006 to evaluate emissions controls and the effect of the rule requirements on the emissions inventory.

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