Chapter 3 - Emission Inventory

3 EMISSIONS INVENTORY

3.1 INTRODUCTION

This chapter discusses the emissions inventory (EI) as related to ozone attainment demonstrations for the SJVAB. The two principal components of OADP EIs are a baseline year and future year projections. The projections reflect emissions reductions stemming from implementation of controls as well as emissions increases stemming from growth. Future year emissions are used as input to a grid-based photochemical computer model that simulates physical and chemical processes in the atmosphere and predicts future ozone levels. Comparison of the magnitude and frequency of the predicted future ozone levels with the national ambient air quality standards allows a demonstration of attainment from the emission controls. The baseline year and future year EIs were developed to reflect emissions of volatile organic compounds (VOCs) and nitrogen oxides (NOx) during the ozone season (May through October). Ozone is not emitted directly into the atmosphere, and thus it does not appear in an emissions inventory. Ozone is created through a photochemical reaction between VOCs and NOx in the presence of sunlight. NOx and VOCs, which are termed ozone precursors, are directly emitted and can be measured as emitted or estimated using parameters that can be easily measured; therefore, they are included in the EI. The EI identifies the sources and quantities of these precursors. VOC emissions from society's activities generally result from evaporation of liquids, release of gaseous VOCs, and incomplete combustion. NOx emissions are primarily the result of high temperature combustion.

Section 3.2 describes the types of emission inventories, Section 3.3 describes the baseline year inventory, and Section 3.4 describes development of the future year inventory. Section 3.5 discusses conformity, and Section 3.6 discusses emission inventory uncertainties. Conclusions are presented in Section 3.7.

3.2 INVENTORY TYPES

An EI is a compilation of emission sources and corresponding quantities of air pollutants emitted per unit time (e.g., tons/day) for a specified time period (e.g., 1990, ozone season 2002, etc.). The two basic types of EIs are modeling and planning inventories; each has a different purpose in the overall air quality planning process, and each reflects a different compilation of emission sources.

3.2.1 Modeling Inventory

The modeling inventory typically represents emissions that occurred on specific days when ambient ozone levels exceeded the NAAQS at locations within the SJVAB. Modeling inventories are used to help understand the conditions that create the high ozone levels and to evaluate emission control measures needed to attain the ozone NAAQS. Modeling EIs therefore include all sources of VOCs and NOx that could be contributing to the problem: anthropogenic (caused by human activity), biogenic (e.g., caused by plants, molds, and animals) and geogenic (e.g., caused by earth processes such as oil seeps). Biogenic and geogenic sources can emit significant quantities of pollutants. Modeling inventories, meteorological conditions, and emission control effectiveness are all used as input to photochemical models to demonstrate that implementation of specified emission control programs will result in attainment of the ozone NAAQS. Also, the spatial coverage of modeling inventories extends beyond the SJVAB boundaries to capture transport and other processes affecting high ozone levels on specific days.

EIs used in the District's attainment demonstration plans are based on data contained in the ARB's California Emission Inventory Development and Reporting Air System (CEIDARS), the California Emission Forecasting System (CEFS), and the Central California Ozone Study (CCOS). The emissions inventory used for model calibration is "day specific." It represents the emissions that occurred when the federal standard for ozone was exceeded in the SJVAB. The use of day specific emissions allows model results to be compared to and calibrated with measured ozone levels.

Modeling inventories encompass an area larger than the SJVAB. The modeling domain is divided into a grid system composed of 4 Km by 4 Km grid cells defined by Universal Transverse Mercator (UTM) coordinates (see Chapter 5). Modelers allocate stationary and mobile source emissions to individual grid cells within this system. They locate area source emissions using readily measured parameters whose behavior would correlate with emissions (e.g., population density). In general, the modeling emission data features episodic-day emissions for the base year. Seasonal variations in activity levels are taken into account in developing gridded stationary point and area source emissions. Variations in temperature, hours of operation, speed of motor vehicles, or other factors are considered in developing gridded motor vehicle emissions. Finally emissions used for modeling are assigned to chemical classes depending on their reactivity in producing ozone in the atmosphere. Hence, "gridded" emissions data used for ozone modeling applications differ from the average annual day or planning inventory emission data in two respects: 1) the modeling region covers larger geographic areas than the SJVAB; and 2) emissions represent day-specific estimates instead of average or seasonal conditions for the base year.

For seasonal sources, emissions were determined by calculating the number of operating days in 1999 during the ozone season and dividing the total emissions for the season by the number of days that the activity occurred during the season. For non-seasonal point sources, emissions for an average operating day were calculated by dividing the facility's total emissions for 1999 by the number of operating days throughout 1999 that the facility operated.

Unlike area and point sources, the motor vehicle emissions inventory was temperature adjusted to represent a typical "summertime" day. Emissions factors for motor vehicles reflect temperature and activity data (vehicle miles traveled, speed, etc.) for six daily time periods. The emissions accounted for in the District's planning inventories are based on the California mobile emission model EMFAC2002.

3.2.2 Planning Inventory

The planning inventory represents a "typical" summer day during the seasonal time period in which ambient air quality standards are violated. For example, the ozone planning inventory is based on daily emissions that occurred during the ozone season, May through October. Although the modeling and planning inventories are based on the same data, the planning inventory is better suited for summary representation of emissions and for fulfilling regulatory requirements. The planning inventory is geared towards complying with emission reduction requirements and the role of control measures in meeting those requirements; it therefore includes only anthropogenic emission sources and does not include biogenic or geogenic emissions. The planning inventory also only includes sources within the SJVAB boundaries.

3.2.3 Data Sources and Accuracy

The bulk of the SJVAB EI is actually estimated rather than directly measured. Multiplying an emission factor by an activity level produces an estimated emission; if the source has a pollutant control device or technique applied, emission estimates are reduced to reflect the efficiency of the pollution control. Emission factors relate air pollutant emission rates (usually mass per unit time) to an easy-to-measure activity level for various types of sources (typically the factors are available for major air pollutant sources found in many regions and states). For example, emission factors for engine operation may use horsepower or gallons of fuel consumed to determine emissions. The emission estimates for most point sources (specific facilities) are more reliable than the estimates for generic classes of sources because emissions from point sources are usually tested, and the test results are used to generate the emission factors. Furthermore, facility operators can inform the District of their actual production figures or fuel burned, thereby eliminating the need for the District to estimate this type of data. In addition, some major sources are equipped with automated emissions monitoring equipment that directly measures emissions to the atmosphere and eliminates the needs for estimations.

Estimating area source emissions is more difficult. Point source estimating techniques are often used, but with less reliability. For example, determining the amounts of specific consumer products used within the SJVAB entails making estimates and assumptions and consulting a variety of data sources that might describe an easily-measured parameter (such as regional sales for a class of product) but do not provide needed information such as location and quantity of use of individual products. Consequently, the resultant quality of the data is not as good as data from point sources and point source tests. Area source emissions estimates often are based on total activity during a season and do not provide much information about typical use, daily activity, or exact location of the source.

Because of the variety of data used to compile EIs and the calculations performed on these data, emissions estimates vary in their accuracy. For example, emissions directly measured by a continuous emissions monitor are generally more accurate than emissions estimated from activity levels, emission factors and control efficiencies. Emissions data in this OADP are reported to the nearest 0.1 tons (200 lbs)/day (with one or two exceptions), even though this level of accuracy may not be representative of all of the inventory source types.

3.2.4 Emission Source Types

3.2.4.1 Stationary Sources

Theoretically, stationary sources are divided into two major subcategories: point and area sources. However, for EI purposes, only point sources are categorized as stationary sources. Point sources are generally large emitters with one or more emissions points at a permitted facility with an identified location. Examples include food processing facilities, oil production and refinery facilities, steam generators, boilers, process heaters, stationary piston engines, glass manufacturing, and mining operations. The emissions from point sources are generally calculated using emission factors obtained from direct measurements (e.g., source testing), EPA's document entitled, *Compilation of Air Pollutant Emissions Factors* (AP-42), or ARB's material balance formula. The simplest method of calculating emissions is to multiply the process rate (how much or how often an activity occurs) by an emissions factor (mass of air pollutant emitted per unit time of activity) and a control factor (percent of emissions not allowed to reach the atmosphere). For most point sources, facility operators provide the process rates (activity levels) that are necessary for emission calculations. Some point sources are equipped with continuous emissions monitoring equipment that provides direct measurement of selected pollutants as they are emitted from a stack to the atmosphere. For these sources, emissions are directly measured and need not be estimated using emission factors and activity levels.

3.2.4.2 Area Sources

ARB and the District jointly develop the area source emission inventories, with the ARB responsible for about two-thirds of the sources and the District for the remaining one-third. Area source categories are divided into two types: aggregated point and area-wide. Aggregated point sources are many small point sources, or facilities, that are not inventoried individually, but are estimated as a group and reported as a single source category. Examples of aggregated point sources include residential water heaters, dry cleaning operations, and automobile service stations. Area-wide sources include many dispersed sources that emit pollutants over a broad geographic area and are not reported in the stationary source inventory. Examples of area-wide sources include consumer products (e.g., nail polish, hair spray, aftershave, household cleaners, paints, windshield washer fluid); home-use pesticides; asphalt paving; pavement-marking paints; off-gassing of manufactured products; residential fuel combustion; farming operations; construction and demolition; road dust; fires; waste burning; and utility equipment.

3.2.4.3 Mobile Sources

ARB develops on-road and non-road mobile source emissions estimates, and maintains a comprehensive compilation of emission factors. These factors are combined with appropriate activity levels and estimates of control measure effectiveness to calculate the emissions (the computer tool used to calculate mobile emissions is referred to as “EMFAC”, although the term “EMFAC” is often used to also describe the final calculated emission estimates). As ARB releases new versions of EMFAC, they are named with the year of release and usually version number within a given year (e.g., EMFAC2002, v. 2.2).

The mobile source category “on-road motor vehicles” includes light duty passenger vehicles, light- and medium-duty trucks, heavy-duty trucks (gas and diesel), heavy-duty urban buses (diesel) and motorcycles. Motor vehicle emissions occur both through the exhaust pipe and from fuel evaporation. ARB uses a complex methodology to calculate the number of motor vehicles, their age and speed distribution, and the resulting emissions of NOx, total organic gases (TOG), reactive organic gases (ROG), carbon monoxide (CO), sulfur oxides (SOx), and particulate matter (PM10). ARB uses EMFAC to develop on-road motor vehicle emission estimates using estimated vehicle miles traveled.

Non-road mobile sources include off-road vehicles such as construction equipment, farm tractors, trains, ships, aircraft (both government, commercial, and private), mobile equipment (forklifts, etc.), and utility equipment (lawn and garden equipment and chain saws).

3.2.4.4 Natural Sources

In addition to man-made air pollution, there are natural sources of emissions, also known as biogenic sources (i.e., plants, molds, and animals,) and geogenic sources (such as oil seeps and other earth processes). These natural sources emit significant quantities of pollutants. For example, certain types of vegetation emit large amounts of isoprene, terpenes, and other organic compounds that are VOC. Emission rates depend upon plant species, season, biomass density, time of day, local temperature, moisture, and other factors.

The SJVAB biogenic VOC emissions inventory, currently estimated at 380 tons per day, has been the subject of recent research and refinements. Seasonal or annual estimates have not been prepared using this updated methodology, but it provides a sense of the magnitude of biogenic emissions during the summer.

3.3 BASELINE YEAR EMISSIONS

The District and ARB developed a well-characterized emissions inventory for 1999 and projected it to years of interest given information on growth trends and control measures that occurred in specific source categories over the time periods of interest. SJVAB emissions for 2000 establish a baseline for evaluating trends out to selected future years (Table 3-1).[1] Carbon monoxide (CO) is included in Table 3-1 because CO can help produce ozone (though it is not typically described as an ozone precursor). The CO emissions in Table 3-1 do not set an emissions budget for conformity (the SJVAB is no longer nonattainment for CO).

Planners calculate the seasonal point source emissions in the EI by applying the fractional monthly throughputs during the ozone season and then dividing the total emissions by the number of days that the activity occurred during the season. Planners calculate non-seasonal point source emissions (average operating day) by dividing the facility's total emissions for a given year by the number of days per year of interest that the facility operated.

Unlike area and point sources, the motor vehicle emissions inventory was temperature adjusted to represent a typical "summertime" day. Emission factors for motor vehicles reflect temperature and activity data (vehicle miles traveled, speed, etc.) for six daily time periods. EMFAC2002, Version 2.2 was used in this document to compute on-road motor vehicle emissions in the planning inventories. Table 3-1 includes the EMFAC2002, Version 2.2 results.

Table 3-1 presents the planning EI for 2000 as well as for 2008 and 2010 (2008 is a Rate of Progress milestone year and 2010 is the target attainment year; note that ROP uses 1990 as a baseline—see Chapter 7). Summer 2000 emissions represent the overall magnitude of emissions that led to the ozone levels occurring during the CCOS episode (see Section 2.4.2.3) used in this *Extreme OADP*.[2] Appendix A presents the county-by-county 2008 and 2010 planning on-road motor vehicle emissions inventories, of which VOC and NOx emissions form the basis of conformity budgets developed later in this chapter.

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[1] Note that different baselines are used in this plan for different purposes. Chapter 7 uses 1990 as a baseline for Rate of Progress calculations as required by the Federal Clean Air Act. Chapter 5 uses day-specific emissions from the July/August 2000 CCOS episode as a base case to establish model performance.

[2] As discussed in Section 3.2.1, the modeling inventory gives day-specific emissions by grid cell in the SJVAB and by reactivity class for VOC; because of its complexity and volume, it is not suitable for reproduction or inclusion in this *Extreme OADP* in either tabular or text form.

Table 3-1
SJVAB 2000, 2008 and 2010 Planning Emissions Inventories
(Summer, tons/day, 1999 Base Year)

Source Categories	2000[1] VOC	2008 VOC	2010 VOC	2000[1] CO	2008 CO	2010 CO	2000[1] NOx	2008 NOx	2010 NOx
STATIONARY SOURCES: FUEL COMBUSTION									
Electric Utilities	0.4	0.5	0.5	2.4	2.7	2.8	3.1	3.0	3.1
Cogeneration	0.8	0.9	1.0	7.0	9.3	9.6	9.0	6.1	6.3
Oil and Gas Production (Combustion)	2.7	3.2	3.2	14.4	15.9	15.7	39.6	25.9	25.4
Petroleum Refining (Combustion)	0.1	0.1	0.1	0.4	0.4	0.4	1.5	1.5	1.5
Manufacturing and Industrial	0.3	0.4	0.4	5.7	6.7	6.8	36.5	38.7	39.7
Food and Agricultural Processing	2.7	2.6	2.6	11.1	10.9	10.9	26.9	24.5	23.6
Service and Commercial	1.2	1.3	1.3	3.3	3.4	3.5	13.7	14.2	14.4
Other (Fuel Combustion)	0.2	0.1	1.1	0.7	0.5	0.4	1.8	1.4	1.2
TOTAL FUEL COMBUSTION	**8.4**	**9.1**	**10.2**	**45.0**	**49.8**	**50.1**	**132.1**	**115.3**	**115.3**
STATIONARY SOURCES: WASTE DISPOSAL									
Sewage Treatment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Landfills	2.8	3.3	3.4	0.0	0.0	0.0	0.0	0.0	0.0
Incinerators	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
Soil Remediation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other	0.5	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL WASTE DISPOSAL	**3.3**	**3.9**	**4.0**	**0.0**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**
STATIONARY SOURCES: CLEANING AND SURFACE COATING									
Laundering	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Degreasing	11.1	1.5	1.5	0.0	0.0	0.0	0.0	0.0	0.0
Coatings & Related Process Solvents	13.8	16.5	17.5	0.0	0.0	0.0	0.0	0.0	0.0
Printing	1.5	1.6	1.7	0.0	0.0	0.0	0.0	0.0	0.0
Adhesives and Sealants	0.7	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0
Other	2.8	3.8	4.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL CLEANING AND SURFACE COATINGS	**29.9**	**24.1**	**25.4**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Table 3-1: SJVAB 2000, 2008 and 2010 Planning Emissions Inventories-(cont.)

Source Categories	2000[1] VOC	2008 VOC	2010 VOC	2000[1] CO	2008 CO	2010 CO	2000[1] NOx	2008 NOx	2010 NOx
STATIONARY SOURCES: PETROLEUM PRODUCTION AND MARKETING									
Oil & Gas Production	31.6	32.1	31.4	0.1	0.1	0.12	0.2	0.2	0.2
Petroleum Refining	1.4	1.4	1.4	0.2	0.2	0.2	0.1	0.1	0.1
Petroleum Marketing	6.6	7.1	7.3	0.0	0.1	0.1	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
TOTAL PETROLEUM PROD./MKTG.	39.6	40.6	40.1	0.4	0.4	0.4	0.3	0.3	0.3
STATIONARY SOURCES: INDUSTRIAL PROCESSES									
Chemical	1.9	2.4	2.5	0.0	0.0	0.0	0.1	0.1	0.2
Food/Agricultural	10.7	11.5	11.8	2.2	2.1	2.1	9.2	9.0	9.0
Mineral Processes	0.3	0.4	0.4	0.4	0.4	0.4	1.5	1.7	1.7
Metal Processes	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0
Wood and Paper	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Glass and Related Products	0.1	0.1	0.1	0.3	0.3	0.3	12.0	9.6	10.1
Electronics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other (Industrial Processes)	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL-INDUSTRIAL PROCESSES	**13.3**	**14.6**	**15.1**	**2.9**	**2.9**	**3.0**	**22.9**	**20.5**	**21.0**
TOTAL STATIONARY SOURCES	**94.3**	**92.3**	**94.6**	**48.1**	**53.1**	**53.5**	**155.2**	**136.2**	**136.6**

Table 3-1: SJVAB 2000, 2008 and 2010 Planning Emissions Inventories-(cont.)

Source Categories	2000[1] VOC	2008 VOC	2010 VOC	2000[1] CO	2008 CO	2010 CO	2000[1] NOx	2008 NOx	2010 NOx
AREA SOURCES: SOLVENT EVAPORATION									
Consumer Products	25.2	25.7	26.7	0.0	0.0	0.0	0.0	0.0	0.0
Architectural Coatings and Related Process Solvents	14.1	12.9	13.1	0.0	0.0	0.0	0.0	0.0	0.0
Pesticides/Fertilizers	27.8	24.0	23.4	0.0	0.0	0.0	0.0	0.0	0.0
Asphalt Paving/Roofing	2.8	3.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL SOLVENT EVAPORATION	**70.0**	**65.6**	**66.3**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
AREA SOURCES: MISCELLANEOUS PROCESSES									
Residential Fuel Combustion	0.5	0.5	0.5	5.4	5.6	5.6	3.3	3.0	3.0
Farming Operations	59.8	68.8	71.0	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
Paved Road Dust	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
Fugitive Windblown Dust	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	1.2	1.3	1.3	0.0	0.0	0.0
Waste Burning and Disposal	33.8	32.8	32.6	423.1	414.1	412.2	2.9	2.9	2.8
Cooking	0.4	0.5	0.50	0.0	0.0	0.0	0.0	0.0	0.0
Other (Misc.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL MISCELLANEOUS PROCESSES	**94.6**	**102.7**	**104.7**	**429.6**	**420.9**	**419.1**	**6.2**	**5.9**	**5.8**
TOTAL AREA SOURCES	**164.6**	**168.3**	**171.1**	**429.6**	**420.9**	**419.1**	**6.3**	**5.9**	**5.9**

Table 3-1: SJVAB 2000, 2008 and 2010 Planning Emissions Inventories-(cont.)

Source Categories	2000[1] VOC	2008 VOC	2010 VOC	2000[1] CO	2008 CO	2010 CO	2000[1] NOx	2008 NOx	2010 NOx
MOBILE SOURCES: ON-ROAD MOTOR VEHICLES [4]									
Light Duty Passenger (LDA)	47.2	23.0	19.2	459.1	240.3	202.5	40.6	19.4	16.1
Light Duty Trucks-1 (LDT1)	23.7	14.5	12.5	291.0	163.7	138.6	24.9	13.1	11.0
Light Duly trucks-2 (LDT2)	15.7	10.4	9.4	195.5	117.4	103.5	21.4	12.6	11.0
Medium Duty Trucks	6.8	4.5	4.1	82.8	51.0	45.7	10.3	6.4	5.6
Light Heavy Duty Gas Trucks-1 (LHDV1)	4.7	1.5	1.4	34.1	8.4	7.0	2.3	2.3	2.4
Light Heavy Duty Gas Trucks-2 (LHDV2)	0.6	0.5	0.5	5.4	2.9	2.5	0.7	0.7	0.7
Medium Heavy Duty Gas Trucks (MHDV)	4.4	2.7	2.4	39.2	19.9	16.7	2.7	2.1	1.9
Heavy Heavy Duty Gas Trucks (HHDV)	2.4	1.6	1.4	42.6	21.1	17.8	4.4	2.8	2.4
Light Heavy Duty Diesel Trucks-1 (LHDV1)	0.1	0.2	0.2	0.3	0.7	0.7	2.0	2.4	2.1
Light Heavy Duty Diesel Trucks-2 (LHDV2)	0.2	0.2	0.2	0.4	0.5	0.5	2.2	1.8	1.6
Medium Heavy Duty Diesel Trucks (MHDV)	0.6	0.6	0.6	3.8	4.1	4.0	18.0	15.9	14.1
Heavy Heavy Duty Diesel Trucks (MHDV)	4.2	3.7	3.4	18.4	15.3	14.2	85.4	69.6	60.9
Motorcycles	2.3	2.0	1.9	16.0	18.3	16.4	0.4	0.5	0.5
Heavy Duty Urban Diesel Buses (UB)	0.2	0.2	0.2	0.7	0.7	0.7	3.6	3.5	3.5
Heavy Duty Gas Urban Buses (UB)	1.0	1.1	1.1	11.5	9.9	9.6	0.9	1.0	1.0
School Buses	0.3	0.3	0.3	4.9	3.3	3.2	2.1	2.6	2.6
Motor Homes	0.9	0.8	0.7	25.1	18.3	15.7	1.9	1.8	1.7
TOTAL ON-ROAD MOTOR VEHICLES	**115.3**	**67.8**	**59.5**	**1230.8**	**695.8**	**599.3**	**223.8**	**158.5**	**139.1**

Table 3-1: SJVAB 2000, 2008 and 2010 Planning Emissions Inventories- (cont.)

Source Categories	2000[1] VOC	2008 VOC	2010 VOC	2000[1] CO	2008 CO	2010 CO	2000[1] NOx	2008 NOx	2010 NOx
OTHER MOBILE SOURCES									
Aircraft	6.9	7.2	7.3	63.6	71.4	72.7	2.3	2.4	4.0[3]
Trains	1.2	1.2	1.1	4.3	4.8	5.0	32.6	21.3	20.8
Ships and Commercial Boats	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3
Recreational Boats	18.6	12.5	10.4	108.5	98.5	98.0	3.7	5.3	5.3
Off-Road Recreational Vehicle	1.8	1.1	1.1	15.9	16.4	16.9	0.3	0.3	0.3
Off-Road Equipment	20.2	12.8	11.7 [6]	165.9	132.2	127.5	51.5	39.6	34.9 [6]
Farm Equipment	12.4	9.2	8.3	72.6	61.5	60.0	80.9	59.1	54.5
Fuel Store/Handle	8.0	2.4	2.4	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL OTHER MOBILE SOURCES	**69.2**	**46.5**	**42.4**	**430.9**	**385.0**	**380.2**	**171.5**	**128.4**	**120.1**[3]
TOTAL MOBILE SOURCES	**184.5**	**114.3**	**101.9**	**1661.7**	**1080.8**	**879.5**	**395.3**	**287.0**	**259.2**[3]
TOTAL SAN JOAQUIN VALLEY	**443.5**	**374.9**	**367.6**	**2139.4**	**1554.8**	**1352.1**	**556.8**	**429.1**	**401.7**

[1] Emissions data for all source categories came from the ARB emissions inventory spreadsheet prepared by the California Air Resources Board for the San Joaquin Valley, v2.11_RF932PEI as accessed from the Central California Ozone Study website in January 2004. This inventory reflects control measures in place as of September 2002. Adjustments as noted below.

[2] An entry of “0.0” means that emissions data are available but are equal to or less than 0.04 tons/day, and thus have been rounded to 0.0 in accordance with the rounding protocol described in Appendix A. Totals of columns may not match sum of entries due to rounding.

[3] Includes line item increase of 1.5 tpd for increased aircraft operations at Lemoore Naval Air Station (2010 NOx only).

[4] For the purposes of consistency, the on-road motor vehicle emissions inventory from the January 2004 CCOS inventory was replaced with the actual emissions data used in deriving the 2008 and 2010 conformity budgets presented later in this Chapter (Table 3-4).

[5] VOC and NOx emissions in 2010 were increased by 1.0 tpd VOC and 0.1 tpd NOx to account for ARB lawn and garden equipment control measures whose emissions reductions were inadvertently reflected in the planning inventory before ARB adopted the *Statewide Strategy*.

[6] VOC and NOx emissions in 2010 were increased by 0.04 tpd VOC and 0.1 tpd NOx to account for an adopted ARB control measure for stationary internal combustion engines whose emission reductions were inadvertently reflected in the planning inventory prior to adoption of the measure.

3.4 FUTURE INVENTORIES

Demonstrating attainment of ambient air quality standards at a future date requires development of future year inventories that are based on assumptions of current levels of controls on sources, growth in activity in the District, use of emission reduction credits (ERCs), and implementation of future programs that affect emissions of air pollutants. These factors are discussed in the following subsections. Table 3-1 summarizes the 2008 and 2010 emission inventories.

3.4.1 Growth Factors

Changes in the baseline emissions inventory over time result from emissions growth (or decline) and/or emissions control. Predicting future ozone precursor emission rates is traditionally accomplished by assuming that VOC and NOx emissions are directly related to social and economic activities and control levels. If social and economic activity levels increase, it is generally assumed that emissions will similarly increase. Indicators representing social and economic activity levels include population, housing, employment, barrels of oil produced, cubic feet of natural gas produced, and vehicle miles traveled. These indicators are referred to as “surrogates.” The ratio of the projected surrogate each year to the actual 1999 level of activity for each surrogate is referred to as its growth factor. Growth factors are multiplied by 1999 emissions to project future year emissions. A growth factor of less than one indicates a decline in an activity over the planning period, while a growth factor of more than one indicates an increase in activity.

ARB and the District compiled growth factor estimates for the years 2008 and 2010 for each of the eight counties within the District using the best data available. Although using growth factors is a standard method for projecting emissions, their use cannot account for all activities that might occur in an area during a given time frame. Moreover, they tend to be more accurate when applied to the Valley as a whole, rather than on a county-by-county basis. For example, one facility might gain in market share while another loses its market share even though production increases at both facilities. While the overall growth factor is correct, each facility had very different growth rates.

On-road mobile source emissions growth is estimated for each class of vehicle by ARB based on estimates of vehicle miles traveled provided by Regional Transportation Planning Agencies (RTPAs) located within the District, and Caltrans. ARB then disaggregates this information by vehicle class and estimates on-road mobile source emissions using the most current version of EMFAC. Also, enhanced inspection and maintenance programs for motor vehicles are factored into the mobile source projections. These data collectively represent the best available estimates on a county-by-county basis of future activity level for stationary and mobile sources within the District.

3.4.2 Control Factors

After the baseline EI is multiplied by a growth factor, it is then multiplied by a control factor. A control factor is a weighted average that represents the level of controls of one or more rules and regulations and/or programs for a group of sources. This control factor takes into account information other than control levels stated in a rule or program. Rule penetration, compliance rates, public awareness, and participation are considered in determining a control factor. Control factors need to be updated on a continuing basis as the production levels, industry types and size, programs, public awareness, and other conditions change over time. The District and ARB compiled control factor estimates using the best data available for each of the eight counties in the SJVAB, based on rule adoption schedules and program changes stated in this and other plans.

3.4.3 Inclusion of Emission Reduction Credits (ERCS)

3.4.3.1 Introduction

The District requires all new and modified stationary sources that increase emissions in amounts in excess of emission offset thresholds to obtain emission reduction credits (ERCs) to offset the growth in emissions. District Rule 2201 (New and Modified Stationary Source Review Rule) contains the offset requirement. Offsets represent either on-site reductions or the use of banked ERCs. The District expects that some pre-baseline (pre-2000 for this *Extreme OADP*) credits will be used to allow growth from permitted stationary sources. Appendix B presents the current list of ERCs for the SJVAB for NOx and VOC.

The General Preamble to the Federal Clean Air Act (57 FR 13498) states that "the pre-baseline ERCs must be reflected as growth and included in the attainment demonstration "*to the extent that the State expects that such credits will be used as offsets or netting prior to attainment of the ambient standards.*" The August 26, 1994 memorandum from John Seitz, EPA's Director of Office of Air Quality Planning and Standards, to David Howekamp of EPA Region IX provides two ways for inclusion of these ERCs as growth by stating that "*A state may choose to show that the magnitude of the pre-1990 ERCs (in absolute tonnage) was included in the growth factor, or the state may choose to show that it was not included in the growth factor, but in addition to anticipated general growth.*"

By including the pre-baseline ERCs in the growth factor, the District has selected the first methodology provided in Seitz's memorandum. However, in either case, the purpose is to show that

baseline inventory + growth + ERCs (pre-baseline) - offsets - reductions

will result in a projected inventory adequate to attain the federal 1-hour ozone standard and any applicable rate of progress, where

growth = non-permitted growth + permitted growth
offsets = ERCs (post-baseline) + ERCs (pre-baseline)
reductions = reductions required by the measures in the Plan

3.4.3.2 Growth Estimate

The District used reports from the California Emission Forecasting System (CEFS) to generate emissions trends and growth estimates in this *Extreme OADP*. The California Air Pollution Control and Air Quality Management Districts and the California Air Resources Board (ARB) jointly developed the SIP/CCOS emissions inventory and associated emissions projections. Staff used the CEFS's computer tools to develop projections and the emission estimates based on the most currently available growth and control data available at the time of the forecast runs. The CEFS was developed in the 1990s to assist in the development of air quality plans, determining how and where air pollution can be reduced, tracking progress towards meeting plans goals and mandates, and in constructing emission trends.

A key component of CEFS is the growth data. In preparation for CCOS, the growth factors were enhanced in 2001. The February 26, 2001 report titled *"Development of Emissions Growth Surrogates and Activity Projections Used in Forecasting Point and Area Source Emissions"* describes efforts undertaken to identify the most appropriate growth surrogates for stationary and area sources. The growth estimates generated by CEFS include growth in emissions requiring offsets under New Source Review Rule as well those that can be accommodated without triggering offsets. Tables 3-2 and 3-3 show total growth rates of 15 tons/day of NOx, and 9.8 tons/day of VOCs. These tables also show the expected reductions for each pollutant from the measures contained or relied on in this Plan. As shown in Tables 3-2 and 3-3, the projected inventory for 2010 incorporates the projected growth as well as the expected controls from the measures contained in the Plan. Notwithstanding slight rounding errors, the projected 2010 inventory equals the baseline inventory plus the projected growth minus the expected reductions from the controls contained in the Plan.

3.4.3.3 Pre-Baseline Offset Use

Under District's New Source Review Rule 2201, new sources with emissions exceeding the following level must offset their emissions:

NOx ……………………………..	20,000 lbs/year
VOC……………………………....	20,000 lbs/year
PM10…………………………….	29,200 lbs/year
SOx………………………………	54,750 lbs/year
CO (attainment area) ………….	200,000 lbs/year
CO (non-attainment area) …….	30,000 lbs/year

Additionally, for existing facilities with emissions meeting or exceeding the above levels, any increase in emissions must be offset. The amount of offsets required was estimated by establishing the percentage of permitting actions for each source category that would be subject to offset requirements under Rule 2201.

Table 3-2
Estimated NOx Growth, Control, and Estimated Offset Use for Stationary Sources[1]

SUMMARY CATEGORY NAME	**2000 Emissions Tons/day**	**Growth Factor (%)**	**Estimated Growth (tons/day)**	**Control Factor (%)**	**Required Reductions (tons/day)**	**2010 Emissions Tons/day**	**Percent Requiring Offsets**	**Estimated Offsets (tons/day)**
STATIONARY SOURCES								
FUEL COMBUSTION								
ELECTRIC UTILITIES	3.1	15.3%	0.5	11.2%	0.4	3.1	80	0.5
COGENERATION	9.0	38.5%	3.5	46.8%	5.8	6.3	80	3.9
OIL AND GAS PRODUCTION (COMBUSTION)	39.6	2.3%	0.9	39.4%	16.0	25.4	80	1.0
PETROLEUM REFINING (COMBUSTION)	1.5	0.1%	0.0	2.8%	0.04	1.5	80	0.0
MANUFACTURING AND INDUSTRIAL	36.5	19.0%	7.0	9.5%	4.1	39.7	30	2.9
FOOD AND AGRICULTURAL PROCESSING	26.9	-2.5%	-0.7	10.1%	2.6	23.6	10	
SERVICE AND COMMERCIAL	13.7	11.7%	1.6	5.9%	0.9	14.4	50	1.1
OTHER (FUEL COMBUSTION)	0.0	0.0%	0.0	0.0%	0.0	0.0		0.0
TOTAL FUEL COMBUSTION	130.2					114.0		

Table 3-2
Estimated NOx Growth, Control, and Estimated Offset Use for Stationary Sources[1] (cont.)

SUMMARY CATEGORY NAME	2000 Emissions Tons/day	Growth Factor (%)	Estimated Growth (tons/day)	Control Factor (%)	Required Reductions (tons/day)	2010 Emissions Tons/day	Percent Requiring Offsets	Estimated Offsets (tons/day)
WASTE DISPOSAL								
SEWAGE TRTMNT	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
INCINERATORS	0.1	13.9%	0.0	0.2%	0.0	0.1	25	0.0
SOIL REMEDTN	0.0	0.0	0.0		0.0	0.0		0.0
OTHER	0.0	0.0	0.0		0.0	0.0		0.0
*** TOTAL WASTE DISP**	0.1			0.2%	0.0	0.1		
CLEANING AND SURFACE COATINGS								
LAUNDERING	0.0	0.0	0.0		0.0	0		0.0
DEGREASING	0.0	0.0	0.0		0.0	0		0.0
COATINGS & REL. PROCESS SOLV	0.0	0.0	0.0		0.0	0		0.0
PRINTING	0.0	0.0	0.0		0.0	0		0.0
ADHESIVES & SEALANTS	0.0	0.0	0.0		0.0	0		0.0
OTHER (CLEANING & SFC COATINGS)	0.0	109.1%	0.0	0.0%	0.0	0.0	10	0.0
*** TOTAL CLN/SFC**	0.0					0.0		
PETROLEUM PRODUCTION AND MARKETING								
OIL/GAS PROD.	0.2	40.4%	0.1	0.1%	0.0	0.2	80	0.1
PET. REFINING	0.1	0.0%	0.0	0.0%	0.0	0.1	80	0.0
PET. MARKETING	0.0	39.7%	0.0	0.6%	0.0	0.0		0.0
*** TOTAL PETROLEUM PROD.& MARKETING**	0.3					0.4		

Table 3-2
Estimated NOx Growth, Control, and Estimated Offset Use for Stationary Sources[1] (cont.)

SUMMARY CATEGORY NAME	**2000 Emissions Tons/day**	**Growth Factor (%)**	**Estimated Growth (tons/day)**	**Control Factor (%)**	**Required Reductions (tons/day)**	**2010 Emissions Tons/day**	**Percent Requiring Offsets**	**Estimated Offsets (tons/day)**
INDUSTRIAL PROCESSES								
CHEMICAL	0.1	20.6%	0.0	0.2%	0.0	0.2	25	0.0
FOOD AND AGRICULTURE	9.2	-3.0%	-0.3	-0.1%	-0.0	9.0	10	0.0
MINERAL PROCESSES	1.5	17.4%	0.3	0.0%	0.0	1.7	25	0.1
METAL PROCESSES	0.0	6.0%	0.0	0.0%	0.0	0.0		0.0
WOOD AND PAPER	0.0	0.0	0.0	0.0%	0.0	0.0		0.0
GLASS AND RELATED PRODUCTS	12.0	18.0%	2.2	28.9%	4.1	10.1	80	2.4
ELECTRONICS	0.0	107.7%	0.0	0.0%	0.0	0.0	25	0.0
OTHER (INDUSTRIAL PROCESSES)	0.0	36.8%	0.0	0.0%	0.0	0.0	25	0.0
*** TOTAL INDUSTRIAL PROCESSES**	22.9					21.0		
**** TOTAL STATIONARY SOURCES**	153.4					135.4		
GRAND TOTAL FOR SJVUAPCD	153.4		15.0			135.4		12.1

[1] This table represents a subset of the emissions inventory data used elsewhere in this Extreme OADP, and is used only for the purposes of estimating emission reduction credit use. It reflects only changes that are projected to occur from 2000 to 2010 in the stationary source component of the overall inventory. Also, it was derived from an ARB emissions inventory that is different from the Central California Ozone Study (CCOS) emissions inventory Version 2.11 used for the remainder of this document, but that was developed with data consistent with the CCOS inventory. Consequently, emissions data presented in Table 3-2 may show minor differences from those in Table 3-1 for some subcategories, and should not be directly compared with Table 3-1 or with other emissions data derived from Table 3-1.

Table 3-3
Estimated VOC Growth, Control, and Estimated Offset Use for Stationary Sources[1]

SUMMARY CATEGORY NAME	2000 Emissions Tons/day	Growth Factor (%)	Estimated Growth (tons/day)	Control Factor (%)	Required Reductions (tons/day)	2010 Emissions Tons/day	Percent Requiring Offsets	Estimated Offsets (tons/day)
STATIONARY SOURCES								
FUEL COMBUSTION								
ELECTRIC UTILITIES	0.4	37.7%	0.1	-0.1%	0.0	0.5	80	0.2
COGENERATION	0.7	27.0%	0.2	-0.0%	0.0	1.0	80	0.2
OIL AND GAS PRODUCTION (COMBUSTION)	2.7	15.6%	0.4	0.0%	0.0	3.2	80	0.5
PETROLEUM REFINING (COMBUSTION)	0.1	0.0%	0.0	0.0%	0.0	0.1	80	0.0
MANUFACTURING AND INDUSTRIAL	0.3	26.3%	0.1	0.1%	0.0	0.4	25	0.03
FOOD AND AGRICULTURAL PROCESSING	2.7	-2.7%	-0.1	-0.1%	0.0	2.6	10	
SERVICE AND COMMERCIAL	1.2	10.5%	0.1	-0.0%	0.0	1.3	25	0.0
OTHER (FUEL COMBUSTION)	0.0	0.0%	0.0	0.0%	0.0	0.0		
*** TOTAL FUEL COMBUSTION**	8.1					9.0		
WASTE DISPOSAL								
SEWAGE TREATMENT	0.0	22.0%	0.0	0.6%	0.0	0.0	25	0.0
LANDFILLS	2.8	21.8%	0.6	0.0%	0.0	3.4	50	0.4
INCINERATORS	0.0		0.0		0.0	0.0	25	0.0

Table 3-3
Estimated VOC Growth, Control, and Estimated Offset Use for Stationary Sources[1] (cont.)

SUMMARY CATEGORY NAME	2000 Emissions Tons/day	Growth Factor (%)	Estimated Growth (tons/day)	Control Factor (%)	Required Reductions (tons/day)	2010 Emissions Tons/day	Percent Requiring Offsets	Estimated Offsets (tons/day)
WASTE DISPOSAL (cont.)								
SOIL REMEDIATION	0.0	13.6%	0.0	0.0%	0.0	0.0	25	0.0
OTHER (WASTE DISPOSAL)	0.5	26.3%	0.1	0.0%	0.0	0.6	25	0.0
*** TOTAL WASTE DISPOSAL**	3.3			-0.0%		4.0		
CLEANING AND SURFACE COATINGS								
LAUNDERING	0.1	23.6%	0.0	0.4%	0.0	0.1		
DEGREASING	11.1	-7.7%	-0.9	86.4%	8.8	1.5		
COATINGS & RELATED PROCESS SOLVENTS	13.8	29.0%	4.0	2.1%	0.4	17.5	50	2.8
PRINTING	1.5	16.9%	0.2	-0.0%	0.0	1.7	25	0.1
ADHESIVES AND SEALANTS	0.7	-16.8%	-0.1	-0.0%	0.0	0.6	25	
OTHER (CLEANING & SURFACE COATINGS)	2.8	43.3%	1.2	-0.0%	-0.0	4.0	50	0.9
***TOTAL CLEANING & SURFACE COATINGS**	29.9					25.4		
PETROLEUM PRODUCTION AND MARKETING								
OIL/GAS PROD.	31.6	0.4%	0.1	0.9%	0.3	31.4	80	0.1
PET. REFINING	1.4	0.3%	0.0	2.1%	0.0	1.4	80	0.0
PET. MARKETING	6.6	21.9%	1.5	9.6%	0.8	7.3	80	1.6
*** TOTAL PETROLEUM PROD. & MARKETING**	39.6					40.1		

Table 3-3
Estimated VOC Growth, Control, and Estimated Offset Use for Stationary Sources[1] (cont.)

SUMMARY CATEGORY NAME	2000 Emissions Tons/day	Growth Factor (%)	Estimated Growth (tons/day)	Control Factor (%)	Required Reductions (tons/day)	2010 Emissions Tons/day	Percent Requiring Offsets	Estimated Offsets (tons/day)
INDUSTRIAL PROCESSES								
CHEMICAL	1.9	31.7%	0.6	0.0%	0.0	2.5	25	0.2
FOOD & AGRICULTURE	10.7	13.0%	1.4	2.7%	0.3	11.8	50	1.0
MINERAL PROCESSES	0.3	22.8%	0.1	0.0%	0.0	0.4	25	0.0
METAL PROCESSES	0.2	0.4%	0.0	0.0%	0.0	0.2		
WOOD & PAPER	0.0		0.0		0.0	0.0		
GLASS & RELATED PRODUCTS	0.1	15.0%	0.0	0.0%	0.0	0.1	80	0.0
ELECTRONICS	0.0	105.9%	0.0	0.0%	0.0	0.0	25	0.0
OTHER (INDUSTRIAL PROCESSES)	0.1	10.0%	0.0	-0.1%	0.0	0.1	25	0.0
*** TOTAL INDUSTRIAL PROCESSES**	13.3					15.1		
**** TOTAL STATIONARY SOURCES**	94.2					93.5		
GRAND TOTAL FOR SJVUAPCD	94.2		9.8			93.5		8.1

[1] This table represents a subset of the emissions inventory data used elsewhere in this Extreme OADP, and is used only for the purposes of estimating emission reduction credit use. It reflects only changes that are projected to occur from 2000 to 2010 in the stationary source component of the overall inventory. Also, it was derived from an ARB emissions inventory that is different from the Central California Ozone Study (CCOS) emissions inventory Version 2.11 used for the remainder of this document, but that was developed with data consistent with the CCOS inventory. Consequently, emissions data presented in Table 3-2 may show minor differences from those in Table 3-1 for some subcategories, and should not be directly compared with Table 3-1 or with other emissions data derived from Table 3-1.

For each source category, this percentage was established based on past permitting history, the fraction of sources in the category with emissions at or above the offset trigger levels, and the historical permitting activity for the source category. The District used the following factors in estimating the potential need for offsets:

- All increases from modifications to existing sources with potential emissions at or above the above offset thresholds would require offsets (District Rule 2201).
- New sources with emissions exceeding the above offset thresholds would require offsets (District Rule 2201).
- The percentage of sources that meet any of the above criteria was estimated by examining past permitting history and by projecting future permitting based on the estimated growth. For instance, the majority of permitting actions with increases in emissions from oil production facilities come from sources with potential emissions in excess of the above offset thresholds. Therefore, for that source category, it was assumed that 100% of increase in overall emissions would require offsets.

The quantity of required offsets was then established by multiplying the expected growth in emissions for each source category by this percentage and the expected offset ratio. District rule 2201 establishes offset ratios ranging from 1.3:1 to 1.5:1 based on the distance from the source of ERCs to the source with the increase in emissions. An offset ratio of 1.5:1 applies to all transactions where the distance is greater than 15 miles. Historically, most transactions in the District involve a distance of greater than 15 miles. For calendar years 2000—2003, the average offset ratio for all permitting actions was slightly higher than 1.4:1. Therefore, the District used an average offset ratio of 1.4:1 for these calculations.

Tables 3-2 and 3-3 contain the expected growth, percentage of activities subject to offset requirements, and the expected quantity of offsets for each pollutant.

Although some offsets are expected to come from post-baseline reduction, this Plan conservatively assumes that all offsets will be pre-baseline. The expected pre-baseline offset usage after 2000 through 2010, as shown in Tables 3-2 and 3-3, is estimated as follows:

NOx ……………………………………12.1 tons/day
VOC …………………………………… 8.1 tons/day

As shown above, the quantities of pre-baseline offsets that are expected to be used between 2000 and 2010 are less than the estimated growth in emissions for each pollutant. As currently adopted, if growth in new and modified sources occurs at the rate estimated in this Plan, the use of offsets as provided in Rule 2201 will ensure that permitted increases in major source emissions will not interfere with progress towards attainment of federal 1 hour ozone standards or the achievement of the 3 percent per year reduction in ozone precursor emissions. As discussed in Chapter 7, the District satisfies the requirement for rate of progress with above-mentioned projected inventories and without taking credit for the ERCs required of and provided by new and modified stationary sources.

3.4.3.4 Safeguards

In order to assure the use of pre-baseline ERCs do not interfere with attainment effort and the applicable rate of progress, this *Extreme OADP* incorporates the following safeguards:

- The District will place a cap on the amount of pre-baseline credits that can be used. Although the District has relied on a number of conservative assumptions in estimating the usage quantity of pre-baseline credits, some degree of uncertainty exists. For instance, unexpected growth or irregular permitting activity may occur for one or more source categories. The cap on the use of pre-baseline ERCs will be enforced by tracking the use of such credits and disallowing such credits, through permitting actions when the above-specified levels are reached. The District Rules and Regulations will be amended to require tracking and enforcement of the above referenced cap within 12 months after EPA approval of this *Extreme OADP*. Appendix E lists the cap on stationary source growth by pollutant.
- Although some ERCs will come from post-baseline reductions, this *Extreme OADP* conservatively assumes that all offsets will come from pre-baseline reductions. As discussed earlier, federal law only requires the pre-baseline ERCs to be included in the growth and the attainment demonstration. This *Extreme OADP* assumes that all ERCs will be pre-baseline ERCs and, therefore, includes them all in the projected inventory as growth. Using a larger than permissible projected inventory leads to conservative conclusions relating to the attainment and rate of progress demonstrations.
- Although permissible, this plan does not take credit for reductions and mitigations required under the District's New Source Review Rule. In particular, this Plan does not reduce the future years emissions by taking credit for the amount of ERCs provided through permitting actions. This conservative approach assures that the attainment demonstration is not affected by the use of pre-baseline ERCs.

3.5 CONFORMITY BUDGETS

Section 176(c) of the FCAA outlines the conformity provision of the Clean Air Act. Federal actions are required to conform to the SIP's purpose of eliminating or reducing the severity and number of exceedances of the NAAQS and achieving expeditious attainment of these standards. The FCAA distinguishes transportation actions [those undertaken by the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA)] from all other federal actions.

Metropolitan Planning Organizations (MPOs) must make findings that the regional transportation plans (RTPs) and transportation improvement programs (TIPs) conform to the SIP. They submit this conformity finding along with the RTP and TIP, to FHWA and FTA for approval. The conformity finding must demonstrate that the emissions associated with the RTP and TIP do not exceed "emission budgets" that are contained in the SIP.

The District's *Amended 2002 and 2005 Rate of Progress Plan for San Joaquin Valley Ozone* established subarea emissions budgets for each county for ROG and NOx for 2005; in addition, the *2003 PM10 Plan* established subarea emissions budgets for each county for NOx and PM for 2005, 2008 and 2010. This *Extreme OADP* establishes new subarea county emissions budgets for ROG and NOx for 2008 and 2010, as provided in Table 3-4 for the purposes of conformity. After an adequacy finding by EPA, these new budgets will apply for subsequent years, unless these budgets are superseded by new budgets or by budgets set for later years.

Efforts have been made to incorporate the SJVAB MPO's updated vehicle miles traveled (VMT) [submitted as comments in response to the release of EMFAC 2002 and used in the Amended 2003 *PM-10 Plan*] into the emissions budgets. ARB staff conducted model runs to match the VMT data through adjustments to vehicle population. With this approach, emissions budgets reflect not only the latest VMT data, but also reflect the additional impact of those data on emissions from vehicle starting and from vehicle fuel evaporation. After reviewing the EMFAC results, District, ARB and TPA staff reduce the emissions estimates to account for any emissions controls that were not included in the model runs, and to make other adjustments as warranted to project emissions for future years. Table 3-4 reflects emissions reductions benefits of the California Inspection and Maintenance (I/M) program, statewide measures affecting mobile sources (Chapter 4), and reductions from the District's Indirect Source Rules (ISR) and incentive programs (Chapter 4).

Table 3-4
Transportation Conformity Budgets[1]

County	VOC Emissions (tons/day)		NOx Emissions (tons/day)	
	2008	2010	2008	2010
Fresno	15.8	13.0	33.7	27.7
Kern (SJVAB)	11.5	9.6	32.7	27.2
Kings	2.5	2.1	6.2	5.4
Madera	3.9	3.3	8.4	7.2
Merced	5.0	4.0	11.4	9.1
San Joaquin	9.3	7.7	22.4	17.9
Stanislaus	8.5	7.0	17.4	14.0
Tulare	8.5	6.9	18.8	15.3
Total	65.0	53.6	151.0	123.8

[1] All emissions are expressed as summer tons/day, and were derived using EMFAC2002, Version 2.2 (April 2003) with updated vehicle population and vehicle miles traveled data. Emissions totals reflect the emissions reductions benefits from motor vehicle inspection and maintenance (I/M), state measure reductions, and reductions from the District's Indirect Source Rules (ISR) and mobile source incentive programs; consequently, totals will not match those in Table 3-1 which do not reflect these additional control measures. The budget was established by taking the EMFAC results, subtracting the emissions reductions benefits, rounding up to the nearest tenth if the hundredths place was "1" or higher. See Appendix A for county-specific breakdown of on-road motor vehicle emissions and emissions reductions benefits.

3.6 EMISSIONS INVENTORY UNCERTAINTIES

A substantial amount of staff work goes into developing emissions inventories for SIPs. In order to prepare a plan in time to meet deadlines, many times the inventory used as a basis for modeling must be "frozen" in time at some point[3] so that modeling can proceed and so that control measures can be evaluated. As staff works with the inventory, they often identify issues that need to be addressed to make the inventory more accurate, such as possible overestimates of source categories, underestimates of source categories, seasonal or other temporal changes in emissions that may not be reflected, or spatial distribution issues addressing how the emissions are distributed over the modeled area.

For this *Extreme OADP*, the following uncertainties were identified after the inventory was frozen for use in plan development: inclusion of emissions from heavy duty trucks used to haul produce from fields to processing locations; inclusion of emissions from heavy duty trucks, entering California from Mexico due to the June 2004 Supreme Court decision regarding the North American Free Trade Agreement (NAFTA); spatial distribution of on-road motor vehicle emissions in the northern four counties vs. the southern four counties; discrepancies between two different methods of estimating heavy duty truck emissions in the SJVAB; the effects of temperature discrepancies on biogenic emissions and resultant predicted ozone levels; and the effects of fires on base case ozone levels and whether or not fires should be included in future scenarios for control measure evaluation (See Chapter 5). Work continues under CCOS to evaluate these and other uncertainties so that their magnitude can be evaluated

[3] For this Extreme OADP, the inventory was frozen in November 2003.

and their effect on future ozone trends quantified. ARB conducts periodic multi-agency meetings to evaluate and discuss SIP emissions inventory issues (see Appendix D).

3.7 CONCLUSION

Emissions inventory data reflect the best estimates that can be made of the rates and chemical composition of air pollutants entering the atmosphere. Although some emissions are directly measured (usually those from large stationary sources equipped with continuous emissions monitors), most of the inventory is estimated using standardized techniques and methodologies. Inventories can change over time due to a number of factors including changes in source activity level, changes in emissions factors, or changes in the spatial distribution, chemical composition, or rate of the emissions.

This *Extreme OADP* is based on two types of inventories: a planning inventory and a modeling inventory. Air quality planners use the planning inventory to study and propose control measures, to track trends in emissions for meeting federal Rate of Progress requirements (Chapter 7) and to track the use of ERCs, and to assist in demonstrating attainment (Chapter 5). In addition, the on-road motor vehicle emissions component of the planning inventory has special importance for establishing conformity budgets for transportation planning purposes. The modeling inventory provides day-specific information used as input for the photochemical model that predicts future ozone levels in the SJVAB. The planning and modeling inventories each have cutoff dates for the inclusion of control measures (i.e., control measures adopted past the cutoff date are not reflected in the inventories and must be subtracted from the results of inventory runs and model runs).

This *Extreme OADP* uses the most accurate and up to date emission inventories possible within the time allowed to meet Federal Clean Air Act requirements. Many emission categories within the inventories were updated to reflect current data and emission factors. While changes and improvements to the SJVAB's inventories are ongoing, at some point in time the planning and modeling inventories must be "frozen" to allow plan development to proceed (i.e., the inventory must be frozen so that potential future emission control measures can be evaluated for their effectiveness in attaining the federal 1-hour ozone standard). Many emission inventory improvement projects are in process or are planned, and the results of these and other studies will be reflected in the inventories used in future SIP submittals.