FINAL
2003 AQMP APPENDIX III

BASE AND FUTURE YEAR EMISSION INVENTORIES

AUGUST 2003

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Table of Contents

CHAPTER 1 INVENTORY DEVELOPMENT

CHAPTER 2 SUMMARIES OF EMISSIONS

REFERENCES

ATTACHMENT A Average Annual Emissions Summary by Major Source Category

ATTACHMENT B Summer Emissions Summary by Major Source Category

ATTACHMENT C Winter Emissions Summary by Major Source Category

ATTACHMENT D Top 300 SCAB VOC and NOx Producers in 1997

ATTACHMENT E On-Road Emissions by Category

ATTACHMENT F Emissions from Diesel Fuel by Major Source Category

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

AQMP	Air Quality Management Plan
CARB	California Air Resources Board
CALTRANS	California Department of Transportation
CAA	Federal Clean Air Act
CAT	Catalytic Converters
CCAA	California Clean Air Act
CEC	California Energy Commission
CO	Carbon Monoxide
DTIM	Direct Travel Impact Model
EDS	Emission Data System
EIS	Emissions Inventory System
U.S.EPA	U.S. Environmental Protection Agency
ERC	Emission Reduction Credits
HD	Heavy-Duty
LDV	Light-Duty Vehicles
MDV	Medium-Duty Vehicles
NCAT	Non-Catalytic Converters
NO_2	Nitrogen Dioxide
NO_X	Oxides of Nitrogen
NSR	New Source Review
PM	Particulate Matter

LIST OF ACRONYMS (continued)

PM_{10}	Particulate Matter Less Than 10 Microns In Diameter

RECLAIM	Regional Clean Air Incentives Market
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCC	Source Classification Code
SIC	Standard Industrial Code
SO_X	Oxides of Sulfur
TOG	Total Organic Gases
UTM	Universal Transverse Mercator
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds

APPENDIX III

BASE AND FUTURE YEAR EMISSION INVENTORIES

CHAPTER 1
INVENTORY DEVELOPMENT

Background
Air Contaminants
Inventory Source Category
Mobile Sources
Inventory Type

INVENTORY DEVELOPMENT

Background

To protect the public health and welfare, federal and state standards limit concentration levels of air contaminants in ambient air. An emission inventory of air pollutants and their sources is essential to identify the major contributors of air contaminants and the measures required to reduce air pollution. 1997 is the base year used to project future year emissions for the 2003 Air Quality Management Plan (AQMP). The 1997 base year emissions inventory reflects adopted air regulations that are implemented as of 1997; whereas future baseline emissions inventories incorporate adopted rules with post-1997 compliance dates and the projected growth factors. A list of SCAQMD rules and regulations and their emission reductions is presented in Table 1-1. Table 1-2 lists California Air Resources Board (CARB) adopted rules and regulations and their associated emission reductions. Both the federal and state Clean Air Acts specify 1990 as the base year to measure emission reduction progress. In these inventories, only anthropogenic sources (i.e., those associated with human activity) are considered. Besides 1997, emission levels of air contaminants in the South Coast Air Basin (Basin) are compiled for two pre-1997 years (1990, 1995), as well as nine future years (2000, 2002, 2003, 2005, 2006, 2007, 2008, 2010 and 2020).

Information necessary to produce an emission inventory for the Basin is obtained from the SCAQMD and other governmental agencies including: California Air Resources Board (ARB), California Department of Transportation (Caltrans), and Southern California Association of Governments (SCAG).

Each of these agencies is responsible for collecting data (e.g., industry growth factors, socio-economic projections, travel activity levels, emission factors, emission speciation profile, emissions) and developing methodologies (e.g., model and demographic forecast improvements) required to generate a comprehensive emissions inventory. Entire statewide emissions inventories are compiled and maintained by CARB in its emission related information databases named California Emission Inventory Development and Reporting System (CEIDARS), and California Emission Forecasting and Planning Inventory System (CEFIS). CARB is the agency responsible for developing the emissions inventory for all the mobile sources. CARB provided on-road and off-road inventories from their EMFAC2002 and Off-Road Models in the 2003 AQMP. SCAG is the primary agency for projecting the growth. Caltrans provides SCAG with information regarding highway projects. SCAG incorporates these data into their Travel Demand Model for estimating/projecting vehicle miles traveled (VMT) and speed. CARB's on-road inventory also relies on SCAG's VMT estimates.

Air Contaminants

Currently, air quality standards exist for the following criteria air contaminants: ozone, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), fine suspended particulate less than 10 microns (PM_{10}), lead, and sulfate. This appendix presents emission levels in the Basin for the criteria air contaminants and their precursors. Specifically, data are included for emissions of total organic gases (TOG), volatile organic compounds (VOC), oxides of nitrogen (NO_x), oxides of sulfur (SO_x), CO, particulate matters (PM), PM_{10} and fine suspended particulate less than 2.5 microns ($PM_{2.5}$). The $PM_{2.5}$ emissions are presented in this document because the U.S. EPA is in the process of adopting $PM_{2.5}$ air quality standards. Ozone is formed from photochemical reactions involving other air contaminants so it is not inventoried. Although air quality standards for NO_x and SO_x are based on NO_2 and SO_2, respectively, emissions of NO_x and SO_x are in the emissions inventory because multiple species of NO_x and SO_x contribute to the formation of particulate, and NO_x and VOC react in the presence of sunlight to produce ozone. TOG incorporates all gaseous compounds containing the element carbon with the exception of the inorganic compounds, CO, carbon dioxide (CO_2), carbonic acid, carbonates and metallic carbides. VOC, a subset of TOG, includes all organic gases in TOG except acetone, ethane, methane, methylene chloride, methylchloroform, perchloroethylene, methyl acetate, parachlorobenzotrifluoride, and a number of Freon-type gases. It should be noted that this definition of VOC is different from the one used by the CARB, which includes some compounds not considered as U.S. EPA's VOC. Table 1-3 lists the 19 compounds that are exempt in U.S. EPA's VOC list, but are included in CARB's ROG. Certain CFC's are still included in the CARB's VOC list. According to ARB, the total emission inventory difference between U.S. EPA VOC and CARB's ROG is very small. PM represents all airborne particulate matters. Important subsets of PM are PM_{10} and $PM_{2.5}$. In this 2003 AQMP, the amount of VOC in TOG and the amount of PM_{10} and $PM_{2.5}$ in PM are calculated for each process primarily using species and size fraction profiles provided by CARB. Besides average annual day emissions that are reported for all criteria pollutants, summer planning inventories (VOC and NOx) are reported for ozone purposes and winter planning inventories (CO and NO_2) are reported for carbon monoxide and nitrogen dioxide purposes.

Table 1-1

Rules and Regulations Adopted by District Since Adoption of 1997/1999 SIPs as of October 2002[a]

Control Measure/Rule	Title	SIP Commitment (tons/day)	Emission Reductions Achieved Through Rule Implementation (tons/day)	Adoption Date
CTS-02C(P2) (Rule 1171)	Solvent Cleaning Operations (VOC)	11.0	11.0[b]	1999
WST-04 (Rule 1150.1)	Disposal of VOC-Containing Materials (VOC)	0.8	0.8	2000
PRC-3(P2) (Rule 1138)	Restaurant Operations (VOC)	0.9	c	c
CTS-020 (Rule 442)	Solvent Usage (VOC)	1	1.9	2000
CTS-02E (Rule 1168)	Adhesives (VOC)	1.3	8.3	2000
RFL-02(P2) (Rule 461)	Gasoline Service Stations (VOC)	2	6.2	2000
CTS-09(P1) (Rule 1132)	Large Coating & Solvent Sources – High Emitting Spray Booth Facilities (VOC)	4	5.4	2000
FUG-06 (Rule 1189)	Hydrogen Plants (VOC)	0.8	1.6	2000
FUG-05(P1) (Rule 1178)	Large Fugitive Emissions Sources (VOC)	1	1.7	2001
PRC-06 (Rule 1131)	Industrial Processes - Food Flavoring (VOC)	3	3.0	2001
CTS-08(P1) (Rule 1130)	Industrial Coatings and Solvents (VOC)	2	1.9	2002
CTS-08(P2) Rule 1122)	Solvent Degreasing (VOC)	3	6.2	2001
CTS-09(P2) (Rule 1162)	Polyester Resins (VOC)	3	1.6	2002
Rule 1102	Dry Cleaners Using Solvent other than Perchloroethylene (VOC)	N/A	0.3	2000
Rule 1104	Wood Flat Stock Coating Operations (VOC)	N/A	0.1	1999
Rules adopted from October 1996 to September 1999[d]		79.8	108.1	11/96-9/99
	Total VOC	**113.6**	**158.1**	

Table 1-1 (Continued)

Rules and Regulations Adopted by District Since Adoption of 1997/1999 SIPs as of October 2002[a]

Control Measure/Rule	Title	SIP Commitment (tons/day)	Emission Reductions Achieved Through Rule Implementation (tons/day)	Adoption Date
CMB-06 (Rule 1121)	Control of Nitrogen Oxides from Residential-Type Natural Gas Fired Water Heaters (NOx)	7.6	7.6	1999
Rule 1146	Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters (NOx)	N/A	0.2	2000
Rules adopted from October 1996 to September 1999[d]		2.4	4.2	11/96-9/99
	Total NOx	**10**	**12**	
Rule 1158	Storage, Handling, and Transport of Petroleum Coke (PM10)	N/A	1	1999
Rule 431.2	Sulfur Content of Liquid Fuels (PM10) (SOx)	N/A	0.1[e] 0.4[e]	2000
PRC-3(P1) Rule 1138	Control of Emissions from Restaurant Operations (PM10)	7.0	1	1997
PRC-01 (Rule 1137)	PM10 Emission Reductions from Woodworking Operations (PM10)	7.5[f]	7.5[f]	2002
	Total **PM10** **SOx**	**16.1**	**9.6** **0.4**	

[a] SCAQMD summer planning emission in 2010 (rounded to the nearest whole number), based on 1997 SIP inventory.
[b] An additional 16 tons of VOC emission reductions associated with Rule 1171 implementation are subject to technology assessments in 2003 and 2004 prior to implementation in 2005 and are not included in this value.
[c] Board approved infeasibility findings in October 2000 and used excess reductions from RFL-02(P2) to meet the SIP commitment.
[d] Reference: Table 1-1 of the 1999 Amendment to the 1997 Ozone SIP for the South Coast Air Basin (SCAQMD, 1999).
[e] Emission reductions listed include only those from stationary sources.
[f] SIP commitment and emission reduction achieved are based on 1997 AQMP inventory methodology.

Table 1-2

Rules and Regulations Adopted by CARB/U.S. EPA Since 1997/1999 SIPs*

RULE TITLE	AGENCY	VOC	NO_X	ADOPTION DATE**
Mid-Term Consumer Products I & II	CARB	15	0	10/99
National Heavy-Duty Diesel Standards	U.S. EPA	1	11	10/97
California Heavy-Duty Diesel Veh. Standards	CARB	5	44	4/98
Clean Fuels (Phase 3/Phase 2/Chamber Dep.)	CARB	13	12	12/98
California Large Off-Road Gas/LPG Engine Stds.	CARB	16	5	10/98
National Heavy-Duty Off-Road Diesel Stds.	U.S. EPA	6	25	10/98
Carl Moyer Program	CARB	0	3	3/99
Marine Pleasure Craft Standards	CARB/U.S.EPA	24	0	7/01
Motorcycle Standards	CARB	1	0	12/98
Low Emission Vehicle Program – Phase II	CARB	4	43	11/98
Gas Can Requirements***	CARB	34	0	9/99
Marine Vessel Standards	U.S. EPA	0	2	12/99
California Heavy-Duty Off-Road Diesel Stds.	CARB	4	18	1/00
Locomotive Standards (incl. MOU-M14)****	U.S. EPA	0	17	5/98
Transit Bus Fleet Rule	CARB	0	1	10/02
Enhanced Vapor Recovery*****	CARB	6	0	3/00
Medium/Heavy Duty Gasoline Vehicle Stds.	CARB	0	1	12/00
2007 Heavy-Duty Diesel Truck Standards	CARB/U.S. EPA	1	16	10/01
Low-Sulfur Diesel Fuel Req. (enable retrofit)	U.S. EPA	0	0	2/01
National Large Off-Road Gas/LPG Standards	U.S. EPA	14	5	9/02
Small Off-Road Engine Standard Revisions	CARB	-1	0	3/98
Total		**143**	**203**	

* SCAQMD summer planning emissions in 2010 (rounded to the nearest whole number), based on 1997 SIP inventory
** Only latest rule adoption date included.
*** Portable fuel containers were not included in the 1997/99 AQMP baseline. Emission reductions are from CARB rule adoptions Staff Report.
**** Emission reductions from locomotives represent the national emission standards for locomotive engines as well as the MOU for the South Coast Air Basin. U.S. EPA has committed to adopt a backstop commitment to ensure that the emission reductions associated with the MOU are achieved. The MOU is hereby included as part of the 2003 AQMP SIP submittal. A copy of the MOU is available at http://www.arb.ca.gov/msprog/offroad/loc/loco.htm.
***** CARB's rule complements District Rule 461. An overall reduction of 6 tons per day of VOC reductions from this category is included in the AQMP baseline.

Table 1-3

List of Compounds Exempt in U.S. EPA's Definition of VOC; Included in CARB's Definition of ROG

Compound	CAS *
3,3-dichloro-1,1,1,2,2-pentafluoropropane (HCFC-225ca);	[422-56-0]
1,3-dichloro-1,1,2,2,3-pentafluoropropane (HCFC-225cb);	[507-55-1]
1,1,1,2,3,4,4,5,5,5-decafluoropentane (HFC-43-10mee);	[138495-42-8]
difluoromethane (HFC-32);	[75-10-5]
ethylfluoride (HFC-161);	[353-36-6]
1,1,1,3,3,3-hexafluoropropane (HFC-236fa);	[690-39-1]
1,1,2,2,3-pentafluoropropane (HFC-245ca);	[679-86-7]
1,1,2,3,3-pentafluoropropane (HFC-245ea);	[24270-66-4]
1,1,1,2,3-pentafluoropropane (HFC-245eb);	[431-31-2]
1,1,1,3,3-pentafluoropropane (HFC-245fa);	[460-73-1]
1,1,1,2,3,3-hexafluoropropane (HFC-236ea);	[431-63-0]
1,1,1,3,3-pentafluorobutane (HFC-365mfc);	[406-58-6]
chlorofluoromethane (HCFC-31);	[593-70-4]
1-chloro-1-fluoroethane (HCFC-151a);	[1615-75-4]
1,2-dichloro-1,1,2-trifluoroethane (HCFC-123a);	[354-23-4]
1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxy-butane ($C_4F_9OCH_3$);	[163702-07-6]
2-(difluoromethoxymethyl)-1,1,1,2,3,3,3-heptafluoropropane ($(CF_3)_2CFCF_2OCH_3$);	[163702-08-7]
1-ethoxy-1,1,2,2,3,3,4,4,4-nonafluorobutane ($C_4F_9OC_2H_5$);	[163702-05-4]
2-(ethoxydifluoromethyl)-1,1,1,2,3,3,3-heptafluoropropane ($(CF_3)_2CFCF_2OC_2H_5$);	[163702-06-5]

* Note: Chemical Abstract Service (CAS) identification numbers have been included in brackets [ ] for convenience.

Inventory Source Category

Stationary Sources

Stationary sources of emissions are grouped into two categories. They are point sources and area sources. Point source emissions are from facilities having one or more pieces of equipment registered and permitted with SCAQMD. Therefore, SCAQMD is able to collect facility emission related information. Area source emissions are from numerous small facilities or pieces of equipment, such as gasoline-dispensing facilities, residential water heaters, consumer products and architectural coatings, for which locations are not specifically identified. For modeling purposes, area source emissions are spatially allocated to grid cells using demographic data (e.g., population, housing, and land use).

Point Sources

The 1997 point source emissions inventory is based on the emissions data reported by point source facilities in the 1996/97 Annual Emissions Reporting (AER) Program. This program applies to facilities emitting 4 tons or more of VOC, NO_x, SO_x, or PM or emitting more than 100 tons of CO per year, as specified in Rule 301(e) which are required to pay emission fees. Facilities subject to the AER Program calculate and report their emissions primarily based on their throughput data (e.g., fuel usage, material usage), appropriate emission factors, and control efficiency (if applicable). Under the 1996/97 AER Program, approximately, 3200 facilities reported their annual emissions to SCAQMD. Emissions from smaller industrial facilities not subject to the AER Program, which represent a small fraction of the overall inventory, are included as part of the area source inventory.

In order to prepare the point source inventory, emissions data for each facility were categorized based on EPA's Source Classification Codes (SCCs) for each emission source category. Since the AER Program collects emissions data on an aggregate basis (i.e., equipment and processes with same emission factor are grouped and reported together), facility's permitted equipment data were used in conjunction with the reported data to assign the appropriate SCC codes and develop the inventory at SCC level. For modeling purpose, facility location is specified in Universal Transverse Mercator (UTM) coordinates. Business operation activity profile is also recorded. For growth purpose, facility business type is designated by Standard Industrial Code (SIC).

Area Sources

SCAQMD and CARB shared the responsibility for developing the 1997 area source emissions inventory for approximately 350 area source categories. Specifically, SCAQMD developed the area source inventory for about 90 categories whereas CARB developed the remaining area source categories (of which 230 categories were associated with consumer products, architectural coatings, and degreasing). For each area source category, a specific methodology is used for estimating emissions. In the 1997 area source inventory, a number of existing methodologies were used with updated activity data such as fuel data or sales data (e.g., fuel combustion categories, landfills, oil/gas production); new methodologies were developed for several categories (e.g., agricultural pumps, residential wood combustion); three new categories (i.e., composting, cargo tanks and gas cans) were added to the inventory, and other existing methodologies were refined based on more recent studies (e.g., consumer products, architectural coatings).

Comparison of 1993 and 1997 inventories

Figure 1-1 and 1-2 provide a comparison of the 1993 in the 1997 AQMP and 1997 point and area source inventories for all pollutants.

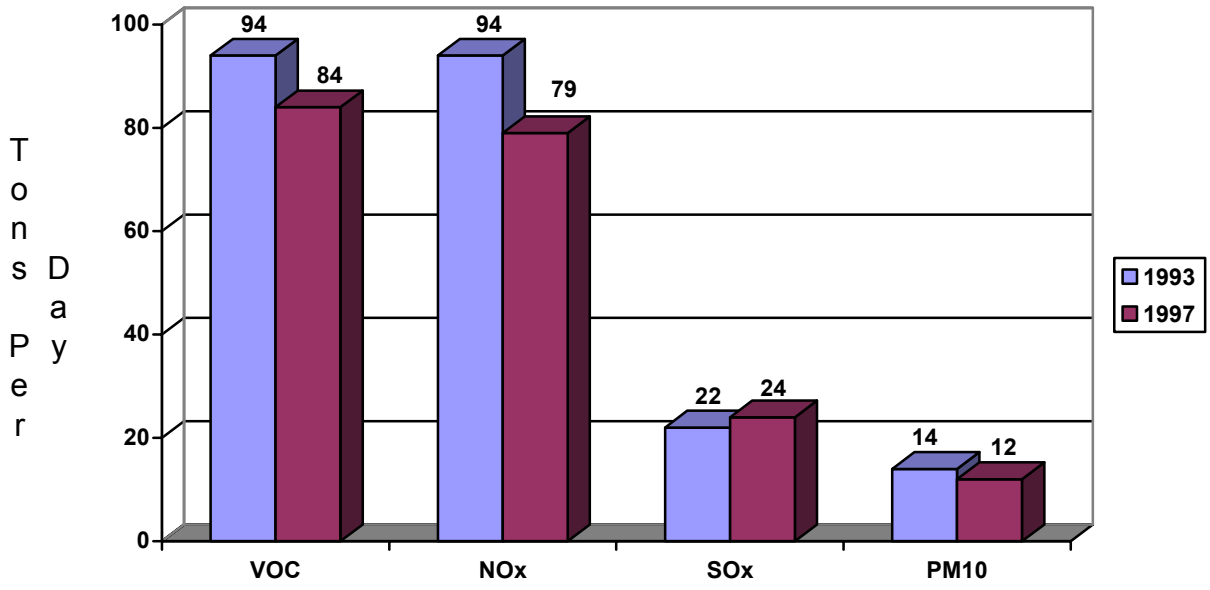


FIGURE 1-1
Total Point Source Emissions

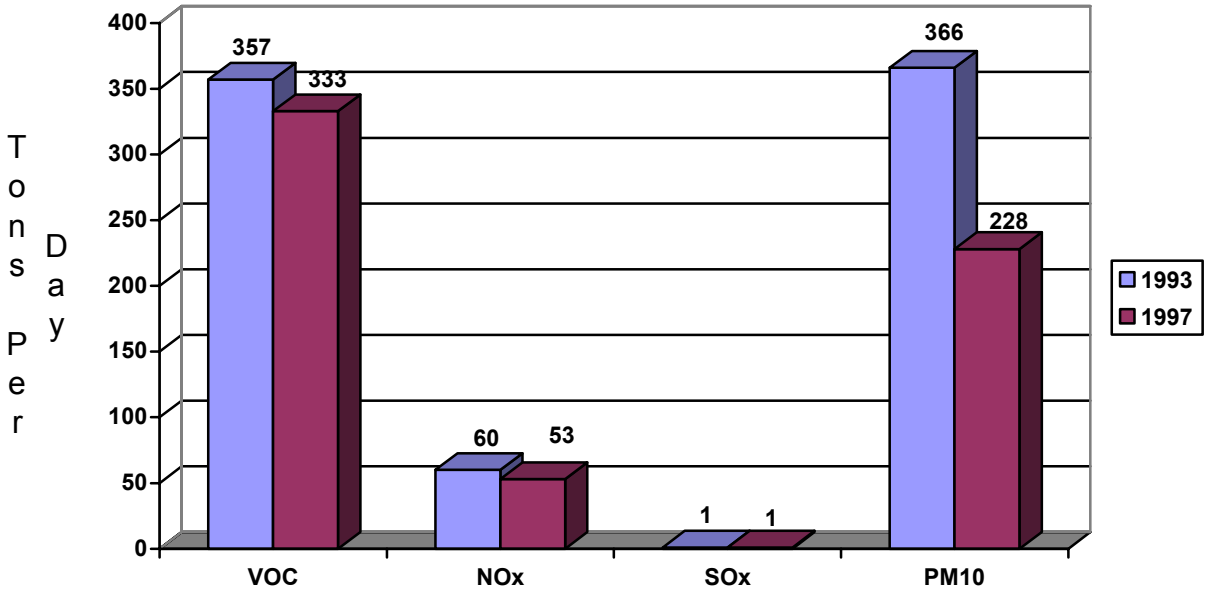


FIGURE 1-2
Total Area Source Emissions

Changes in Point Sources

The point source inventory (except SO_x) continued its downward trend primarily due to the implementation of existing stationary source regulations. As indicated in Figure 1-1 above, the 1993 VOC and NO_x emissions decreased from 94 and 94 tons per day to 84 and 79 tons per day respectively in 1997. In addition to the effect of existing regulations, another major reason for the decreased VOC emissions was the use of EPA's correlation equations for calculating fugitive emissions (i.e., component leaks) by the petroleum industry, which significantly reduced the calculated fugitive emissions.

Also, VOC emissions (primarily methanol) from hydrogen plants process vents in refineries were identified for the first time in 1997, which were included in the baseline inventory. This new emission source category contributed to about two tons of VOC emissions per day in 1997 and is currently regulated under SCAQMD Rule 1189. For NO_x emissions, the majority of the emission decrease in 1997 (compared to 1993) is attributed to reductions achieved through the RECLAIM Program. The increase in SO_x emissions was primarily due to changes in methodology for estimating emissions from refinery flares. The decrease in PM10 was primarily due to implementation of several BACM rules (e.g., Rule 403 and Rule 1186).

Changes in Area Sources

The area source inventory also decreased between 1993 and 1997 for all criteria pollutants due to the effect of rules adopted by SCAQMD and CARB as well as due to the improved or updated area source methodologies used for estimating emissions, which are briefly discussed below.

Rule Implementation

The 1998 Architectural and Industrial Maintenance Coatings Survey conducted by CARB indicated an increase in the use of water-based coatings compared to oil-based coatings between 1990 and 1996 (76% to 82%), primarily due to the SCAQMD Rule 1113 – Architectural Coatings. As a result, VOC emissions decreased by 5 tons per day in 1997 compared to 1993.

In addition, a number of other rules which had implementation dates between 1993 and 1997 contributed to some of the emission reductions between these years. Emission source categories mostly affected by rules included: adhesive applications (Rule 1168), commercial bakery ovens (Rule 1153), screen printing operations (Rule 1130.1), solvent cleaning operations (Rule 1171), marine tank vessel operations (Rule 1142), sumps and wastewater separators (Rule 1176), organic liquid loading (Rule 462), gasoline transfer and dispensing

(R461), stationary internal combustion engines (Rule 1110.2), sulfur content of gaseous fuels (Rule 431.1), and consumer products regulated by CARB.

Improved/Updated Methodologies

Gasoline Dispensing - Emissions from gasoline dispensing were adjusted to account for the low levels of compliance identified in various audits conducted by SCAQMD since 1997 and tests conducted by CARB in 1999. The audits and tests revealed that the overall vapor recovery effectiveness at gasoline dispensing facilities was significantly reduced as a result of many defects found in the systems. The adjustment caused an increase of the emissions for this category from 23 tons per day in 1993 to 35 tons per day in 1997.

Industrial Coatings - A more detailed evaluation of the unspecified industrial coatings category revealed that emissions from this category were previously over-estimated and were primarily attributed to more specific coating categories. Accordingly, the emissions from this category were distributed to appropriate categories.

Consumer Products - A comprehensive survey of consumer products and aerosol coatings was conducted by CARB in 1997 which identified a number of new product categories not inventoried before and also provided a more accurate basis for estimating emissions from existing categories. Between 1993 and 1997, emissions from this category were also reduced due to CARB's consumer products regulation. The net effect of the survey results and CARB's regulation was an overall increase in VOC emissions from 105 to 118 tons of VOC per day.

Residential Wood Combustion - For the residential wood combustion category (fireplaces), AQMD used a new methodology which relied on the total number of wood burning households in each county (based on survey results), the estimated amount of wood burned, and AP-42 emission factors. The new methodology increased the PM and CO emissions from 0.4 and 6 tons per day in 1993 to 4 and 28 tons per day in 1997 respectively. CARB is currently evaluating other methodologies and is also conducting a survey to develop a better estimate of emissions from this category.

Composting - As part of the overall ammonia emissions inventory update, emissions from composting operations were quantified for the first time. VOC emissions from composting were estimated at 6.8 tons/day. (Ammonia emissions are discussed in the Special Studies section below.)

Truck Stops - This is the first time that idle emissions from truck stops have been included in the inventory. Truck stops emissions were estimated from survey data from IdleAire Technologies Corp. conducted in 2001 and emission rates provided by CARB. There are approximately 1,700 truck stop spaces in the SCAB, located in Fontana, Ontario, Banning,

Colton, Rialto, Vernon and Wilmington. Part of the truck stop emissions are counted in CARB's EMFAC2002. CARB collected truck stop data from in-state trucks and grouped them into idle emissions with the other truck idling activities, such as idling at distribution centers, idling for loading and unloading, and in-trip idling. CARB will expand and complete their truck stop emission data in their next generation of on-road mobile source emission factors. The overlapping part of the truck stop emissions in the EMFAC2002 has been eliminated. The estimated 2010 annual average day emissions are 0.14 tons and 2.52 tons for VOC and NO_x respectively.

Metrolink - Commuter train emissions were never estimated in the inventory and are now grouped under the Trains category. Southern California Regional Rail Authority provided the total train miles, train travel time, average speed and engine specifications. CARB provided the emission rates and EPA's passenger locomotive driving cycles for emission estimates. The estimated 2010 annual average week day emissions are 0.11 tons, 2.95 tons and 0.35 tons for VOC, NO_x and SO_x respectively.

Fugitive Dust - Subsequent to the approval of the 1997 AQMP, CARB released updated emission factors for several fugitive dust sources. The 2003 AQMP incorporates those updated emission factors and / or 1997 activity data for source categories such as entrained paved and unpaved road dust, construction, windblown dust, and farming operations. The greatest change was in the estimation of windblown agricultural dust; new emission factors dramatically reduced annual emission estimates. (Windblown dust can still be a major contributor during high wind episodes). Better road construction activity data have become available with the release of SCAG's 2001 RTP, resulting in revised road construction emissions. Although VMT increased slightly in 1997, entrained paved road dust emission estimates are smaller in the 2003 AQMP due to lower CARB emission factor. Entrained road dust remains the major source of fugitive primary PM_{10} emissions. Overall emission estimates were lower for the 2003 AQMP. Table 1-4 indicates the changes in PM_{10} (tons/day) to the fugitive dust inventories.

Table 1-4
Comparison of 1993 and 1997 Major PM_{10} Sources Emissions (Tons/Day)

Source Category	1997 AQMP 1993 Inventory	2003 AQMP 1997 Inventory
Paved Road Dust	168.9	134.3
Unpaved Road Dust	52.4	13.0
Construction	44.3	29.6
Windblown	54.2	19.2
Farming Operations	15.7	7.4
Landfills	1.0	0.2
Total	**336.5**	**203.7**

Special Studies

Aircraft – In 1999, an inventory study was conducted by Energy and Environmental Analysis for SCAQMD to develop the 1997 aircraft emissions for commercial, general aviation (GA), and military airports. The aircraft activity data (i.e., number of aircraft operations by aircraft types) was obtained from commercial airport operators, and from FAA for general aviation airports. The U.S. EPA's Emissions Dispersion Modeling System (EDMS) was used in this study to calculate aircraft emissions. Emissions from commercial aircraft were calculated based on the aircraft type, engine type, number of engines, time-in-mode, emission factors, mixing height, and the number of landing and take-off cycles. GA aircraft emissions were primarily calculated using AP-42 emission factors. Military airport emissions were provided by military airport operators. For future years, SCAG's 2025 projected emission inventories for commercial airports and growth factors for GA airports were utilized. For intermediate years, emissions for commercial airports were interpolated between 1999 and 2025 based on the passenger level (i.e., million air passengers) specified for each commercial airport in the 2001 Regional Transportation Plan.

Marine Vessels – The Marine Vessels Emissions Inventory study was conducted in 1999 by Arcadis, Geraghty and Miller (previously known as Acurex Environmental) for SCAQMD to update the 1997, 2000, 2010, and 2020 baseline emissions inventory. The Study included ocean-going vessels (calling on San Pedro Bay Ports of Los Angeles and Long Beach or on the Chevron offshore facility at El Segundo, as well as ships transiting through the area without calling on the ports), tugboats, harbor vessels, fishing vessels, and U.S. Navy and coast Guard Vessels. Emissions for ocean-going vessels (i.e., tankers, container ships, passenger ships) were calculated based on the activity data including the number of ships calling on the ports, propulsion type (motor ship, steamship), engine size, service speed,

time-in-mode (hotelling, maneuvering and cruising), power requirement for each mode, and the available emission factors for different engine types. Emissions from other marine vessel categories were primarily calculated based on the number of vessels, fuel consumption rate, and appropriate emission factors.

Ammonia Sources - A comprehensive revision to the ammonia inventory was performed by AVES(ATC) as part of the Technical Enhance Program 2000 (TEP2000) program. The final report was released in August 2001 and entitled "1997 Gridded Ammonia Emission Inventory Update for the South Coast Air Basin." This revision systematically updated emission factors and activity levels (e.g. population) for Basin ammonia sources. The inventory now includes composting emissions, a previously uninventoried source. Based on recent tunnel studies, including Fraiser and Cass (1998), AVES recommends that the mobile source emission factor is 3 to 4 times greater than previously estimated. This change dramatically changes the amount of mobile source ammonia emissions, but these emissions continue to be spread out spatially. However, until federal and state agencies review and confirm the new emission factor, AQMD staff will continue to use the current lower emission factor in its PM modeling. The AVES inventory also shows fewer emissions from poultry (lower emission factor) and horses (smaller population estimate and emission factor), and higher emissions from dairy cows (higher emission factor and inclusion of heifers and calves) than the 1997 AQMP inventory. Table 1-5 summarizes the changes to the ammonia inventory.

Table 1-5
Changes in Ammonia Emissions (Tons/Day) between 1995 and 1997

Source Category	**1997 AQMP 1995 Inventory**	**2003 AQMP 1997 Inventory**
Soil / Fertilizer	50.0	41.9
Domestic	9.1	25.9
Point / Other	3.1	13.2
Cattle	10.8	32.4
Poultry	28.8	22.6
Other Livestock	17.0	5.4
Composting / Related Operations	NI	8.7
Mobile Source	7.0	7
Total	**155.8**	**157.1**

Mobile Sources

On-Road Mobile Sources

Caltrans, CARB, SCAG, and the Department of Motor Vehicles (DMV) supply data necessary to develop the on-road mobile source inventory. DMV maintains a count of registered vehicles; and Caltrans provides highway network, traffic counts and road capacity data. SCAG maintains the regional transportation model containing the temporal and spatial distribution of motor vehicle activity (travel time, travel speed, and volume of traffic for morning-peak, afternoon-peak, mid-day and night hours). In addition, SCAG periodically conducts origin and destination surveys to validate the regional transportation model, and updates a demographic database for population, housing, employment and patterns of land use within SCAQMD jurisdiction.

CARB estimates on-road motor vehicle emissions from their emissions model called EMFAC. Emission rate data are collected from various sources, such as individual vehicles in a laboratory setting, tunnel studies and certification data, etc. Vehicle activity data are obtained from regional planning agencies, such as SCAG. The EMFAC model calculates exhaust and evaporative emission rates by vehicle type for different temperatures, operating speeds and relative humidity. Temperature and humidity profiles are used to produce month specific, annual average; seasonal and episodic inventories. Parameters accounted for by EMFAC include the following: type of control technology and fuel usage, distribution of operating speeds, speed and temperature correction factors, and the reduction in emissions resulting from the state's motor vehicle regulatory programs. CARB released the latest emissions model (EMFAC2002) in September, 2002 to be used for the development of the motor vehicle emissions inventory. EMFAC2002 includes (1) thirteen vehicle classes (light-duty passenger, light-duty trucks under 3750 pounds, light-duty trucks between 3750 pounds and 5750 pounds, medium-duty trucks, light-heavy-duty trucks between 8501 pounds and 10000 pounds, light-heavy-duty trucks between 10000 pounds and 14000 pounds, medium-heavy-duty trucks, heavy-heavy-duty-trucks, line-haul, urban buses, motorcycles, school buses and motor homes.); (2) two fuel types (gas and diesel); (3) three technology groups (catalyst, non-catalyst, and diesel); (4) 60 calendar years (1980-2040); (5) two exhaust processes (starts and running); (6) four evaporative processes (diurnal, hot soak, running loss, and resting loss); (7) seven pollutants (HC, CO, CO_2, NO_X, PM, SO_X, lead) and (8) fuel consumption. EMFAC2002 also includes a "What-If-Scenario Generator" (WIS) that can be used to evaluate the impacts that changes to various inputs, such as population, vehicle speed or control strategy, would have on motor vehicle emissions. In the Final AQMP, SCAG's updated activity data were incorporated into EMFAC2002 model to estimate the on-road emission inventories.

For modeling gridded inventory, emissions from on-road motor vehicles are estimated at grid level, by using Caltrans' Direct Travel Impact Model (DTIM). DTIM calculates emissions based on detailed information regarding each link (roadway segment) in an

area for each hour of the day. The required inputs of the model include traffic volume, traffic speed, vehicle fleet characteristics, and ambient temperature. The characteristics of DTIM include: (1) It calculates emissions based on more specific information, such as link speed, link volume, and temperature; (2) It takes into consideration the spatial and temporal distribution of emissions, thus providing hourly gridded emissions; and (3) It can show the emission impact on various types of transportation and regional planning alternatives (e.g., changes in roadway network configuration, or public transportation services). DTIM system consists of three steps. First step is to reformat and sort emission rates for all vehicle classes produced by the CARB vehicle emission factor program (EMFAC). Second step is to produce average emission rates for specific vehicle classes identified by the user. The last step is to combine emission rates with vehicle activity estimates from a transportation demand model and supplemental information on temperatures and temporal patterns to produce regional mobile source emissions and hourly gridded mobile emissions. DTIM provides the detailed emission inputs needed by photochemical grid models such as Urban Airshed Model (UAM). DTIM4 has been recently updated to incorporate CARB's EMFAC2002.

CARB's EMFAC7G model was used in the 1997 AQMP. EMFAC 2002 model is used in this 2003 AQMP. Between these two models, CARB released two other EMFAC models; they are EMFAC2001 version 2.02 and EMFAC2001 version 2.08. Major improvements from EMFAC7G to EMFAC2002, other than updated all the existing factors from the most current adopted rules and available data and items mentioned previously (thirteen vehicle classes, two exhaust processes, four evaporative processes, sixty calendar years….,etc.), include updated unregistered vehicle estimates; updated Inspection/Maintenance benefit estimates; updated idle emission rates; extended idle for heavy-duty trucks; adding EVII and Tier II programs; and adding air conditioning correction factors. A detailed description of EMFAC2002 is available at CARB's website. (www.arb.ca.gov/msei/msei.htm) EMFAC2002 results indicate that EMFAC7G underestimated the emissions. Figure 1-3 provides a comparison of the 1997 on-road annual average emissions (tons/day) by pollutant between EMFAC7G and EMFAC2002. It should be noted that in addition to methodology improvements, EMFAC2002 also incorporates rules adopted since the release of EMFAC7G.

The on-road planning and annual average inventories in this Appendix are based on CARB's EMFAC2002 inventories, while DTIM is used to develop modeling inventory. EMFAC2002 has been approved by the U. S. EPA for use as a SIP motor vehicle emissions model, and for use in analyzing conformity against emission budgets. Accordingly, EMFAC2002 will be the basis for on-road planning inventories, emission budgets, and rate-of-progress calculations.

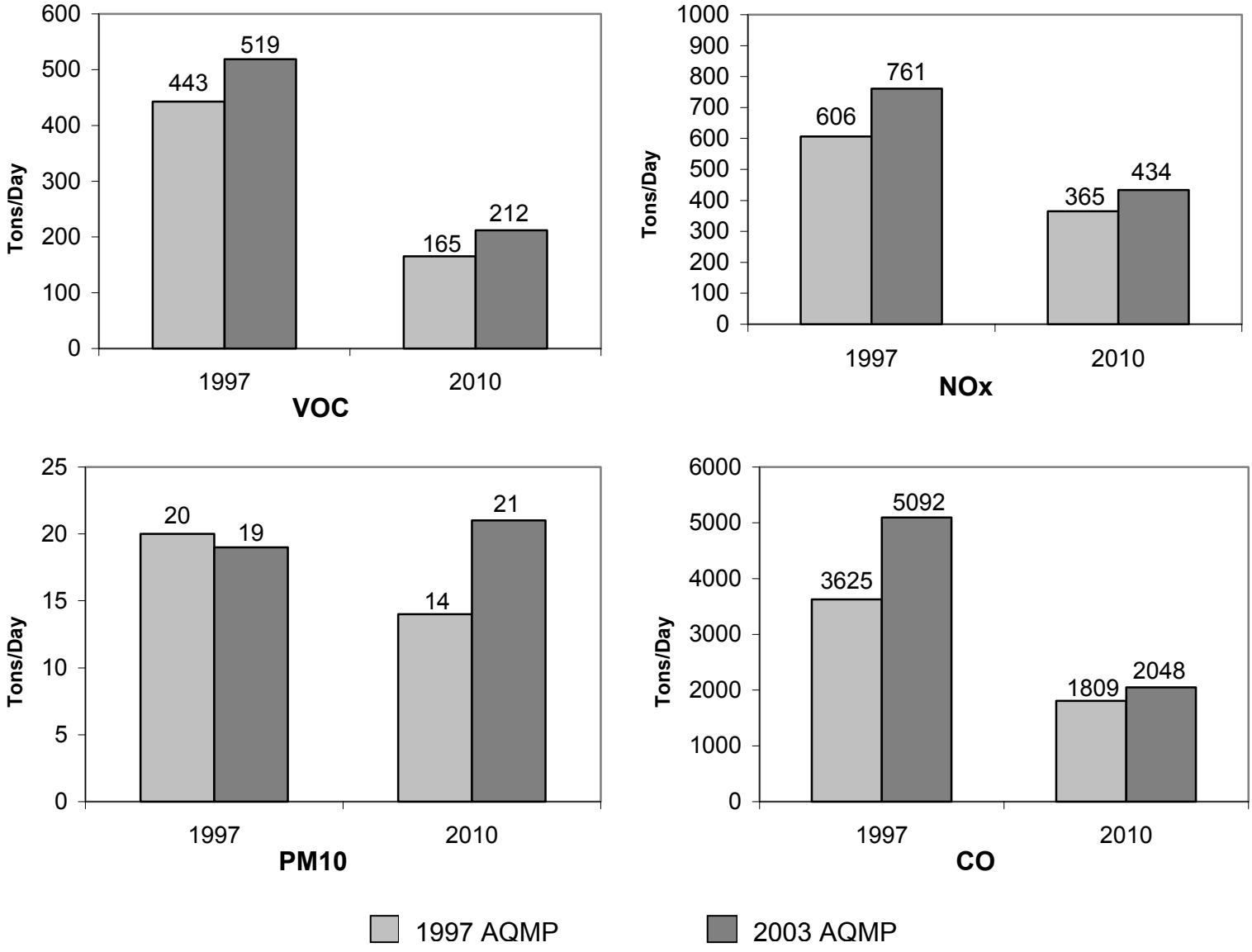


FIGURE 1-3
Comparison of 1997 and 2010 Baseline Emissions Between 1997 AQMP (EMFAC7G) and 2003 AQMP (EMFAC2002)

Off-Road Mobile Sources

All mobile sources not included in the on-road mobile source inventory are considered as "off-road" mobile sources which include aircraft, ships, commercial boats, recreational vehicles, construction equipment, etc. This is the first time CARB's OFF-ROAD model is used to estimate off-road emissions in the AQMP. This model calculates emissions from more than one hundred equipment types. "OFF-ROAD" model incorporates various aspects of off-road elements, such as the effects of various adopted regulations, technology types, and seasonal conditions on emissions. The model combines population, activity, horsepower, load factors, emission factors and control factors to yield the annual equipment emissions by county, air basin or state. The spatial

and temporal features have also been incorporated to estimate the seasonal emissions. The improvements from the "OFF-ROAD" model versus the methodology used before include: (1) More equipment types, horsepower groups and fuel types are categorized; (2) Average maximum horsepower, load factor and usage estimates are updated based on recent available data. (3) Equipment population in any given calendar year is distributed by age; (4) All the adopted regulations related to emission reductions are reflected in the emission calculations. These features make the OFF-ROAD model more accurate in its depiction of emissions. Off-road emissions can be found at CARB's website. (www.arb.ca.gov/msei/off-road/off-road.htm) Currently other than ships, aircraft, locomotive and recreational vehicles, all the other categories are being estimated from the OFF-ROAD model. CARB's updated population and activity data in lawn and garden and locomotive categories were used in the 2003 AQMP. Continuous effort is being made to improve the off-road mobile source emissions. Figure 1-4 illustrates the comparison of emissions presented in the 1997 AQMP and 2003 AQMP.

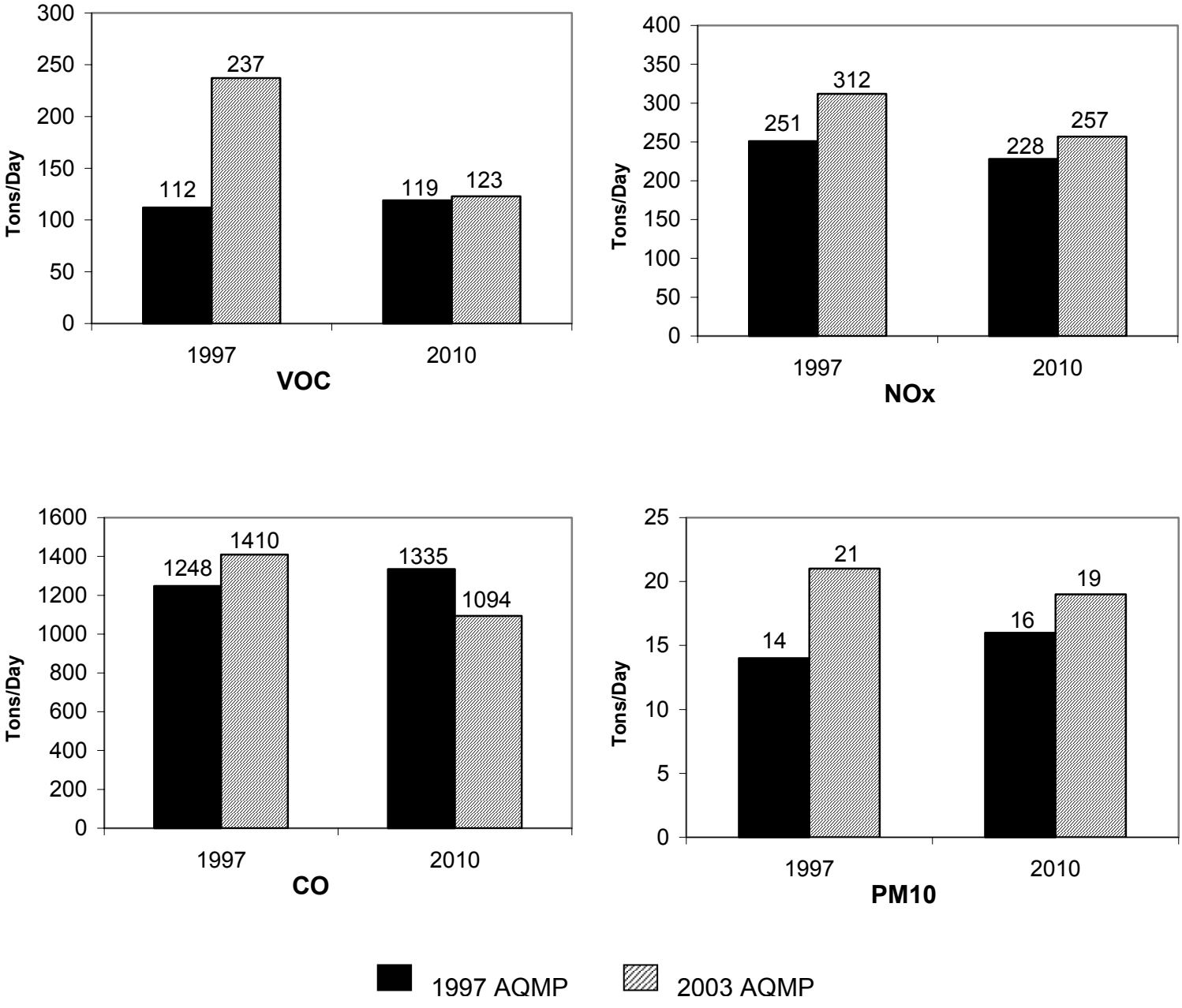


FIGURE 1-4
Comparison of Off-Road Baseline Emissions
1997 AQMP and 2003 AQMP (off-road model)
(Annual Average Emissions)

Inventory Type

Average Annual Day Inventory

The average annual day emissions inventory was derived primarily by dividing the annual total emissions by 365, except for the emissions derived from CARB's EMFAC2002 (on-road mobile sources) and OFFROAD (most off-road mobile sources) models. For those sources, the average annual day emissions represent 40% of winter emissions and 60% of the summer emissions. In addition, the average annual day inventory was developed for all criteria pollutants regardless of their attainment status. The average annual day emissions are used to estimate cost-effectiveness of proposed control measures and future tracking of AQMP implementation (e.g., annual progress report on rule adoption).

Planning Inventory

The challenge of bringing the Basin air quality into compliance with state and federal air quality standards is complicated by the fact that ambient concentrations of ozone are typically at their highest during the summer (defined as May through October for planning purposes) while those for CO and NO_2 are generally highest during the winter months (November through April). Any strategy designed to mitigate air pollution in the Basin must consider this seasonal variation in ambient air quality. Planning inventories are also referred to as seasonal inventories. These inventories only present emissions for those air pollutants or their precursors for which the area is in non-attainment with state or federal air quality standards. The intent of a planning inventory is to characterize emission levels representative of those that occur during the typical season of violations. For example, the summer, or ozone, planning inventory contains emissions of ozone precursors (i.e. VOC and NO_x) during the summertime. The winter, CO and NO_2, planning inventory represent emission levels during the wintertime. These planning inventories provide the basis for tracking emission reduction progress specified by the federal Clean Air Act (CAA) and California Clean Air Act (CCAA). The CAA requires the District to produce a plan for reducing all non-attainment pollutants or their precursors by fifteen percent between 1990 and 1996, and three percent each year thereafter, averaged every consecutive three years until reaching the attainment date. The CCAA requires emission reductions by five percent or more per year, averaged every three consecutive years until 2000. In addition, the CAA specifies 1990 as the base year, whereas the CCAA specifies 1987.

CARB has developed guidelines for the development of planning inventories. For point sources emission estimates represent an "average annual operating day." Emissions from point sources are calculated by dividing the total annual emissions produced by a source by the number of days the source was in operation. For example, if a company emitted 150 tons in a year and the production lines operated 5 days a week for 40 weeks, then the average operating emissions from this facility are calculated to be 150 tons divided by 200 days or 0.75 tons per day. Although emissions of volatile organic

compounds (VOC) from some sources may depend on the ambient temperature or other meteorological factors, adjustments are not currently made for these parameters. However, CARB staff is continuing to evaluate possible adjustments.

For area and other mobile sources, planning emissions represent an "average seasonal operating day." As an example, VOC emissions produced by asphalt road-paving operations are calculated by taking into account the variation in monthly levels and weekly operating days for paving activity during the year. Road paving varies from maximum rates during the summer season to minimum levels during the winter season. Paving activity varies throughout the week with, on average, five operating days in a week. The allocation of annual area source emissions among the seasons is based on estimated relative monthly and weekly emissions patterns. As pointed out earlier, sources included in CARB's OFF-ROAD model do include seasonal activity and temperature profiles which are used to develop the planning inventories.

Both summer and winter planning on-road emission inventories were provided by CARB by incorporating SCAG's updated activity data into CARB's EMFAC2002.

CHAPTER 2
SUMMARIES OF EMISSIONS

Baseline Emissions Inventories

- **Base Year Emission Data**
- **Future Year Emission Data**
- **Emission Trend Analysis**
- **Growth Impact**

Controlled Emissions Inventories

- **Emission Impacts of SCAQMD Programs**
- **Proposed Control Measures**
- **CEPA Emission Calculations**
- **CARB Emission Date Report System**

BASELINE EMISSIONS INVENTORIES

Base Year Emission Data

The 1997 emission inventory is used as the base year inventory to project future year emissions. It represents the most recent and comprehensive inventory development. For the purposes of Reasonable Further Progress (RFP) reporting as required by both the federal and state CAAs, 1990 emissions were reconstructed. 1990 emissions were reconstructed or backcast from 1997 using the latest inventory methodologies (e.g., EMFAC2002 and OFF-ROAD) and socioeconomic/demographic data for all source categories, except for the point sources where reported emissions by facilities were used. Attachments A, B and C include emissions for 1995, 1997, 2000, 2002, 2003, 2005, 2006, 2007, 2008, 2010, and 2020 by major source categories. A major source category refers to a group of emission sources with similar characteristics. Emissions result primarily from the combustion of fuels, evaporation of solvents or fuels, and processing of materials. Hence, stationary sources are grouped under fuel combustion; waste disposal; cleaning and surface coatings; petroleum production and marketing; industrial processes; solvent evaporation; and other miscellaneous processes. Mobile sources are divided into two source categories: 1) on-road, and 2) other (off-road) mobile sources. On-road mobile sources include light-duty passenger vehicles; light-, medium-, and heavy- heavy duty trucks; motorcycles; urban buses; school buses and motor homes. Other mobile sources include aircraft; trains; ships and commercial boats; off-road recreational vehicles; off-road equipment; farm equipment, fuel storage and handling and truck stops. Attachment A summarizes annual average day baseline inventories at major source category. Attachment B is for summer planning baseline inventories and Attachment C is for winter planning inventory. Attachment D lists top 300 VOC and NOx polluters (facilities) in the 1997 inventory in the SCAB. Attachment E illustrates on-road emissions by vehicle class for 1990, 1997, 2006, 2010, and 2020. Due to the recent significance placed on diesel emissions, Attachment F has been added, showing various source categories' emissions due to combustion of diesel fuel. Figure 2-1 compares the annual average emissions between 1990 and 1997. All pollutants have been significantly reduced between these two years. The adopted air rules and regulations are the major contributors toward the reductions.

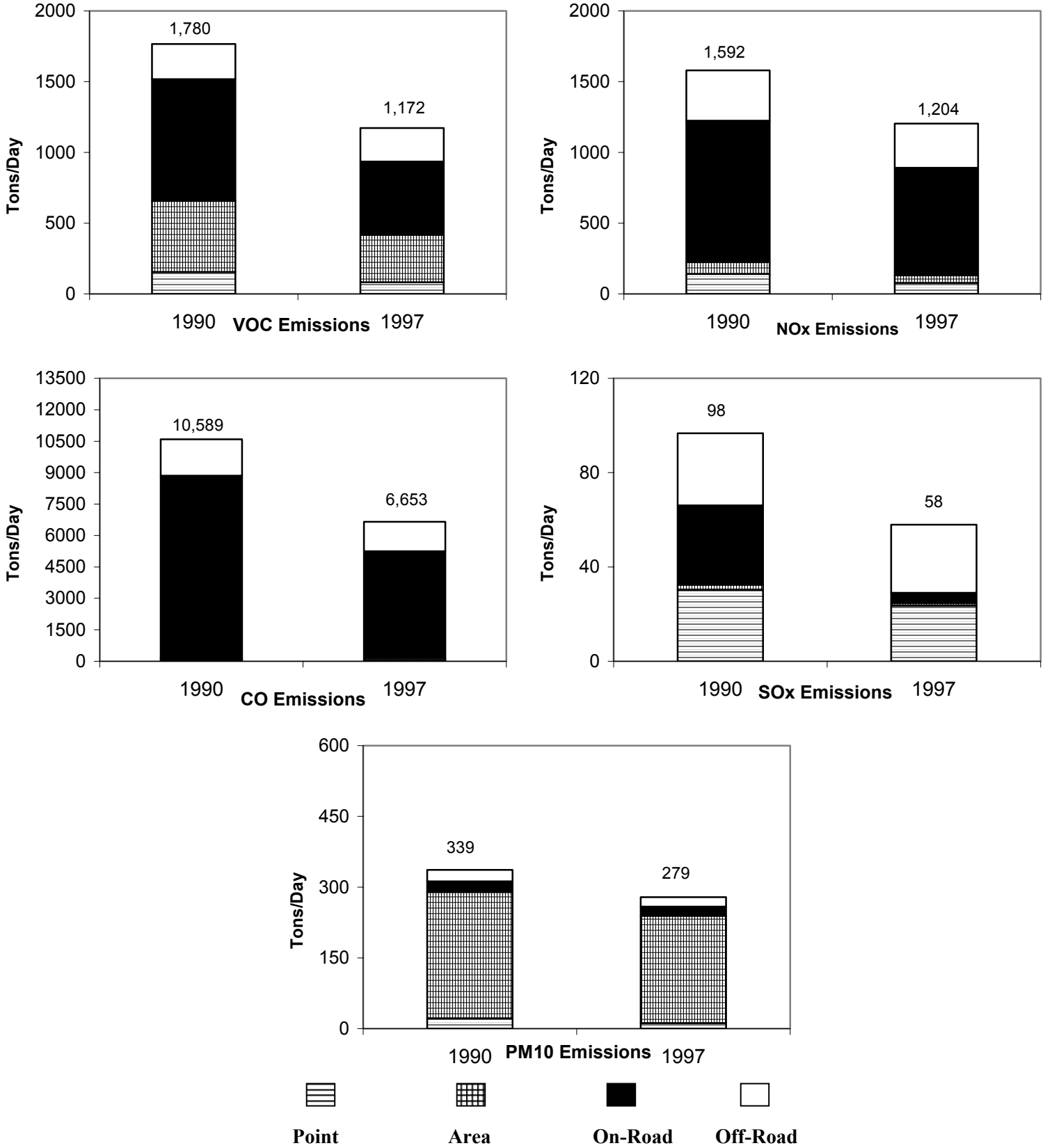


FIGURE 2-1
Comparison of Annual Average Emissions Inventory of 1990 and 1997

FUTURE YEAR EMISSIONS

Future baseline emissions, which are those expected if no additional air quality regulations are introduced, are given in this appendix for the years 2000, 2002, 2003, 2005, 2006, 2007, 2008, 2010, and 2020. These emissions are forecast from the 1997 base year by incorporating the controls implemented under SCAQMD and CARB rules adopted as of October 31, 2002 and a specific set of growth rates from SCAG for population, industry, and motor vehicle activity. Growth projections from SCAG were replaced for certain categories where more specific information is available to improve emission forecasts. For example, California Energy Commission's (CEC) energy demand forecasts for natural gas and petroleum refineries are used to forecast the emissions of those source categories. Rules adopted after October 31, 2002 are treated as control measures for emission reduction accounting purposes. The impact of New Source Review and emissions budgeted for several District programs are addressed in the Controlled Emission Data section. Due to the adoption of the Regional Clean Air Incentive Market (RECLAIM) program in October 1993, emissions are divided into two categories, RECLAIM and non-RECLAIM. Future emissions from RECLAIM sources are estimated based on their allocations specified by District Rule 2002 as well as the trading activity as of 2001. The methodology used to forecast emissions for non-RECLAIM sources is described in the following sections. Baseline emissions for future years are obtained using the following equation:

$$\mathbf{(F.Y.)_i = (B.Y.)_i(C.F.)_i(G.F.)_i}$$

where $(F.Y.)_i$ is the forecast emissions of an air pollutant in the South Coast Air Basin for a future year. $(B.Y.)_i$ refers to the base year emissions of the air pollutant (i.e., 1997). The control factor, $(C.F.)_i$, is an indicator of the level of control imposed on a specific source category as a result of adopted state and local air quality regulations. $(G.F.)_i$ is a growth factor determined for different categories of industry and socioeconomic data.

Control Factors

Air pollution regulations adopted or amended by the District and CARB prior to October 31, 2002 with compliance dates after 1997 are listed in Tables 2-1 and 1-2, respectively. The impact of these rules is included in the baseline emission forecasts by means of control factors. Control factors were developed in reference to 1997 and applied to source categories and/or specific industries affected by the adopted rules/amendments. For industry, the standard industrial codes (SIC) system is used, and for equipment, EPA's SCC system is used. A control factor $(C.F.)_i$ is calculated by the following equation for an individual source category:

$$\mathbf{(C.F.)_i = 1 - Control\ Efficiency}$$

Control efficiency is mostly based on estimates projected during rulemaking. Control factors represent the remaining emissions after a rule or regulation is implemented after 1997. Table 2-2 lists control factors for the years 2000 and 2010 for District rules with post-1997 compliance dates.

Growth Factors

Growth factors applied to each emission inventory source category were derived from several surrogates, including industry output growth, employment growth, demographic growth and others. These growth projections were developed primarily by SCAG. The selection of surrogate by which emission growth is projected dependent on the type of activity. In general, manufacturing sectors and solvent groups use output growth as a surrogate. Output growth is the product of projected employment and productivity. For industry with finish products employment growth appears to be a better indicator than output growth, such as agricultural sector, construction business, etc. Certain emission sources use demographic data as surrogate, such as architectural coatings and landfills. In some cases modifications to the traditional forecasting methodology are warranted in order to better project future emissions. For example, ships and aircraft emissions are provided via special studies. An inventory study was conducted by Energy and Environmental Analysis to develop the 1997 aircraft emissions. The marine vessels emissions inventory was conducted in 1999 by Arcadis, Geraghty and Miller to update the 1997, 2000, 2010 and 2020 baseline emissions. Table 2-3 lists the types of growth surrogates used for the inventory source categories in the 2003 AQMP.

Table 2-1
Rules and Regulations Adopted/Amended by SCAQMD
between September 30, 1996 and October 31, 2002 *

Rule Number	Title	Adoption/ Amendment Date
403	Fugitive Dust	12/98
431.1	Sulfur Content of Gasoline Fuels	6/98
431.2	Sulfur Content of Liquid Fuels	9/00
442	Usage of Solvents	12/00
461	Gasoline Transfer and Dispensing	6/01
462	Organic Liquid Loading	5/99
1102	Dry Cleaners Using Solvents Other Than Perc	11/00
1104	Wood Flat Stock Coating Operations	8/99
1107	Coating of Metal Parts and Products	11/01
1110.1	Stationary Internal Combustion Engines	11/97
1110.2	Gaseous- and Liquid-Fueled Internal Combustion	11/97
1113	Architectural Coatings	7/01
1121	Residential Natural Gas-Fired Water Heaters	12/99
1122	Solvent Degreasers	7/01
1124	Aerospace Assembly and Component Mfg. Op.	9/01
1130	Graphic Arts	10/99
1130.1	Screen Printing Operations	12/96
1131	Food Product Manufacturing and Processing	9/00
1132	High Emitting Spray Booth Facilities	1/01
1136	Wood Products Coatings	6/96
1137	PM_{10} Emissions from Woodworking Op.	2/02
1138	Restaurant Operations	11/97
1145	Plastic, Rubber and Glass Coatings	2/97
1146	Non-Residential Boilers, Steam Generator, PH	11/00
1146.2	Large Water Heaters and Small Boilers	1/98
1158	Storage, Handling, Transport of Petroleum Coke	6/99
1162	Polyester Resin Operations	11/01
1168	Adhesive and Sealant Applications	7/02
1171	Solvent Cleaning Operations	8/02
1176	Sumps and Wastewater Separators	9/96
1178	Storage Tanks at Petroleum Facilities	12/01
1186	Paved and Unpaved Roads and Livestock Op.	9/99
1189	Hydrogen Plant Process Vents	1/00
2202	On Road MV Mitigation	10/98

* Only the latest rule amendment dates with emission reductions are listed.

Table 2-2
Control Factors by District Rules with Post-1997 Compliance Dates *

RULE		2000				2010			
Number	Rule Name	VOC	NOx	SOx	PM	VOC	NOx	SOx	PM
431.1	Sulfur Content of Gasoline Fuels	-	-	0.93	-	-	-	0.93	-
431.2	Sulfur Content of Liquid fuels	-	-	-	-	-	-	0.08	
0.90									
442	Usage of Solvents	-	-	-	-	0.30	-	-	-
						0.99			
461	Gasoline Transfer and Dispensing	0.89	-	-	-	0.36	-	-	-
462	Organic Liquid Loading	0.88	-	-	-	0.88	-	-	-
1102	Dry Cleaners Using Solvents Other Than Perc	-	-	-	-	0.17	-	-	-
1104	Wood Flat Stock Coating Operations	0.83	-	-	-	0.83	-	-	-
1107	Coating of Metal Parts and Products	0.93	-	-	-	0.93	-	-	-
1110.1&	Stationary Internal Combustion Engines	-	0.85	-	-	-	0.24	-	-
1110,2									
1113	Architectural Coatings	0.95	-	-	-	0.41			
1121	Residential Natural Gas-Fire Water Heaters	-	-	-	-	-	0.43	-	-
1122	Solvent Degreasers	0.24	-	-	-	0.12	-	-	-
1124	Aerospace Assembly and Component	0.95	-	-	-	0.89	-	-	-
1130	Graphic Arts	0.86	-	-	-	0.86	-	-	-
		0.94				0.94			
1130.1	Screen Printing Operations	-	-	-	-	0.90	-	-	-
						0.99			
1131	Food Product Manufacturing and Processing	-	-	-	-	0.15	-	-	-
1132	High Emitting Spray Booth Facilities	-	-	-	-	0.44	-	-	-
						1.00			
1136	Wood Products Coatings	0.71	-	-	-	0.24	-	-	-
1137	PM10 Reductions from Woodworking Op.	-	-	-	-	-	-	-	0.94
1138	Restaurant Operations	0.85	-	-	0.95	0.85	-	-	0.95
1145	Plastic,Rubber and Glass Coatings	0.60	-	-	-	0.60	-	-	-
1146	Non-Residential Boilers, Steam Generator	-	-	-	-	-	0.81	-	-
1146.2	Large Water Heaters and Small Boilers	-	0.97	-	-	-	0.33	-	-
1158	Storage,Handling,Transport of Petroleum Coke	-	-	-	0.54	-	-	-	0.21
1162	Polyester Resin Operations	-	-	-	-	0.24	-	-	-
						0.77			
1168	Adhesive and Sealant Applications	1.14	-	-	-	0.33	-	-	-
1171	Solvent Cleaning Operations **	0.58	-	-	-	0.12	-	-	-
1176	Sumps and Wastewater Separators	0.34	-	-	-	0.34	-	-	-
1178	Storage Tanks at Petroleum Facilities	-	-	-	-	0.44	-	-	-
1186	Paved and Unpaved Roads and Livestock Op.	-	-	-	0.87	-	-	-	0.67
					0.99				0.93
1189	Hydrogen Plant Process Vents	-	-	-	-	0.20	-	-	-
2202	On-Road MV Mitigation	-	-	-	-	0.99	0.99	0.99	0.99

* List only rules have emission impact after 1997.

** Tier II controls are subject to technology assessment in 2005.

Table 2-3

Growth Surrogates by Source Category

Group 1: Source Categories Using Industry Output as Growth Factors

Area Sources

Source Description	Parameter
Baking – Commercial	Manufacturing-Food
Chemical Processes - Fabrication/Manufacturing	Manufacturing-Rubber
Degreasing	Manufacturing-Total
Metal Processes - Secondary Product	Manufacturing-Metal
Mineral Processes - Non-Asphalt	Manufacturing-Stone, Clay
Mobile Equipment – Refrigeration	Manufacturing-Food
Solvent Use - Adhesive & Seal	Manufacturing-Total
Solvent Use - Industrial-Misc.	Manufacturing-Total
Solvent Use - Industrial-Fabric	Manufacturing-Apparel
Solvent Use - Industrial-Metal Furn	Manufacturing-Furniture
Solvent Use - Industrial-Paper	Manufacturing-Paper
Solvent Use - Industrial-Marine	Manufacturing-Transportation
Solvent Use - Printing & Publish	Manufacturing-Print
Wine Making - Wine & Brandy	Manufacturing-Food
Wood And Paper - Processing Loss	Manufacturing-Furniture

Point Source Industries

SIC	Source Description
10-14	Mining
20-38	Manufacturing
40	Railroad Transportation
43	U.S. Postal Service
46	Pipeline, Except Natural Gas
48	Communications

Table 2-3

(continued)

Group 2: Source Categories Using Employment Data As Growth Factors

Area Sources

Source Description	Parameter (Employment)
Agricultural Processes – Agricultural	Agriculture-Total Employment
Cooking – Commercial	Manufacturing-Total Employment
Const. & Demolition - Non-Government	Construction Employment
Const. & Demolition – Government	Government Employment
Farming Operations – Agricultural	Agriculture-Total Employment
Fuel Combustion – Agricultural	Agriculture-Total Employment
Fuel Combustion – Commercial	Services-Total Employment
Fuel Combustion –Industrial	Manufacturing-Total Employment
Industrial Equipment - Light Duty	Construction Employment
Mineral Processes - Surface Blasting	Total Employment
Non-Farm Equipment – Heavy Duty	Construction Employment
Other – Unspecified	Total Employment
Pesticide Appli/Use – Agriculture-Synthetic	Agriculture-Total Employment
Pesticide Appli/Use - Non-Agricultural	Total-Co Employment
Solvent Use – Commercial	Services-Automobile Employment
Solvent Use - Dry Cleaning	Services-Professional Employment
Solvent Use - Asphalt Paving/Other	Construction Employment
Waste Burning – Range Management	Agriculture-Total Employment

Point Source Industries

SIC	Source Description
1-9	Agriculture
15-17	Construction
39	Miscellaneous Manufacturing
41	Local & Interurban Transit
42	Trucking & Warehousing
44	Water Transportation
45	Air Transportation
47	Transportation Services
49	Gas & Sanitary
50-51	Wholesale Trade
52-59	Retail Trade
60-67	Finance, Insurance & Real Estate
70-89	Services
91-97	Public Administration

Table 2-3

(continued)

Group 3: Source Categories Using SCAG's Demographic Data as Growth Factors

Area Source

Source Description	Parameter
Industrial Equipment - Light Duty	Population-SCAG
Pesticide Applications – Consumer Product	Population-SCAG
Solvent Use – Architectural	Housing Unit-SCAG
Solvent Use - Consumer Product	Population-SCAG
Unplanned Fires - Structural Fire	Housing Unit-SCAG
Utility Equipment - Lawn & Garden (Non-Commercial)	Housing Unit-SCAG
Waste Disposal – Landfills	Population-SCAG *

*Wasterecycling programs incorporated.

Group 4: Source Categories Using VMT as Growth Factors

Area source

Source Description	Parameter
On-Road	VMT-SCAG
Paved Road Collector	VMT-Collector
Paved Road Local Street	VMT-Local

Table 2-3

(continued)

Group 5: Others

Area Source

Source Description	Parameter	Note
Commercial Boat	Activity Forecast	(1)
Fuel Combustion – Petroleum Product	Energy Forecast	(2)
Gas Distribution – Transmission	Natural Gas Forecast	(2)
Gasoline Dispensing – Tanks/Vehicle Refueling	Fuel Consumption	(3)
Mineral Processes – Petroleum Related	Energy Forecast	(2)
Windblown Dust	No Growth	(4)
Oil & Gas Extraction	No Growth	(2)
Oil Production	No Growth	(2)
Paved Road – Freeway/Major Arterial	Road Miles	(5)
Pesticide Appli/Use - Ag-Non-Synthetic	No Growth	(6)
Petroleum Related Source – Petroleum	Energy Forecast	(2)
Unpaved Road Dust – Entrained Road	No Growth	(4)
Unplanned Fires – Automobile Fire/Wildfires	No Growth	(4)
Waste Burning – Forest Mgmt	Forest Management	(7)
Waste Disposal – Solvent	No Growth	(4)
Non-RECLAIM Power Plants	CEC	(8)
Locomotive	Activity	(9)

Comments:

(1) Arcadis, Geraghty and Miller (1999)
(2) CEC's 1999 Fuels Report
(3) CARB EMFAC2002 Burden Model Fuel Consumption Estimates
(4) Revised Inventory Methodology by District
(5) Caltrans And CARB Data
(6) CARB's Data - No Growth Since 1982
(7) Angeles National Forest Office
(8) CEC's Forecast, 2001
(9) CARB's Survey Data

The demographic forecasts from the year 1997 to the years 2010, and 2020 for population, housing, employment, and motor vehicle activity are shown in Table 2-4. Table 2-5 exhibits the relative distribution of population by county in the Basin for the years 1987, 1990, 1997, 2000, 2010, 2020 and 2025. By 2010 the population in Los Angeles county is projected to increase by 10% from 1997 levels, compared with increases for Orange (17%), San Bernardino (32%), and Riverside (46%) counties.

Growth factors for specified ranges of SIC were projected by SCAG (2001), and are based on predictions of growth for different industrial sectors per county. SCAG has provided growth factors for the years 2000, 2005, 2010, 2015, 2020, 2025 and 2030. The growth factors for other years are interpolated between these years. Tables 2-6 and 2-7 list growth factors for 2010 and 2020 for Los Angeles County, Orange County, Riverside County and San Bernardino County in SCAB.

Table 2-4

Baseline Socioeconomic Forecasts Used in the 2003 AQMP

Category	1997	2010 (% Growth)		2020 (% Growth)	
Population (Millions)	14.3	16.5	(+15)	18.2	(+27)
Housing Units (Millions)	4.6	5.3	(+15)	5.9	(+18)
Total Employment (Millions)	6.3	7.8	(+24)	8.5	(+35)
Daily VMT (Millions)	296.8	387.4	(+31)	454.7	(+53)

Table 2-5

Population Distribution by County in SCAB (in Thousands)

Year	Los Angeles	Orange	Riverside	San Bernardino	Basin Total
1987	8,250	2,197	627	934	12,008
1990	8,612	2,411	864	1,108	12,995
1997	9,207	2,701	1,093	1,252	14,252
2000	9,412	2,863	1,202	1,348	14,826
2010	10,124	3,168	1,594	1,647	16,533
2020	10,942	3,343	1,997	1,924	18,206
2025	11,428	3,415	2,237	2,089	19,169

Table 2-6

SIC Code Growth Factors by County for the Year 2010					
SIC Sector	**SIC Code**	**Los Angeles**	**Orange**	**Riverside**	**San Bernardino**
Agriculture	1-9	0.868	0.986	1.019	0.703
Mining	10-12,14	0.910	0.680	1.200	0.260
Oil & Gas Extr.	13	1.000	1.000	1.000	1.000
Construction	15-17	1.354	1.436	2.575	1.602
Food/Tobacco	20	1.090	1.290	1.470	1.500
Textile Mill	22	1.430	1.380	1.670	1.660
Apparel/Other Text.	23	1.390	1.650	1.510	1.450
Lumber/Wood	24	0.890	1.210	1.360	1.500
Furniture/Fixtures	25	0.950	1.150	1.520	1.780
Paper	26	1.270	1.640	1.940	1.510
Printing	27	1.030	1.630	1.710	2.750
Chemicals	28	1.280	1.480	1.630	1.880
Petroleum Products	29	1.000	1.000	1.000	1.000
Rubber & Plastic	30	1.390	2.130	1.900	2.310
Leather	31	0.630	0.640	0.860	0.660
Stone,Clay & Glass	32	1.200	1.110	1.490	1.210
Primary Metals	33	1.730	1.390	1.760	1.830
Fabricated Metals	34	1.030	1.420	1.960	1.900
Machinery	35	2.910	3.840	5.230	7.110
Electronic Equip.	36	2.430	2.510	4.660	4.120
Trans. Equip.	37	1.090	1.270	1.850	1.470
Instruments	38	1.440	2.050	3.620	2.600
Misc. Mfg.	39	0.902	1.130	1.434	1.477
Railroads	40	1.530	1.970	1.320	1.550
Local Transits	41	1.049	1.441	1.167	1.182
Trucking	42	1.436	1.536	1.970	1.815
Water Transport	44	1.083	1.111	0.000	0.000
Air Transport	45	1.100	1.797	2.000	1.243
Pipelines Trans.	46	1.140	1.360	0.000	1.350
Travel Services	47	1.754	1.925	0.857	1.000
Communications	48	1.070	1.830	1.850	2.400
Utilities	49	1.293	1.579	4.200	2.083
Wholesales	50-51	1.034	1.413	1.669	1.648
Retails	52-59	1.023	1.404	1.863	1.531
Finance	60-62,67	0.923	1.569	1.780	1.557
Insurance	63-64	1.030	1.656	1.636	1.417
Real Estate	65,67	1.263	1.529	1.543	1.441
Hotels	70	1.163	1.350	1.182	1.387
Personal Services	72	1.282	1.667	1.920	1.590
Business Services	73	1.549	1.477	2.559	2.093
Auto Repairs	75-76	1.025	1.758	2.289	1.843
Motion Pictures	78	1.164	1.500	1.636	1.133
Amusements	79	1.112	1.554	1.631	1.286
Health Services	80	1.091	1.151	2.183	1.791
Legal Services	81	1.245	1.807	1.923	1.476
Educational Services	82	1.146	1.321	2.300	1.600
Non-Profit Org.	83,84,86	1.304	1.829	2.188	1.745
Professional Services	87,89	1.250	1.443	1.923	1.722
Government	91-97	1.138	1.205	1.563	1.390

Note: SCAG projections relative to 1997 base year.

Table 2-7

SIC Code Growth Factors by County for the Year 2020

SIC Sector	SIC Code	Los Angeles	Orange	Riverside	San Bernardino
Agriculture	1-9	0.706	0.838	1.048	0.676
Mining	10-12,14	1.120	0.580	1.290	0.260
Oil & Gas Extr.	13	1.000	1.000	1.000	1.000
Construction	15-17	1.474	1.524	3.075	1.845
Food/Tobacco	20	1.200	1.470	1.770	1.760
Textile Mill	22	1.910	1.830	2.360	2.280
Apparel/Other Text.	23	1.860	2.280	2.050	1.920
Lumber/Wood	24	0.890	1.300	1.560	1.700
Furniture/Fixtures	25	1.000	1.270	1.840	2.160
Paper	26	1.520	2.050	2.650	1.870
Printing	27	1.110	1.920	2.140	3.570
Chemicals	28	1.600	1.890	2.190	2.540
Petroleum Products	29	1.000	1.000	1.000	1.000
Rubber & Plastic	30	1.820	3.010	2.750	3.380
Leather	31	0.590	0.580	0.830	0.530
Stone,Clay & Glass	32	1.440	1.300	1.930	1.420
Primary Metals	33	2.600	1.950	2.680	2.760
Fabricated Metals	34	1.170	1.730	2.690	2.480
Machinery	35	7.440	10.500	15.920	22.020
Electronic Equip.	36	5.020	5.200	11.540	9.530
Trans. Equip.	37	1.260	1.520	2.510	1.820
Instruments	38	2.010	3.060	6.340	4.110
Misc. Mfg.	39	0.885	1.162	1.618	1.616
Railroads	40	2.240	2.950	1.820	2.310
Local Transits	41	1.066	1.618	1.278	1.318
Trucking	42	1.559	1.714	2.455	2.213
Water Transport	44	1.115	1.111	0.000	0.000
Air Transport	45	1.134	2.344	2.000	1.378
Pipelines Trans.	46	1.390	1.760	0.000	1.770
Travel Services	47	1.961	2.660	0.857	1.000
Communications	48	1.290	2.580	2.770	3.770
Utilities	49	1.379	1.719	5.700*	2.611
Wholesales	50-51	1.053	1.607	2.068	1.965
Retails	52-59	1.037	1.525	2.345	1.835
Finance	60-62,67	0.934	1.817	2.240	1.871
Insurance	63-64	1.031	1.988	2.000	1.667
Real Estate	65,67	1.250	1.741	1.857	1.676
Hotels	70	1.265	1.417	1.318	1.581
Personal Services	72	1.449	1.852	2.480	1.897
Business Services	73	1.858	1.714	3.456	2.702
Auto Repairs	75-76	1.055	2.000	3.022	2.314
Motion Pictures	78	1.267	1.656	2.000	1.200
Amusements	79	1.187	2.096	2.015	1.452
Health Services	80	1.155	1.199	2.869	2.235
Legal Services	81	1.392	2.211	2.462	1.762
Educational Services	82	1.239	1.464	3.067	1.927
Non-Profit Org.	83,84,86	1.481	2.378	2.881	2.161
Professional Services	87,89	1.399	1.614	2.462	2.130
Government	91-97	1.181	1.258	1.865	1.603

Note: SCAG projections relative to 1997 base year.

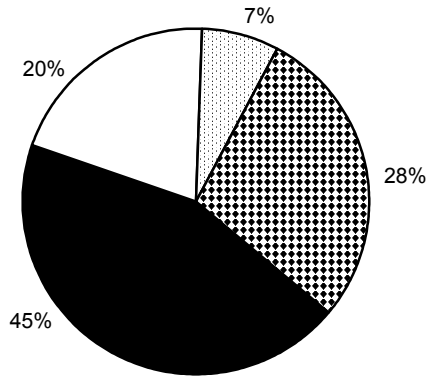
* Utility emissions are mostly limited by RECLAIM, not growth.

Future Year Emission Data

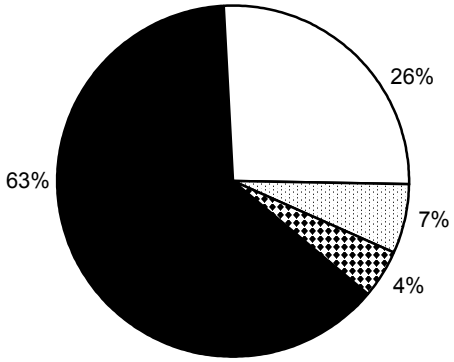
Based on the methodology described above, future year emission inventories data for the milestone years 2000, 2002, 2003, 2005, 2006, 2007, 2008, 2010, and 2020 are presented in Attachments A (average annual day) B (summer planning inventory) and C (winter planning inventory) of this report. These target years are selected to correspond to the years required by either the federal or state CAA to demonstrate attainment with the corresponding air quality standards. Years 2006, and 2010 are milestones to attain PM_{10}, and ozone air quality standards, respectively. Emissions for the year 2020 are projected to assess the need for a maintenance plan once all federal standards are attained by 2010.

Emission Trend Analysis

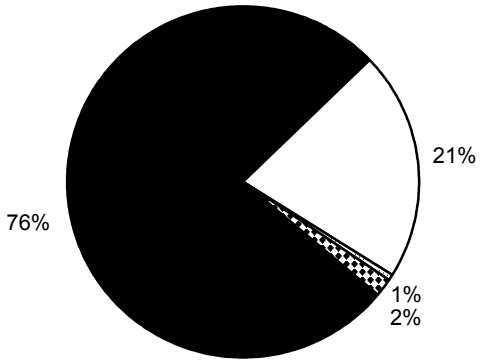
Figures 2-2 through 2-5 present the relative contributions by source categories (i.e., point, area, on-road, and off-road) to total emission levels in 1997 and 2010, respectively. As seen in the figures, in 1997 (average annual day) on-road and off-road mobile sources are major contributors of CO (97%), NO_x (89%), SO_x (57%) and VOC (65%) emissions. Fine particulate matter (PM_{10}) is produced mostly from entrained road dust (53%). For 2010 (average annual day), mobile sources continue to be major contributors to total CO, NO_x, and SO_x emissions by approximately 94%, 89%, and 68%, respectively. However, contribution to VOC by mobile sources is reduced due to the CARB programs. On the contrary, area sources become major contributors to VOC emissions (from 28% in 1997 to 36% in 2010). Figures 2-6 through 2-9 illustrate the emission trends by pollutant for 1990, 1997, 2006, and 2010.



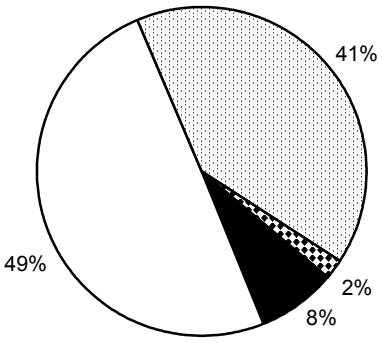
VOC Emissions: 1,172 Tons/Day



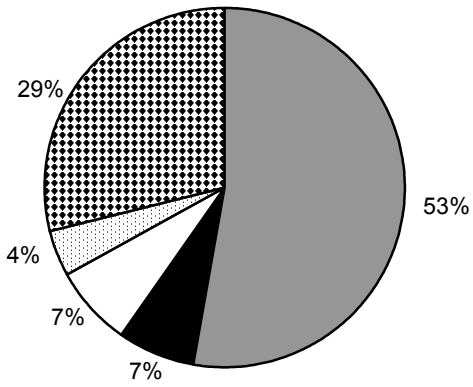
NOx Emissions: 1,204 Tons/Day



CO Emissions: 6,653 Tons/Day



SOx Emissions: 58 Tons/Day

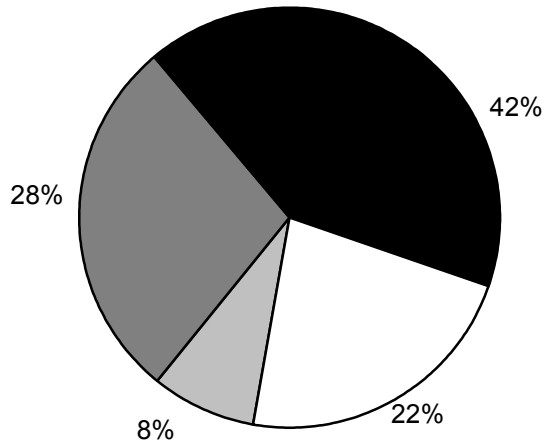


PM10 Emissions: 279 Tons/Day

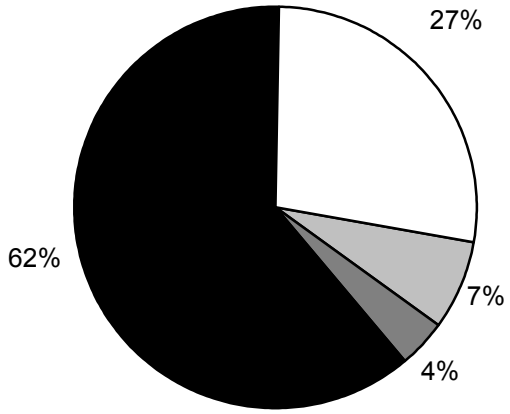
On-Road **Off-Road** **Point** **Area** **Entrained Road Dust**

FIGURE 2-2
Relative Contribution by Source Category to
1997 Emissions Inventory – Average Annual Day

SUMMER

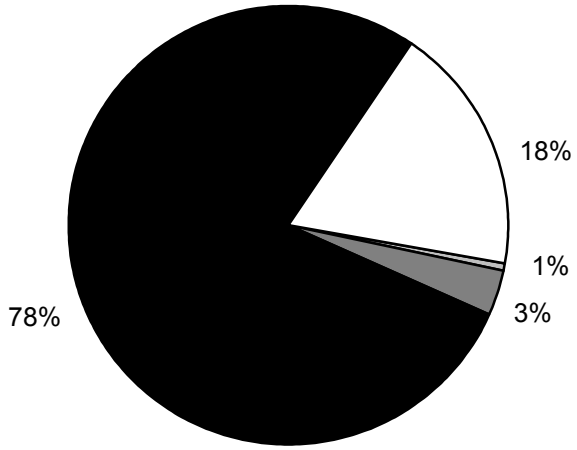


VOC Emissions =1,222 Tons/Day

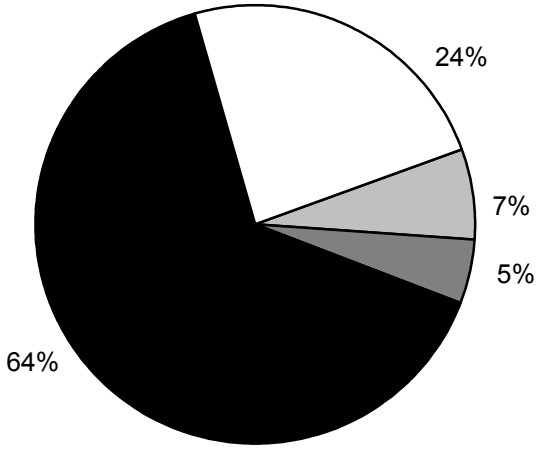


NOx Emissions = 1,165 Tons/Day

WINTER



CO Emissions: 6,461 Tons/Day



NO_2 Emissions: 1,278 Tons/Day

Point **Area** **On-Road** **Off-Road**

FIGURE 2-3
Relative Contribution by Source Category to
1997 Emissions Inventory – Planning Inventory

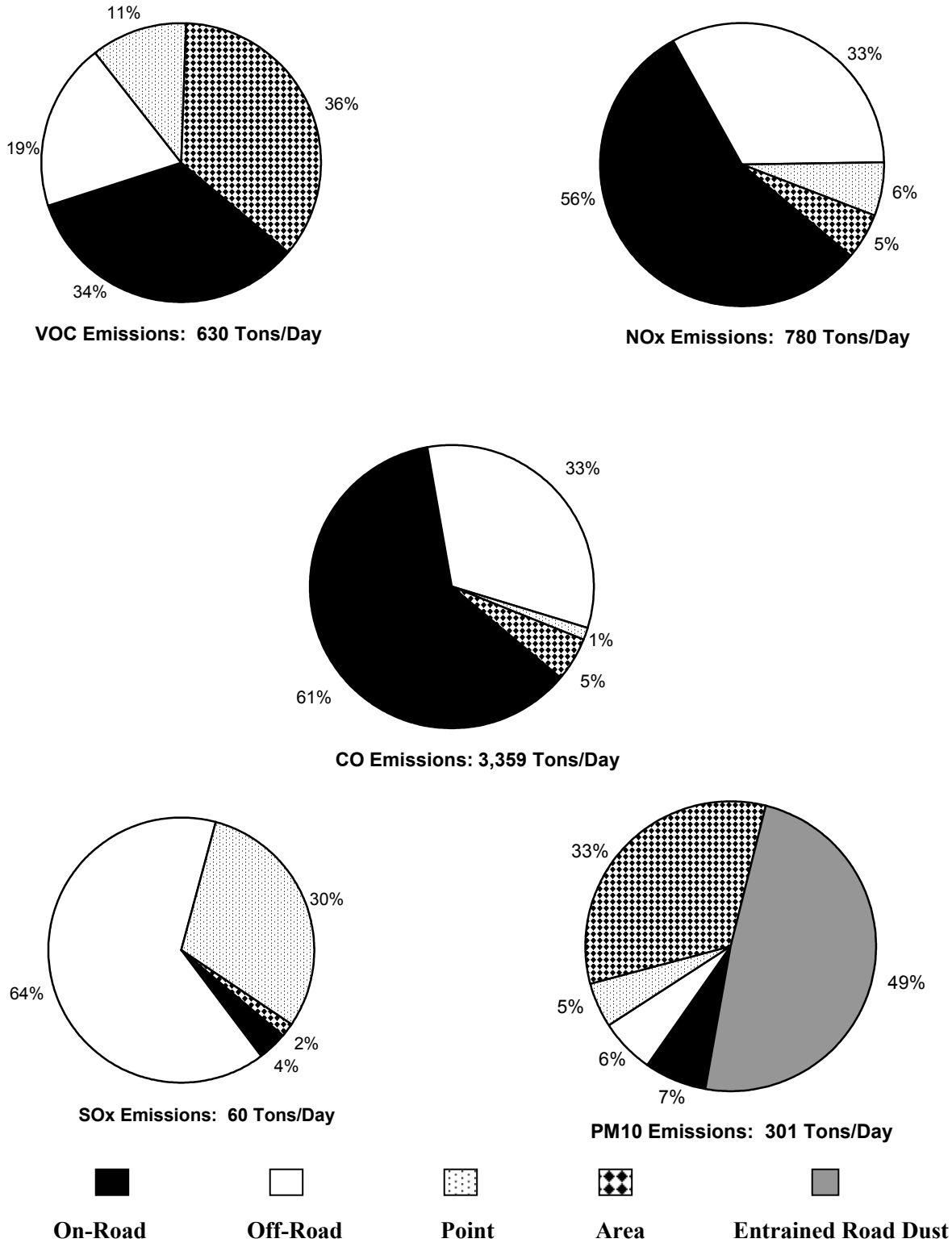
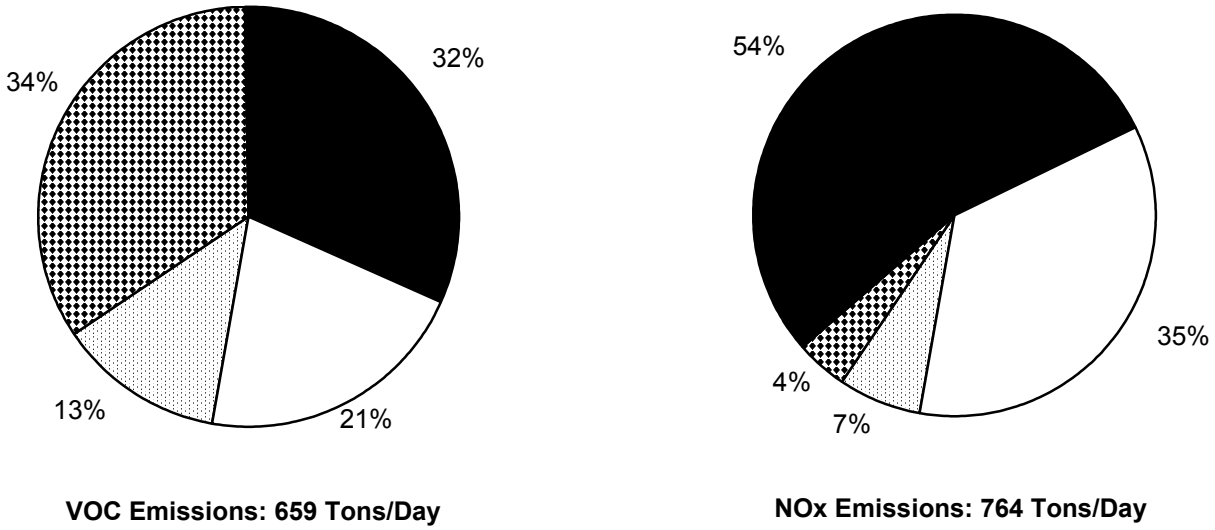


FIGURE 2-4
Relative Contribution by Source Category to
2010 Emissions Inventory –Average Annual Day

SUMMER



WINTER

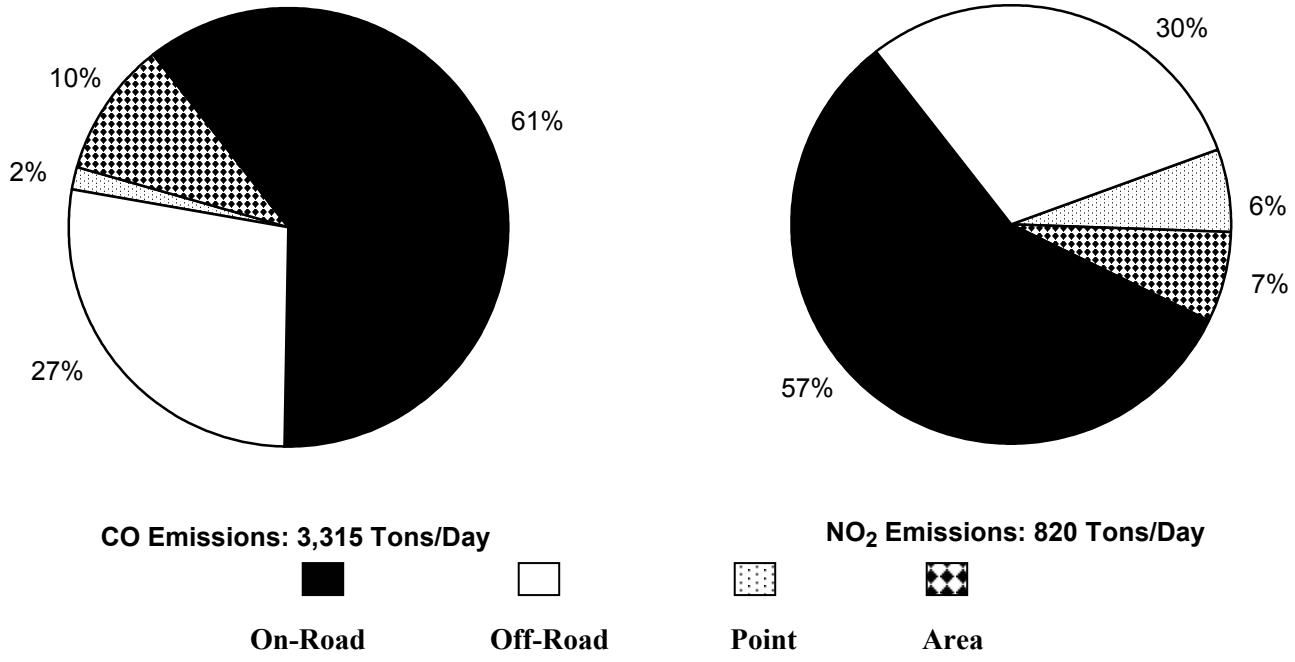


FIGURE 2-5
Relative Contribution by Source Category to
2010 Emissions Inventory – Planning Inventory

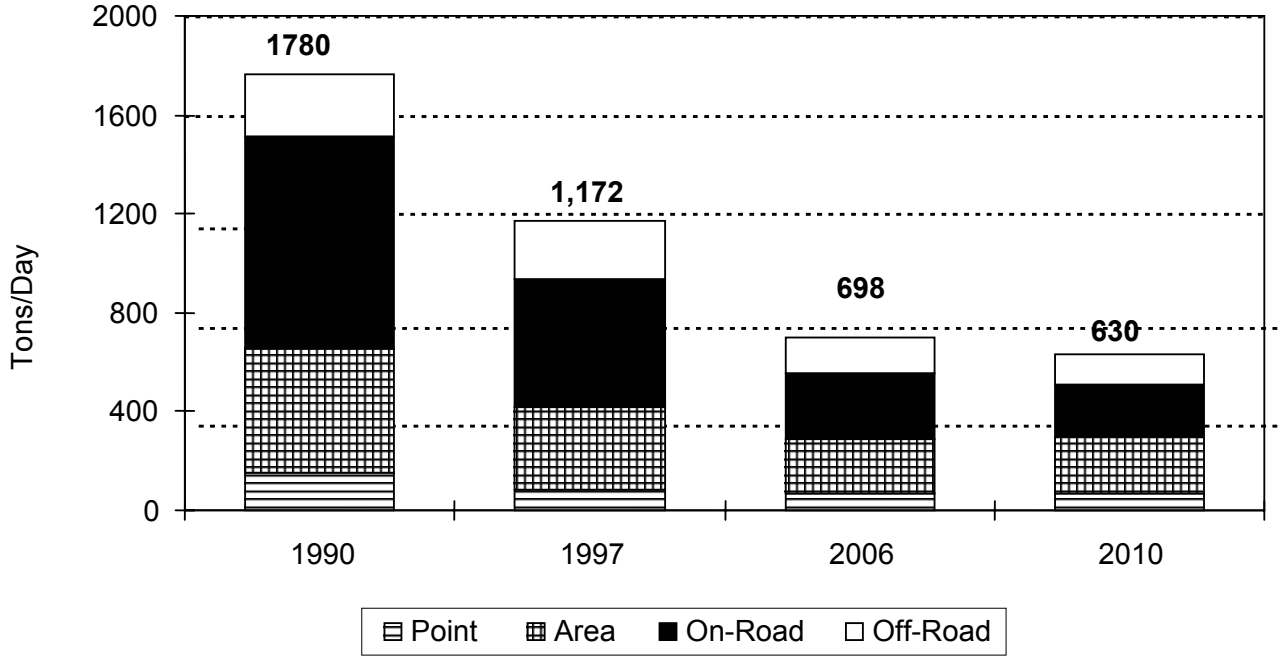


FIGURE 2-6A
VOC Emission Trend by Source Category - Average Annual Day

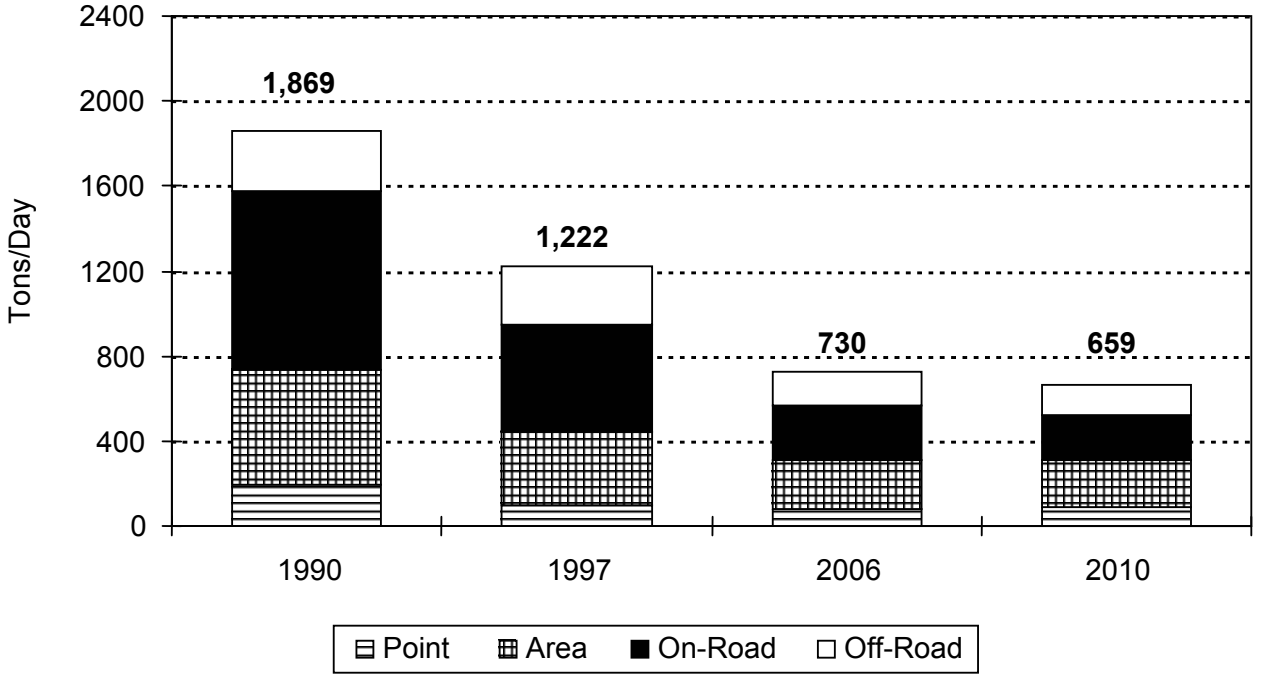


FIGURE 2-6B
VOC Emission Trend by Source Category - Summer Planning

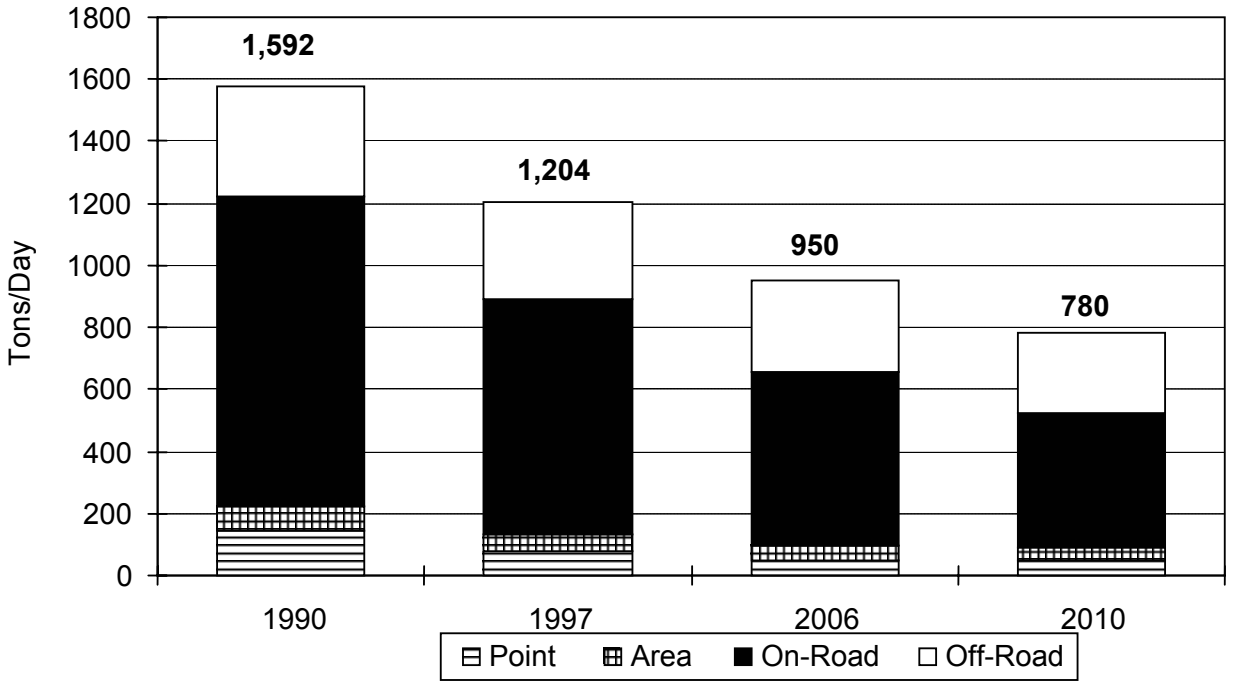


FIGURE 2-7A
NO_x Emission Trend by Source Category - Average Annual Day

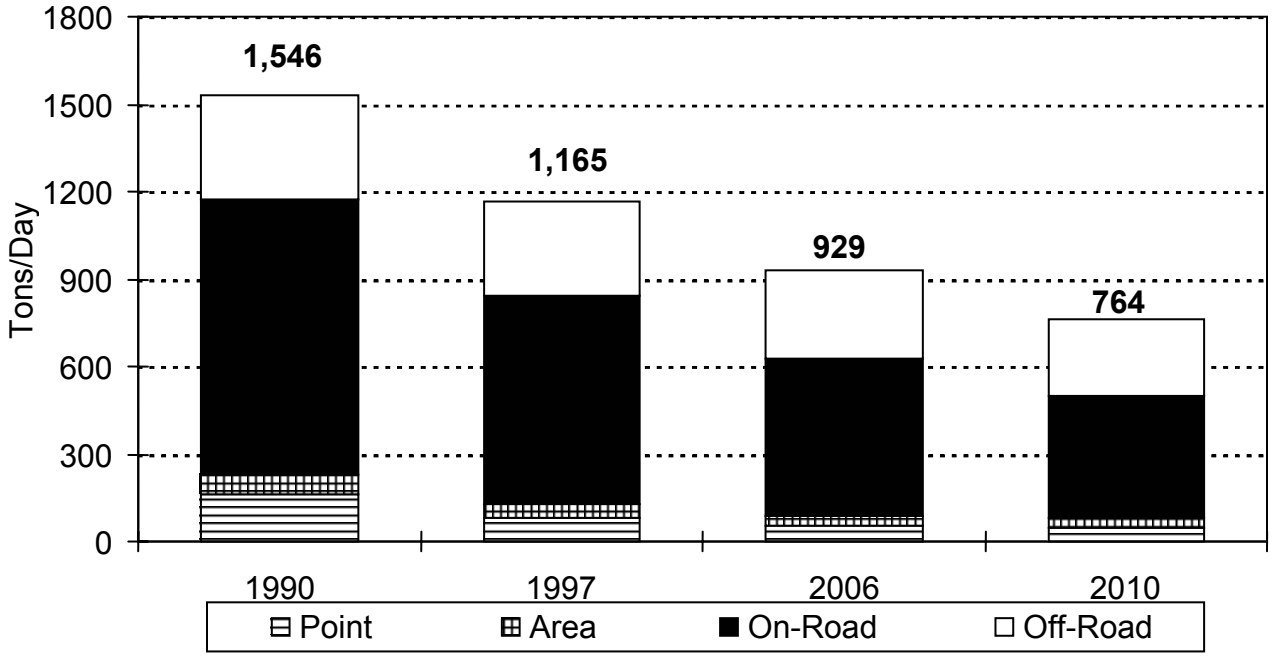


FIGURE 2-7B
NO_x Emission Trend by Source Category - Summer Planning

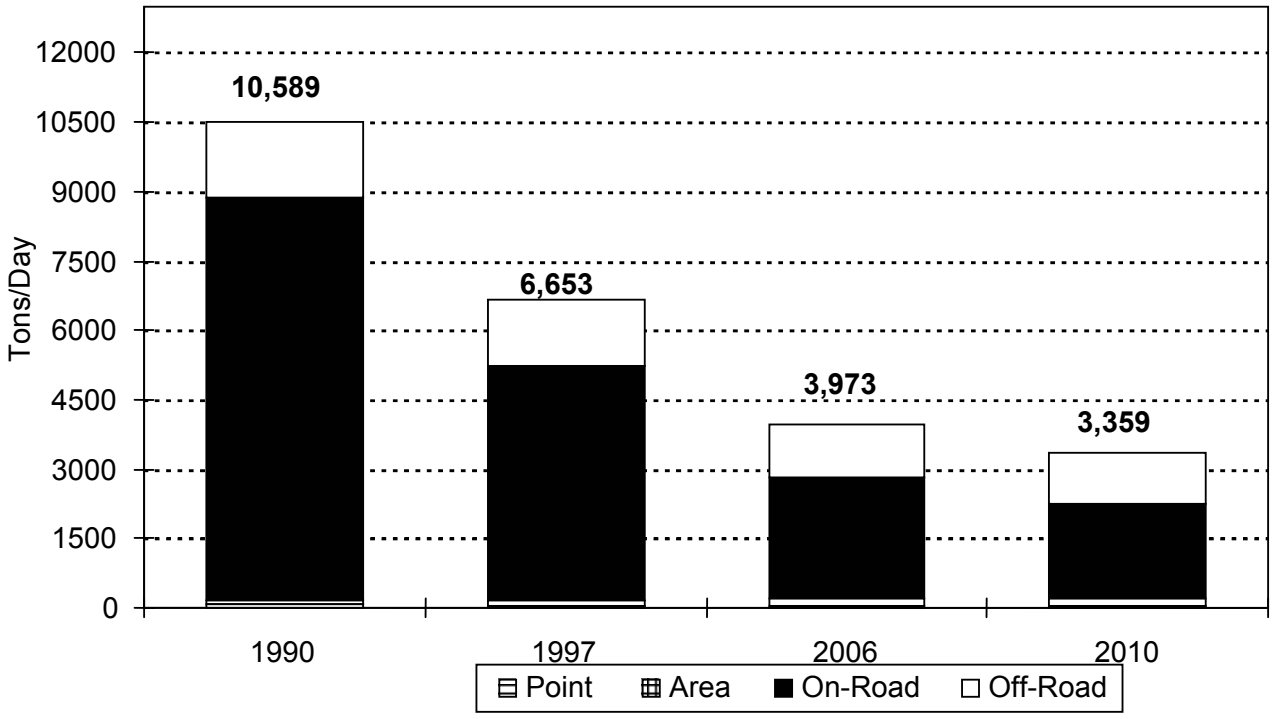


FIGURE 2-8A
CO Emission Trend by Source Category - Average Annual Day

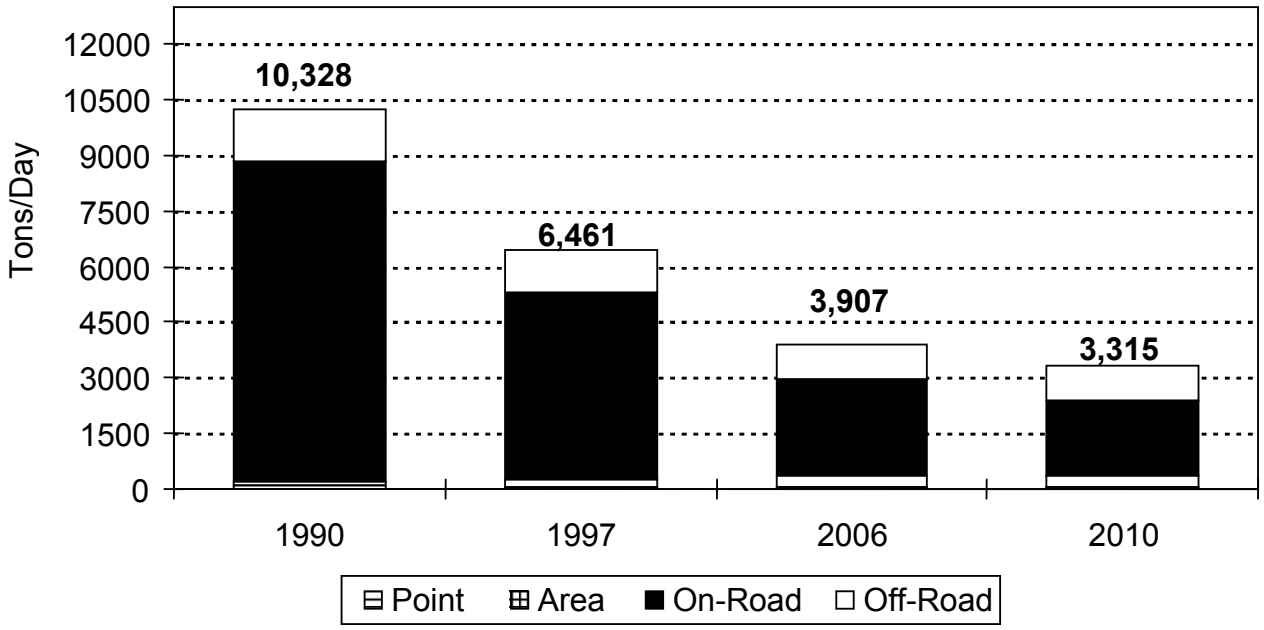


FIGURE 2-8B
CO Emission Trend by Source Category - Winter Planning

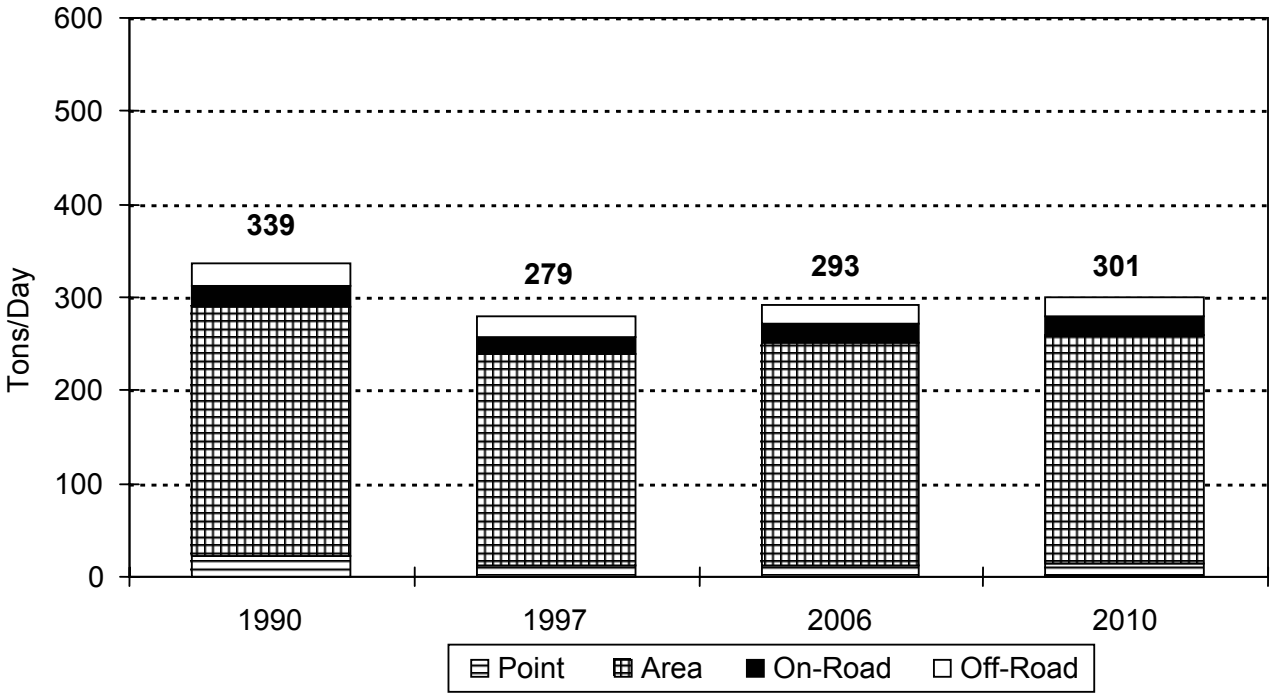


FIGURE 2-9
PM_{10} Emission Trend by Source Category - Average Annual Day

VOC Emissions

As presented in Figure 2-6, emissions from area sources, off-road mobile sources and on-road mobile sources all show a significant decrease. Area source emissions are projected to drop from 333 tons/day in 1997 to 224 tons/day in 2010. Between 1997 and 2010, emissions from off-road mobile sources are expected to fall from 237 tons/day to 123 tons/day, while on-road emissions should fall from 519 tons/day to 212 tons/day. Area source reductions are derived mainly from the District's adopted rules for gasoline transfer and dispensing (Rule 461), architectural coatings (Rule 1113), solvent degreasing (Rule 1122), and solvent cleaning operations (Rule 1171). Off-road reductions result primarily from emission controls for spark-ignition marine engines; new emission standards for small and large gasoline powered engines, and liquefied petroleum gas (LPG) used in off-road equipment. Since its adoption in 1990, California's Low Emission Vehicle I (LEV I) program has produced significant emission reductions from on-road passenger vehicles by relying on a systems-wide approach to achieve reductions from fuels and mobile source exhaust and evaporative emissions. Both LEV I and LEV II, adopted in 1998, include four primary elements: (1) increasingly stringent exhaust emission standards, (2) an increasingly stringent annual fleet average standard for non-methane organic gas (NMOG), (3) banking and trading provisions, and (4) a requirement that a specific percentage of vehicles be Zero Emission Vehicles (ZEVs), vehicles with no emissions. Under LEV II, sport utility vehicles, pick-up trucks, and mini-vans must achieve the same emission standards as cars, beginning in 2004-2007. Other programs to reduce emissions from mobile sources include: (1) the Carl Moyer program, which provides financial incentives for the early

introduction of clean heavy-duty engines, (2) regulations to reduce emissions from on-road heavy-duty engines and vehicles, (3) low sulfur diesel and cleaner burning gasoline requirements, (4) smog check programs, and (5) District and CARB fleet rules.

NO_x Emissions

Figure 2-7 illustrates the NOx emissions by major source category. NOx emissions from both off-road mobile (312 tons/day to 257 tons/day) and on-road mobile (761 tons/day to 434 tons/day) sources are projected to decrease substantially between 1997 and 2010. The reductions largely reflect the replacement of existing engines and vehicles with cleaner models as rules are implemented and vehicle fleets turn over. As mentioned above, programs to reduce off-road emissions result primarily from emission controls for spark-ignition marine engines; new emission standards for small and large gasoline powered engines, and liquefied petroleum gas (LPG) use in off-road equipment. On road emission reductions derive from CARB's LEV programs, low-sulfur diesel fuel and cleaner-burning gasoline requirements, regulations to reduce emissions from on-road heavy-duty engines and vehicles, smog check requirements, and other programs.

CO Emissions

Figure 2-8 shows CO emissions over a period of time. Almost all of the CO emissions are from mobile sources. The drastic reduction between 1997 and 2010 is from on-road mobile sources (5092 tons/day to 2048 tons/day). The LEV program has been particularly effective in reducing carbon monoxide emissions from on-road vehicles.

PM10 Emissions

Figure 2-9 shows the PM_{10} emission trend. About half of the emissions are from road dust. The amount of dust is projected to stay constant between 1997 and 2010. (147 tons/day and 147 tons/day respectively)

Growth Impact

Despite rules and regulations adopted by SCAQMD, CARB and U.S. EPA as of October 31, 2002, the projected future emissions are still above the levels required for achieving federal and state air quality standards. The main reason is that the region as a whole is projected to continue to grow in population; housing, employment and vehicle miles traveled (VMT).

To illustrate the impact from the growth, year 2010 no-growth emissions were estimated by removing the growth factors from the 2010 baseline emissions. Table 2-8 presents the 2010 forecasted emission estimates with and without growth.

Table 2-8
Growth Impact to 2010 Annual Average Emissions in Tons Per Day

With Growth	**VOC**	**NOx**	**CO**	**SOx**	**PM_{10}**
Point	72	47	48	18	14
Area	224	42	168	1	100
Road Dust					147
On-Road	212	435	2048	2	21
Off-Road	122	256	1094	39	19
Total	630	780	3358	60	301
No Growth	**VOC**	**NOx**	**CO**	**SOx**	**PM_{10}**
Point	54	44	38	18	11
Area	190	37	113	1	77
Road Dust					134
On-Road	175	356	1679	2	17
Off-Road	106	222	948	33	17
Total	525	659	2778	54	256

Mobile and Area Source Credit Programs

In 2001, the AQMD Governing Board adopted six mobile and area source pilot credit generation rules: Rule 1612.1 - Mobile Source Credit Generation Pilot Program, Rule 1631 – Pilot Credit Generation Program for Marine Vessels; Rule 1632 – Pilot Credit Generation Program for Hotelling Operations; Rule 1633 – Pilot Credit Generation for Truck/Trailer Refrigeration Units; Rule 1634 – Pilot Credit Generation Program for Truck Stops; and Rule 2507 – Pilot Credit Generation Program for Agricultural Pumps. NO_x emission reductions generated from these pilot credit generation rules can be used in the RECLAIM program either directly or through the RECLAIM Reserve under the Executive Order (EO) Mitigation Fee Program for power producing facilities and in the Air Quality Investment Program (AQIP) for specific RECLAIM facilities.

All six pilot credit generation rules have been submitted to EPA for inclusion in the State Implementation Plan (SIP). The first five pilot credit generation rules, Rules 1612.1, 1631, 1632, 1633, and 2507 have been approved by CARB and EPA. EPA published their final approval of the five pilot credit generation rules on February 19, 2002. Rule 1634, submitted to CARB and EPA after its adoption in November 2001, is currently

being reviewed by EPA. As part of EPA requirements, the AQMP needs to identify these emissions explicitly. Table 2-9 lists these emissions.

Federal and state approval of the first five pilot credit generation rules represents a significant milestone in market incentives programs as they are the first mobile source credit generation rules to receive federal approval. These rules will provide an important option to RECLAIM facilities if the demand for RTCs increases and will also enable AQMD to use these credits to mitigate excess emissions from power plants.

Table 2-9

Credit Rules and Associated 1997 Annual Emissions (Tons/Day)

Rule	Name	Target Sources	VOC	NO_x	CO	SO_x	PM10
1612.1	Mobile Sources	On-Road Heavy-Heavy-Duty Trucks and Yard Hostlers	8.9	198.2	41.8	1.8	6.0
1631	Marine Vessels	Commercial Boats	0.4	9.5	1.3	0.1	0.1
1632	Hotelling Operations	Ship Berthing	1.7	10.7	1.5	7.9	0.7
1633	Truck/Trailer Refrigeration	Transportation Refrigeration Unit	1.7	10.2	5.4	0.05	1
1634	Truck Stops	Truck Idling	0.1	1.5	0.5	.004	.018
2507	Stationary Agricultural Pumps	Agricultural Irrigation Pumps	0.1	1.6	0.3	.024	0.109

CONTROLLED EMISSIONS INVENTORIES

This section describes the methodology used to estimate the controlled and remaining emissions after the proposed control measures in the 2003 AQMP are implemented for the years 2006, and 2010. Emission reductions are derived from applying the control efficiency of a control measure to the projected baseline inventories.

In addition to the proposed control measures, the impacts of NSR-related set aside tracking and other budgeted emissions for various District programs (e.g., RECLAIM, HILO) are also discussed in this section.

To project emission reductions and remaining emissions from the implementation of the proposed control measures, a mathematical algorithm called Controlled Emissions Projection Algorithm (CEPA) is used. CEPA is developed to calculate projected remaining emissions and/or emission reductions for specified control scenarios. CEPA is briefly discussed in this section. A more comprehensive and extensive discussion of CEPA is presented in Technical Report III-A of the 1991 AQMP.

Emission Impacts of SCAQMD Programs

There are several SCAQMD regulatory programs that have specific impacts on future emissions through certain "set-aside" or exemption provisions. As a result, special emission accounts were created for the 2003 AQMP to track these emissions. For air quality modeling purposes, these emissions (except RECLAIM allocations) are distributed across the entire non-RECLAIM point source inventory and the RECLAIM

Hi-Lo

In order to encourage new business locating to the Basin, a Clean Air Bank was established for high employment – low polluting (HILO) companies. RECLAIM companies creating a minimum of 500 job positions and emitting at a rate (on a per employee basis) less than half of the AQMP 2010 goal would be exempt from NSR offset requirements. As a result, 0.25 tons/day of NO_x and SO_x (each) were set aside for this purpose, in the RECLAIM baseline emissions.

RECLAIM Allocation

Future year emissions for RECLAIM facilities were based on their initial allocation as specified in Rule 2002 as well as trading transactions as of February, 2001. Reported 1996-1997 emissions for Cycle I and Cycle II facilities were used for the calendar year 1997. Over forty facilities joined the RECLAIM universe in 1999 either because the facilities had grown to over 4 tons per year for NOx or SOx, or because they opted to expand in the future. Amendments to allocations as a result of the change in the RECLAIM universe were incorporated into the 2003 AQMP.

SIP Set Aside Accounts

Background

The 2003 AQMP includes an emissions set aside to account for growth from new and modified sources, the Offset Budget, the potential increase from VOC emissions from the phase-out of ozone depleting compounds (ODCs) or toxic air contaminants, and a SIP Reserve for potential technology assessments. As shown in Table 2-10, the total 2010 emissions to account for growth and the various set-aside emissions accounts is approximately 14 tons per day of VOC, 4 tons per day of NOx, 2 tons per day of CO, 2 tons per day of SOx and 1 ton per day of PM10. The methodology and assumptions used to develop these set-aside accounts for the 2003 AQMP are discussed in detail below. It should be noted that emission increases or decreases discussed herein are in reference to the projected AQMP baseline emissions without the effect of implementation of the AQMD's New Source Review program.

Table 2-10
Summary of Emissions Growth Set-Aside for the 2003 AQMP
(Tons per Day)

	VOC	NOx	CO	SOx	PM10
New and Modified Sources	8.73	0.07	0.80	0.76	0.23
Offset Budget	N/A	1.00	1.00	1.00	1.00
VOC Emissions from Phase-out of ODCs or Toxics	2.00	N/A	N/A	N/A	N/A
SIP Reserve (Potential Tech Assessments)	3.00	2.00	0.00	0.00	0.00
Total - 2010 Emissions	**13.73**	**3.07**	**1.80**	**1.76**	**1.23**

Growth from New and Modified Sources

The 2003 AQMP accounts for growth from new and modified sources based on emissions offsets used and generated through the AQMD's New Source Review program. The AQMD's Regulation XIII – New Source Review (NSR) program is an emission reduction control strategy program as it requires new and modified sources to meet a Best Available Control Technology (BACT) emissions level (which is generally cleaner than a Best Available Retrofit Control Technology (BARCT) emissions level, and all external offsets must be traded at a 1.2 to 1 trading ratio. In addition, the AQMD's New Source Review program requires that all emission increases from new and modified sources be fully offset. Emissions offsets are obtained from either the open market or from the AQMD's NSR Account. In general, any facility with a potential to emit greater than or equal to four tons per year of VOC, NO_x, SO_x, or PM10

or 29 tons per year of CO must provide offsets or Emission Reduction Credits (ERCs) for all increases of that pollutant from the open market. Emission increases from sources below these emissions thresholds or specific source categories that are exempt from obtaining offsets from the open market can obtain emission offsets from the AQMD's NSR Account.

Overall Approach and Methodology

The following five steps were used to estimate the potential increase in emissions from new and modified sources by the year 2010:

Step 1: Estimate annual average net demand from open market
Step 2: Calculate 2010 Net Demand for Open Market
Step 3: Estimate annual average net demand from AQMD's NSR Account
Step 4: Calculate 2010 Net Demand for AQMD's NSR Account
Step 5: Total 2010 Net Demand from New and Modified Sources

In general, the annual average net demand from the open market and the AQMD's NSR Account are estimated based on historical records. Based on the annual average net demand, the 2010 net demand from the open market and the AQMD's NSR Account are calculated. The sum of the 2010 net demand from the open market and the AQMD's NSR Account represents the potential 2010 emissions from new or modified sources. The net demand simply represents the emission increases in the future years to be offset by reductions previously banked (i.e., prior to the AQMP base year). Each of these steps are discussed in more detail below.

Step 1: Estimating Annual Average Net Demand from Open Market

To account for emissions growth from sources that are accessing the open market, the AQMD staff assessed the net annual average demand of ERCs from the open market between 1997 and 2001. The net annual average demand for ERCs from the open market is based on the difference between the annual average demand and supply of ERCs.

Net Annual Average Demand for ERCs = Annual Average Demand of ERCs – Annual Average Supply of ERCs

As shown in Table 2-11 below, the net annual average demand for ERCs in the open market ranges from 0.01 to .56 tons per day, depending on the pollutant.

Table 2-11
Annual Average Net Demand for ERCs in the Open Market
(Tons per Day)

	VOC	NOx	CO	SOx	PM10
Annual Average Demand[1]	0.59	0.01	0.12	0.01	0.04
Annual Average Supply[2]	0.03	0.00	0.01	0.00	0.01
Net Annual Average Demand	0.56	0.01	0.11	0.01	0.03

[1] Annual average use of ERCs from the open market. Based on 1998-2001 for CO, PM10, SOx, and NOx, and 2000-2001 for VOC. Average use excludes electric generating facilities and non-Regulation XIII offsetting uses. Annual average use adjusted by 80 percent to reflect actual emissions.

[2] Annual average supply is based on ERCs issued from 1998 to 2002. Annual average use is divided by 1.2 to account for the trading ratio applied to all external offsets and multiplied by 80 percent to reflect actual emissions.

Annual Average Demand for ERCs in the Open Market

The annual average demand for the five criteria pollutants are presented in Table 2-11 above. The annual average demand is based on ERCs used from 1998 through 2001 for CO, PM10, SOx and NOx, and based on ERCs used from 2000 and 2001 for VOC (no VOC ERC use data in 1998 and 1999). In addition, the annual average use is based on ERCs use from non-electric generating facilities, and excludes those ERCs that were used for CEQA mitigation, orders of abatements, interdistrict transfers, non-VOC removal, Rule 2202, and variances. The annual demand, which is based on the facilities' permitted emissions level is adjusted to reflect the actual amount of emissions that are emitted into the air. It is assumed that actual emissions represent 80 percent of permitted emissions. This ratio of permitted to actual emissions is currently being used Report on the Effectiveness of Regulation XIII – New Source Review (AQMD, 1988).

Annual Average Supply for ERCs in the Open Market

The annual average supply for the five criteria pollutants are presented in Table 2-11 above. The annual average supply is based on ERCs issued from 1998 through 2002. Under Regulation XIII, sources that are using external offsets, or ERCs not generated within their facility must apply a trading ratio of 1.2 to 1. To more accurately reflect the actual supply of ERCs that are needed to offset emission increases, the trading ratio was backed out of the annual ERC supply by dividing the annual issuance of ERCs by 1.2. In addition, similar to the ERCs used, the amount of ERCs issued was adjusted by 80 percent to reflect actual emissions that are offset as compared to the permitted emissions level.

Step 2: Calculate 2010 Net Demand for Open Market

For the purpose of estimating the emissions growth from newly permitted sources in the 2003 AQMP, it is assumed that each year, beginning in 2003, there is an incremental

emissions increase equivalent to the annual average net demand for ERCs in the open market. The maximum amount of growth that can be realized in future years is assumed to be capped by the current available supply of ERCs in the open market. The 2010 net demand for the open market represents the amount of emissions growth at a BACT level that is expected to occur by 2010. This estimate was based on the annual average net demand for each pollutant. Each year beginning in 2003, the annual average net demand is cumulatively added over the next seven years to 2010. Table 2-12 summarizes the annual average net demand for offsets by the year 2010 from the open market.

Table 2-12
2010 Net Demand for ERCs in the Open Market
(Tons per Day)

	VOC	NOx	CO	SOx	PM10
2010 Net Annual Average Demand	3.90	0.07	0.80	0.06	0.23

[1] 2010 Net Annual Average Demand is based on the cumulative net average demand from 2003 to 2010.

Step 3: Estimating Annual Average Net Demand from AQMD's NSR Account

Sources accessing the AQMD's NSR Account include those sources that are exempt from obtaining offsets from the open market. To estimate emissions growth from these sources, the net annual average amount of offsets being used and generated was estimated. The net annual average amount of offsets is based on the difference between the annual average demand and supply of offsets from the AQMD's NSR Account. Annual average demand and supply of offsets are averaged over a four-year period, from July 1997 to August 1998, from July 1998 to August 1999, from July 1999 to August 2000, and from July 2000 to August 2001. Annual demand and supply of offsets from the AQMD's NSR Account is based on data reported in the AQMD's Annual Effectiveness Reports on Regulation XIII.

The net annual average demand and supply is the difference between the annual average demand minus the annual average supply of offsets from the AQMD's NSR Account. As shown in Table 2-13, the net annual average demand and supply from the AQMD's NSR Account is positive for VOC and CO, and negative for NOx and PM10. Values that are negative represent those pollutants where the annual average supply of offsets is greater than the annual average demand of offsets. For SOx, on average the amount of credits used and generated is even.

Table 2-13
Annual Average Net Demand for Offsets in the AQMD's NSR Account[1]
(Tons per Day)

	VOC	NOx	CO	SOx	PM10
Annual Average Demand[1]	3.79	0.84	0.83	0.04	0.18
Annual Average Supply[2]	3.10	1.16	0.73	0.04	0.72
Net Demand and Supply from AQMD's NSR Account	0.69	-0.32	0.10	0.00	-0.54

[1] Based on annual use of offsets from the AQMD's NSR Account, which includes offsets used sources below emissions thresholds, priority reserve, and Rule 1304 offset exemptions. Average annual use based on data from the 1997/1998, 1998/1999, 1999/2000/ and 2000/2001 Annual Effectiveness Report on Regulation XIII – New Source Review.

[2] Based on annual supply of offsets into the AQMD's NSR Account, which includes offsets generated from orphan shutdowns, surplus reduction credits, BACT and other discount of ERCs, and positive balance adjustments. Average annual use based on data from the Annual Effectiveness Report on Regulation XIII – New Source Review, for the reporting periods from July 1997 to August 1998, from July 1998 to August 1999, from July 1999 to August 2000, and from July 2000 to August 2001.

Annual Average Demand and Supply for ERCs from the AQMD's NSR Account

Table 2-13 above summarizes the annual average demand and supply of offsets from the AQMD's NSR Account, based on accounting to satisfy equivalency with the state new source review requirements. The annual demand is based on those sources that are eligible to use offsets from the AQMD's NSR Account or are exempt from providing offsets from the open market, of which include facilities with a potential to emit less than four tons per year of VOC, NO_x, SO_x, or PM10 or 29 tons per year of CO annual emissions; sources eligible for the priority reserve; and sources exempt from providing offsets pursuant to Rule 1304. The annual demand, which is based on the facilities' permitted emissions level is adjusted to reflect the actual amount of emissions that are emitted into the air. It is assumed that actual emissions represent 40 percent of permitted emissions. In an analysis conducted by the AQMD staff in 1998 for sources less than four tons per year, actual emissions were less than 40 percent of permitted emissions. (AQMD, 1988). It should be noted, however, as a conservative estimate the Annual Report on the Effectiveness for Regulation XIII assumes that actual emissions represent 80 percent of permitted emissions. The annual supply is based on offsets that go into the AQMD's NSR Account such as credits generated from orphan shutdowns; surplus reduction credits; BACT and other discount of ERCs; and positive balance adjustments by way of ERCs.

Step 4: Calculate 2010 Net Demand for AQMD's NSR Account

For the purpose of estimating the emissions growth from newly permitted sources in the 2003 AQMP, it is assumed that each year, beginning in 2003, there is an incremental emissions increase equivalent to the annual average net demand for offsets in the AQMD's NSR Account. The maximum amount of growth that can be realized in future years is assumed to be capped by the current available supply of offsets in the AQMD's NSR Account. The 2010 net demand for the open market represents the amount of emissions growth at a BACT level that is expected to occur by 2010. This estimate was based on the annual average net demand for each pollutant. For NOx and PM10, where the net annual average demand for offsets was negative, indicating that the annual average supply of offsets is greater than the use, it assumed that there is no additional emissions growth in 2010 from sources accessing the AQMD's NSR Account. Similarly for CO, as the net annual average demand for offsets was zero. For VOC and SOx, each year beginning in 2003, the annual average net demand is cumulatively added over the next seven years to 2010. Table 2-14 summarizes the annual average net demand for offsets by the year 2010 from the AQMD's NSR Account for the five criteria pollutants.

Table 2-14
2010 Net Demand for ERCs in the AQMD's NSR Account
(Tons per Day)

	VOC	NOx	CO	SOx	PM10
2010 Net Annual Average Demand	4.83	0.00	0.00	0.70	0.00

[2] 2010 Net Annual Average Demand is based on the cumulative net average demand from 2003 to 2010

Step 5: Total 2010 Net Demand from New and Modified Sources

The total 2010 emissions growth from new and modified sources is equivalent to the sum of the 2010 net annual average demand for the open market and the 2010 net annual average demand for the AQMD's NSR Account. Table 2-15 summarizes the total 2010 emissions growth new and modified sources.

Table 2-15
Total 2010 Net Demand from New and Modified Sources
(Tons per Day)

	VOC	NOx	CO	SOx	PM10
2010 Net Annual Average Demand	8.73	0.07	0.80	0.76	0.23

[3] 2010 Net Annual Average Demand is based on the sum of the 2010 net demand from the open market and the AQMD's NSR Account.

NSR Reduction Benefit

Since the AQMP future year baseline inventories already include emissions growth based on SCAG projections in the absence of NSR constraints, adding additional related emissions growth to the baseline inventories would be overstating the potential growth. Therefore, reconciliation of growth projections between existing sources and new sources are necessary. Following a similar methodology employed in the 1997 AQMP, emission reductions attributable to the NSR program due to installation of BACT rather than BARCT were estimated. For VOC and SOx sources, it is assumed that BACT and BARCT are the same. For NOx, CO, and PM10, it is assumed that BACT represents approximately 60 percent of BARCT emissions.

Table 2-16
Estimated Emission Reduction Benefit from
Installation of BACT for New and Modified Sources
(Tons per Day)

	VOC[1]	NOx[2]	CO[2]	SOx[1]	PM10[2]
Estimated New and Modified Sources (2010)	8.73	0.07	0.80	0.76	0.23
Emission Reduction Benefit	8.73	0.12	1.3	0.76	0.38

[1] Assumed that BACT = BARCT for VOC and SOx sources.
[2] Assumed that BACT = 60% of BARCT.

Offset Budget

Rule 1309.2 – Offset Budget creates an emissions bank to provide offsets to sources that otherwise cannot obtain offsets. Strict eligibility requirements are placed on the offset budget. Only those sources which are not exempt from offsets under Rule 1304 – Exemptions; and not eligible for offsets under Rule 1309.1 – Priority Reserve; can apply for offset budget credits. Other eligibility criteria include a facility having all sources at or below BARCT and conducting a good faith effort to obtain open market offsets. Finally, a non-refundable mitigation fee is required for each pound of credits obtained. The Offset Budget will be funded by expired permit source shutdown credits, emissions reductions from projects funded by mitigation fees collected, and other methods approved by the Executive Officer, CARB and U.S. EPA. The initial funding of the Offset Budget will be from expired permit source shutdown credits for the years 2000 through 2002.

The 2003 AQMP includes a set aside account of one ton per day for each criteria pollutant for the Offset Budget. This line item is to account for emissions that may not be included in the AQMP baseline inventories. As such, the set aside account should not be viewed as the cap for the Offset Budget. Furthermore, AQMP inventories are based on actual emissions not potential to emit or offsets needed under New Source Review. The Offset Budget is designed to be a source of offsets, but used as a "bank of last resort." It ensures the availability of offsets, but encourages sources to seek offsets from the open market first.

VOC Emissions from Phase-Out ODCs and Toxics

The 1997 AQMP included an emissions set-aside for potential VOC emissions increases from the phase-out of ozone depleting compounds (ODCs). The 1997 AQMP set aside approximately 10 tons per day of VOC emissions due to the potential conversion of ODCs to VOC containing materials. Based on historical use, the 2003 AQMP modifies the amount of the set aside to 2 tons per day of VOC emissions for the potential increase in VOC emissions from the conversion of ODCs to VOC containing materials and the potential conversion of toxic materials to VOC containing materials.

SIP Reserve for Potential Technology Assessments

To achieve air quality goals, adopted and amended rules and regulations that rely on technology forcing emission limits are often needed. Technology forcing emission limits are designed to provide ample time for the development and implementation of new air pollution technologies. In the event, however, that the new air pollution control technology does not come to fruition by the implementation date of the adopted or amended rule there may be a need to delay or relax the future emission limits. The SIP Reserve is designed to ensure that delaying or relaxing future emission limits for technology forcing rules will not interfere with the Basin's attainment demonstration. In addition, the SIP Reserve allows the AQMD to adopt and amend rules with technology forcing limits while maintaining SIP approvability if a rule relaxation or delay is needed.

Summary

For the purpose of attainment demonstration and rate of progress, additional emissions are included in the controlled emissions after implementation of proposed control measures. These emissions are estimated based on the difference between emission estimates presented in Tables 2-10 and 2-16. Table 2-17 summarizes the emissions added to controlled emissions for attainment demonstration.

Table 2-17
Emissions Added to Controlled Emissions for Attainment Demonstration
(Tons per Day)

	VOC	NOx	CO	SOx	PM10
Total - 2010 Emissions (Table 2-10)	13.73	3.07	1.80	1.76	1.23
Emission Reduction Benefit (Table 2-16)	8.73	0.12	1.30	0.76	0.38
2010 Emissions Added to Controlled Emissions	**5.00**	**2.95**	**0.50**	**1.00**	**0.85**

Proposed Control Measures

In order to assess emission reduction potential and remaining emissions from proposed control measures, a control factor profile needs to be developed identifying source category targeted by a measure, its control efficiency, and implementation schedule.

Control Efficiency/Control Factor

One factor that determines the effectiveness of a control measure is its control efficiency (CE), expressed in percentage. Control efficiency is dependent on the specific control technologies proposed, and each control measure may have one or perhaps more if several control technology options are available. If there is only one feasible control technology in a control measure, its control efficiency is primarily based on an engineering evaluation of the proposed technology. However, if several control technologies are available to control an emission source, the average control efficiency is used. If multiple control technologies are proposed to reduce emissions from various steps of an operation, a weighted average control efficiency is developed to represent an overall control of the emission sources. Once the control efficiency of a control measure is determined, it is used to estimate emission reductions of the proposed measure. Control efficiencies for the proposed control measures are identified and discussed in detail in Appendix IV of the 2003 AQMP.

The control factor (CF) is used to estimate remaining emissions once a proposed control measure is implemented. A control factor equal to 0 indicates complete emission control

or 100 percent efficiency. A control factor equal to 1 indicates no emission control or emission unchanged. A high control factor value indicates a low control efficiency. As the control efficiency goes up, the control factor value goes down and approaches 0. Thus, the equation to calculate a control factor is as follows:

$$\mathbf{CF = 1 - (CE/100)}$$

And, the remaining emissions can be calculated as

$$\mathbf{REM = BE * CF}$$

Where REM is Remaining Emissions, and BE is Baseline Emissions

The 2003 AQMP has many milestones for which emission reduction progress needs to be projected. As a result, control factors for each milestone year have to be developed. Such a control factor profile for each measure is developed considering the following factors:

- proposed adoption date,
- implementation lead time
- phase-in period, if any.

The adoption date as proposed in the 2003 AQMP is the date the District is expected to adopt the control measure as a rule. The implementation lead time reflects the time allowed for the emission sources to install controls. When a rule is implemented, it is not unusual that it may have multiple interim implementation dates prior to full implementation. This is because the requirements in a rule may require two or three phases to reach the final emission target (e.g., a technology-forcing regulation). Or, a rule may regulate such a large population of equipment that it is impractical to implement it all at once, and it becomes administratively necessary to phase in its implementation. In either case, a control profile would indicate an initial implementation date and an ending implementation date. The adoption and implementation schedule of the proposed control measures is presented in Chapter 7 of the 2003 AQMP.

Measure Impact Sources

Each proposed control measure describes specific emission sources subject to potential controls. Based on the description of these sources, corresponding sources as tracked in the emission inventory are identified. In general, emission sources are grouped by major source category, which can be further subcategorized into point sources denoted by Source Classification Codes (SCC) and area sources denoted by Category Emission Source (CES) Codes. To track emission reductions more accurately, the control factors at the SCC/CES level become necessary.

An SCC, an 8-digit EPA code, is used to identify emissions from a point source at the equipment level. A CES, a 5-digit CARB code, is used to describe an area source for which emissions are distributed across the region with no specific locations.

For some measures the controls target not only the type of equipment, but also the industries engaged in. In those cases, control factors will be developed by pairing SCCs and Standard Industrial Classification (SIC) Codes to clearly and specifically point out the emission sources in the inventory that the measure designs to reduce. Such SCC/SIC pairs significantly enhance the ability to quantify emissions closely following the intent of a proposed control measure.

In spite of significant progress made in identifying emissions at the SCC or CES level, there are still instances where an SCC or CES category is not fully impacted by a control measure. As a result, an impact factor (IF) is developed as a weighing factor for such an adjustment. For example, an IF of 0.58 was used for some thinning solvent sources to account for the portion of emissions reductions from Rule CTS-02 (Solvent Cleaning Operations). In this case, CF is calculated as

$$\mathbf{CF = 1 - ((CE /100) \times IF)}$$

Impact factors will accurately track the measure baseline emissions, and calculate the true reductions from the proposed control measures.

CEPA Emission Calculations

The District uses the CEPA program to calculate emission projections for the proposed AQMP control measures. Based on the control factor profile and projected baseline emissions, CEPA estimates emission reductions and remaining emissions for future years by pollutant (i.e., summer VOC and NO_x; winter CO and NO_2; and average annual day for VOC, NOx, CO, SO_x and PM_{10}).

CEPA allows interaction of multiple control measures affecting a specific emission source, avoiding double counting of emission reductions from additional measures. It also provides flexibility in analyzing various scenarios and improves accuracy by standardizing calculation methodologies.

To run CEPA, the program requires four data input files. These input files are as follows:

1. Master Measure File - This file contains all the measures proposed in the AQMP. There is only one master measure file in the entire CEPA program.

2. Scenario File - This file is a listing of selected measures to characterize emission reductions, and is a subset of the master measure file. For example, it

can contain a group of control measures targeting mobile sources only, or a group of measures to be implemented by U.S. EPA.

3. Control Factor File - As previously discussed, this file shows control factor by pollutant by SCC/SIC (or CES/CES) pairs for each control measure in a specified year.

4. Baseline Emission File - This file contains projected emission data (tons/day) for future years based on the 1997 emissions inventory. There are two types of baseline emission data available for CEPA runs. These are the average annual day emissions inventory with pollutants VOC, NO_x, CO, SO_x, and PM_{10}; and the planning inventory with pollutants VOC and NO_x during summer, and CO and NO_2 during winter.

CEPA calculates the remaining emissions at the SCC/SIC level. It can generate many types of emission summary reports or electronic files. For example, the program can provide composite control factors for on-road mobile sources in sixteen categories used in the air quality modeling analysis or composite control factors from all the proposed control measures in the scenario file. It can also provide remaining emissions by SCC/S1C or CES/CES pairs; by major source category; or by SIC. It can present emission reductions by each control measure in the absence of other competing measures; or reductions for each control measure following a pre-determined implementation sequence. The result of CEPA runs will be presented in Appendix V of the 2003 AQMP.

CARB Emission Data Reports System

As mentioned in Chapter 1, the entire emissions inventories are compiled and maintained by CARB in its statewide emission related information databases named California Emission Inventory Development and Reporting System (CEIDARS), and California Emission Forecasting and Planning Inventory System (CEFIS). In both systems, emissions are traced by CARB's new coding method called Emission Inventory Codes (EIC code). The EIC code is a 14-digit number arranged into four fields: major category, source category, materials description and emission sub-category. For example, EIC 210-200-3300-0000 is for dry cleaning using perchloroethylene material. 210 indicates this source is under laundering group. 200 means the source category is dry cleaning. 3300 refers to the material as perchloroethylene. 0000 implies, as current, there is no sub-category under this particular source. EIC separates emission sources into four major divisions: stationary, area-wide, non-anthropogenic and mobile source. This new coding system allows flexibility in how sources are selected, sorted and grouped to fit users' needs. The other advantage of this new coding system is that EIC links area sources and

point sources together to allow a computer program to automatically reconcile point and area source emissions. In this 2003 AQMP, all the emission summary reports are based on CARB's new EIC codes. Because only the anthropogenic sources are included in this document, all summary reports in appendices include three major divisions. They are stationary, area-wide, and mobile source. This is the first time the District is using this new coding system for emission data reports in the AQMP.

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