



**SACRAMENTO METROPOLITAN
AIR QUALITY MANAGEMENT DISTRICT**

2003 TRIENNIAL REPORT

**PREPARED IN COMPLIANCE WITH
THE CALIFORNIA CLEAN AIR ACT**

APRIL 2005

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This California Clean Air Act Triennial Assessment and Transport Mitigation Plan evaluates the progress made towards attaining the state air quality standards in Sacramento County during 2001-2003 and revises its air quality plan to mitigate ozone transport and to pursue the expeditious adoption of all feasible control measures.

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1. EXECUTIVE SUMMARY

1.1 Introduction

The California Clean Air Act (CCAA) requires the air district to assess the progress made towards attaining the state air quality standards in Sacramento County during the past three years (2001-2003). This “Triennial Report” describes the historical trends in ambient air quality levels, provides updates to the emission inventories, and evaluates the implementation of stationary and mobile source control measures in reducing air pollutant emissions. In addition, ozone transport mitigation requirements for upwind districts are addressed.

1.2 Air Quality Trends

Air quality indicators show significant overall progress toward reducing exceedances of the ambient ozone standards and region-wide exposure to unhealthy concentrations since the late 1980’s. There is some year-to-year meteorological variability in the downward trend, but the general pattern suggests that the worst years for air quality are becoming less severe, and the best air quality years are becoming cleaner. However, the largest improvement occurred between 1988 and 1991.

1.3 Emission Inventories

Emission inventories for ozone precursor pollutants take into account stationary sources, area-wide sources, and mobile sources. The most recent updates to the inventory include some revisions that have decreased emissions from on-road motor vehicles (EMFAC2002) and increased emissions from off-road mobile source categories. Overall updated emissions are slightly less than the previous 2000 Triennial Report inventories.

Between 1990 and 2005, emission inventory trends in Sacramento County indicate reactive organic gas emissions and nitrogen oxide emissions are estimated to decline about 50% and 40%, respectively. These emission reductions have mainly occurred from on-road motor vehicles, individual stationary source categories, consumer products, and off-road equipment. Projected emission forecasts to 2020 show a more gradual declining trend.

1.4 Stationary Source Control Program

The Sacramento region’s attainment strategy requires emission reductions of both reactive organic gases (ROG) and nitrogen oxides (NOx) from stationary sources. During the 2001-2003 triennial period, two rules were adopted and implemented that achieved an additional 1.8 tons per day of ROG emission reductions. The NOx rule amendment for internal combustion engines at non-major sources is still being developed. Eight other potential control categories were evaluated, but only one of

these (fugitive emissions from petroleum production and processing facilities) was deemed viable for future adoption. Overall, the recent stationary source controls surpassed the District's 2000 Triennial ROG emission reduction commitments of 0.6-1.5 tons per day for "all feasible measures" evaluations.

Recent inter-agency rule evaluation efforts and additional extensive internal District reviews of over 30 control measure categories have resulted in an updated list of 12 potential stationary source rules for adoption/amendment or further study during the next 2004-2006 triennial period. These control measure commitments are being proposed for incorporation into the District's attainment strategy as a triennial plan revision to satisfy the "all feasible measures" progress requirement.

1.5 District Mobile Source NOx Control Programs

The District's mobile source NOx control program uses financial incentives to promote the accelerated introduction of low emission vehicle, engine, and fuel technologies to the Sacramento area. The program has expanded each year, spending a total of about \$48 million during the 2001-2003 triennial period from a variety of funding sources. NOx reductions achieved from over 1,500 on-road heavy-duty vehicles account for 1.2 tons per day region-wide. The off-road mobile portion has been more successful by decreasing NOx emissions 2.2 tons per day region-wide, mostly due to the emission reductions from nearly 600 agricultural water pumping engines. NOx reductions from the District's mobile source program surpassed the expected 0.5 tons per day region-wide commitment from the 2000 Triennial Report.

Other efforts to reduce mobile source NOx emissions include the certification of lower emission fuels for use in standard diesel engines and verification of cost-effective retrofit exhaust equipment. The District is also proposing two new mobile source measures for further study evaluation. In addition, Sacramento jurisdictions are developing ordinances for establishing low-emission vehicle fleets for public agencies, for providing incentives to encourage contractors working for public agencies to use low-emission vehicles, and for reducing idling emissions from on-road and off-road diesel engines. As a result, new and continued mobile source NOx control program commitments are proposed to achieve 0.6 ton per day of NOx reduction for the 2004-2006 triennial period.

1.6 Land Use and Transportation Programs

Emission reductions are beginning to be achieved from the implementation of land use and construction mitigation policies and transportation control measures, about 0.10 ton per day of ROG and 0.19 ton per day of NOx for Sacramento County projects approved during the 2001-2003 triennial period. Many of the land use projects to which these policies have been applied are only partially constructed and occupied, thus much of the emission benefits are expected to increase substantially over time.

Additionally, District staff is working with appropriate land use jurisdictions to ensure that air quality mitigation measures are effectively monitored and enforced. In an effort to broaden the implementation of these air quality beneficial land use policies, the District has initiated the process of developing “indirect source” rules for both its Construction Mitigation and Land Use Mitigation Programs. As a result, new and continued land use and transportation program commitments are proposed to achieve an additional 0.04 ton per day of ROG and 0.78 ton per day of NO_x reductions for the 2004-2006 triennial period.

1.7 Community Education Programs

The District’s community education programs have continued to lead and coordinate efforts pertaining to “Spare The Air” and voluntary driving curtailment strategies. These activities include the daily air quality ozone forecasts, continued utilization of hourly-updated Web site ozone movies, and the expansion of personal electronic messages to alert subscribers of unhealthy air quality episodes. The program also includes the promotion of public education tools, such as the “Smog City” interactive air pollution simulator on the Internet, and the creation of the new CD-ROM adventure game, “Save Planet Polluto”.

Continued public outreach using multi-media approaches and enhanced public survey methods have increased regional awareness of the air quality problem and solutions. As a result, methodologies have been developed to quantify the emission reductions associated with the Spare The Air program. The Sacramento County benefits during the 2001-2003 triennial period were estimated to be about 0.1-0.6 ton of ROG and NO_x each per Spare The Air day. Funding for the continued operation of Spare The Air will provide continued benefits for the 2004-2006 triennial period.

1.8 Ozone Transport Mitigation

2003 amendments to the ozone transport mitigation regulations require specified upwind districts to adopt and implement “all feasible measures” as expeditiously as practicable, regardless of their attainment status, until their downwind districts attain the State ozone standard.

Based on recent extensive control measure evaluations, the Sacramento air district has identified new potential emission reduction opportunities. Therefore, in consultation with downwind districts, additional air quality measures are being proposed to update control measure commitments to continue satisfying the “all feasible measures” requirement. In addition, the Sacramento air district is required to lower its stationary source new source review no net emission threshold for offset requirements to 10 tons per year by the transport mitigation amendments by December 31, 2004.

1.9 Conclusions

The Sacramento area has made significant achievements in overall reduction of ambient ozone and precursor emissions since the late 1980's. Future efforts to continue achieving emission reductions include the ongoing commitment to implement an "all feasible measures" control strategy, a diverse mobile source incentives program, various land use and transportation measures, and innovative community education activities. It is anticipated that the additional reductions gained from this comprehensive strategy will allow the Sacramento area to continue making progress towards attaining the state ozone standards in accordance with the California Clean Air Act requirements and transport mitigation regulations.

This triennial plan update, including the 2004-2006 control measure commitments listed in Table 11-2, upon approval will become; when combined with already adopted rules, the District's state ozone attainment plan and satisfy the California Clean Air Act requirements including the Transport Mitigation requirements of California Code of Regulations Section 70600 et. seq. and the "all feasible measures" requirements contained therein.

2. OVERVIEW OF AIR QUALITY PLANNING PROCESS

2.1 Background

2.1.1 California Clean Air Act and 1991 Air Quality Attainment Plan

The California Clean Air Act (CCAA) of 1988 requires the air districts to endeavor to achieve and maintain the state ambient air quality standards by the earliest practicable date and develop plans for attaining the state ozone, carbon monoxide, sulfur dioxide, and nitrogen dioxide standards. In compliance with the CCAA, the Sacramento Metropolitan Air Quality Management District (SMAQMD or District) prepared and submitted the 1991 Air Quality Attainment Plan (AQAP) to mainly address Sacramento County's nonattainment status for ozone and carbon monoxide (CO), and although not required, particulate matter (PM10). The 1991 AQAP was designed to make expeditious progress toward attaining the state ozone standard and contained preliminary implementation schedules for control programs on stationary sources, transportation, and indirect sources, and a vehicle/fuels program. Sacramento County has met the ambient air quality standards for sulfur dioxide and nitrogen dioxide.

2.1.2 Triennial Progress Report Requirement

The CCAA also requires that by the end of 1994 and once every three years thereafter, the districts are to assess their progress toward attaining the air quality standards. This triennial assessment is to report the extent of air quality improvement and the amounts of emission reductions achieved from control measures for the preceding three year period. The District shall also review and revise its attainment plan, if necessary, to correct for deficiencies in meeting progress and to incorporate new data or projections. This 2003 Triennial Report was prepared to fulfill these requirements.

2.2 Ozone Attainment Planning Process

2.2.1 1994 Sacramento Area Regional Ozone Attainment Plan

The CCAA requirement for the first triennial progress report and plan revision of the 1991 AQAP was fulfilled with the preparation and adoption of the 1994 Sacramento Area Regional Ozone Attainment Plan. This document was incorporated as part of the State Implementation Plan (SIP) to meet the requirements of the Federal Clean Air Act (FCAA) and replaced the 1991 AQAP.

2.2.2 CCAA 1997 Triennial Progress Report

The 1997 Triennial Report was prepared in compliance with the CCAA in order to assess the progress in meeting the control measure commitments during the 1995-1997 period. It was concluded that the District had adopted almost all of the 1994 committal control measures and some new measures as well. Implementation of transportation

and land use strategies, low emission vehicle and fuels technologies, and public education programs had begun. In addition, the Air Resources Board determined that it was unnecessary for the District to prepare a comprehensive plan update in 1997, and that the District was to focus on implementing existing control strategies and commitments.

2.2.3 CCAA 2000 Triennial Progress Report

The 2000 Triennial Report was prepared to assess the progress in meeting the control measure commitments during the 1998-2000 period. Almost all of the remaining committal controls were adopted and implemented, which included the organic chemical manufacturing rule and the surface preparation and cleanup solvent rule amendments. Remaining committal measures to be adopted were the NO_x measure for internal combustion engines at non-major sources and another solvent cleaning operations measure. The air district has shown a commitment to reviewing existing stationary source control measures and assessing new technologies, resulting in additional rule amendments, to fulfill the progress requirement for an “all feasible measures” control strategy.

The District’s mobile source NO_x control program for the accelerated introduction of low emission vehicle and engine technologies to the Sacramento area expanded each year and had significant additional state funding in 2000. The District designed and began implementing over 20 transportation control measures and land use strategies that provided increasing potential emission reduction benefits. The District’s community education program broadened efforts pertaining to innovative “Spare The Air” activities and voluntary driving reductions that have increased regional awareness of the air quality problem and solutions.

2.3 Carbon Monoxide Attainment Planning Process

2.3.1 Carbon Monoxide Reduction Measures

The 1991 Air Quality Attainment Plan discussed control measures to be implemented to bring Sacramento into attainment of state and federal CO standards. Many of these measures were replaced with the state’s Oxygenated Fuel Program implemented in October, 1992. Other reductions were derived from stationary source controls implemented by the District to control other pollutants, and the ARB’s motor vehicle control program.

2.3.2 Attainment Redesignation

In July of 1995, the ARB submitted a request for redesignation of the District to attainment of the federal CO standard based upon the results of the oxygenated fuel program. In the March 31, 1998 Federal Register, (pages 15344-15345), the EPA

proposed to approve this redesignation request. Receiving no adverse comments, the redesignation was finalized on June 1, 1998.

In addition, the 1997 annual review and update of area designation for state CO standards prepared by the Air Resources Board shows that the District has been redesignated to attainment of the state CO standard.

3. TRIENNIAL ASSESSMENT AND TRANSPORT MITIGATION PLAN LEGAL REQUIREMENTS

3.1 Triennial Progress Report

Pursuant to Section 40924 of the Health and Safety Code, once every three years, the district shall assess its progress toward attainment of the state ambient air quality standards. Each triennial assessment shall contain, at a minimum, both of the following:

- The extent of air quality improvement achieved during the preceding three years, based upon ambient pollutant measurements, best available modeling techniques, and air quality indicators identified by the ARB.
- The expected and revised emission reductions for each measure scheduled for adoption in the preceding three-year period.

3.2 Triennial Plan Revision

Pursuant to Section 40925 of the Health and Safety Code, at least once every three years, the district shall review and revise its attainment plan to:

- Correct for deficiencies in meeting the interim measures of progress incorporated into the attainment plan pursuant to Section 40914.
- Incorporate new data or projections into the attainment plan, including, but not limited to, the quantity of emission reductions actually achieved in the preceding three-year period and the rates of population-related, industry-related, and vehicle-related emissions growth actually experienced in the district and projected for the future.

3.3 Measure of Progress

Section 40914 of the Health and Safety Code requires air districts to achieve at least a 5 percent annual reduction in district-wide emissions unless ARB approves an alternative measure of progress that includes the expeditious adoption of all feasible control measures. This “all feasible measures” control strategy applies to the Sacramento district.

3.4 Ozone Transport Mitigation Regulations

The California Clean Air Act (CCAA) directs the ARB to periodically assess transport in terms of the contribution of ozone and ozone precursors from upwind regions to ozone concentrations in downwind regions. In addition, the CCAA directs ARB to establish

mitigation requirements for upwind districts commensurate with their contributions to downwind air quality problems.

3.4.1 Emission Control Requirements

ARB first adopted mitigation regulations in 1990, which established mitigation requirements for upwind areas found to have either overwhelming or significant impacts on downwind areas. The primary mitigation requirement was to accelerate application of best available retrofit control technology (BARCT) to major stationary sources in upwind districts.

In May 2003, ARB amended its transport mitigation regulations in Title 17, California Code of Regulations, Sections 70600 and 70601, to include: 1) the all feasible measures requirement for both ROG and NO_x regardless of the upwind area's attainment status, 2) a more stringent no net increase threshold requirement, and 3) the downwind district consultation process and triennial finding requirement. The 2003 regulations state that at a minimum, the attainment/transport mitigation plans for districts within the Broader Sacramento Area shall:

- A) require the adoption and implementation of all feasible measures as expeditiously as practicable.
- B) require the adoption and implementation of best available retrofit control technology, as defined in Section 40406 of the Health and Safety Code, on all existing stationary sources of ozone precursor emissions as expeditiously as practicable.
- C) require the implementation, by December 31, 2004, of a stationary source permitting program designed to achieve no net increase in the emissions of ozone precursors from new or modified stationary sources that emit or have the potential to emit 10 tons or greater per year of an ozone precursor.
- D) include measures sufficient to attain the state ambient air quality standard for ozone by the earliest practicable date within the Upper Sacramento Valley and that portion of the Mountain Counties Air Basin north of the Calaveras-Tuolumne County border and south of the Sierra-Plumas County border, except as provided in Section 41503(d) of the Health and Safety Code, during air pollution episodes which the state board has determined meet the following conditions:
 - i) are likely to produce a violation of the state ozone standard in the Upper Sacramento Valley or that portion of the Mountain Counties Air Basin north of the Calaveras-Tuolumne County border and south of the Sierra-Plumas County border; and

- ii) are dominated by overwhelming pollutant transport from the Broader Sacramento Area; and
- iii) are not measurably affected by emissions of ozone precursors from sources located within the Upper Sacramento Valley or that portion of the Mountain Counties Air Basin north of the Calaveras-Tuolumne County border and south of the Sierra-Plumas County border.

3.4.2 Implementation Requirements

Implementation requirements in Section 70600(c) of the California Code of Regulations, state that prior to revising its attainment/transport mitigation plan, each upwind district subject to the ozone transport mitigation regulations “shall, in consultation with the downwind districts, review the list of control measures in its most recently approved attainment plan and make a finding as to whether the list of control measures meets the requirements of Section 70600(b). The district shall include the finding in its proposed triennial plan revision.”

3.4.3 Conditions for Limiting the Mitigation Requirements

Under Section 70601 of the California Code of Regulations, specific sources may be excluded from the all feasible measures and/or best available retrofit control technology transport mitigation strategy, if:

- a) the emissions from the source, because of its location, do not contribute to ozone violations in any downwind area; or
- b) emissions reductions from the source are not needed to attain the ozone standard in any downwind area; or
- c) the district is implementing an as effective and as expeditious alternative emissions reduction strategy pursuant to Section 40914 of the Health and Safety Code; or
- d) the most recent transport assessment demonstrates that the district’s transport impact is inconsequential.

4. AIR QUALITY TRENDS

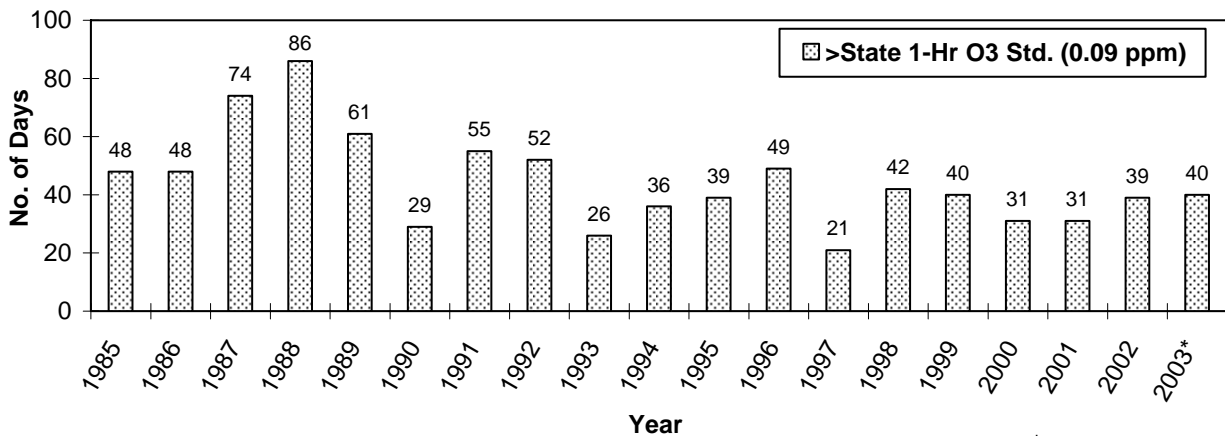
4.1 Ozone Exceedances

The graph in Figure 4-1 shows the number of state ozone exceedance days in Sacramento County since 1985. An exceedance of the standard occurs when the monitored ambient concentration level is greater than the standard. The state 1-hour ozone standard is 0.09 ppm. Note that monitored concentrations that are 0.095 ppm or greater are considered exceedances and values lower than 0.095 ppm are not due to rounding procedures.

The period from the late 1980's to 2003 shows an overall reduction in days exceeding the ozone standards. The peak year for ozone exceedances was 1988 with 81 days over the state standard. The least ozone exceedances occurred in 1997 with 21 days over the state standard. In 2003, ozone concentrations exceeded the state standard 40 days.

The general pattern for ozone exceedances is not a steady trend downward, but one that includes several peaks. The variability in the observed pattern is primarily due to differences in meteorology and economic activity from year to year. The general pattern suggests, however, that the worst years for air quality are becoming less severe, and the best air quality years are becoming cleaner.

Figure 4-1
Number of Days Exceeding State 1-Hr Ozone (O₃) Standard
in Sacramento County



*Preliminary data

4.2 Ozone Expected Peak Day Concentrations

Another indicator used to assess air quality trends for ozone is the expected peak day concentration (EPDC). This peak indicator is derived by a statistical method and is representative of specific monitoring sites. The EPDC is defined as the air quality

concentration that is expected to be exceeded once per year on average. Each EPDC value is calculated using three years of monitoring data; for example, the EPDC for 2002 uses 2000-2002 data.

Three terms need to be defined for understanding the data in the ozone trend indicator tables:

- Composite Native Variability Limits (CNVL) are included in the EPDC calculation and are an estimate of a range of uncertainty associated with the indicator value. Most uncertainty is thought to be the result of meteorology.
- Confidence Level is attached to the CNVL to estimate the degree of confidence that some amount of progress in air quality is due to the reductions in emissions that have occurred.
- Documented Progress is the amount of progress from the base (1986-1988) to the end period (2000-2002) that is attributed to changes in emissions and is associated with a specific confidence level.

ARB guidance recommends reporting documented progress at the 95% confidence level, and also including progress at other levels if desired. Note that the air quality indicators of progress are reported at the 50% confidence level, because the Composite Native Variability Limits at the 95% confidence level were not available to the District.

Table 4-1 and Figures 4-2 to 4-5 summarize the EPDC indicators for the base period (1986-1988) to the end period (2000-2002) for four different monitoring sites in Sacramento County. For Folsom, the documented progress was a 21.1% decrease in the EPDC between 1988 and 2002 at the 50% confidence level. For Del Paso Manor, there was a 20.0% decrease in the EPDC between 1988 and 2002. For North Highlands, there was a 21.3% decrease in the EPDC between 1988 and 2002. For the T Street site, the EPDC shows a 3.5% decrease between 1991 and 2002.

**Table 4-1
Summary of Expected Peak Day Concentrations**

Site	EPDC (ppm) Base Period (1986-1988)	EPDC (ppm) End Period (2000-2002)	Difference (Base – End)	Documented Progress @ 50% Confidence Level
Folsom	0.171	0.135	0.036	-21.1%
Del Paso Manor	0.160	0.128	0.032	-20.0%
North Highlands	0.150	0.118	0.032	-21.3%
T Street	0.113 ('89-'91)	0.109	0.004	-3.5%

4.3 Ozone Exposure Indicators

The population-weighted exposure indicator is used to assess trends in the average annual exposure per person to ozone concentrations above the level of the state standard. Exposure can be thought of as the annual sum of the number of hours above the state health standard. For example, a measured concentration of 0.13 ppm for two hours represents an exposure of 0.08 ppm-hours [(0.13 ppm – 0.09 ppm) x 2 hrs] above the state ozone standard of 0.09 ppm.

The area-weighted exposure indicator is used to assess trends in the average annual exposure per unit area to ozone concentrations above the level of the state standard.

Table 4-2 and Figures 4-6 and 4-7 summarize the population-weighted and area-weighted exposure indicators for the 3-year average base period (1986-1988) and the 3-year average end period (2000-2002) within Sacramento County. There is a 78.4% decrease in population-weighted ozone exposure between the base and end periods within Sacramento County at the 50% confidence level. There is also a 78.0% decrease in area-weighted ozone exposure between the base and end periods within Sacramento County at the 50% confidence level. [However, the largest improvements occurred between 1988 and 1991.]

The results indicate that after removing much of the variability due to meteorology and isolating the effects from the District's emission reduction control program, a definite downward trend in ozone concentrations is exhibited. Thus, real progress has been made in reducing the peak ozone concentrations and ozone exposure above the standard, especially between the late 1980's to the early 1990's.

**Table 4-2
Summary of Exposure Indicators
Sacramento County**

Exposure Indicator	Base Period (1986-1988) 3-Yr Avg	End Period (2000-2002) 3-Yr Avg	Difference (Base – End)	Documented Progress @ 50% Confidence Level
Population-Weighted (ppm-hrs/person)	1.486	0.321	1.165	-78.4%
Area-Weighted (ppm-hrs/sq km)	1.067	0.235	0.832	-78.0%

Figure 4-2
Expected Peak Day Concentration (EPDC) Ozone Trend
Folsom* Monitoring Site

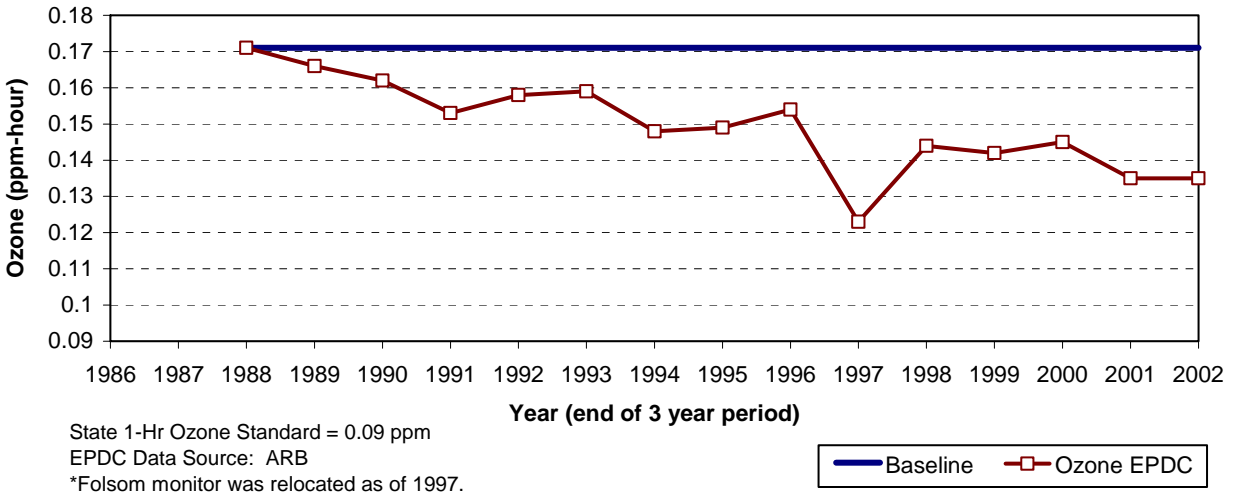


Figure 4-3
Expected Peak Day Concentration (EPDC) Ozone Trend
Del Paso Manor Monitoring Site

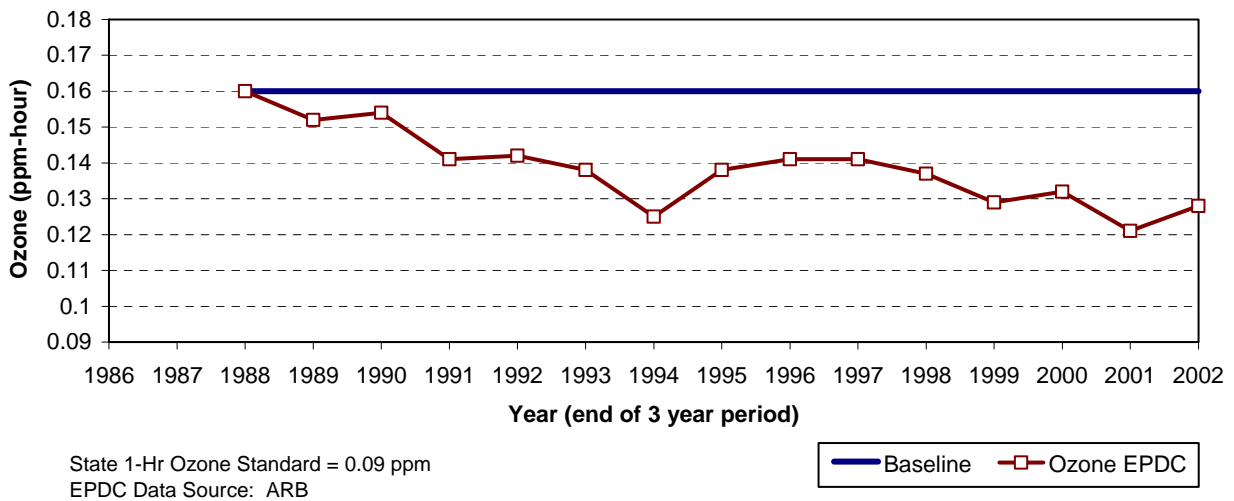


Figure 4-4
Expected Peak Day Concentration (EPDC) Ozone Trend
North Highlands Monitoring Site

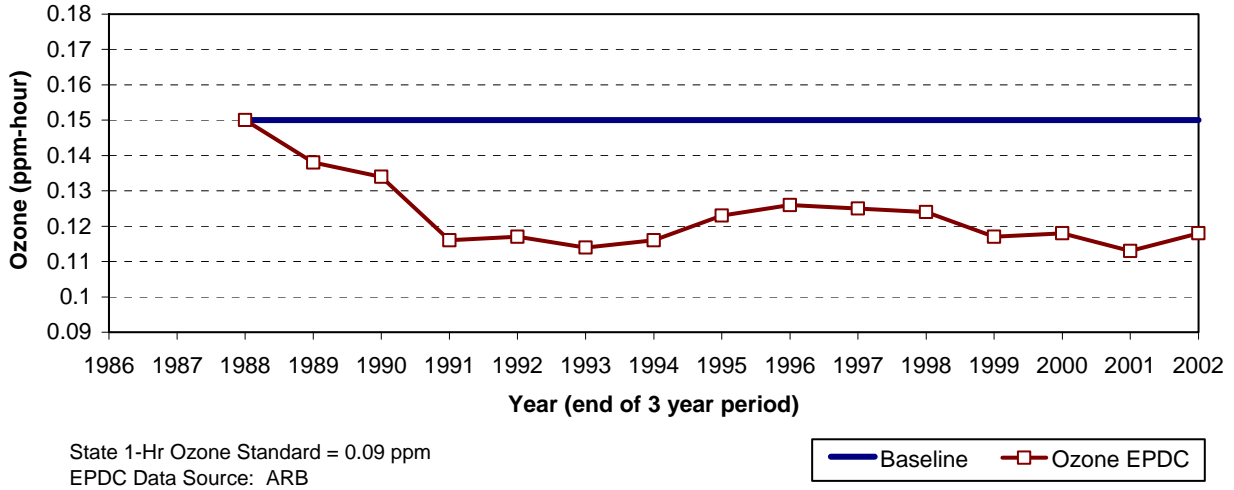


Figure 4-5
Expected Peak Day Concentration (EPDC) Ozone Trend
T Street Monitoring Site

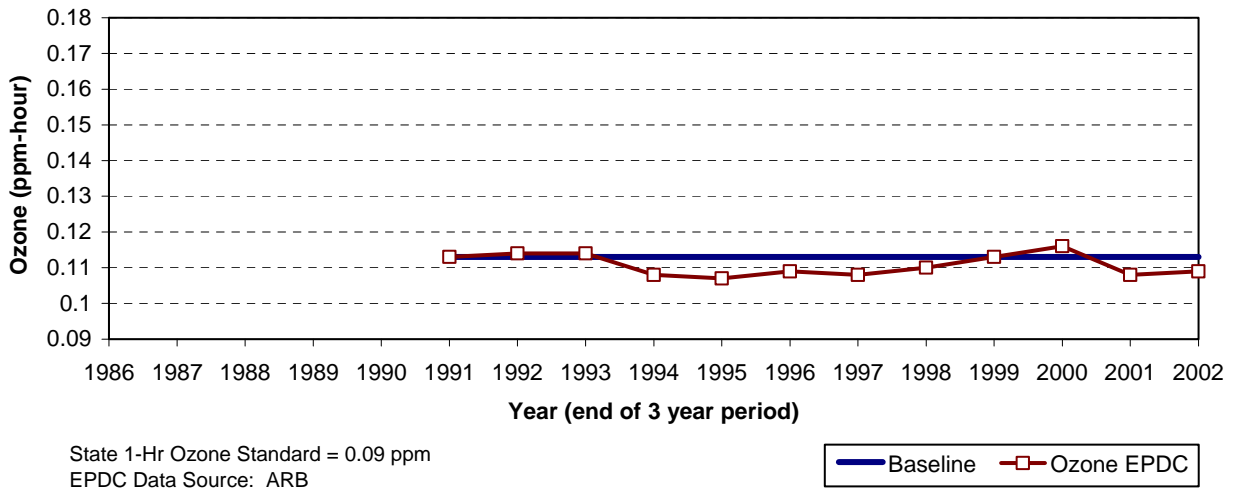


Figure 4-6
Population-Weighted Exposure Ozone Trend
Sacramento County

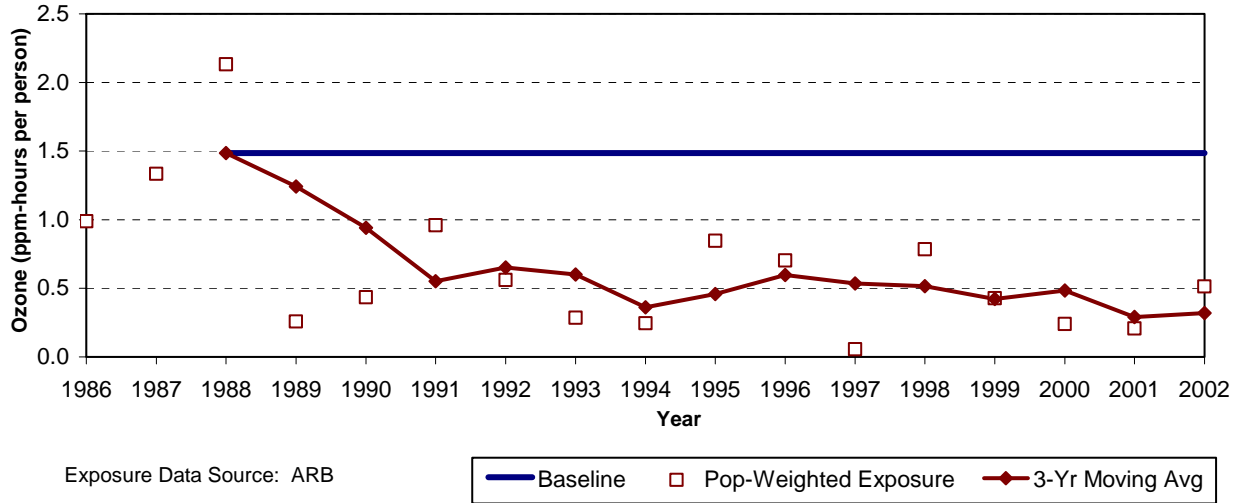
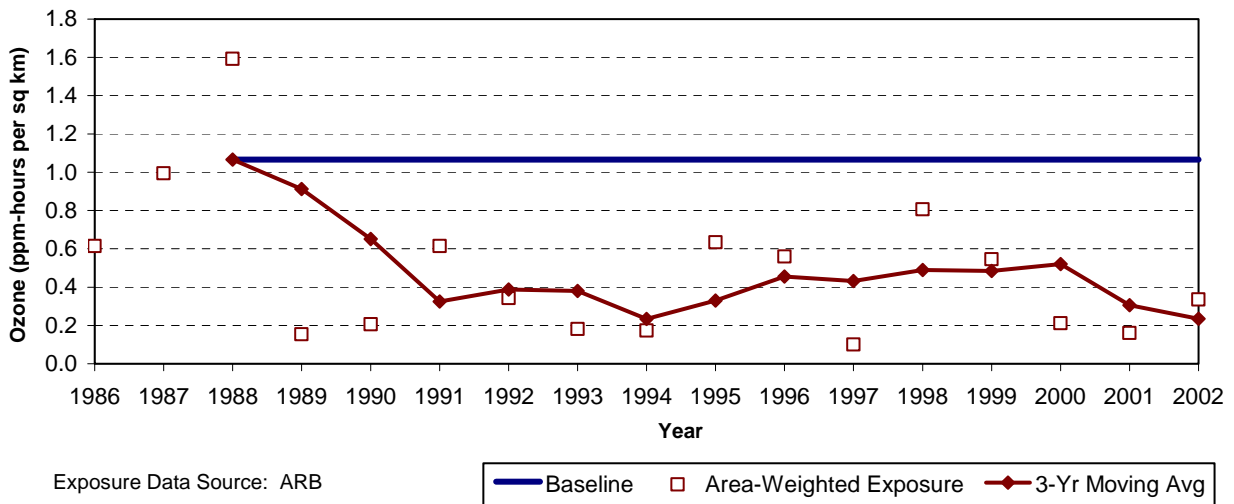


Figure 4-7
Area-Weighted Exposure Ozone Trend
Sacramento County

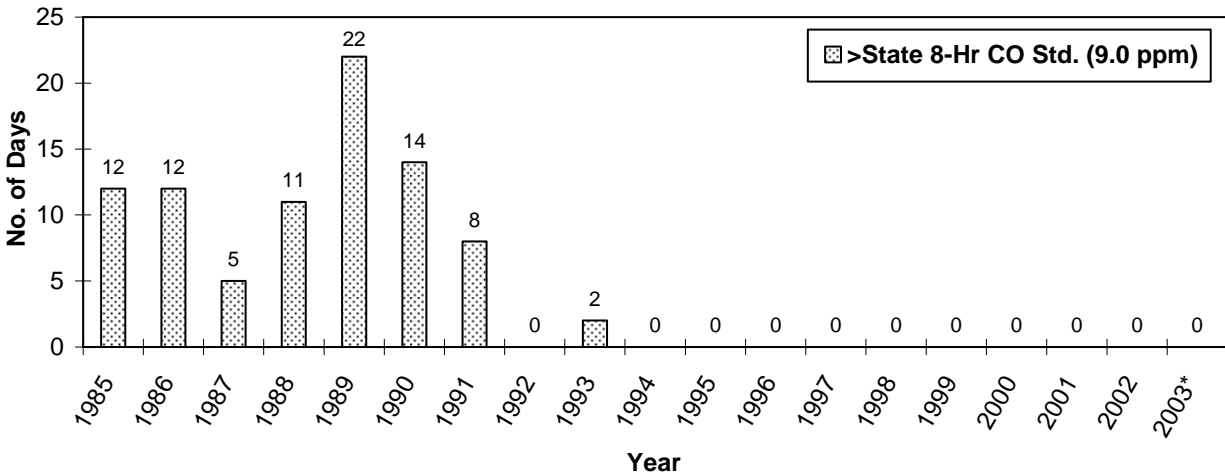


4.4 Carbon Monoxide Exceedances

The graph in Figure 4-8 shows the number of state carbon monoxide (CO) exceedance days in Sacramento County since 1985. An exceedance of the standard occurs when the monitored ambient concentration level is greater than the standard. The state 8-hour CO standard is 9.0 ppm.

The trend in ambient levels of carbon monoxide is a different story from ozone. After peaking in 1989, when there were 22 exceedances of the state standard observed, CO has dropped down to zero exceedances of the standard since 1994. This strong downward trend is primarily due to the state's Oxygenated Fuel Program implemented in October, 1992.

Figure 4-8
Number of Days Exceeding State Carbon Monoxide (CO) Standard
in Sacramento County



*Preliminary data

5. EMISSION INVENTORIES

5.1 Development of Emission Inventories

To determine to what extent various sources within the region are responsible for ozone precursor production, emission inventories have been developed for reactive organic gases (ROG) and nitrogen oxides (NO_x). These two pollutants are produced by a wide variety of emission sources that have been categorized into: 1) stationary sources, such as industrial equipment, 2) area-wide sources, such as consumer products and pesticides, and 3) mobile sources, which include on-road motor vehicles, such as cars and trucks, and other mobile sources, such as trains and off-road equipment.

The emission inventory represents estimates of actual emissions that are calculated using reported or estimated process rates and emission factors. Motor vehicle emission calculations include consideration of the fleet mix, vehicle miles traveled, trip starts, speeds, and vehicle emission factors.

To derive past and future year emission inventories, a current base year inventory is projected backward and forward in time, based on prior and expected growth rates of population, travel, employment, industrial/commercial activity, and energy use. The emission projections also take into account the historical and anticipated emission reduction effects from previously adopted control measures.

5.2 Sacramento County Emission Inventory Updates

Emission inventories are constantly being updated and improved to better reflect the conditions within the region and to better determine the contribution of various sources to air pollution. The updated inventories presented in this report are based on the most current 1999 base year emission estimates and reflect emission inventory additions and improvements since the 2000 Triennial Report. Tables 5-1 and 5-2 provide a comparison of previous and updated source category estimates of Sacramento County summer daily emissions of ROG and NO_x for 1990, 1995, 2000, 2005. Also, note that in addition to 1990-2005 emissions, the updated inventory includes emission forecasts through 2020, so future emission trends can be evaluated.

5.2.1 Stationary and Area-Wide Source Categories

The contribution from stationary sources is mainly due to cleaning and surface coatings for ROG emissions and fuel combustion for NO_x emissions. The ROG emissions from area-wide source categories are primarily from consumer products and architectural coating solvents.

The current stationary/area-wide source inventory projections reflect new growth surrogates and profiles from the Pechan Growth Study, ARB Contract #98-719. The inventory also reflects additional controls, which were not accounted in the previous

2000 Triennial inventories, and new controls which were implemented since the last report.

Previously uninventoried categories, agricultural irrigation pumps, and fugitive emission from gasoline cargo tanks, add 0.6 and 1.0 tons per day of NO_x and ROG, respectively, to the 1990 inventory. New control measures reduce NO_x and ROG emissions from these categories to 0.5 ton per day each by 2005.

Revisions which result in substantial decrease in emissions include pesticide and unspecified industrial coatings. The pesticide inventory is replaced with estimates from the Department of Pesticide Regulation. The new 2005 estimate is 1.2 ton of ROG per day less than the previous 2005 inventory. Whereas, the unspecified industrial coatings category was revised using 2000 national industrial coating (OEM) production and reconciling it with associated coating categories already accounted in the inventory. This revision resulted in 1.5 ton per day less ROG in the 2005 inventory.

Minor updates include the addition of NO_x emissions from agricultural crop waste burning, and the recalculation of stationary diesel IC engines, commercial natural gas combustion, livestock, and cooking.

Overall, the current 2005 ROG emissions from stationary source and area-wide source categories are each about 5 tons per day less from the 2000 Triennial Report inventories. Whereas, the latest inventory estimates indicate current 2005 NO_x emissions from stationary source and area-wide source categories to be about 0.1 and 0.2 ton per day more, respectively.

5.2.2 On-Road Motor Vehicle and Other Mobile Source Categories

The majority of emissions in Sacramento County come from on-road motor vehicles, especially automobiles and the various truck categories. Other mobile source emission categories consist mostly of recreational boats, off-road construction/industrial equipment, farm equipment, and trains.

The updated mobile source inventory incorporates ARB's latest on-road motor vehicle emission factors and activities. Due to revisions to vehicle population and age from California Department of Motor Vehicles data, the new motor vehicle emissions model, (EMFAC2002, v2.2)¹, lowers the 2005 ROG and NO_x emissions for automobiles and gasoline trucks by about 10 and 9 tons per day, respectively. Also, the new 2005 NO_x emissions for heavy-duty diesel trucks and buses are about 4 tons per day higher due

Footnotes:

¹ CARB, "EMFAC2002, The Latest Update to the On-Road Emissions Inventory" (Public Release Document), September 2002.

to the addition of extended idle emissions and previously unaccounted school bus activity. Other updates to the motor vehicle emissions model result in minor changes. These updates are fully documented on ARB's website, <http://www.arb.ca.gov/msei/on-road/on-road.htm>.

Gas can emissions, a previously uninventoried source, was added to the most recent estimates for the other mobile source categories. It contributes about 3 tons per day to the 1990 ROG inventory. ARB regulation lowers gas can emissions to 1.2 ton per day by the 2005 inventory.

Major revisions to the OFFROAD Model lower the 2005 ROG by about 3 tons per day for recreational boats and increase ROG emissions about 3 tons per day for gasoline powered lawn and garden, industrial, and construction equipment categories under off-road equipment. The latest 2005 NOx emissions inventory for off-road mobile sources are 2 tons per day higher for trains, mainly from previously underestimated train switching operations, and 1 ton per day lower for recreational boats. The discussions and methodologies for the recent updates, except train switching and aircraft, to the off-road mobile inventory are posted on the CARB emissions inventory website, <http://www.arb.ca.gov/msei/off-road/updates.htm>.

5.2.3 Graphs Comparing Previous and Updated Emission Inventories

The graphs in Figures 5-1 and 5-2 illustrate how the updated Sacramento County daily emissions inventory for ROG and NOx compares to the previous 2000 Triennial Report emissions inventory. Estimates are provided in 5-year increments and categorized by stationary sources, area-wide sources, on-road motor vehicles, other mobile sources, and total sources. Overall, the revised emissions for 1990-2005 are slightly less than the previous inventory, mainly due to recalculations of the on-road motor vehicle emissions.

5.3 Updates to Population and Vehicle Miles Traveled (VMT) Growth

In addition to updates in methodologies, process rates, and emission factors for individual emission source categories, updates in growth factors can affect emission inventory forecasts. Changes to the most recent growth assumptions for Sacramento County population and vehicle miles traveled (VMT) from those assumed in the 2000 Triennial Report could contribute to some of the emission differences in population-related area source categories and on-road mobile sources.

Figure 5-3 is a graph illustrating the comparison of population and VMT growth between the 2000 Triennial Report and this 2003 Triennial Report. Current population growth estimates are only slightly higher than previous 2000 Triennial Report data, while current VMT growth is slightly less than previous 2000 Triennial Report assumptions.

5.4 Emission Inventory Trends

5.4.1 1990-2005 Emission Reductions

Between 1990 and 2005, overall Sacramento County ROG emissions are estimated to decline about 50%, and NO_x emissions are expected to decline about 40% or approximately 3% per year. These emission reductions are mostly from the largest category, on-road motor vehicles (i.e., automobiles and trucks). Statewide mobile source regulations, such as low emission vehicle programs and reformulated gasoline, have been very effective, despite growth in the number of vehicle miles traveled.

Significant ROG and NO_x emission reductions have also been achieved from stationary source categories, such as cleaning and surface coatings, industrial processes, and fuel combustion. These emission decreases are mainly due to locally adopted District control measures.

Emissions from area-wide source categories have not changed much since 1990, except for some decline in consumer product ROG emissions. The only significant reductions within “other mobile source” emission categories have occurred from off-road equipment.

5.4.2 2005-2020 Emission Reductions

Projected emission forecasts to 2020 continue to show a declining trend for ROG and NO_x emissions. However, the relative declination of ROG emissions will be less steep than that of NO_x emission reductions. Emission reductions from the largest emission category, on-road mobile sources, provide the most emission reductions in the future as new cleaner vehicles enter the vehicle fleet.

**Table 5-1
ROG Emissions (tons per day) – Sacramento County**

	2000 Triennial Report				2003 Triennial Report ^a						
	1990	1995	2000	2005	1990	1995	2000	2005	2010	2015	2020
STATIONARY SOURCES											
Cleaning and Surface Coatings	13.0	13.3	10.1	10.8	11.0	10.2	5.9	5.4	6.0	6.6	7.2
Petroleum Production/Marketing	2.5	2.0	1.9	1.9	4.0	3.1	2.6	2.5	2.6	2.9	3.1
Industrial Processes	2.6	2.0	1.3	1.4	2.9	2.6	0.8	0.9	1.0	1.1	1.2
Waste Disposal	<0.1	0.1	0.2	0.2	0.9	0.9	0.2	0.2	0.2	0.2	0.2
Fuel Combustion	0.2	0.1	0.1	0.1	0.3	0.2	0.5	0.5	0.5	0.5	0.5
TOTAL STATIONARY SOURCES	18.3	17.4	13.6	14.4	19.1	17.0	10.0	9.5	10.3	11.3	12.2
AREA-WIDE SOURCES											
Consumer Products	11.3	9.6	9.4	8.7	11.1	9.5	9.4	8.8	9.5	10.1	10.8
Architectural Coatings/Solvents	4.2	4.7	5.4	6.0	6.4	6.1	5.3	4.3	4.5	4.7	5.0
Pesticides/Fertilizers	2.7	1.4	1.6	1.7	0.8	0.6	0.4	0.5	0.5	0.5	0.5
Farming Operations	2.1	2.1	2.1	2.1	1.7	1.6	1.5	1.5	1.5	1.5	1.5
Miscellaneous	2.1	2.1	2.2	2.3	1.2	1.1	1.2	1.2	1.2	1.3	1.3
TOTAL AREA-WIDE SOURCES	22.4	19.8	20.6	20.9	21.2	19.0	17.8	16.3	17.2	18.1	19.1
MOBILE SOURCES											
ON-ROAD MOTOR VEHICLES											
Automobiles	50.3	38.2	27.3	16.7	38.8	28.0	17.4	11.4	7.5	5.1	3.8
Light/Medium Duty Trucks	22.4	20.4	16.9	12.6	25.2	19.9	13.2	10.1	8.1	6.4	5.3
Heavy Duty Gas Trucks	17.0	11.1	7.5	4.8	13.0	7.9	4.5	2.8	1.8	1.4	1.1
Heavy Duty Diesel Trucks	1.9	1.6	1.2	1.1	1.6	1.3	1.1	1.0	0.8	0.6	0.5
Motorcycles	1.9	1.4	0.7	0.5	2.3	1.7	0.8	0.6	0.4	0.3	0.3
Buses	0.2	0.2	0.2	0.2	0.6	0.6	0.4	0.3	0.3	0.3	0.3
Motor Homes	0.2	0.2	0.1	0.1	0.3	0.3	0.2	0.2	0.2	0.1	0.1
TOTAL ON-ROAD MOTOR VEHICLES	93.9	73.0	53.9	35.9	81.7	59.6	37.6	26.4	19.0	14.3	11.3
OTHER MOBILE SOURCES											
Aircraft	1.1	1.2	1.2	1.3	1.2	0.7	0.4	0.5	0.5	0.6	0.7
Trains	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Ships & Commercial/Recreational Boats	6.2	7.0	7.0	6.5	3.4	4.1	4.3	3.5	2.8	2.2	1.9
Off-Road Recreational Vehicles	0.8	0.8	0.4	0.3	0.8	0.8	0.4	0.3	0.3	0.3	0.3
Off-Road Equipment	6.4	5.8	4.6	3.7	11.7	10.2	8.8	6.4	5.0	4.5	3.8
Farm Equipment	0.6	0.6	0.5	0.4	0.6	0.6	0.5	0.5	0.4	0.3	0.2
Fuel Storage & Handling (Gas Cans)					3.1	3.3	3.5	1.2	1.0	1.1	1.1
TOTAL OTHER MOBILE SOURCES	15.1	15.4	13.9	12.3	21.1	20.0	18.1	12.5	10.1	9.0	8.2
TOTAL MOBILE SOURCES	109.0	88.5	67.8	48.3	102.8	79.6	55.7	38.9	29.2	23.4	19.4
GRAND TOTAL	149.8	125.7	102.0	83.6	143.1	115.5	83.5	64.8	56.7	52.8	50.7

^a Data source: CARB CEFS Version 2.12 (6/30/04) and EMFAC2002, v.2.2 (run 8-31-04) for avg. summer day, and SMAQMD data.

**Table 5-2
NOx Emissions (tons per day) – Sacramento County**

	2000 Triennial Report				2003 Triennial Report ^a							
	1990	1995	2000	2005	1990	1995	2000	2005	2010	2015	2020	
STATIONARY SOURCES												
Fuel Combustion	4.3	2.8	2.4	2.6	5.0	3.5	2.7	2.7	2.6	2.6	2.4	
Miscellaneous	0.2	0.2	0.3	0.3	0.2	0.2	0.3	0.3	0.4	0.4	0.4	
TOTAL STATIONARY SOURCES	4.5	2.9	2.6	2.9	5.1	3.7	3.0	3.0	3.0	3.0	2.9	
AREA-WIDE SOURCES												
Residential Fuel Combustion	1.4	1.6	1.8	2.0	2.3	1.9	2.0	2.0	2.1	2.2	2.3	
Miscellaneous	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
TOTAL AREA-WIDE SOURCES	1.4	1.6	1.8	2.1	2.5	2.1	2.2	2.3	2.3	2.4	2.5	
MOBILE SOURCES												
ON-ROAD MOTOR VEHICLES												
Automobiles	33.5	27.4	20.3	12.6	27.0	21.1	13.8	8.5	5.3	3.2	2.1	
Light/Medium Duty Trucks	22.7	23.5	20.0	13.6	24.3	22.4	15.9	10.6	7.5	5.1	3.6	
Heavy Duty Gas Trucks	15.3	11.8	8.7	5.5	10.2	7.9	5.0	3.3	2.5	1.6	1.2	
Heavy Duty Diesel Trucks	33.8	28.4	24.9	20.9	35.7	30.2	28.3	24.6	17.4	10.6	6.5	
Motorcycles	0.2	0.2	0.1	0.1	0.3	0.2	0.1	0.1	0.1	0.1	0.1	
Buses	1.4	1.2	1.3	1.4	2.3	2.4	2.1	1.9	1.9	1.8	1.8	
Motor Homes	0.5	0.7	0.6	0.6	0.5	0.7	0.5	0.5	0.5	0.4	0.4	
TOTAL ON-ROAD MOTOR VEHICLES	107.3	93.1	75.9	54.6	100.2	84.8	65.7	49.5	35.1	22.9	15.7	
OTHER MOBILE SOURCES												
Aircraft	1.3	1.5	1.7	2.0	1.6	1.3	1.4	1.9	2.1	2.2	2.4	
Trains	4.1	3.3	3.1	2.3	5.0	5.2	5.6	4.3	3.6	3.6	3.5	
Ships & Commercial/Recreational Boats	2.3	2.3	2.5	2.9	1.3	1.3	1.5	1.9	1.9	1.8	1.7	
Off-Road Recreational Vehicles	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
Off-Road Equipment	21.8	16.6	16.6	15.0	22.0	16.7	16.9	15.4	12.3	9.5	5.9	
Farm Equipment	5.0	4.1	3.9	3.3	5.1	4.4	3.8	3.2	2.6	2.0	1.6	
TOTAL OTHER MOBILE SOURCES	34.6	27.8	27.9	25.5	35.0	29.0	29.2	26.7	22.6	19.3	15.3	
TOTAL MOBILE SOURCES	141.9	120.9	103.8	80.1	135.2	113.8	94.9	76.3	57.7	42.2	31.0	
GRAND TOTAL	147.8	125.5	108.3	85.1	142.9	119.7	100.1	81.6	63.1	47.6	36.4	

^a Data source: CARB CEFS Version 2.12 (6/30/04) and EMFAC2002, v.2.2 (run 8-31-04) for avg. summer day, and SMAQMD data.

Figure 5-1
Sacramento County ROG Emissions Inventory
Comparison Between 2000 Triennial and 2003 Triennial

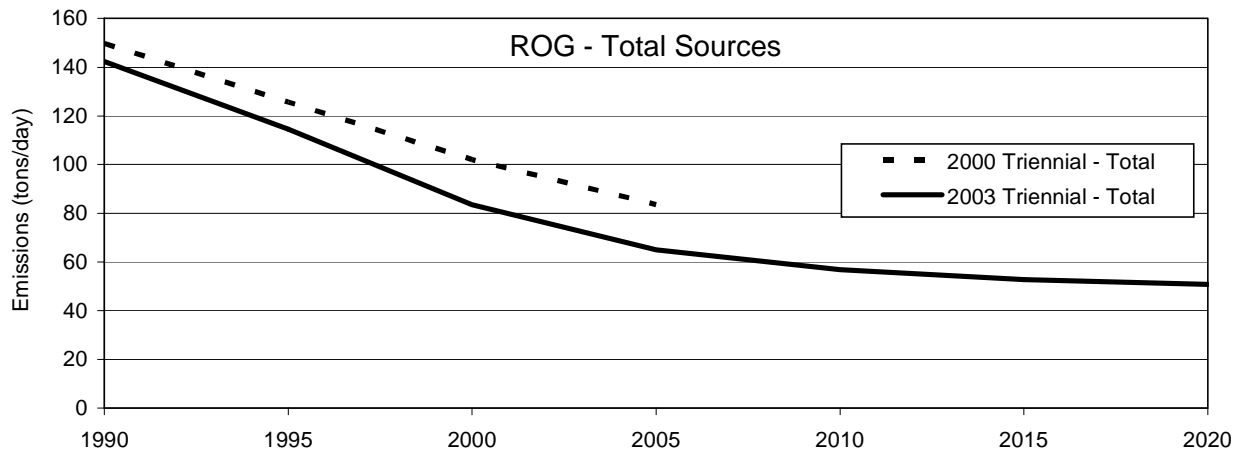
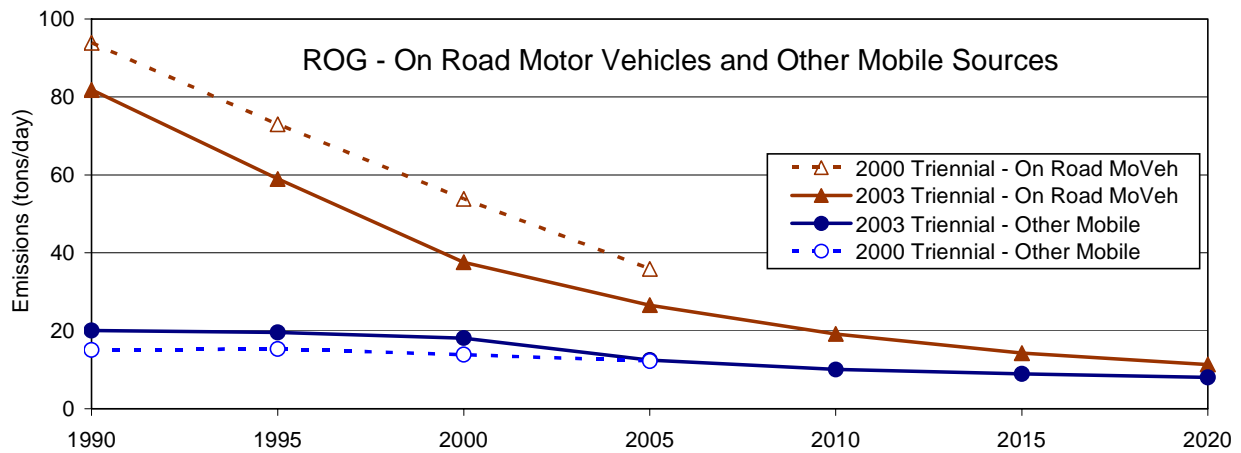
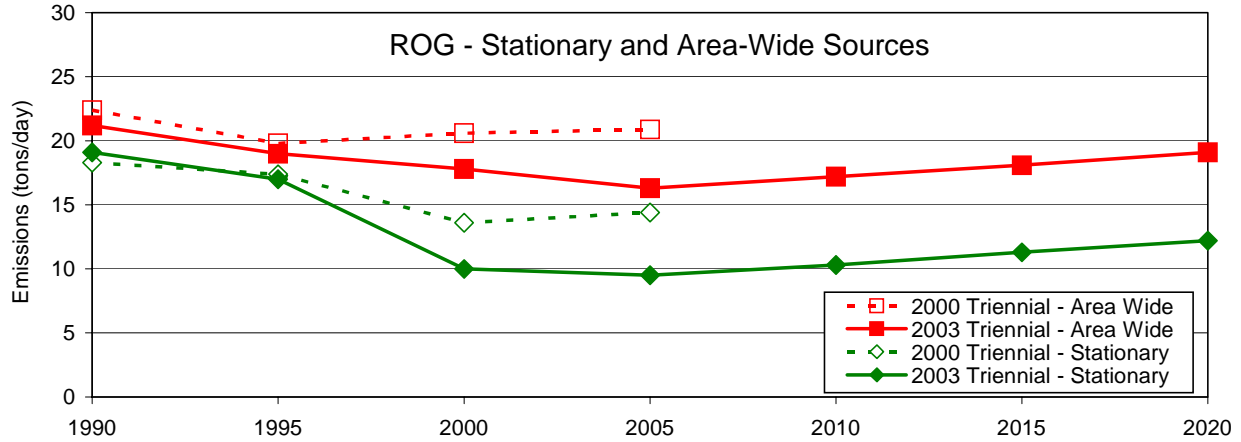


Figure 5-2
Sacramento County NOx Emissions Inventory
Comparison Between 2000 Triennial and 2003 Triennial

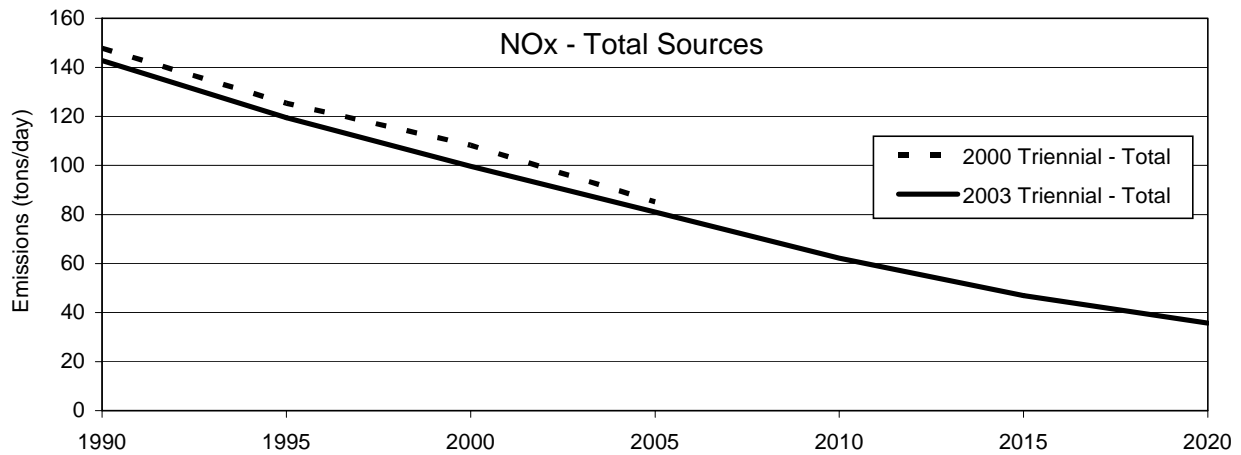
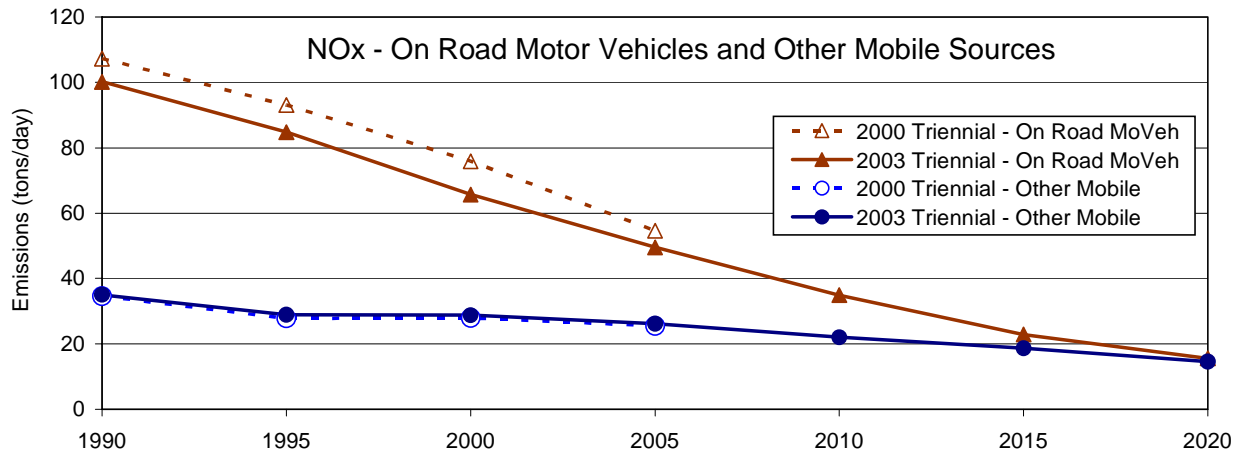
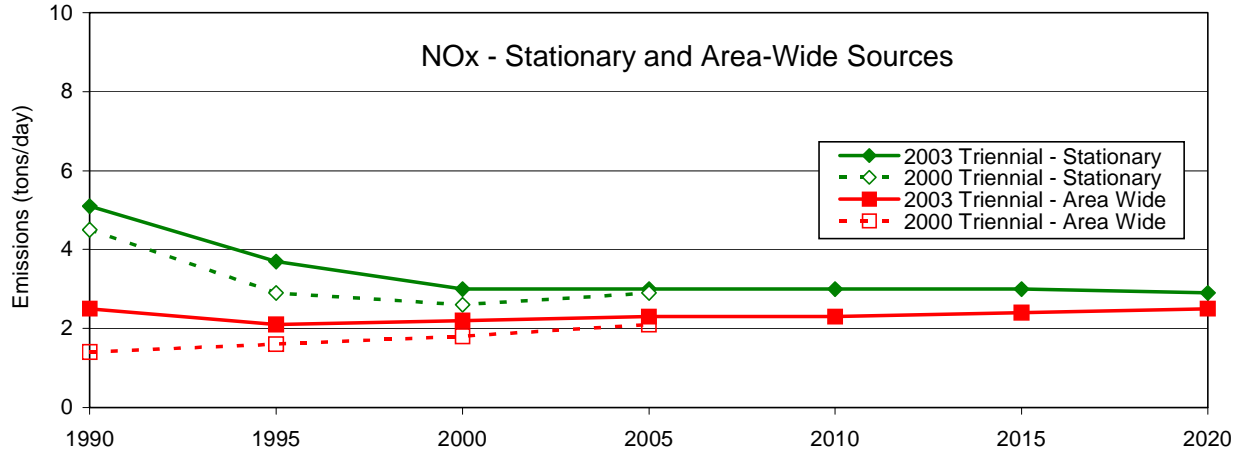
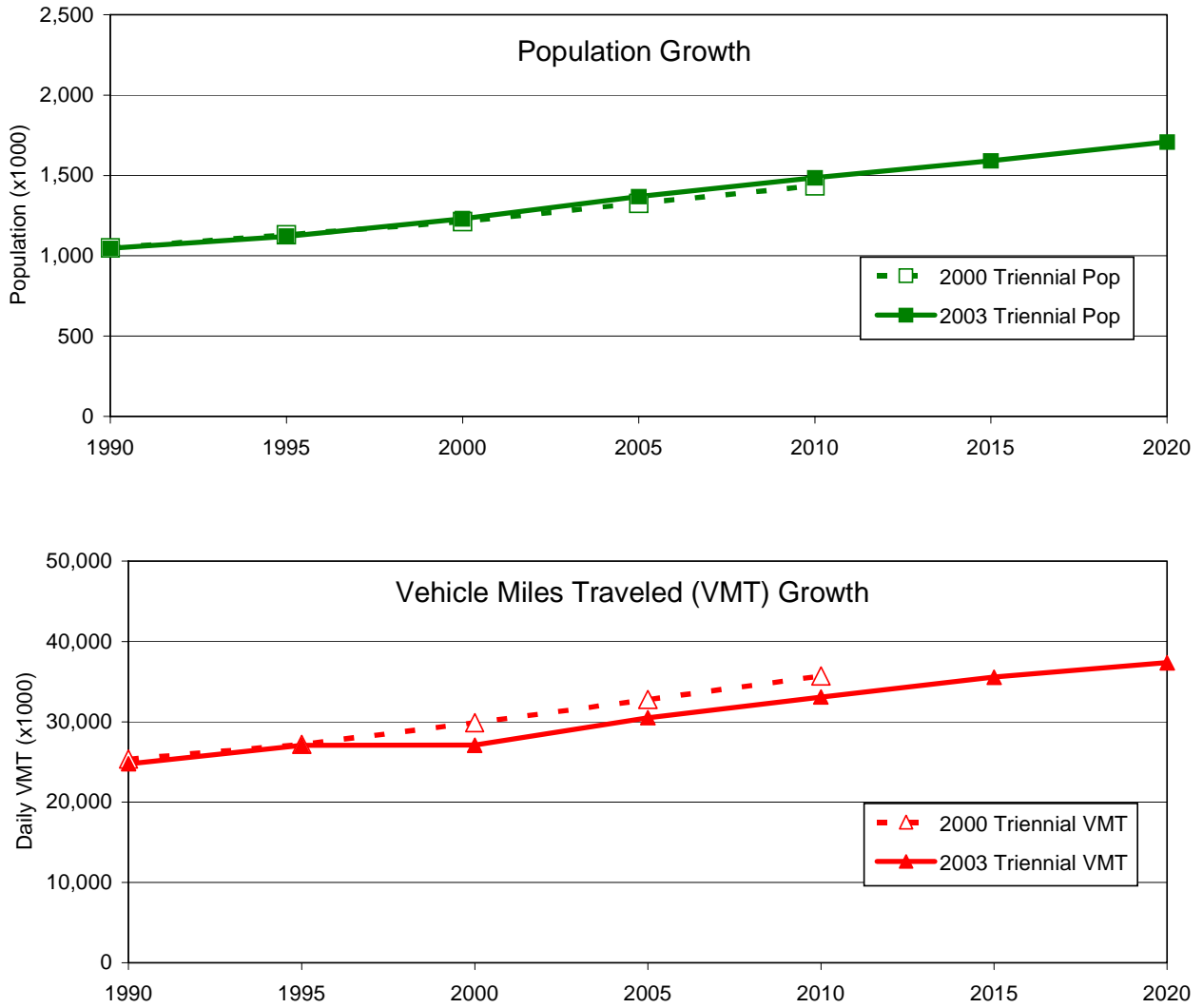


Figure 5-3
Sacramento County Population and Vehicle Miles Traveled (VMT) Growth
Comparison Between 2000 Triennial and 2003 Triennial



Data source: 2000 Triennial population: 4-6-01 e-mail from Vivian Lerch, CARB, GAP file, except 1995 by interpolation.
 2003 Triennial population: 7-9-04 e-mail from Larry Hunsaker, CARB, current growth database.
 2000 Triennial VMT: 7-9-04 e-mail from Larry Hunsaker and Doug Thompson, CARB, EMFAC 2000 v.2.02.
 2003 Triennial VMT: from http://www.arb.ca.gov/app/emsinvtrends/ems_trends.php (4-7-04).

6. STATIONARY SOURCE CONTROL PROGRAM

6.1 2000 Triennial Report Committal Measures

The rate of emission reduction in Sacramento County is approximately 3% per year, which is less than the goal of 5% per year. Therefore, the District must implement “all feasible measures” as provided in Health and Safety Code, Section 40914. By the end of 2000, the only stationary source committal measures left to be adopted by the District were the following:

- The District was still in the process of developing a NO_x rule amendment for stationary internal combustion engines at non-major sources. This measure was scheduled for late 2001.
- Another component of the surface preparation and cleanup solvent measure was determined to be necessary for reducing ROG emissions from solvent cleaning operations, such as degreasing at auto repair garages. This rule was scheduled for adoption in late 2001.

Also during the 1998-2000 triennial period, the District began reviewing the previously scheduled “all feasible measures” list for additional emission reductions. The effort resulted in new commitments for evaluating emission control categories affecting architectural coatings, auto refinishing, wood products coatings, polyester resins, aerospace coatings, fugitive emissions from oil and gas production and processing facilities, ozone-reducing catalyst for air conditioners, large commercial bakeries, and cutback and emulsified asphalt. As a result, the 2000 Triennial Report identified eleven “all feasible measures” commitments, with expected ROG emission reductions¹ of 0.6-1.5 tons per day, to be evaluated during the 2001-2003 timeframe.

6.2 2001-2003 Triennial Evaluation of Committal Measures

Table 6-1 contains a summary of the 2001-2003 triennial evaluation or disposition of each of the committal measures with estimates of ROG emission reductions of about 1.8 tons per day achieved in 2003.

The architectural coatings rule was amended in May 2001 to lower VOC solvent content and achieved emission reductions of about 0.5 tons per day. In May 2002, the final component to the surface preparation and cleanup solvent measure was adopted as a new solvent cleaning rule and an amendment to the degreasing rule, which reduced ROG emissions by 1.3 tons per day.

The NO_x rule amendment for internal combustion engines at non-major sources is still being developed and is scheduled for adoption in 2006. Also, the measure for fugitive emissions from oil and gas facilities is scheduled to be adopted in 2005. The ozone-reducing catalyst measure for air conditioners has been included as a California Environmental Quality Act (CEQA) mitigation strategy.

The automotive refinishing measure was determined to not be cost effective, while the aerospace coatings evaluation concluded no significant reductions. Finally, the four remainder 2000 Triennial Report commitment measures (wood products coatings, polyester resins, large commercial bakeries, and cutback/emulsified asphalt) were deemed to already be equivalent to the most stringent rule in California.

6.3 Proposed New “All Feasible Measures” Commitments

District staff participated with the Bay Area AQMD, San Joaquin Valley Unified APCD, Yolo-Solano AQMD, and CARB to perform a direct comparison of 11 rule categories² to identify additional emission reduction opportunities. Staff also participated in the development and evaluation of the list of potential all feasible measures³ prepared by the California Air Pollution Control Officers Association (CAPCOA). Furthermore, the District held a consultation meeting (8-11-04) with downwind air districts to receive input on proposed “all feasible measures” for addressing ozone transport mitigation requirements.

As a result of these recent inter-agency rule evaluation activities and additional extensive internal District reviews of over 30 control measure categories, more stationary source rules have been identified for potentially new emission reduction opportunities. These measures include adhesives and sealants, degreasing operations, natural gas fired water heaters, boilers, unspecified coatings, organic liquid loading, food product manufacturing and processing, polyester resins, concentrated animal feeding operations, and automotive refinishing.

Table 6-2 contains a list of 12 proposed “all feasible measures” commitments with estimates of expected emission reductions (total of 0.87 tons per day of ROG and 0.17 tons per day of NOx) and cost effectiveness. 8 of these measures are being proposed for rule adoption/amendment and 4 are being proposed for further study during the next triennial period (2004-2006). The approval of these control measure commitments as a triennial plan revision will result in their incorporation into the District’s attainment strategy and satisfy the “all feasible measures” progress requirement.

Footnotes:

¹ SMAQMD, “2000 Triennial Report” (Table 6), January 2001.

² CARB, “Ozone Transport Mitigation In California” (Staff Report to April 22, 2004 Board meeting). List of rule categories on page 9 of CARB staff report includes adhesives, boilers, can and coil coating, degreasing, graphic arts, internal combustion engines, solvent cleaning, storage of organic liquids, turbines, valves and flanges, and vehicle refinishing.

³ List of 28 source categories from the 2003 CAPCOA Potential All Feasible Measures List that was approved at the December 2003 CAPCOA Board meeting.

**Table 6-1
2001-2003 Triennial Evaluation of Committal Measures
SMAQMD Stationary Source Program**

Rule No.	Control Category	Expected Completion Date	Expected Emission Reduction (TPD)	2001-2003 Triennial Evaluation Results	2003 Emission Reduction Achieved (TPD)
442	Architectural Coatings	5/2001	0.52	Adopted 5/2001	0.48 ^a
412	Stationary IC Engines (at Non-Major Sources)	11/2001	-	To be adopted 2006	
459	Automotive Refinishing	3/2001	0.01	Not Cost Effective	-
463	Wood Products Coatings	2003	-	Equivalent Stringency ^b	-
465	Polyester Resins	2002	-	Equivalent Stringency ^b	-
456	Aerospace Coatings	7/2001	-	No significant Reductions	-
461	Fugitive Emissions from Oil and Gas Prod. & Proc. Facil.	2002	-	To be adopted 2005	
454/ 466	Degreasing Operations/ Solvent Cleaning	9/2001	0.1-1.0	Adopted 5/2002	1.3 ^c
New	Ozone-Reducing Catalyst (for Air Conditioners)	2002	-	Included in CEQA mitigation	
458	Large Commercial Bakeries	2003	-	Equivalent Stringency ^b	-
453	Cutback and Emulsified Asphalt	2003	-	Equivalent Stringency ^b	-

^a 2003 emission reduction achieved estimated from SMAQMD Architectural Coatings Rule 442 staff report (4-24-01) based on VOC limits in rule.

^b "Equivalent Stringency" means that the rule contains standards and exemptions achieving roughly equivalent emission reduction benefits as the most stringent rule in the state of California.

^c 2003 emission reduction achieved estimated from SMAQMD Degreasing Operations Rule 454 and Solvent Cleaning Rule 466 staff report (5-23-02) based on emission inventory developed by District from CARB data and solvent usage data provided by Safety Kleen.

Table 6-2
List of Proposed Triennial Commitments for 2004-2006
SMAQMD Stationary Source Program

Rule No.	Control Category	Proposed Action and Schedule	Expected ROG Emission Reduction (TPD)	Expected NOx Emission Reduction (TPD)	Cost Effectiveness (\$/ton)
460	Adhesives and Sealants	To be amended 2006	0.06	-	\$373
454/ 466	Degreasing Operations/ Solvent Cleaning	To be amended 2006	0.37 ^a	-	\$0 - \$4,200
414	Natural Gas Fired Water Heaters	To be adopted 2005	-	0.08	\$1,200 - \$10,600
440	Unspecified Coatings	To be adopted 2005	0.27	-	\$800 - \$14,400
461	Oil and Gas Fugitive Emissions	To be adopted 2005	0.17	-	\$9,957
411	Boilers, Steam Generators, and Process Heaters/Space Heaters	To be amended 2005	-	0.09	\$12,664 - \$40,000
447	Organic Liquid Loading	To be amended 2006	-	-	Low
412	Stationary IC Engines	To be amended 2006	-	To be determined	To be determined
459	Automotive Refinishing	To be re-evaluated 2006	Further study	-	To be determined
New	Concentrated Animal Feeding Operations	To be evaluated 2006	Further study	-	To be determined
New	Food Product Manufacturing and Processing	To be evaluated 2006	Further study	-	To be determined
465	Polyester Resins	To be re-evaluated 2006	Further study	-	To be determined

^aImplementation and emission reductions are expected to occur in 2007.

7. DISTRICT MOBILE SOURCE NO_x CONTROL PROGRAMS

7.1 Vehicle and Engine Technology Program

As part of the overall strategy to reduce ambient ozone concentrations, Sacramento region air districts committed to comprehensive control programs, which included stationary and mobile sources. To achieve emission reductions from mobile sources, particularly heavy-duty vehicles, a Vehicle and Engine Technology Program was implemented. This program uses market-based incentive programs to promote the accelerated introduction of lower emission technologies into the Sacramento region. The program focuses on reducing NO_x emissions from heavy-duty diesel engines associated with on-road vehicles, self-propelled off-road vehicles, and agricultural pump engines. The major strategies for achieving the desired NO_x emission reductions are:

- Introducing new, low-emission certified vehicles when older vehicles are being replaced or when new vehicles are being added to a fleet;
- Replacing an older existing engine with a newer, lower emission engine, referred to as repowering;
- Replacing an older truck with a newer truck when the older truck's owner would not otherwise purchase a newer truck;
- Retrofitting an older engine to operate at a lower emission level;
- Using a lower emission fuel.

7.2 2000 Triennial Report District Mobile Source Commitments

The 2000 Triennial Report contains Sacramento air district mobile source program commitments to continue to pursue reductions from government fleet heavy-duty vehicles (such as school buses, refuse trucks, and utility service vehicles), as well as privately owned heavy-duty vehicles (such as trucking firms and off-road mobile equipment used in construction or farming). The commitment for future expected NO_x emission reductions from newly funded projects was estimated at 0.5 tons per day for the region in 2002.

7.3 2001-2003 Triennial Evaluation of District Mobile Source Commitments

During the 2001-2003 triennial period, \$48 million has been used to effect a variety of vehicle and engine NO_x reduction incentive projects. The revenue sources include Department of Motor Vehicle Surcharge funds, "Measure A" sales tax funds, Carl Moyer funds, and Sacramento Emergency Clean Air and Transportation (SECAT) Program funds, Congestion Mitigation and Air Quality (CMAQ) funds, and Lower-Emission School Bus Program funds.

The District mobile source market-based incentive program has achieved additional NO_x emission reductions of 3.4 tons per day from projects initiated during 2001-2003 as shown in Table 7-1. The NO_x reductions from on-road heavy-duty vehicles account for

1.2 tons per day. The off-road mobile portion has been more successful by decreasing NOx emissions 2.2 tons per day, mostly due to the reductions from agricultural water pumping engines.

Due to the nature of mobile source emissions, the emission reductions from on-road and off-road vehicle project categories in Table 7-1 occur throughout the Sacramento federal ozone nonattainment region and not just in Sacramento County. However, of the 365 businesses receiving funds for on-road projects during 2001-2003, 153 of them were located in Sacramento County. Also, of the 67 businesses receiving funds for off-road vehicle projects during 2001-2003, 16 of them were located in Sacramento County. Approximately 5 percent of the agricultural water pump engines in the program are located in Sacramento County.

7.4 Additional District Mobile Source Efforts

The “pull forward” introduction of 2004 emission standard compliant diesel engines in October 2002 allowed reduction opportunities where there were previously few options. An example would be the installation of these 2004 compliant engines in relatively new trucks with engines that would not otherwise require this type of major service. Additionally, lower emission fuels have been and are being certified for use in standard diesel engines without modification to the engine. Retrofit exhaust after-treatment manufacturers have certified or verified (or are in the process of) equipment that can be installed on existing engines at a minimum of cost and required maintenance.

In addition, SMAQMD staff in cooperation with an effort led by Placer County is pursuing an emission reduction strategy to encourage Sacramento County and incorporated cities to develop ordinances that would amend local codes for the following purposes:

- To establish a Low-Emission Vehicle and Fleet Program for public agencies, which requires the purchase of low-emission vehicles or the retrofit of existing vehicles when practical, and certification as a low-emission fleet;
- To develop a program to encourage contractors for public agencies operating in the jurisdiction to procure and operate low-emission vehicles and to obtain certification as a low-emission fleet for their off-road equipment and heavy-duty on-road vehicles;
- To reduce the idling of on-road and off-road diesel engines.

7.5 Outlook and Proposed Commitments for 2004-2006

During 2004-2006, at least \$5 million is expected to be available for on-road and off-road mobile projects (\$3 million for on-road and \$2 million for off-road). The resulting NOx emission reduction benefits will be approximately 0.18 ton per day for on-road and 0.4 ton per day for off-road on a region-wide basis. In addition to the \$5 million, there are potential new funding sources being proposed by both federal and state

governments. If successful, total available funding could range up to \$61 million and result in additional NOx reduction benefits.

Two new District mobile source measures are being proposed for further study during 2004-2006. The first measure is the accelerated vehicle retirement program, which consists of buying back old vehicles. This measure would need to be evaluated in terms of feasibility, cost effectiveness, eligibility criteria, emission reduction calculation guidelines, and integration with a similar State program. The second measure is a free gas caps program, which would enable motorists to replace faulty or missing gas caps.

Furthermore, the implementation of local ordinances and policies for expanding low-emission fleets and restricting diesel engine idling are anticipated to reduce NOx emissions region-wide. The estimated emission reductions are yet to be determined and need further evaluation. Table 7-2 summarizes the list of proposed commitments from the District mobile source NOx control programs for the next 2004-2006 triennial period.

**Table 7-1
2001-2003 Triennial Estimated Emission Reductions
District Mobile Source NOx Control Programs**

2001-2003 Project Categories	Number of Engines	Estimated 2003 NOx Reductions ^a (tons/day)
On-Road Heavy-Duty Vehicles ^b	1,548	1.2
Off-Road Self-Propelled Vehicles ^b	131	0.5
Agricultural Water Pumping Engines ^c	583	1.7
Total	2,262	3.4

^a Emission reductions were calculated using EMFAC2002 (v2.2) and current off-road mobile emission factors.

^b Emission reductions from on-road and off-road vehicle project categories occur throughout the Sacramento federal ozone nonattainment region.

^c These agricultural pump engines are region-wide with about 5 percent located in Sacramento County.

**Table 7-2
List of Proposed Triennial Commitments for 2004-2006
District Mobile Source NOx Control Programs**

2004-2006 Control Measure/Program Categories	Proposed Action and Schedule	Expected 2006 ROG Emission Reduction (tons/day)	Expected 2006 NOx Emission Reduction (tons/day)	Cost Effectiveness (\$/ton)
Vehicle and Engine Technology Market-Based Incentive Program - On-Road Heavy-Duty Vehicles - Off-Road Vehicles and Ag. Pumps	To be implemented 2004-2006	---	0.18 (On-Road) 0.4 (Off-Road)	\$10-11,000 (On-Road) \$3-4,000 (Off-Road)
Accelerated Vehicle Retirement	To be evaluated 2006	Further study	Further study	To be determined
Free Gas Caps	To be evaluated 2006	Further study	---	To be determined
Model Low Emission Vehicle & Fleet Ordinance	Developed for local implementation 2004-2006	---	To be determined	To be determined
Model Low Emission Vehicle "Green" Contracting Ordinance	Developed for local implementation 2004-2006	---	To be determined	To be determined
Model Limitation on Engine Idling Ordinance	Developed for local implementation 2004-2006	---	To be determined	To be determined

8. LAND USE AND TRANSPORTATION PROGRAMS

8.1 Program Goals

Original land use and transportation program goals relied heavily on the implementation of Sacramento County General Plan policies that had, at that time, been recently adopted. It also relied on the District's Land Use and Construction Mitigation Programs, which rely on the California Environmental Quality Act (CEQA) for their implementation. Most major land use development projects completed since 1994 or currently under construction were approved with air quality mitigation plans and construction mitigation plans.

The 2000 Triennial Report indicated that only minimal emission reduction benefits from these policies had been quantified so far. There was a commitment to continue to implement the District's various land use mitigation strategies and transportation control measures (TCMs), but the expected emission reductions for Sacramento County were not specified for the 2001-2003 triennial period.

8.2 2001-2003 Triennial Evaluation of Land Use and Transportation Programs

This report shows that emission reductions are beginning to be achieved from the implementation of land use and construction mitigation policies and TCMs. The potential emission reductions associated with their implementation are expected to increase substantially over time. Many of the land use projects to which these policies have been applied are only partially constructed and occupied, thus much of the emission benefits have not yet been realized. Additionally, SMAQMD staff is working with appropriate land use jurisdictions to ensure that air quality mitigation measures are effectively monitored and enforced.

Land use projects during the 2001-2003 triennial period included the land use construction phase mitigation, the Vineyard Springs comprehensive plan, the Laguna Stonelake development, the Village of Zinfadel project, and the East Franklin specific plan, resulting in about 0.07 ton per day of ROG reductions and 0.16 ton per day of NOx reductions. The transportation control measures include emission reductions from the incremental increase in usage of the Highway 99 carpool lane extension. There was also a new transportation control measure that extended the Regional Transit light rail south line, but emission benefits are yet to be determined. Emission reductions from land use projects and transportation control measures during the 2001-2003 triennial period are summarized in Table 8-1.

8.3 Additional Rule Development Efforts

In an effort to broaden the implementation of these air quality beneficial land use policies, the SMAQMD has initiated the process of evaluating "indirect source" rules for both its Construction Mitigation and Land Use Mitigation Programs currently being

implemented under CEQA. Reliance on CEQA for implementation of these programs does not ensure that potential benefits will be fully realized. This is primarily due to some entities not incorporating the District's mitigation recommendations and/or inadequate monitoring and enforcement of adopted mitigation measures. These rules, if adopted, will offer the District more direct control of its air quality mitigation efforts for construction and land use projects.

8.4 Outlook and Proposed Commitments for 2004-2006

Additional emission reductions are expected during 2004-2006 from existing and new land use projects. The construction phase mitigation program is anticipated to continue achieving NO_x reductions. The on-going Vineyard Springs comprehensive plan and East Franklin specific plan land use projects should result in more reductions in the next few years. New land use project emission reductions are anticipated for the Laguna Ridge specific plan. Total additional emission reductions expected from the land use construction and operational mitigation programs would be about 0.04 ton per day of ROG and 0.78 ton per day of NO_x for Sacramento County.

The District is proposing to include indirect source rules for construction and land use mitigation programs as further study measures. These measures need to be evaluated as to their feasibility, potential emission reductions, and cost effectiveness. The development and implementation of indirect source rules may increase emission reduction benefits.

There is also a new transportation control measure scheduled in 2005 that would extend the Regional Transit light rail system to Folsom. However, the benefits from the Folsom light rail extension are yet to be determined. Additional transit projects and bicycle/pedestrian programs will be evaluated as TCM further study measures to provide and encourage alternative transportation modes. Table 8-2 summarizes the list of proposed commitments from the District land use and transportation programs for the next 2004-2006 triennial period.

**Table 8-1
2001-2003 Triennial Estimated Emission Reductions
District Land Use and Transportation Control Measures**

Sacramento County	Estimated 2003 Emission Reductions (tons/day)	
	ROG	NOx
2001-2003 Land Use Measures		
CEQA Construction Mitigation Program	n/a	0.072
CEQA Land Use Operational Mitigation Program		
- Vineyard Springs Comprehensive Plan	0.017	0.034
- Laguna Stonelake	0.011	0.007
- Village of Zinfandel	0.027	0.030
- East Franklin Specific Plan	0.017	0.020
Land Use Measures Subtotal	0.07	0.16
2001-2003 Transportation Control Measures		
Highway 99 Carpool Lane (increased usage) ^a	0.025	0.030
South Line Light Rail Extension	tbd	tbd
Transportation Control Measures Subtotal	tbd	tbd
Total Land Use & TCM Reductions	0.10	0.19

n/a – not applicable

tbd – to be determined

^aAccounts for incremental increase in volume usage of carpool lane over volume usage credited in 2000 Triennial Report.

**Table 8-2
List of Proposed Triennial Commitments for 2004-2006
District Land Use and Transportation Control Measures**

Sacramento County	Proposed Action and Schedule	Expected 2006 Emission Reductions (tons/day)		Estimated Cost Effectiveness (\$/ton)
		ROG	NOx	
2004-2006 Land Use Measures				
CEQA Construction Mitigation Program	To be implemented 2004-2006	n/a	0.74	\$13,600
CEQA Land Use Operational Mitigation Program				
- Vineyard Springs Comprehensive Plan (on-going) ^a	To be implemented 2004-2006	0.005	0.010	Unknown ^b
- East Franklin Specific Plan (on-going) ^a	To be implemented 2004-2006	0.009	0.010	Unknown ^b
- Laguna Ridge Specific Plan (new)	To be implemented 2004-2006	0.023	0.024	Unknown ^b
Indirect Source Rule for Construction	To be evaluated 2004-2006	Further study	Further study	tbd
Indirect Source Rule for Land Use Operational Phase	To be evaluated 2005-2006	Further study	Further study	tbd
Land Use Measures Subtotal^c		0.04	0.78	
2004-2006 Transportation Control Measures				
Folsom Light Rail Extension	To be implemented 2005	tbd	tbd	tbd
Additional Transit: Light Rail and Bus Rapid Transit	To be evaluated 2006-2007	Further study	Further study	tbd
Promote Bicycle and Pedestrian Programs	To be evaluated 2006-2007	Further study	Further study	tbd
Transportation Control Measures Subtotal		tbd	tbd	
Total Land Use & TCM Reductions		0.04	0.78	

n/a – not applicable

tbd – to be determined

^a Accounts for incremental increase in operational emission reductions from land use projects over reductions credited in 2003.

^b Cost effectiveness data not quantified. Actual cost effectiveness depends on the project-specific emission reduction measures selected by the developer.

^c Emission reductions were calculated with URBEMIS 2002 (on-road motor vehicles use EMFAC 2002).

9. COMMUNITY EDUCATION PROGRAMS

9.1 Spare The Air Program

SMAQMD's "Spare The Air" voluntary driving curtailment program marked its ninth year of operation in 2003. This coordination included the air districts of the Sacramento federal ozone nonattainment area, as well as Spare The Air programs in the San Francisco Bay Area and San Joaquin Valley to maintain statewide program consistency. Highlights of these efforts include:

- Daily air quality forecasts and episodic Spare The Air advisories.
- Continuation of Ozone Movies updated hourly between 8 a.m. and 10 p.m. from May through October and distributed over the Internet at: www.sparetheair.com.
- The expansion of "AirAlert", an e-mail, text pager, and digital cellular phone notification system that issues Spare The Air advisories and alerts subscribers when air quality reaches certain unhealthy AQI (Air Quality Index) levels.
- Partnership with the Sacramento County Department of Transportation by using its five electronic changeable message signs on four major thoroughfares to publicize Spare The Air days.
- Continued public outreach through Century Theaters by displaying slides with air quality messages before the start of movies and providing air quality posters for the lobby.
- Since 2001, created and distributed Save Planet Polluto, a CD-ROM adventure game that teaches children the causes and effects of air pollution and what they can do to clean up the air.
- Continued use and promotion of the "Smog City" interactive air pollution simulator on the Internet at: www.sparetheair.com.

9.2 2001-2003 Triennial Evaluation of Spare The Air Program

Regional awareness of the air quality problem and the Spare The Air programs remains high. Phone surveys conducted immediately after Spare The Air episodes indicate about 25 percent of drivers that knew the air was forecasted to be unhealthy said they reduced driving by one or more trips.

Employer participation remained strong. Over 480 businesses participated in our employer outreach network. This encompasses over 1,000 work sites comprising nearly 200,000 employees. The Employee Transportation Coordinators at these

businesses distributed Spare The Air advisories via FAX, e-mail and signage at their work sites.

9.3 Additional Public Outreach Efforts

SMAQMD continued existing public outreach efforts, including:

- American Lung Association’s outreach included the High School Challenge, school curriculum, Clean Air Month and health effects study.
- Continued news media and public inquiry response.
- Development of information brochures, newsletters and fact sheets.
- General air quality awareness advertising including radio and television announcements.
- Paid radio advertising and free media coverage of Spare The Air advisories.
- Complete re-design and expansion of the sparetheair.com Web site to provide additional real-time health information, historical data and services.

9.4 Estimated Emission Reductions

As a result of extensive research conducted by the U.S. EPA and ARB, enhanced procedures to adequately quantify participation in the Spare The Air program were developed. That methodology has been incorporated into Spare The Air surveys conducted by the Cleaner Air Partnership and its contract surveying vendor. Table 9-1 contains the estimated number of Sacramento County trips reduced and associated emission reductions on an average Spare The Air day due to the efforts of the Spare The Air program in 2001-2003.

Table 9-1
2001-2003 Triennial Estimated Emission Reductions
from the “Spare The Air” Program in Sacramento County

Year	STA Daily Trips Reduced ^a	ROG ^b Emission Factor (grams/trip)	NOx ^b Emission Factor (grams/trip)	ROG Reductions (tons/day)	NOx Reductions (tons/day)
2001 (15 STA days)	115,963	5.38	4.96	0.69	0.63
2002 (22 STA days)	98,712	4.81	4.35	0.52	0.47
2003 (14 STA days)	29,120	4.36	3.83	0.14	0.12

^a The average number of trips reduced on Spare The Air (STA) days are from Cleaner Air Partnership Spare The Air Evaluation Reports for 2001, 2002, and 2003.

^b Emission factors from EMFAC2002, V2.2 for average emissions/trip for Sacramento County light duty automobiles and light duty truck categories for specific years indicated during the summer season.

9.5 Outlook and Proposed Commitments for 2004-2006

The District is proposing a commitment to continue its Spare The Air program and other various public outreach activities during the next triennial period (2004-2006). The Sacramento Area Council of Governments recently approved the extension of the regional Spare The Air program to be funded with federal transportation funds through the smog seasons of 2004, 2005, and 2006.

Based on the previous three years (2001-2003) data and taking into account slightly declining fleet motor vehicle emission factors, the expected Sacramento County emission reductions for the Spare The Air program in the next 2004-2006 triennial period are estimated to be about 0.1-0.5 ton per day of ROG and NOx each.

In addition, the estimated cost effectiveness of the Spare The Air program is approximately \$10,000-\$50,000 per ton of combined ROG and NOx emission reductions region-wide. There is a wide range for cost effectiveness due to the variable emission reductions that are dependent on the number of Spare The Air days and public response.

Furthermore, the District is proposing to add a further study measure to evaluate the feasibility and cost effectiveness of a Clean Air Consortium for the Spare The Air program. The Clean Air Consortium measure would establish a partnership with cities, counties, and other public agencies that voluntarily minimize polluting activities on Spare The Air days by rescheduling lawn maintenance, painting, vehicle refueling, and vehicle trips. Table 9-2 summarizes the list of proposed commitments from the District community education programs for the next 2004-2006 triennial period.

Table 9-2
List of Proposed Triennial Commitments for 2004-2006
District Community Education Programs

2004-2006 Control Measure/Program Categories	Proposed Action and Schedule	Expected 2006 ROG Emission Reduction (tons/day)	Expected 2006 NOx Emission Reduction (tons/day)	Cost Effectiveness (\$/ton)
Spare The Air	To be implemented 2004-2006	0.1-0.5	0.1-0.5	\$10,000 - \$50,000
Clean Air Consortium for Spare The Air	To be evaluated 2005-2006	Further study	Further study	To be determined

10. OZONE TRANSPORT MITIGATION

10.1 “All Feasible Measures” Control Strategy

2003 amendments to the ozone transport mitigation regulations require upwind districts to adopt and implement “all feasible measures” as expeditiously as possible, regardless of their attainment status, until their specified downwind districts attain the State ozone standard. For purposes of this regulation, as defined in Section 70600(a)(1) of the California Code of Regulations, “all feasible measures” means air pollution control measures, including but not limited to emissions standards and limitations, applicable to all air pollution source categories under a district's authority that are based on the maximum degree of reductions achievable for emissions of ozone precursors, taking into account technological, social, environmental, energy and economic factors, including cost-effectiveness.

The Sacramento air district has been complying with the “all feasible measures” requirement as part of the California Clean Air Act regulations for achieving an alternative measure of progress pursuant to Section 40914 of the Health and Safety Code. For example, the previous discussion in Section 6.2 of this report listed various potential stationary source measures identified in the 2000 Triennial Report and summarized the evaluation or disposition of each measure in Table 6-1. Furthermore, additional control measures are being proposed for adoption/amendment or further study as a result of the District’s recent rule evaluation efforts to satisfy the “all feasible measures” requirement.

10.2 BARCT Implementation

The transport mitigation regulations require the adoption and implementation of best available retrofit control technology (BARCT) on all existing stationary sources of ozone precursor emissions as expeditiously as practicable. As defined in Section 40406 of the Health and Safety Code, BARCT means an emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each class or category of source.

The Sacramento air district has been applying BARCT requirements to existing stationary sources with ROG and NO_x emissions as part of the overall control strategy to attain the state and federal ozone standards as expeditiously as practicable.

10.3 Status of No Net Increase Program

The 2003 amendments to the transport mitigation regulation require specified upwind districts to update their no net increase emission threshold for new source review offset requirements by December 31, 2004, to be as stringent as the threshold for their downwind districts. No net increase thresholds are part of a district’s stationary source permitting program. New or modified stationary sources with emissions or the potential

to emit above the threshold must offset their emissions increase with additional emission reductions from elsewhere at the source or from other sources. The purpose is to achieve no net increase in emissions within the district.

The Sacramento air district's no net increase threshold is currently set at 15 tons per year. Since the San Joaquin Valley Unified Air Pollution Control District (a designated downwind district) has a threshold level of 10 tons per year, the Sacramento air district is required to lower its threshold to 10 tons per year. In accordance with the transport mitigation regulation, the Sacramento air district approved the required change to its New Source Review Rule 202 in February 2005.

10.4 Measures Mitigating Transport to Downwind Areas

The transport mitigation regulations (Section 70600(c) of the California Code of Regulations) require that each specified upwind district "shall, in consultation with the downwind districts, review the list of control measures in its most recently approved attainment plan and make a finding as to whether the list of control measures meets the requirements" in the regulations. The Sacramento air district's downwind areas include the Upper Sacramento Valley, the Mountain Counties Air Basin, the San Joaquin Valley, and the San Francisco Bay Area.

A meeting was held on August 11, 2004 at which downwind districts were invited to comment on the proposed list of control measures included in the Sacramento air district's triennial/transport mitigation plan. As a direct result of these comments, the following additional control measures were added to the SMAQMD list of proposed all feasible measures for adoption, amendment, or further study during the next 2004-2006 triennial period.

- Organic liquid loading stationary source rule to be amended.
- Concentrated animal feeding operations to be evaluated for further study.
- District mobile source accelerated vehicle retirement program to be evaluated for further study.
- District mobile source free gas caps to be evaluated for further study.
- Indirect source rule for land use operational phase to be evaluated for further study.
- Clean air consortium for Spare The Air program to be evaluated for further study.

Furthermore, based on recent control measure evaluations previously mentioned in Section 6.3 of this report, the Sacramento air district has identified potential stationary source rules with additional emission reduction opportunities. Therefore, this 2003 Triennial Report is recommending revising the plan commitments to include: 1) the proposed list of 12 stationary source measures identified in Table 6-2, 2) the mobile source program commitments in Table 7-2, 3) the land use and transportation program commitments in Table 8-2, and 4) the Spare The Air program commitments in Table 9-2 to continue satisfying the ozone transport mitigation requirements. With these amendments, the revised plan strategy meets the "all feasible measures" requirement.

11. SUMMARY AND CONCLUSIONS

11.1 Control Programs Summary

The Sacramento region's attainment strategy requires emission reductions of both reactive organic gases (ROG) and nitrogen oxides (NOx) from emission sources. This triennial assessment evaluates and reports the amounts of emission reductions achieved from control measures for the preceding three year period, 2001-2003. This amended plan is a blueprint of the District's implementation strategy to show expeditious progress toward attaining the state air quality standards pursuant to the California Clean Air Act. This plan also satisfies requirements to mitigate the District's transported pollutants impact on downwind areas.

Table 11-1 is a summary of ROG and NOx emission reductions achieved during 2001-2003 from Sacramento air district control programs, which include stationary source measures, mobile source NOx projects, land use and transportation control measures, and Spare The Air. In addition, Table 11-2 includes a summary list of the District's proposed control program commitments for the next 2004-2006 triennial period. Table 11-3 compiles the District's proposed further study measures as well as the mobile source model ordinances to be developed for implementation by local jurisdictions.

Measures listed in Table 11-3 are not part of the District's state attainment plan at this time. Rather the District measures in Table 11-3 are potential measures that may be included in future plans if the feasibility, cost effectiveness, emission reductions, etc. are promising. The District may choose to implement these measures prior to the next planning cycle, if appropriate, however no formal commitment is being made to implement Table 11-3 measures. The studies of Table 11-3 measures will be completed during the next planning cycle.

11.2 Stationary Source Control Program

During the 2001-2003 triennial period, two rules were adopted and implemented that achieved an additional 1.8 tons per day of ROG emission reductions. The NOx rule amendment for internal combustion engines at non-major sources is still being developed. Eight other potential control categories were evaluated, but only one of these (fugitive emissions from petroleum production and processing facilities) was deemed viable for future adoption. Overall, the recent stationary source controls surpassed the District's 2000 Triennial ROG emission reduction commitments of 0.6-1.5 tons per day for "all feasible measures" evaluations.

Recent inter-agency rule evaluation efforts and additional extensive internal District reviews of over 30 control measure categories have resulted in an updated list of 12 potential stationary source rules for adoption/amendment or further study during the next 2004-2006 triennial period. These control measure commitments are being proposed for incorporation into the District's attainment strategy as a triennial plan revision to satisfy the "all feasible measures" progress requirement.

11.3 District Mobile Source NOx Control Programs

The District's mobile source NOx control program uses financial incentives to promote the accelerated introduction of low emission vehicle, engine, and fuel technologies to the Sacramento area. The program has expanded each year, spending a total of about \$48 million during the 2001-2003 triennial period from a variety of funding sources. NOx reductions achieved from over 1,500 on-road heavy-duty vehicles account for 1.2 tons per day region-wide. The off-road mobile portion has been more successful by decreasing NOx emissions 2.2 tons per day region-wide, mostly due to the emission reductions from nearly 600 agricultural water pumping engines. NOx reductions from the District's mobile source program surpassed the expected 0.5 tons per day region-wide commitment from the 2000 Triennial Report.

Other efforts to reduce mobile source NOx emissions include the certification of lower emission fuels for use in standard diesel engines and verification of cost-effective retrofit exhaust equipment. The District is also proposing two new mobile source measures for further study evaluation. In addition, Sacramento jurisdictions are developing ordinances for establishing low-emission vehicle fleets for public agencies, for providing incentives to encourage contractors working for public agencies to use low-emission vehicles, and for reducing idling emissions from on-road and off-road diesel engines. As a result, new and continued mobile source NOx control program commitments are proposed for the 2004-2006 triennial period.

11.4 Land Use and Transportation Programs

Emission reductions are beginning to be achieved from the implementation of land use and construction mitigation policies and transportation control measures, about 0.10 ton per day of ROG and 0.19 ton per day of NOx for Sacramento County projects during the 2001-2003 triennial period. Many of the land use projects to which these policies have been applied are only partially constructed and occupied, thus much of the emission benefits are expected to increase substantially over time.

Additionally, District staff is working with appropriate land use jurisdictions to ensure that air quality mitigation measures are effectively monitored and enforced. In an effort to broaden the implementation of these air quality beneficial land use policies, the District has initiated the process of developing "indirect source" rules for both its Construction Mitigation and Land Use Mitigation Programs. As a result, new and continued land use and transportation program commitments are proposed for the 2004-2006 triennial period.

11.5 Community Education Programs

The District's community education programs have continued to lead and coordinate efforts pertaining to "Spare The Air" and voluntary driving curtailment strategies. These activities include the daily air quality ozone forecasts, continued utilization of hourly-

updated Web site ozone movies, and the expansion of personal electronic messages to alert subscribers of unhealthy air quality episodes. The program also includes the promotion of public education tools, such as the "Smog City" interactive air pollution simulator on the Internet, and the creation of the new CD-ROM adventure game, "Save Planet Polluto".

Continued public outreach using multi-media approaches and improved public survey methods have increased regional awareness of the air quality problem and solutions. As a result, methodologies have been developed to quantify the emission reductions associated with the Spare The Air program. The Sacramento County benefits during the 2001-2003 triennial period were estimated to be about 0.1-0.6 ton of ROG and NOx each per Spare The Air day. Funding for the continued operation of Spare The Air will provide continued benefits for the 2004-2006 triennial period. In addition, the District is proposing to evaluate the feasibility of establishing a Clean Air Consortium of public agencies to voluntarily minimize polluting activities on Spare The Air days.

11.6 Ozone Transport Mitigation

2003 amendments to the ozone transport mitigation regulations require specified upwind districts to adopt and implement "all feasible measures" as expeditiously as practicable, regardless of their attainment status, until their downwind districts attain the State ozone standard.

Based on recent extensive control measure evaluations, the Sacramento air district has identified new potential emission reduction opportunities. Therefore, in consultation with downwind districts, additional air quality measures are being proposed to update control measure commitments to continue satisfying the "all feasible measures" requirement. In addition, the Sacramento air district is required to lower its stationary source new source review no net emission threshold for offset requirements to 10 tons per year by the transport mitigation amendments by December 31, 2004.

11.7 Conclusions

The Sacramento area has made significant achievements in reducing ozone precursor emissions. The District will evaluate existing stationary source rules and assess new technologies to determine whether additional emission reductions could be gained from them. Other efforts to continue achieving emission reductions include the ongoing commitment to implement a diverse mobile source incentives program, various transportation and land use measures, and innovative community education activities.

Air quality indicators show significant overall reductions of peak ambient ozone and region-wide exposure to unhealthy concentrations since the late 1980's. The District believes its control efforts and overall air quality indicators demonstrate that the District has been making the expeditious progress set forth in the control plan towards attaining the state ozone standards in accordance with the California Clean Air Act requirements and transport mitigation regulations.

This triennial plan update, including the 2004-2006 control measure commitments listed in Table 11-2, upon approval will become; when combined with already adopted rules, the District's state ozone attainment plan and satisfy the California Clean Air Act requirements including the Transport Mitigation requirements of California Code of Regulations Section 70600 et. seq. and the "all feasible measures" requirements contained therein.

**Table 11-1
Summary of 2001-2003 Triennial Emission Reductions
Sacramento Metropolitan AQMD Control Programs**

District Control Programs	Estimated 2003 ROG Reductions (tons/day)	Estimated 2003 NOx Reductions (tons/day)
Stationary Source Measures ^a		
- Architectural Coatings	0.48	
- Surface Prep/Cleanup Solvent	1.3	
Stationary Source Measures Subtotal	1.8	
District Mobile Source Projects ^b		
- On-Road Heavy-Duty Vehicles ^c		1.2
- Off-Road Self-Propelled Vehicles ^c		0.5
- Agricultural Water Pumping Engines ^d		1.7
District Mobile Source NOx Projects Subtotal		3.4
Land Use and TCM Programs		
- Land Use Mitigation Projects	0.07	0.16
- TCM Projects ^e	0.03	0.03
Land Use and TCMs Subtotal	0.10	0.19
Community Education Programs		
- Spare The Air ^f	0.14	0.12
Community Education Programs Subtotal	0.14	0.12
Total	2.0	3.7

^a Estimated emission reductions achieved from SMAQMD rule adoption staff reports.

^b Emission reductions were calculated using EMFAC2002 (v2.2) and current off-road mobile emission factors.

^c Emission reductions from on-road and off-road vehicle project categories occur throughout the Sacramento federal ozone nonattainment region.

^d These agricultural pump engines are region-wide with about 5 percent located in Sacramento County.

^e Emission reductions from Regional Transit light rail south line extension are yet to be determined.

^f Spare The Air (STA) emission reductions for Sacramento County ranged 0.5-0.7 tons per STA day for ROG and NOx each during 2001 and 2002.

Table 11-2
Summary of Proposed Triennial Commitments for 2004-2006
Sacramento Metropolitan AQMD Control Programs
“Committed – All Feasible Measures”

District Control Programs	Proposed Action and Schedule	Expected ROG Emission Reduction (TPD)	Expected NOx Emission Reduction (TPD)	Cost Effectiveness (\$/ton)
Stationary Source Measures (Rule No.)				
Adhesives and Sealants (460)	To be amended 2006	0.06	-	\$373
Degreasing Operations/ Solvent Cleaning (454/466)	To be amended 2006	0.37 ^a	-	\$0 - \$4,200
Natural Gas Fired Water Heaters (414)	To be adopted 2005	-	0.08	\$1,200 - \$10,600
Unspecified Coatings (440)	To be adopted 2005	0.27	-	\$800 - \$14,400
Oil and Gas Fugitive Emissions (461)	To be adopted 2005	0.17	-	\$9,957
Boilers, Steam Generators, and Process Heaters/Space Heaters (411)	To be amended 2005	-	0.09	\$12,664 - \$40,000
Organic Liquid Loading (447)	To be amended 2006	-	-	Low
Stationary IC Engines (412)	To be amended 2006	-	tbd	Tbd
District Mobile Source NOx Programs				
Vehicle and Engine Technology Market-Based Incentive Program - On-Road Heavy-Duty Vehicles - Off-Road Vehicles and Ag. Pumps	To be implemented 2004-2006	-	0.18 (On-Road) 0.4 (Off-Road)	\$10-11,000 (On-Road) \$3-4,000 (Off-Road)
Land Use and Transportation Control Measures				
CEQA Construction Mitigation Program	To be implemented 2004-2006	-	0.74	\$13,600
CEQA Land Use Operational Mitigation Program	To be implemented 2004-2006	0.04	0.04	Unknown ^b
TCM Projects – Folsom Light Rail Extension ^c	To be implemented 2005	tbd	tbd	Tbd
Community Education Programs				
Spare The Air Program ^d	To be implemented 2004-2006	0.1-0.5	0.1-0.5	\$10,000 - \$50,000

tbd – to be determined

^a Implementation and emission reductions are expected to occur in 2007.

^b Cost effectiveness data not quantified. Actual cost effectiveness depends on the project-specific emission reduction measures selected by the developer.

^c Emission reductions from Regional Transit light rail line extension to Folsom are yet to be determined.

^d Emission reductions and cost effectiveness are dependent on the varying number of Spare The Air days and public response each year.

Table 11-3
Summary of Proposed Triennial Commitments for 2004-2006
Sacramento Metropolitan AQMD Control Programs
Further Study Measures and Model Ordinances

District Control Programs	Proposed Action and Schedule	Expected ROG Emission Reduction (TPD)	Expected NOx Emission Reduction (TPD)	Cost Effectiveness (\$/ton)
Stationary Source Measures (Rule No.)				
Automotive Refinishing (459)	To be re-evaluated 2006	Further study	-	tbd
Concentrated Animal Feeding Operations (New)	To be evaluated 2006	Further study	-	tbd
Food Product Manufacturing and Processing (New)	To be evaluated 2006	Further study	-	tbd
Polyester Resins (465)	To be re-evaluated 2006	Further study	-	tbd
District Mobile Source NOx Programs				
Accelerated Vehicle Retirement	To be evaluated 2006	Further study	Further study	tbd
Free Gas Caps	To be evaluated 2006	Further study	-	tbd
Land Use and Transportation Control Measures				
Indirect Source Rule for Construction	To be evaluated 2004-2006	Further study	Further study	tbd
Indirect Source Rule for Land Use Operational Phase	To be evaluated 2005-2006	Further study	Further study	tbd
Additional Transit: Light Rail and Bus Rapid Transit	To be evaluated 2006-2007	Further study	Further study	tbd
Promote Bicycle and Pedestrian Programs	To be evaluated 2006-2007	Further study	Further study	tbd
Community Education Programs				
Clean Air Consortium for Spare The Air	To be evaluated 2005-2006	Further study	Further study	tbd
Mobile Source Ordinances for Local Jurisdictions				
Model Low Emission Vehicle & Fleet Ordinance	Developed for local implementation 2004-2006	-	tbd	tbd
Model Low Emission Vehicle "Green" Contracting Ordinance	Developed for local implementation 2004-2006	-	tbd	tbd
Model Limitation on Engine Idling Ordinance	Developed for local implementation 2004-2006	-	tbd	tbd

tbd – to be determined