
REVISED

SAN FRANCISCO BAY AREA

OZONE ATTAINMENT PLAN

FOR THE 1-HOUR NATIONAL OZONE STANDARD

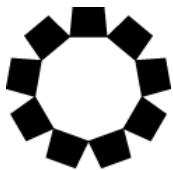
ADOPTED

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METROPOLITAN
TRANSPORTATION
COMMISSION

SUMMARY

This Plan responds to the United States Environmental Protection Agency's (EPA) partial disapproval of the Bay Area's 1999 Ozone Attainment Plan (1999 Plan) and finding of failure to attain the national ambient air quality standard for ozone¹, and establishes an ozone attainment plan that will provide for attainment by 2006. It will also lead to consideration of an improved attainment assessment in 2003 – 04. This document amends and supplements the *San Francisco Bay Area Ozone Attainment Plan for the 1-Hour National Ozone Standard*, dated June 1999 and submitted to the United States Environmental Protection Agency (EPA) by the California Air Resources Board (ARB) in August 1999.

In a March 30, 2001 *Federal Register* notice (66 Fed. Reg. 17379), EPA proposed to make a finding that the Bay Area has not attained the national 1-hour ozone standard. EPA proposed partial approval and partial disapproval of the 1999 Plan. EPA's March 30, 2001 *Federal Register* notice proposed to approve the following parts of the 1999 Plan:

- Baseline (1995) Emission Inventory
- Reasonable Further Progress Demonstration
- Commitment to Achieve Additional Emission Reductions through Implementation of New Control Measures
- Contingency Measures
- Proposal to delete four TCMS (TCMs 6, 11, 12 and 16)

and to disapprove these parts of the 1999 Plan:

- Attainment Assessment
- Transportation Emissions Budgets²
- Reasonably Available Control Measure (RACM) Demonstration

On August 28, 2001, EPA took final action on their March 2001 notice, triggering a Clean Air Act requirement that a new plan be submitted within one year of the effective date of EPA's final action.

This revised 2001 Plan includes the necessary changes to the three elements EPA disapproved. In addition, to address the requirements triggered by EPA's finding of failure to attain, this plan also includes a new emissions inventory and commitments to adopt and implement additional control measures to attain the standard by 2006, the attainment deadline. It also includes additional contingency measures in the event the Bay Area does not attain the standard by 2006.

The co-lead agencies³ believe that this 2001 Plan: (1) meets the applicable federal Clean Air Act planning requirements, (2)

remedies deficiencies in those elements of the 1999 Plan that EPA has disapproved, and (3) provides for expeditious attainment of the national 1-hour ozone standard for the San Francisco Bay Area. The 2001 Plan will be adopted by Bay Area co-lead agencies, then submitted to the ARB for approval and subsequent transmittal to EPA. When approved by EPA, it will become part of California's State Implementation Plan⁴ (SIP). The 2001 Plan will incorporate into the SIP significant ozone precursor emission reductions designed to enable the region to attain the national 1-hour ozone standard as expeditiously as practicable.

The control strategy in this plan includes the following measures:

Stationary Source Measures

- Improved Architectural Coatings Rule
- Improved Storage of Organic Liquids Rule
- Surface Preparation and Cleanup Standards for Metal Parts Coating
- Aqueous (Water-Based) Solvents
- Petroleum Refinery Flare Monitoring
- Low-Emission Refinery Valves
- Improved Process Vessel Depressurization Rule

Mobile Source Measures

- Motor Vehicle Inspection and Maintenance Program: Liquid Leak Inspection and Improved Evaporative System Test
- Low-Emission Vehicle II (M-2)
- California Reformulated Gasoline Regulations (Phase III)
- On-Road Heavy-Duty Diesel Engines (M-5, M-6, transit bus regulations, and school bus program)
- Heavy-Duty Off-Road Diesel Engines (M-9 and M-10)
- Gas and LPG Equipment 25 - 175 horsepower (M-11 and M-12)
- Locomotives National Emission Standards (M-14)
- Pleasure Craft Emission Standards (M-16; additional emission reductions for marine pleasurecraft)
- Midterm Consumer Products (Measure CP-2)
- Aerosol Coatings (Measure CP-3)
- Portable Fuel Container Regulations
- Enhanced Vapor Recovery Regulations

¹ The U.S. EPA has set the national one-hour standard at 12 parts per hundred million.

² Emission budgets are used to ensure consistency of regional transportation plans and programs with air quality attainment plans.

³ The co-lead agencies are the Bay Area Air Quality Management District, the Metropolitan Transportation Commission and the Association of Bay Area Governments.

⁴ The SIP is a compilation of California's nonattainment area and maintenance plans designed to fulfill requirements of the Federal Clean Air Act. It includes the text of air agency regulations for each air basin, except for those regulations that were adopted solely to meet requirements of the California Clean Air Act.

Transportation Control Measures

- Regional Express Bus Program
- Bicycle / Pedestrian Program
- Transportation for Livable Communities
- Expansion of Freeway Service Patrol
- Transit Access to Airports

These measures, in combination with previous SIP measures and considering growth in all pollution sources in the region, will result in a reduction of VOC emissions of 121 tons per day and a reduction in NOx emissions by 124 tons per day from 2000 – 2006. Contingency measures are proposed in the event these additional measures do not achieve air quality consistent with attainment by 2006.

Lastly, because EPA has indicated that it will rely upon the Plan's most stringent analysis of emission reductions required for attainment, the co-lead agencies commit to adopt measures necessary to achieve 148 tons per day VOC reductions - unless modified by a mid-course review - by the attainment deadline. This mid-course review will include a review of the results of the Central California Ozone Study (CCOS) and an open, consultative process to determine whether additional emission reductions, beyond those included in this Plan, are necessary for attainment by 2006. An open, public consultative process will also be used to evaluate potential new control measures. The co-lead agencies will prepare a SIP for adoption and submittal through ARB to EPA by April 15, 2004. The emission reduction target in the 2004 SIP revision may be higher, lower, or equal to the 148 ton-per-day target in this 2001 Plan, depending on the results of CCOS.

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SECTION 1: INTRODUCTION

Purpose of the 2001 Plan

This is an Attainment Plan for the 1-hour *National Ozone Standard*.⁵ It is designed to identify control measures the region should implement in order to improve air quality in the San Francisco Bay Area air basin. The goal of the Ozone Attainment Plan is to identify a means for the region to re-attain the national 1-hour ozone standard. It is intended to comply with requirements of the United States Environmental Protection Agency (EPA) and the State of California.

The need for this Plan was determined in October 2000, at the conclusion of the 2000 ozone season. The Bay Area recorded more exceedances of the national ozone standard in 2000 than was allowed by the EPA. Thus, the co-lead agencies met with EPA, the California Air Resources Board (ARB) and a number of environmental and community groups in October 2000, and discussed ways in which the co-lead agencies' could best respond to the situation. Federal law allows a 12-month timeframe for preparing a new plan if one is determined to be needed. Based on these exceedances and the threat of litigation for not acting within a statutory timeframe set in the Federal Clean Air Act, EPA published notice March 2001 proposing to disapprove parts of the 1999 Ozone Attainment Plan. The co-lead agencies agreed that taking the full 12 months to develop a plan to respond to EPA's decision would delay including new control measures into the State Implementation Plan (SIP), which ensures that the measures are federally enforceable. The co-lead agencies wanted to move expeditiously to include new controls in the SIP to continue cleaning the air.

Although the co-lead agencies adopted the 2001 Ozone Attainment Plan in July 2001, the California Air Resources Board did not take action on the Plan. ARB called for additional meetings with community groups and interested parties, which were held in August 2001. Upon adoption by the co-lead agencies, this Revised Plan will be resubmitted for ARB's consideration.

⁵ The 1-hour national ozone standard is a health-based ambient air quality standard, set by EPA in 1979, at a level of 0.12 parts per million (ppm) for a 1-hour average. California has a separate standard for ozone set at 0.09 parts per million, for a 1-hour average. There is a separate State air quality planning process outlined in the *1988 California Clean Air Act*, as amended. The Bay Area's most recent plan to comply with California requirements is the *2000 Clean Air Plan*.

Ozone in the lower atmosphere is an air pollutant that is harmful to humans because it causes respiratory problems. Ozone also reduces crop yields, and accelerates deterioration of paints, finishes, rubber products, plastics and fabrics. The EPA has set primary national ambient air quality standards (NAAQS) for ozone and other air pollutants to define the levels considered safe for human health. The Bay Area has a network of 23 air monitoring stations measuring ozone and other pollutants.

On August 28, 2001, EPA took final action on the March 2001 notice, approving parts of the 1999 Ozone Attainment Plan and disapproving other parts of the 1999 Plan.

Because EPA disapproved parts of the 1999 Plan, the Bay Area could be subject to a transportation conformity lapse⁶ in January 2002, which would prohibit certain transportation projects from moving forward into implementation. Only adopted transportation control measures (TCMs), projects under construction or exempt projects can proceed. This lapse will occur if the EPA does not approve the Revised Plan or find the motor vehicle emissions budgets adequate by January 21, 2002 (See "Transportation Emission Budgets").

Thus, the co-lead agencies expedited the planning schedule while still meeting all requirements of federal law regarding public involvement, plan availability and noticing, and public hearings. The agencies will request an expedited review of the Plan by ARB and EPA to avoid a transportation conformity lapse.

Background

This SIP submittal, as part of the air quality planning process set forth in the federal Clean Air Act, is a revision to the Bay Area's Environmental Management Plan. Previous revisions to the air quality component of the Environmental Management Plan are the *1982 Bay Area Air Quality Plan* and the *1994 Bay Area Redesignation Request and Maintenance Plan*. The most recent air quality plan submitted to EPA for the Bay Area is the *1999 Ozone Attainment Plan* (discussed below).

1. Redesignation to Attainment. EPA redesignated the Bay Area to attainment status for the 1-hour National Ozone Standard on May 22, 1995. The agency did this because the Bay Area attained the ozone standard at the end of the '92 ozone season (having three "clean" years – 1990, 1991 and 1992), and maintained the standard in '93 and '94. At the same time EPA took action on the Bay Area's ozone redesignation, EPA also approved an *Ozone Maintenance Plan* submitted by the "co-lead" agencies in 1993 and revised in 1994.

2. Redesignation Back to Nonattainment. In the summers of 1995 and 1996, the Bay Area experienced a number of episodes of hot, stagnant weather. This led to exceedances of the 1-hour standard. EPA received two petitions requesting redesignation of the Bay Area to nonattainment status (see 63 Fed. Reg. 37261). EPA determined that the "contingency measures" in the

⁶ A transportation conformity lapse occurs when transportation planning agencies are unable to demonstrate that growth in the transportation system is within acceptable bounds as defined in the applicable, approved air quality plan for the region. The demonstration of conformity is required by the EPA's Transportation Conformity Regulation, and is intended to ensure that transportation projects and plans do not frustrate efforts to attain national ambient air quality standards.

Maintenance Plan were not adequate to bring the region back into compliance with the standard and that the region's adopted and projected actions would not be sufficient to reestablish attainment of the standard.

EPA published a notice that revoked the region's ozone attainment status (proposed action 62 Fed. Reg. 66578; final action 63 Fed. Reg. 37258). The final notice (July 10, 1998) called for the region to submit three plan elements: (1) a 1995 emissions inventory for Volatile Organic Compounds (VOC) and Nitrogen Oxides (NOx), (2) an attainment assessment (an analysis, based on available information, showing the VOC and NOx reductions necessary for the region to re-attain the 1-hour National Ozone Standard), and (3) a control strategy, comprised of control measures that provide sufficient emission reductions to attain the ozone standard.

3. 1999 Ozone Attainment Plan. The co-lead agencies prepared the *1999 Ozone Attainment Plan* to comply with these requirements. The 1999 Plan was submitted to EPA in August, 1999.

The deadline EPA set for attaining the 1-hour national ozone standard was November 15, 2000. The region continued to experience a few exceedances of the 1-hour standard in 1999 and 2000. Emission reductions from control measures in the *1999 Ozone Attainment Plan* were not sufficient to bring the Bay Area back into compliance.

4. The 2001 Ozone Attainment Plan. In a March 30, 2001 *Federal Register* notice (66 Fed. Reg. 17379), EPA proposed to make a formal finding that the Bay Area has not attained the national 1-hour ozone standard. EPA finalized the March notice on August 28, 2001, resulting in partial approval and partial disapproval of the 1999 Plan. EPA's August 28, 2001 action approved the following parts of the 1999 Plan:

- Baseline (1995) Emission Inventory
- Reasonable Further Progress Demonstration
- Commitment to Achieve Additional Emission Reductions through Implementation of New Control Measures
- Contingency Measures
- Proposal to delete four TCMs (TCMs 6, 11, 12 and 16)

and disapproved these parts of the 1999 Plan:

- Attainment Assessment
- Transportation Emissions Budgets⁷
- Reasonably Available Control Measure (RACM) Demonstration

This 2001 Plan includes a revision to the three elements EPA disapproved. The plan also satisfies planning requirements that are triggered by a final finding of failure to attain. Specifically,

⁷ Emission budgets are the motor vehicle emissions projections, used to ensure consistency of regional transportation plans and programs with air quality attainment plans.

this plan adds the following elements to the State Implementation Plan for ozone.

- A new emissions inventory for 1995 and 2000 – 2006. The on-road motor vehicle component of the inventory uses ARB's emission factors (EMFAC 2000) and revised travel activity, with MTC's assumptions about future growth in travel demand. The revised inventory forms the basis for new transportation emission budgets used to ensure conformity of transportation and air quality plans.
- A revised and improved attainment assessment. (The agencies acknowledge current limitations to the technical adequacy of setting an emissions reduction target.⁸)
- Adjustments to the 1999 Plan's control strategy by adding stationary, area, mobile and transportation control measures, and a commitment to adopt additional control measures as needed to attain the standard.
- Commitment to evaluate further study measures to determine their potential emission reductions and feasibility.
- Contingency measures to be automatically implemented in the event the Bay Area does not attain the national 1-hour ozone standard by 2006.
- Commitment to review the results of the Central California Ozone Study when available and amend the ozone SIP control strategy through a public process as necessary to achieve attainment by 2006.

After this 2001 Plan is adopted by the co-lead agencies, it will be submitted to ARB and EPA for incorporation into California's SIP.

Amending the State Implementation Plan

This Plan in its entirety amends the Bay Area's portion of the California SIP for ozone. Since EPA has approved some elements of the *1999 Ozone Attainment Plan*, portions of that Plan will become part of the SIP. This Plan replaces or removes the following sections of the 1999 Plan:

- Introduction, p. 1 (replaced)
- Context for Bay Area Ozone Planning, pp. 2-4 (removed)

⁸ The 1999 Plan used modeling of 1997 emissions based on a 1989 ozone episode to estimate 1995 – 2000 VOC and NOx reductions needed to attain. Significant advances in our ability to quantify and model emissions are currently underway. The Central California Ozone Study is currently developing a new model based on a field study conducted during the 2000 ozone season. Model results that could inform a Bay Area attainment assessment will not be available until 2003.

- Bay Area Ozone Experience – 1990 through 1998, pp. 5-6 (replaced)
- Transportation Emission Budgets, p. 13 (replaced)
- Attainment Assessment, pp. 14-18 (replaced)
- Future Air Quality Planning, p. 29 (replaced)

SECTION 2: BAY AREA OZONE EXPERIENCE - 1990 THROUGH 2000

Air in the Bay Area meets the national 1-hour ozone standard more than 99.9% of the time. On occasion, during hot summer afternoons, ozone concentrations may approach or even exceed the standard. This is most likely to occur in the inland valleys, and especially in the Livermore Valley.

Emissions of ozone precursors have trended downward throughout the decade, both in the Bay Area and nationally. This is largely as a result of cleaner vehicles and cleaner fuels. Also, the Bay Area has made significant progress in reducing stationary source emissions, in the face of growing population and a growing economy.

EPA has set criteria for designation to attainment of the national 1-hour ozone standard. EPA requires that air basins record no more than three exceedances at a single station, over a three-year period (no more than one exceedance per year, on average). Stations that record four or more exceedances in three years cause the region to violate the standard. Typically, Livermore has the highest ozone levels in the Bay Area. Table 1 illustrates the number of exceedances recorded at each air monitoring station in the region from 1990 to 2000. Livermore is the only station that has more than one exceedance per year over the eleven-year period. Six stations recorded no exceedances in any year. This record has been achieved despite the unusually hot weather experienced in the mid-90's.

TABLE 1

DAYS EXCEEDING THE 1-HOUR NATIONAL OZONE STANDARD: 1990 - 2000

Station	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Total	Annual Avg.
Livermore – Old First	1	1	0	1	2	7	8	0	6	2	2	30	2.73
Livermore – Rincon											1	1	1.00
Concord	0	0	0	2	0	3	1	0	2	2	1	11	1.00
San Martin					1	1	0	0	3	1	0	6	0.86
Los Gatos	0	0	1	1	0	4	1	0	1	0	0	8	0.73
Fremont	1	0	0	1	0	2	0	0	0	1	0	5	0.45
San Jose East (Burbank)	1	0	0	1	0							2	0.40
Gilroy	0	1	0	0	0	1	0	0	2	0	0	4	0.36
San Jose – Alum Rock	0	0	1	0	0	3	0	0	0	0	0	4	0.36
Bethel Island	0	0	0	0	0	1	1	0	0	1	0	3	0.27
Fairfield	0	0	0	1	0	1	0	0	0	1	0	3	0.27
Hayward	0	0	1	0	0	2	0	0	0	0	0	3	0.27
San Leandro	0	0	0	0	0	3	0	0	0	0	0	3	0.27
Napa	0	0	0	0	0	1	0	0	1	0	0	2	0.18
San Jose – 4 th Street	0	0	0	0	0	1	0	0	1	0	0	2	0.18
Pittsburg	0	0	0	1	0	0	0	0	0	0	0	1	0.09
Redwood City	0	0	0	0	0	1	0	0	0	0	0	1	0.09
Vallejo	0	0	0	0	0	1	0	0	0	0	0	1	0.09
Mountain View	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Oakland	0	0	0	0	0	0	0	0	0	0	0	0	0.00
San Francisco	0	0	0	0	0	0	0	0	0	0	0	0	0.00
San Pablo	0	0	0	0	0	0	0	0	0	0	0	0	0.00
San Rafael	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Santa Rosa	0	0	0	0	0	0	0	0	0	0	0	0	0.00
Any Bay Area Monitoring Site*	2	2	2	3	2	11	8	0	8	3	3		

* Numbers do not add since an exceedance may occur at multiple monitoring sites on a single day

SECTION 3: EMISSION INVENTORY

Introduction

EPA's March 30, 2001 notice proposes to approve the 1999 Ozone Attainment Plan's baseline (1995) emissions inventory. However, it proposes to disapprove the motor vehicle emissions budgets. Therefore a new emissions inventory must be submitted that includes revised on-road motor vehicle emission budgets. Furthermore, EPA's August 28, 2001 action found that the region failed to attain the 1-hour ozone standard. This finding triggers Attainment Plan requirements under Sections 110 and 172 of the Clean Air Act, including the requirement for new base year and attainment year inventories.

An emission inventory is an itemized list of emission estimates for sources of air pollution in a given area, for a specified time period. These inventories are sometimes called "source inventories" because they list various sources, or categories of sources, of air pollutant emissions. The BAAQMD began preparing emission inventories in 1957.

This emission inventory is a "Planning Inventory" for ozone. For ozone, a typical summer day inventory is needed, because ozone levels are highest during summer.

The inventory is divided into stationary sources (point, area and biogenic) and mobile sources. Stationary source emissions are calculated by the BAAQMD using various procedures. Generally, the reported emissions estimates come from

engineering calculations using emission factors from local or outside test data. Emission computation methodology by source categories is set forth in the BAAQMD publication "Source Category Methodologies." The inventory takes into account growth in sources as well as effectiveness of regulations adopted as of December 31, 2000. The BAAQMD participates in the California Emission Inventory Technical Advisory Committee (EITAC). The BAAQMD maintains the best available inventory methodologies.

Many area source categories are further classified into sub-categories for better emission computation, speciation and regulation development. For example, emissions from aircraft categories are subdivided into various aircraft types. Architectural coating categories are subdivided into various types of coatings and varnishes to account for varying solvent content. More than 900 different sub-categories are used in this inventory. Emissions for categories affected by regulations are adjusted to reflect the controls required. They are also adjusted to reflect our estimate of rule effectiveness. The emissions are presented in tons per day (tpd) for volatile organic compounds (VOC) and oxides of nitrogen (NOx).

Table 2 shows some of the factors (by county, for 1999 or 2000) that influence emissions of air pollutants: population, natural gas use, gasoline sales and vehicle use.

**TABLE 2
INVENTORY-RELATED STATISTICS, BY COUNTY**

County	2000 Population	Area (Square Miles)			1999 Daily Natural Gas Usage (Million cu.ft.)	2000 Daily Gasoline Sales (Gallons)	2000 Daily Vehicle Miles Traveled (Millions)
		Land	Water	Total			
Alameda	1,463,000	738	84	821	152	1,745,000	32.9
Contra Costa	942,000	720	82	802	466	1,154,000	23.8
Marin	250,000	520	308	828	26	350,000	6.7
Napa	128,000	754	35	788	13	151,000	3.0
San Francisco	799,000	47	185	232	134	1,090,000	12.7
San Mateo	737,000	449	292	741	73	1,061,000	21.8
Santa Clara	1,755,000	1,291	13	1,305	203	2,333,000	43.2
Solano*	287,000	370	64	434	44	323,000	6.5
Sonoma*	399,000	664	4	668	32	480,000	9.1
TOTAL	6,760,000	5,553	1,067	6,619	1,142	8,687,000	159.6

* Portion within Bay Area Air Quality Management District.

Sources: Population – Association of Bay Area Governments
Area – CA Dept. of Finance
Daily VMT – CA Air Resources Board

Stationary Source Emissions

Point Sources

Sources identified on an individual facility or source basis are called point sources. Refineries and industrial plants are examples of point sources. The emission characteristics of individual facilities vary widely and each facility is examined individually. The BAAQMD collects and maintains a computer data bank with detailed information on point sources. Almost all facilities emitting greater than 2.5 tons per year of any air pollutant are included. The inventory accounts for about 3,900 facilities, with 20,000 different sources. There are about 35,000 different processes, because some sources have more than one process (e.g., boilers burning different fuels, tanks storing different materials, and painting/printing operations using different coatings).

Data on the activity, seasonal variations, and hours of operation are collected at the process level from each facility. Parameters that affect the quantity of emissions are updated regularly. Emissions are calculated using the detailed data for each of the 7,000 facility processes listed as storage of organic liquid, and 10,000 facility processes listed as organic solvent users. The emissions from combustion and other general processes are computed using generalized or specific emission factors. These factors are periodically reviewed and updated.

The inventory includes emissions from existing and new power plants (including proposed plants that have not yet received permit approval), based on California Energy Commission projections of capacity and demand. The inventory includes substantial increases in generation of electricity at Bay Area power plants. The power production in 2006 is projected to be more than twice the year 2000 levels. Production by existing plants will drop by 20% by 2006. That load, plus the projected increases will be generated by newly constructed plants. Because the new plants are much cleaner and more efficient than the existing plants, overall NO_x emissions for this source sector will decrease by 69 percent from 2000 to 2006. Additional detail is available in the Air District's source methodology document.

Area Sources

Those stationary sources that are not identified individually are called area sources. This term is sometimes extended to cover numerous small point sources such as dry cleaners or gas stations which are known individually. It also includes the diverse universe of unpermitted small sources. These small sources individually do not emit significant amounts of pollutants. However, together they make a large contribution to the emission inventory. Examples of area sources are residential heating equipment and the diverse use of paints, solvents, and consumer products. Emissions from these sources are grouped into categories and calculated based on surrogate variables. Information on these surrogates is usually available for the state or by county. Selected surrogates are used to apportion the category emissions into diurnal and spatial patterns. Emissions

for some source categories are estimated by the California Air Resources Board (ARB) based on statewide data.

The 1999 Plan identified excess VOC emissions, starting in 1995, from certain models of gasoline dispensing equipment that experienced high failure rates in their vapor recovery components. So, the systems were not working as efficiently as envisioned. The 1999 Plan projected that most of the excess emissions would be reduced by June 2000. Because of the technical complexities, State consideration of industry investment, and division of regulatory authority, only about 44% of the excess emissions were reduced by 2000. These reductions, about six tons/day, were achieved through Air District regulatory, permitting and enforcement actions. These actions, plus ARB regulatory changes, are projected to reduce remaining excess emissions by an additional 44% by 2003, and by 90% by 2007. Additional detail is available in the Air District's source methodology document.

Inventory Issues

Public comments during the planning process for this Plan have expressed particular concern over two source categories in the stationary source inventory: diesel powered electric generators and refinery flares.

The ARB has estimated that there are about 2,000 such generators in the Bay Area; the actual number may be even higher. Most are intended for emergency use only and to provide back-up power to a single building or facility. There is an expectation that some will be drawn into service during rotating blackout conditions. Blackout conditions are expected to be more frequent during the summers of 2001 – 2003, then less in 2004 and 2005 as adequate grid power becomes available. The BAAQMD and State agencies are working to minimize diesel power to generate electricity, because of diesel particulate toxicity. But diesel use is not likely to delay ozone attainment in the Bay Area because the problem will be temporary (4 – 5 years). The emissions inventory (see "Reciprocating Engines", Table 4) reflects the expected short-term increase and subsequent decline in NO_x emissions. The following increase in NO_x emissions has been factored into the inventory to account for emergency use of diesel-powered generators: 2001 – 17 tpd, 2002 – 21 tpd, 2003 – 23 tpd, 2004 – 11 tpd, 2005 – 5 tpd. These excess emissions are estimated to occur on about 30 days each year. Additional detail is available in the Air District's source methodology document.

The public has also expressed concern about emissions from refinery flaring. Flares are part of the refinery blowdown system. The blowdown system collects and recovers liquid and gaseous discharges from process units. Typically, flares provide a backup safety device to combust gases that cannot be recovered, thereby preventing their direct release to the atmosphere. Thus, flares are also pollution control devices because the combustion products are less polluting than the unburned gas streams. Flares are designed to handle large fluctuations in the flow rate

and hydrocarbon content of gases, as flaring tends to be episodic in response to upsets and emergencies. However, some flares may operate more continuously if there is a steady flow of refinery gases that cannot be recovered and used by the refinery. Historically, the District emissions inventory has not carried all emissions from flaring because of their episodic nature. This is because the ozone planning inventory is required to include those emissions that represent a typical summer day scenario. Because the public expressed concern that flaring was more common than prior inventories would indicate, the District re-evaluated data from its 1990 flare study, which suggests that emissions averaged over a year could be as high as 13 tons per day. There is considerable uncertainty about these emission estimates, which vary depending upon characteristics of the input stream (flow rate, composition, duration), flare combustion efficiency, and photochemical reactivity of combustion products. Though these emissions are thought to vary greatly from day to day, they have been included in the 2001 Plan inventory as an interim estimate until better data are available. Since 1988 and 1989, when the data were gathered for the District's flare study, process units at all of the Bay Area refineries have been substantially modified to produce reformulated gasoline, and the

1990 study may not be a reliable guide to current emissions. For that reason, control measure SS-15, requiring flare monitoring, and further study measure FS-8, requiring the District to study flaring and flare emissions, have been included in the plan. When monitoring data and study results are available, the District will revise its inventory to reflect the latest information.

Biogenic Sources

In addition to man-made air pollution, there are significant quantities of pollutants from natural sources (e.g., plants, animals, marshes, and the earth itself). Vegetation, for example, emits large amounts of isoprene, terpenes, and other organic compounds. These compounds are precursors of ozone. Emission rates depend upon species, season, biomass density, time of day, local temperature, moisture and other factors. Total volatile organic compound emissions from Bay Area vegetation are estimated to be about 300 tons per day and are not included in the Planning Inventory but *are* included in photochemical modeling inventories. Biogenic emission estimates are developed using EPA's personal computer version of the Biogenic Emissions Inventory System (PC-BEIS).

Mobile Source Emissions

Mobile sources consist of on- and off-road sources such as passenger cars, motorcycles, trucks, buses, heavy-duty construction equipment, recreational vehicles, marine vessels, lawn and garden equipment, and small utility engines. There were approximately 4.5 million vehicles (excluding trucks and buses) in the Bay Area in 2000.

On-Road Motor Vehicles

On-road motor vehicles consist of passenger cars, trucks, buses and motorcycles. Emissions from on-road motor vehicles are a major portion of the emission inventory and are estimated using computer models developed by ARB. The version used for this inventory is EMFAC 2000 Version 2.04x, released for the Bay Area by ARB on June 6, 2001.

EMFAC 2000 consists of two major parts: EMFAC and BURDEN. EMFAC calculates emission rates for a variety of vehicle types (passenger cars, trucks, etc.) by fuel usage, control technology and mode of operation (e.g., hot start, cold start). It also accounts for vehicle age, and operating conditions such as speed and temperature. Recent improvements to EMFAC include adjustments to account for real world driving patterns (e.g., rapid acceleration), use of NO_x defeat devices in trucks, use of air conditioning in cars, and fuel line leaks from cars and trucks.

Emission factors are produced for summer and winter operations to reflect the type of fuel in use, such as wintertime oxygenated fuel and summer time fuel which has lower volatility (lower Reid Vapor Pressure) than winter. Emission reductions resulting from California's Inspection and Maintenance ("Smog Check") program are incorporated.

Another model, BURDEN, uses emission factors from EMFAC and a large database of vehicle activity for each county to calculate total daily emissions. The activity is in the form of number of in-use vehicles, number of vehicle engine starts and vehicle miles traveled (VMT) for each vehicle type. The vehicle trips and VMT data for these calculations were estimated by ARB for 2000. Vehicle population is derived from Department of Motor Vehicle (DMV) data and number of engine starts is based on the population data and ARB surveys. Vehicle speed data and vehicle trip/VMT growth projections were obtained from MTC.

ARB produced the on-road motor vehicle emission estimates using EMFAC 2000, together with updated travel activity for the region. The vehicle miles traveled for 2000 are based on prior-year odometer readings recorded from vehicles registered in the Bay Area during their biennial Smog Check. ARB used factors supplied by the MTC for speed distribution on Bay Area roadways and to project travel growth between 2000 and 2006. These region-specific inputs have been incorporated into the coding of the model itself, resulting in a unique version of the EMFAC2000 model for this Bay Area SIP.

Since ARB developed the emissions component of the EMFAC 2000 model last year, the State and federal government have made regulatory and program changes that will affect vehicle emissions in the Bay Area during the plan timeframe. ARB staff has quantified the benefits of ARB's new emission standards for medium-duty vehicles and heavy-duty gas vehicles, ARB's incentive program for cleaner school buses, and U.S. EPA's low-sulfur requirements for on-road diesel fuel in 2006. The motor vehicle inventory numbers reflect these controls, which do not produce significant VOC or NO_x benefits until later years when a substantial portion of the fleet turns over to the cleaner vehicles.

However, the inventory does not reflect the potential emissions increases that may result from U.S. EPA's June 12, 2001 denial of California's request for a waiver from the federal oxygenated fuel requirements. California continues to pursue all possible legal avenues to gain a waiver, which is needed to support the phase out of methyl tertiary butyl ether (MTBE) in the State's gasoline supply. ARB staff is also working to quantitatively assess the net emissions impact of using ethanol to meet the oxygenate requirement. If resolution of this issue would impact the emission inventory and motor vehicle emissions budgets, ARB will take appropriate action to ensure that SIPs are revised for all affected areas of California.

Planning Inventory

A planning inventory is a seasonal inventory representing emissions when a pollutant's concentrations are at their highest levels. For example, the emission inventory for the ozone season represents emissions occurring during the summer when ozone levels are highest. The emission inventory for the particulates season represents emissions occurring during the winter when particulate levels are highest. The seasonal inventories (summer and winter) are prepared based on published ARB and EPA guidelines, as described below.

The summer season is considered May through October and the winter season is considered November through April. Data on normal operating schedules (hours per day, days per week and weeks per year) are collected as part of routine point source inventory procedures. For area sources, representative profiles showing monthly, weekly, and daily variation in emissions are prepared for each source category. These profiles are then used to obtain average seasonal operating day emissions.

For on-road motor vehicles, the EMFAC 2000 was used to develop planning inventories. The emission estimates for these inventories are based on ambient temperature profiles representing the ten days having the highest pollution levels.

Other Mobile Sources

These sources include boats, ships, trains, and aircraft, as well as garden, farm and construction equipment. Various methodologies are used for compilation of emissions for these mobile sources. Emission factors and methodologies for these sources are provided by ARB and EPA. Aircraft type and activity data specific to each airport were used in estimating aircraft emissions. ARB has recently developed a model (OFFROAD) to better account for emissions of various off-road mobile sources.

Summer temperature profiles are used to generate the ozone-precursor (VOC and NO_x) emission inventory.

BURDEN divides the day into six different time periods consistent with motor vehicle activity patterns, including the morning and evening commute periods. These six periods are: midnight - 6am, 6am - 9am, 9am - noon, noon - 3pm, 3pm - 6pm, and 6pm - midnight. For each period, specific temperatures, activity data and vehicle speeds are used to estimate emissions. The emissions from the six periods are then summed to get daily emissions.

The above calculations are made for each county. For Solano and Sonoma, only the portions under BAAQMD jurisdiction are represented. The number of vehicles by vehicle class (e.g., light-duty truck, motorcycle, etc.) was based on vehicle registration information supplied by ARB.

EPA has exempted certain low reactivity organic compounds from federal control. Some of these compounds are shown in Table 3. Although they are not part of the VOC emission inventory, they are included in air quality modeling runs.

**TABLE 3
LOW REACTIVITY COMPOUNDS**

- | | |
|--|---|
| 1. Methane | 8. Trichlorofluoromethane (CFC-111) |
| 2. Ethane | 9. Dichlorodifluoromethane (CFC-12) |
| 3. Acetone | 10. Chlorodifluoromethane (CFC-22) |
| 4. Methylene chloride | 11. Trifluoromethane (CFC-23) |
| 5. Perchloroethylene | 12. Dichlorotetrafluoroethane (CFC-114) |
| 6. Methyl Chloroform (1,1,1 Trichloroethane) | 13. Chloropentafluoroethane (CFC-115) |
| 7. Trichlorotrifluoroethane (CFC-113) | |

Table 4 presents 1995 and 2000 - 2006 emissions of VOC and NO_x by source category. (1995 has been included since it serves as a base period for the ozone isopleth analysis of the 1999 Plan attainment assessment and the revision to that analysis in this 2001 Plan – See Section 4, below.) In 2000, total VOC and NO_x emissions in the Bay Area Air Basin were 554 and 648 tons/day, respectively. VOC emissions are expected to decline to 445 tons/day in 2006, and NO_x emissions are expected to

decline to 525 tons/day in 2006. Consequently, with already adopted regulations, VOC emissions are projected to decline by 20% between 2000 and 2006, and NO_x emissions are projected to decline by 19% between 2000 and 2006. This is a 3.3% per year reduction in VOC emissions and a 3.2% per year reduction in NO_x emissions.

The largest inventory sector is on-road motor vehicles, comprising 43% of VOC and 54% of NO_x emissions in 2000. Motor vehicles' contribution to total Bay Area inventory is expected to decline to 38% of VOC and 52% of NO_x by 2006. The emission rates of motor vehicles are directly affected by ARB's clean fuel and clean vehicle programs. They are also affected by the Bureau of Automobile Repair's Smog Check Program. Motor vehicle emissions are affected to a smaller extent by MTC decisions on maintaining and expanding the various components of the Bay Area's transportation system, which includes roads, bridges, public transit, and bicycle facilities.

Table 4
Bay Area Baseline ¹ Emission Inventory Projections : 1995 - 2006
Planning Inventory ² (Tons/Day) ³

SOURCE CATEGORY	Volatile Organic Compounds ⁴								Oxides of Nitrogen ⁵							
	1995	2000	2001	2002	2003	2004	2005	2006	1995	2000	2001	2002	2003	2004	2005	2006
INDUSTRIAL/COMMERCIAL PROCESSES																
PETROLEUM REFINING FACILITIES																
Basic Refining Processes	0.2	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5
Wastewater (Oil-Water) Separators	3.2	3.4	3.4	3.5	3.5	3.6	3.6	3.7	--	--	--	--	--	--	--	--
Wastewater Treatment Facilities	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	--	--	--	--	--	--	--	--
Cooling Towers	1.6	1.7	1.8	1.8	1.8	1.8	1.9	1.9	--	--	--	--	--	--	--	--
Flares & Blowdown Systems ⁶	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	2.3	2.5	2.5	2.6	2.6	2.7	2.7	2.7
Other Refining Processes	1.6	1.4	1.5	1.5	1.5	1.5	1.5	1.6	--	--	--	--	--	--	--	--
Fugitives	9.9	5.3	5.4	5.4	5.5	5.6	5.7	5.8	--	--	--	--	--	--	--	--
Subtotal	29.7	25.6	25.8	26.0	26.2	26.4	26.6	26.8	2.7	3.0	3.0	3.1	3.1	3.1	3.2	3.2
CHEMICAL MANUFACTURING FACILITIES																
Coating, Inks, Resins & Other Facilities	0.6	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Pharmaceuticals & Cosmetics	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.5	1.6	1.9	1.9	1.9	1.9	2.0	2.0	2.0
Fugitives - Valves & Flanges	1.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	--	--	--	--	--	--	--	--
Subtotal	2.8	1.8	1.9	1.9	1.9	1.9	2.0	2.0	1.7	1.9	2.0	2.0	2.0	2.0	2.1	2.1
OTHER INDUSTRIAL/COMMERCIAL PROCESSES																
Bakeries	1.0	1.1	1.1	1.1	1.2	1.2	1.2	1.2	--	--	--	--	--	--	--	--
Cooking	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	--	--	--	--	--	--	--	--
Wineries & Other Food & Agr. Processes	1.0	1.5	1.5	1.5	1.5	1.6	1.6	1.6	--	--	--	--	--	--	--	--
Metallurgical & Minerals Manufacturing	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Waste Management	2.8	2.9	2.9	2.9	2.9	2.9	2.8	2.8	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Semiconductor Manufacturing	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	--	--	--	--	--	--	--	--
Fiberglass Products Manufacturing	0.5	0.7	0.8	0.8	0.8	0.8	0.8	0.8	--	--	--	--	--	--	--	--
Rubber & Plastic Products Manufacturing	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	--	--	--	--	--	--	--	--
Contaminated Soil Aeration	4.1	1.6	0.5	0.4	0.3	0.2	0.2	0.1	--	--	--	--	--	--	--	--
Other Industrial Commercial	1.4	1.5	1.5	1.5	1.5	1.6	1.6	1.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Subtotal	12.9	11.6	10.5	10.5	10.5	10.5	10.4	10.5	1.3	1.3	1.4	1.4	1.4	1.4	1.4	1.4
PETROLEUM PRODUCT/SOLVENT EVAPORATION																
PETROLEUM REFINERY EVAPORATION																
Storage Tanks	6.8	3.6	3.5	3.5	3.6	3.6	3.7	3.7	--	--	--	--	--	--	--	--
Loading Operations	2.8	1.2	1.2	1.3	1.3	1.3	1.3	1.3	--	--	--	--	--	--	--	--
Subtotal	9.6	4.9	4.7	4.8	4.9	4.9	5.0	5.1	--	--	--	--	--	--	--	--
FUELS DISTRIBUTION																
Natural Gas Distribution	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	--	--	--	--	--	--	--	--
Bulk Plants & Terminals	1.2	0.9	0.9	0.9	0.9	0.9	0.9	0.9	--	--	--	--	--	--	--	--
Trucking	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	--	--	--	--	--	--	--	--
Gasoline Filling Stations	21.9	15.2	12.8	11.2	9.6	8.5	7.5	6.6	--	--	--	--	--	--	--	--

Table 4, Continued
Bay Area Baseline ¹ Emission Inventory Projections : 1995 - 2006
Planning Inventory ² (Tons/Day) ³

SOURCE CATEGORY	Volatile Organic Compounds ⁴								Oxides of Nitrogen ⁵							
	1995	2000	2001	2002	2003	2004	2005	2006	1995	2000	2001	2002	2003	2004	2005	2006
Aircraft Fueling	3.3	3.4	3.4	3.4	3.4	3.4	3.4	3.4	--	--	--	--	--	--	--	--
Recreational Boat Fueling	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	--	--	--	--	--	--	--	--
Fuel Container Spillage	18.1	18.5	16.1	14.0	11.9	9.7	7.6	6.2	--	--	--	--	--	--	--	--
Other Fueling	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	--	--	--	--	--	--	--	--
Subtotal	46.3	39.9	35.3	31.5	27.8	24.6	21.5	19.2	--	--	--	--	--	--	--	--
OTHER ORGANIC COMPOUNDS																
Cold Cleaning	6.5	6.3	5.9	6.0	5.5	5.5	5.6	5.7	--	--	--	--	--	--	--	--
Vapor Degreasing	3.5	3.2	3.2	3.2	3.1	3.1	3.1	3.0	--	--	--	--	--	--	--	--
Handwiping	5.3	5.1	5.1	5.0	5.0	5.0	4.9	4.9	--	--	--	--	--	--	--	--
Dry Cleaners	0.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Printing	6.4	5.6	4.8	4.8	4.9	4.9	4.9	5.0	--	--	--	--	--	--	--	--
Adhesives & Sealants	11.1	8.9	9.0	9.1	9.3	9.4	9.5	9.6	--	--	--	--	--	--	--	--
Structures Coating	27.3	24.6	24.7	24.6	24.7	24.8	24.9	24.9	--	--	--	--	--	--	--	--
Industrial/Commercial Coating	20.9	18.9	19.1	19.3	19.6	19.7	20.0	20.3	--	--	--	--	--	--	--	--
Storage Tanks	1.4	1.3	1.3	1.3	1.3	1.3	1.4	1.4	--	--	--	--	--	--	--	--
Lightering & Ballasting	1.8	1.3	1.4	1.4	1.5	1.5	1.6	1.6	--	--	--	--	--	--	--	--
Other Organics Evaporation	1.7	1.4	1.5	1.5	1.5	1.6	1.6	1.7	--	--	--	--	--	--	--	--
Subtotal	85.9	76.7	75.9	76.2	76.3	76.8	77.4	77.9	--	--	--	--	--	--	--	--
COMBUSTION - STATIONARY SOURCES																
FUELS COMBUSTION																
Domestic	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	12.5	11.1	11.2	10.6	10.0	10.1	10.2	10.3
Cogeneration	0.8	0.9	0.9	0.9	0.9	1.0	1.0	1.0	11.2	4.4	3.7	3.7	3.8	3.8	3.8	3.9
Power Plants	0.1	0.1	0.2	0.1	0.2	0.2	0.3	0.3	15.5	17.0	18.5	10.1	7.9	6.3	5.1	5.6
Oil Refineries External Combustion	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	30.1	24.8	20.4	14.5	8.6	8.7	8.8	8.9
Glass Melting Furnaces - Natural Gas	--	--	--	--	--	--	--	--	4.3	2.9	2.9	3.0	3.0	3.1	3.1	3.1
Reciprocating Engines	0.3	0.3	2.1	2.5	2.7	1.5	0.9	0.3	7.2	4.4	21.5	25.5	27.6	15.6	9.7	3.7
Turbines	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	2.1	1.6	1.6	1.7	1.7	1.7	1.7	1.7
Other External Combustion	0.6	0.8	0.9	0.9	0.9	0.9	0.9	0.9	27.0	15.4	15.6	15.8	16.0	16.3	16.5	16.7
Subtotal	4.2	4.7	6.6	7.0	7.3	6.2	5.7	5.1	109.8	81.5	95.5	84.8	78.5	65.4	58.8	53.8
BURNING OF WASTE MATERIAL																
Incineration	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3
Planned Fires	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	--	--	--	--	--	--	--	--
Subtotal	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Banked Emissions ⁷	0.0	10.4	10.4	10.4	10.4	10.4	10.4	10.4	0.0	7.6	7.6	7.6	7.6	7.6	7.6	7.6
Alternative Compliance Allowance ⁸	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.4	10.2	7.8	6.4	4.7	3.3
Subtotal (District Jurisdiction)	191.4	175.8	171.2	168.5	165.4	161.7	159.0	157.0	115.7	95.6	117.1	109.3	100.7	86.2	78.1	71.8

Table 4, Continued
Bay Area Baseline ¹ Emission Inventory Projections : 1995 - 2006
Planning Inventory ² (Tons/Day) ³

SOURCE CATEGORY	Volatile Organic Compounds ⁴								Oxides of Nitrogen ⁵							
	1995	2000	2001	2002	2003	2004	2005	2006	1995	2000	2001	2002	2003	2004	2005	2006
COMBUSTION - MOBILE SOURCES																
ON-ROAD MOTOR VEHICLES																
Passenger Cars	208.5	139.5	131.6	122.4	113.9	105.7	97.8	89.8	162.0	111.2	104.9	98.8	90.3	84.6	78.9	72.8
Light Duty Trucks < 6000 lbs	59.3	47.2	46.0	44.4	42.9	41.5	40.1	38.6	80.0	61.8	58.9	56.3	52.5	50.1	47.8	45.3
Med Duty Trucks 6001- 8500 lbs	22.0	17.7	16.9	16.2	15.6	15.0	14.4	14.0	25.3	22.6	21.5	20.7	19.5	18.8	18.0	17.4
Light Heavy Duty Trucks 8501- 14000	18.9	14.0	13.6	13.1	12.7	12.2	11.8	11.1	23.4	18.9	18.9	18.9	18.5	18.3	18.1	17.5
Med Heavy Duty Trucks 14001- 33000	11.5	7.4	7.1	6.8	6.6	6.3	6.0	5.7	44.9	41.3	41.2	41.2	40.0	38.7	37.4	35.6
Heavy Heavy Duty Trucks >33000 lbs	7.7	5.3	5.1	4.8	4.6	4.4	4.3	4.0	81.8	79.2	78.3	77.7	74.6	71.6	68.9	65.1
School/Urban Buses	1.7	1.7	1.8	1.8	1.8	1.9	2.0	2.0	12.5	13.8	13.9	14.0	14.1	14.2	14.3	14.5
Motor-Homes	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	3.0	2.4	2.4	2.4	2.4	2.3	2.3	2.3
Motorcycles	9.4	4.9	4.4	4.1	3.8	3.5	3.2	3.0	1.2	0.8	0.8	0.8	0.7	0.7	0.7	0.7
Subtotal	339.5	238.1	227.0	214.1	202.4	190.9	179.9	168.5	434.2	352.1	340.9	330.8	312.5	299.2	286.2	271.0
OFF-HIGHWAY MOBILE SOURCES																
Lawn, Garden & Other Utility	17.9	11.7	10.8	10.0	9.1	8.3	7.4	7.3	0.7	0.7	0.8	0.8	0.8	0.9	0.9	0.9
Transportation Refrigeration Units	1.1	1.1	1.1	1.0	1.0	1.0	1.0	0.9	5.2	4.8	4.8	4.7	4.6	4.5	4.4	4.2
Farm Equipment	1.7	1.6	1.6	1.5	1.5	1.4	1.4	1.3	11.9	11.0	10.7	10.3	10.0	9.6	9.3	8.9
Construction Equipment	11.9	11.2	10.9	10.6	10.3	10.0	9.6	9.0	101.4	95.9	93.8	91.7	89.7	87.6	85.5	81.5
Heavy Duty Industrial Equipment	1.0	1.0	1.0	1.0	1.0	1.0	0.9	0.9	6.9	6.5	6.4	6.3	6.2	6.1	6.0	5.7
Light Duty Industrial Equipment	11.8	11.4	11.0	10.7	10.4	10.0	9.7	9.1	26.3	27.6	26.5	25.4	24.4	23.3	22.3	21.0
Locomotive Operations	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	10.9	10.5	10.4	10.4	10.4	10.4	10.3	10.3
Off Road Motorcycle/All Terrain	2.5	1.5	1.4	1.3	1.3	1.2	1.2	1.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Ships	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	9.9	10.6	10.8	11.0	11.2	11.4	11.7	11.9
Commercial Boats	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	5.3	5.8	5.9	5.8	5.9	5.9	6.0	6.0
Recreational Boats	27.7	28.8	27.7	26.6	25.6	24.5	23.4	22.4	4.8	5.2	5.4	5.7	6.0	6.2	6.5	6.6
Subtotal	77.4	70.0	67.3	64.6	61.9	59.2	56.5	54.0	183.6	178.7	175.5	172.3	169.1	166.0	162.9	157.1
AIRCRAFT																
Commercial Aircraft	2.7	3.2	3.3	3.3	3.4	3.4	3.5	3.5	13.0	15.7	16.2	16.7	17.2	17.8	18.3	18.8
General Aviation	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Military Aircraft	5.9	6.1	6.2	6.3	6.5	6.6	6.7	6.8	4.4	4.5	4.6	4.7	4.8	4.9	4.9	5.0
Airport Ground Support Equipment	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Subtotal	9.8	10.6	10.8	11.0	11.1	11.3	11.5	11.7	18.1	21.0	21.6	22.2	22.8	23.5	24.1	24.7

Table 4, Continued
Bay Area Baseline ¹ Emission Inventory Projections : 1995 - 2006
Planning Inventory ² (Tons/Day) ³

SOURCE CATEGORY	Volatile Organic Compounds ⁴								Oxides of Nitrogen ⁵							
	1995	2000	2001	2002	2003	2004	2005	2006	1995	2000	2001	2002	2003	2004	2005	2006
MISCELLANEOUS OTHER SOURCES																
Construction Operations	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Farming Operations	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Entrained Road Dust-Paved Roads	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Entrained Road Dust-Unpaved Roads	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Wind Blown Dust	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Animal Waste	3.5	3.9	3.9	4.0	4.1	4.1	4.2	4.2	--	--	--	--	--	--	--	--
Agricultural Pesticides	4.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	--	--	--	--	--	--	--	--
Non-Agricultural Pesticides	0.6	0.4	0.4	0.4	0.3	0.3	0.3	0.3	--	--	--	--	--	--	--	--
Consumer Products(Excluding Pesticides)	53.8	51.9	52.2	51.3	48.4	48.1	46.0	46.4	--	--	--	--	--	--	--	--
Other Sources	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Subtotal	62.9	59.3	59.6	58.8	56.0	55.7	53.6	54.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
GRAND TOTAL EMISSIONS	681	554	536	517	497	479	461	445	752	648	655	635	605	575	551	525

¹ Inventory and projections assume implementation of all control measures adopted as of December 31, 2000.

² The planning inventory represents average summer day emissions.

³ Entries are rounded to nearest whole number, totals may not equal to sums of column entries.

⁴ Photochemically reactive organic compounds, excludes methane and other non-reactives and 300 tpd of volatile organic emissions from natural sources.

⁵ Oxides of nitrogen (nitric oxide and/or nitrogen dioxide), NO_x as NO₂.

⁶ Refinery flare emissions vary greatly on a day-to-day basis. While an estimate based on 1988 and 1989 data has been provided for this source category, there is considerable uncertainty about the magnitude of emissions and their variability over time (see discussion in Section 3 of the Plan).

⁷ Banked Emission Reduction Credits show the total current deposits in the District's emissions banking program as allowed by BAAQMD Regulation 2, Rules 2 and 4. These emissions reductions are real, quantifiable, enforceable, permanent and surplus. They may be withdrawn from the bank and used to offset new source emissions and therefore may be emitted in future years.

⁸ Surplus emissions, voluntarily reduced, available for alternative compliance with requirements of selected District rules, as prescribed by State law and BAAQMD Regulation 2, Rule 9.

SECTION 4: ATTAINMENT ASSESSMENT

Introduction

EPA's August 28, 2001 action disapproved the 1999 Ozone Attainment Plan's attainment assessment. Because the region experienced ozone exceedances in 2000 inconsistent with attainment (interpreted in the July 20, 1998 *Federal Register* notice as more than one exceedance at a single monitor in 2000), EPA could not approve the attainment assessment.

EPA also found that the region failed to attain the national 1-hour ozone standard by the November, 2000 deadline. This finding

requires the Bay Area to submit a revised attainment assessment projecting attainment as expeditiously as practicable, but no later than 5 years from the finding of failure to attain (i.e., 2006).

This section summarizes the attainment assessment in the *1999 Ozone Attainment Plan* and then provides revisions to that attainment assessment to meet the new requirements.

1999 Ozone Attainment Plan Attainment Assessment

At the direction of EPA, the District was required to prepare an "attainment assessment", which is described herein, instead of an "attainment demonstration", which is well defined and established in the federal Clean Air Act and EPA regulations. The *1999 Ozone Attainment Plan* looked at air quality in 1995, when the Bay Area recorded 11 exceedances of the national 1-hour ozone standard (the highest number since 1987, when 14 exceedances were recorded). From this worst case year, an estimate was made of the reduction in VOC and NO_x needed to attain the standard in 2000. An ozone isopleth diagram developed from previous photochemical model sensitivity simulations was used to develop the emission reduction estimate. Monitored air quality in 2000 was slightly worse than the modeled predictions.

A region's attainment/nonattainment status is determined by the air monitoring site with the highest design value. For the Bay Area, Livermore has been that site in recent years.

Based on the form of the national ozone standard, attainment is determined from air monitoring data from a three-year period. If a site has no more than one exceedance per year on average, it has attained the NAAQS for ozone. A site's design value is defined as the ozone concentration that would be expected to be exceeded once per year on average over a three-year period. It is most commonly approximated as the fourth highest ozone concentration recorded in the past three years. So a site exceeds the NAAQS if its 4th highest value is at least 125 parts per billion (ppb), which is the effective level of the standard. The design value also indicates the amount by which the standard is exceeded. For example, if a site's design value is 130 ppb, then ozone levels would have to be reduced by 6 ppb, or about 5%, to meet the standard.

Revised Attainment Assessment

This section revises and strengthens the attainment assessment in the 1999 Plan and provides additional analyses and information. It is important to note that complete data for estimating the emission reductions needed to attain the national 1-hour ozone standard are still not available. This revised

The 1999 attainment assessment made use of an isopleth diagram originally prepared to demonstrate 1997 ozone levels' responsiveness to VOC and NO_x reductions. The meteorological conditions for the simulation were derived from field data from an actual September 1989 ozone episode. New inventory estimates were applied, and the diagram was scaled to represent 1995 air quality, using the ratio of the 1995 design value (138 ppb at Livermore) to the simulated Bay Area maximum ozone concentration in 1997. The analysis showed that 11 tons per day of additional VOC reduction would be needed to attain the standard by 2000. No further reduction in NO_x – beyond controls already adopted and submitted into the SIP – was found to be necessary. These estimates did not provide any margin of safety.

The *1999 Ozone Attainment Plan* committed to achieve the additional 11 tpd VOC reduction through implementation of various stationary, area, and mobile source control measures. All of the control measures were adopted and implemented, and the emission reduction target was exceeded. Based on the success in implementing the 1999 Plan's commitments, EPA proposes to find that the region met the Clean Air Act's "Reasonable Further Progress" (RFP) requirement. However, it was recognized that the emission reduction target did not ensure attainment of the standard.

The task of determining a specific emission target for NAAQS attainment is difficult under any circumstances. It is especially challenging in the absence of current field study data, particularly upper air data, needed for photochemical modeling. The District expects this vital air quality planning data to be available in 2003 when the Central California Ozone Study should be complete.

assessment is based on improved and updated information. However, better tools (i.e. extensive field data and up-to-date photochemical modeling) will not be available for an attainment demonstration until at least 2003 when the results of the Central California Ozone Study (CCOS) are expected to be available.

The revised attainment assessment updates or adds the following information:

- Attainment requirement
- Air quality data
- Updated Attainment Assessment
 - Precursor emission trends
 - Precursor concentration trends
 - Rollback calculation
 - Updated 1995 ozone isopleth analysis
 - Ozone trends
 - 2000 ozone isopleth analysis

Attainment Requirement

EPA's August 28, 2001 action includes a finding of failure to attain the national 1-hour ozone standard. This finding, requires attainment of the standard as expeditiously as practicable, but not later than five years after the finding has been published (i.e., 2006).

Air Quality Data

Section 172(c)(1) of the CAA requires that a non-attainment area plan "provide for attainment." Given that the Bay Area could not show 3 years of clean data for 1998 – 2000, for the 1999 Plan requirements, EPA interpreted the CAA requirement as a showing that there would be no more than one exceedance at any monitor in 2000, the 1999 Plan's attainment year.

There were two exceedances at the Livermore Old First Street station in 2000 – 137 ppb on June 15 and 126 ppb, barely above the standard, on July 31. The highest 1-hour ozone value for 2000 – 152 ppb – was recorded on June 15 at the new Livermore Rincon Avenue monitoring station. This is comparable to the highest value (155 ppb) the region experienced during a July 1995 ozone episode. The highest Livermore values occurred on June 15, an unusual ozone episode because the exceedances occurred only in the Livermore area. Because of the form of the national standard, the rare high outlier values are eliminated from the design value calculation. Short-term air quality planning analyses may focus on the second-highest value for a specific year at the monitoring site. Because of the two Livermore exceedances, the region must still reduce precursor emissions in an effort to attain the national standard. The only other ozone exceedance in 2000 was at the Concord monitor.

Updated Attainment Assessment

The revised attainment assessment consists of several approaches to assess whether the region will be able to attain the standard by 2006, the attainment deadline. The first approach is a review of precursor emission trends. The second approach is an analysis of trends in ozone precursor concentrations in ambient air. The third approach is a rollback calculation. This approach applies the percentage reduction in ozone values needed to attain the standard to the reduction in ozone precursor emissions. The fourth method is an updated analysis using the ozone isopleth diagram. The analysis uses

updated emission inventory data with the ozone isopleth diagram starting in 1995, as was used in the 1999 Plan. A fifth approach is a review of ambient ozone monitoring data. The sixth is the use of the ozone isopleth diagram including the past year (2000) as the starting point.

1) Precursor Emission Trends

Table 4 in this Plan shows emission inventory data for ozone precursors from 1995, 2000 and projections for 2006. Over the 1995 – 2006 period, VOC emission reductions are expected to average 3.2% per year and NO_x reductions are expected to average 2.7% per year. These are very significant emission reductions, and are expected to reduce ambient ozone levels significantly in the Bay Area and downwind locations.

Because climate and weather conditions vary, and because ozone formation is a complex and non-linear process, no one can guarantee that ambient ozone measurements will decline at the same rate as the precursor emissions. But the emission trends do bode well for local and downwind ozone attainment efforts.

2) Precursor concentration trends

Emission inventory estimates indicate that ozone precursor emissions have been reduced significantly in previous years, and project continuing reductions of both VOC and NO_x in the future years covered by this Plan. To verify this expectation, and to compare atmospheric measurements with inventory calculations, air monitoring data from the District's air monitoring stations can be used.

Figures 1 and 2 provide a summary of trends in atmospheric measurements of ozone precursor concentrations, compared to the estimated trends in emission rates for the same pollutants. Figure 1 shows VOC comparisons and Figure 2 shows NO_x.

FIGURE 1
PERCENT ANNUAL REDUCTIONS IN EMISSIONS AND 3-SITE AVERAGE AMBIENT VOC CONCENTRATIONS (APRIL – OCTOBER, 1991 TO 2000)

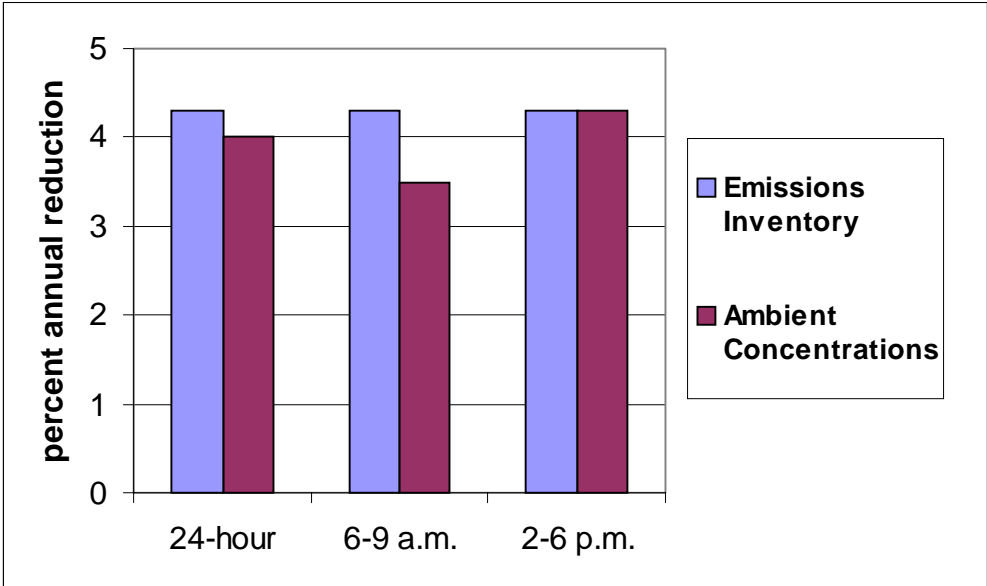
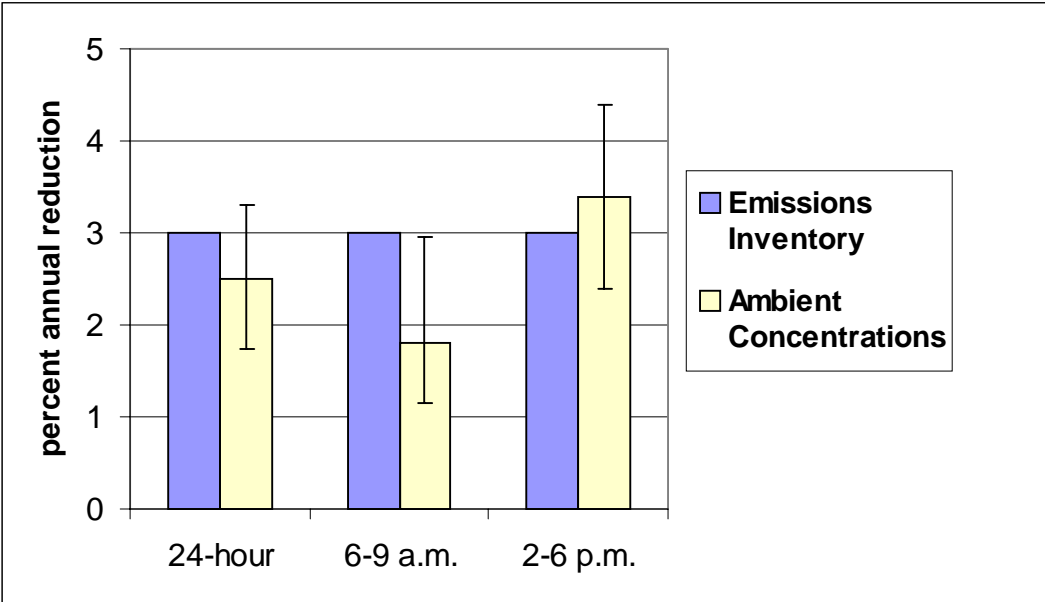


FIGURE 2
PERCENT REDUCTIONS IN EMISSIONS AND DISTRICT-WIDE AMBIENT NOX CONCENTRATIONS (APRIL – OCTOBER, 1991 TO 2000)

VERTICAL LINES INDICATE 80% CONFIDENCE INTERVALS



In general, the aggregated atmospheric measurements validate the emission inventory estimates. As expected, they do not track perfectly. And there are some individual stations that depart from the average trends. The real-world emission patterns are complex, in spatial distribution and temporal variations. And atmospheric measurements are subject to the usual variability in weather and climate, the effects of topography and local sources, and the limitations of the individual monitoring instruments. The NO_x measurements are relatively reliable, and we have 14 monitoring sites. The VOC measurements are less reliable, because of the inherent limitations of the monitoring instruments and the calculation method.

Some of the difficulties in measuring ambient VOC concentrations are:

1. There are many different organic compounds in the atmosphere--probably more than a hundred, of which twenty or thirty are significant. Even the most sophisticated instruments (gas chromatographs and/or mass spectrometers) cannot measure each different compound accurately, because they differ in molecular size, structure, polarity, functionality, etc.
2. The simpler instruments used for routine, continuous air quality monitoring cannot detect and measure all of these myriad compounds with equal reliability. Rather, they use a measurement system that "counts" the total number of carbon atoms present in the mixture of organic compounds in the sample. Their sensitivity is non-linear, however, depending on the size of the molecule and the presence of interfering functional groups.
3. Ambient concentrations of any specific compound are usually very low, making detection and measurement difficult for any kind of instrument. Only methane is present in relatively high concentrations.
4. Methane is not photochemically reactive, so ozone planning uses measurements of VOC that exclude methane, using a separate measurement of methane that is subtracted from the total VOC measurement. The problem is that the desired result is the relatively small derived difference between two larger numbers.

In the Bay Area, the Air District has determined that only three monitoring stations have VOC measuring systems sufficiently reliable to provide ambient VOC data. The three stations are Fremont, Livermore, and San Jose Fourth Street. For research and special studies, the Air District does collect some scattered additional VOC samples, with more accurate analytical work completed in the laboratory. But the number and timing of such samples is not adequate for trend studies.

Taken together, the ambient VOC trends track the regional inventory trends very well, showing reductions of about 4% per year over the decade 1991 to 2000. But there are marked variations among the three sites. Livermore showed greater reductions than the average, while Fremont showed almost no change. San Jose was in between.

In the case of NO_x trends, the situation reversed for Livermore. That site showed almost no reduction in ambient NO_x levels over the decade, while other stations averaged about 2% per year. The Livermore record was affected by local bus traffic. A bus station was constructed nearby in 1998 and contributed local NO_x that would tend to bias the monitor.

To summarize, the District's air monitoring stations provide continuous measurements of ambient concentrations of the ozone precursors, VOC and NO_x. There is some expected uncertainty in the data, especially for VOC, and some station-to-station variability. In the aggregate, however, the data provide strong confirmation that the historic emission reductions shown in this and prior plans have in fact occurred. This validation of the inventory procedures and estimates provides a greater level of confidence that future projections of emission reductions will also be realized.

3) Rollback Perspective

In 2000, the second highest exceedance at the Livermore Old First Street monitor was recorded at 126 ppb. This reading is 1.6 percent above the effective level of the standard (124 ppb). This reading triggered the nonattainment judgment and prevented approval of the 1999 Plan.

One way to assess the level of emission reductions needed to attain the standard would be to reduce ozone precursor emissions by at least the same percentage. This is normally applied to non-reactive pollutants and is not considered a reliable quantitative analysis tool for ozone. Nonetheless, it is presented here to provide context and perspective. As shown in the "Emission Inventory" section, emissions of VOC and NO_x are expected to decline by 3.3% per year and 3.2% per year, respectively, between 2000 and 2006. Based on this rollback calculation, emission reductions from already adopted regulations would be more than sufficient to provide for attainment during this time period. The linear rollback procedure is not the preferred method of analyzing pollutants formed (like ozone) through complex atmospheric chemistry. But it does, in this case, provide a perspective on the degree of nonattainment to be addressed in this Plan.

4) Updated 1995 Ozone Isopleth Analysis

The 1999 Plan's attainment assessment included an analysis that relied on an isopleth diagram capable of illustrating the effect of various combinations of VOC and NO_x reductions on ambient ozone. Staff stated when preparing the 1999 Plan that this procedure was not the ideal tool to set emission reduction targets. But it was the best available at the time, and is the best available now.

This 2001 Plan revises the 1999 analysis using updated emission inventory data with significant improvements. The most important are the use of new EMFAC 2000 motor vehicle emissions, and the inclusion of NO_x reductions from measures outside the SIP. As in the analysis for the 1999 Plan attainment

assessment, the Livermore monitoring site is the focus of the 2001 Plan attainment assessment because Livermore continues to record the highest and most exceedances of the 1-hour national ozone standard.

Figure 3 illustrates how peak Livermore ozone levels would change with reductions in VOC and NOx emissions. Applying updated VOC and NOx emission inventory projections from Table 4, the diagram can be used to project future ozone levels.

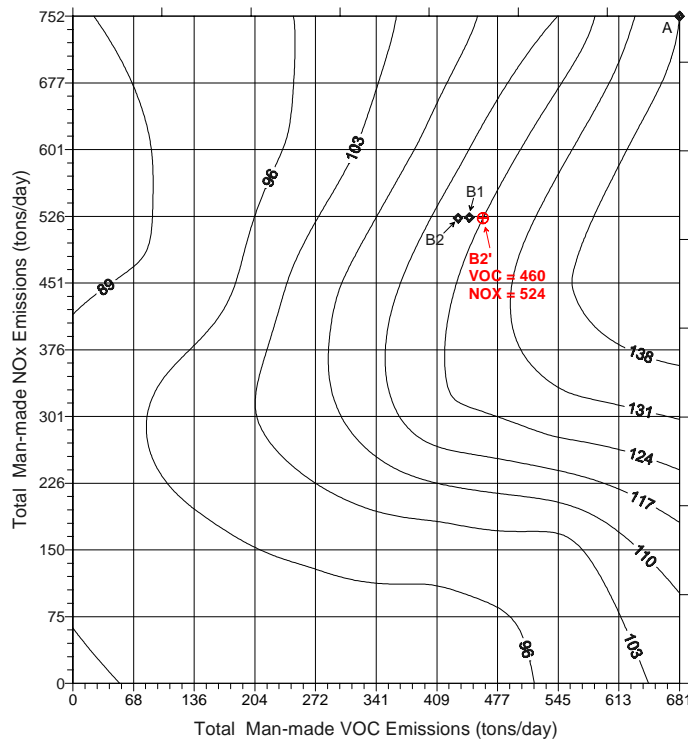
Point A in the upper right corner represents the ozone design value (138 ppb) corresponding to 1995 emissions of VOC and NOx. Point "B1" is the projected value for 2006, the attainment deadline, based on regulations that have already been adopted (i.e., not including the new measures proposed in this plan). Point "B1" lies beyond the 124 ppb isopleth, at a level that is expected to be in attainment of the standard. New measures in this plan, when adopted and implemented, would provide additional emission reductions beyond those called for by this analysis. Point "B2" is the projected attainment point including benefits from the new measures proposed in this Plan. Point B2' is the level of VOC emissions corresponding to 124 ppb.

5) Ozone Trends

The goal of the ozone planning process is to achieve attainment of the ambient ozone standard(s) everywhere in the region. The District has twenty-two air monitoring stations measuring ozone in various parts of the Bay Area. Twenty-one have consistent, long-term data records that can be used to assess trends. Ozone trends are not smooth and continuous, because ozone measurements vary greatly from hour to hour, day to day, and year to year. Over periods of several years, ozone trends depend more on changes in precursor emissions. Over shorter time periods, the variability is due almost entirely to weather and climate conditions.

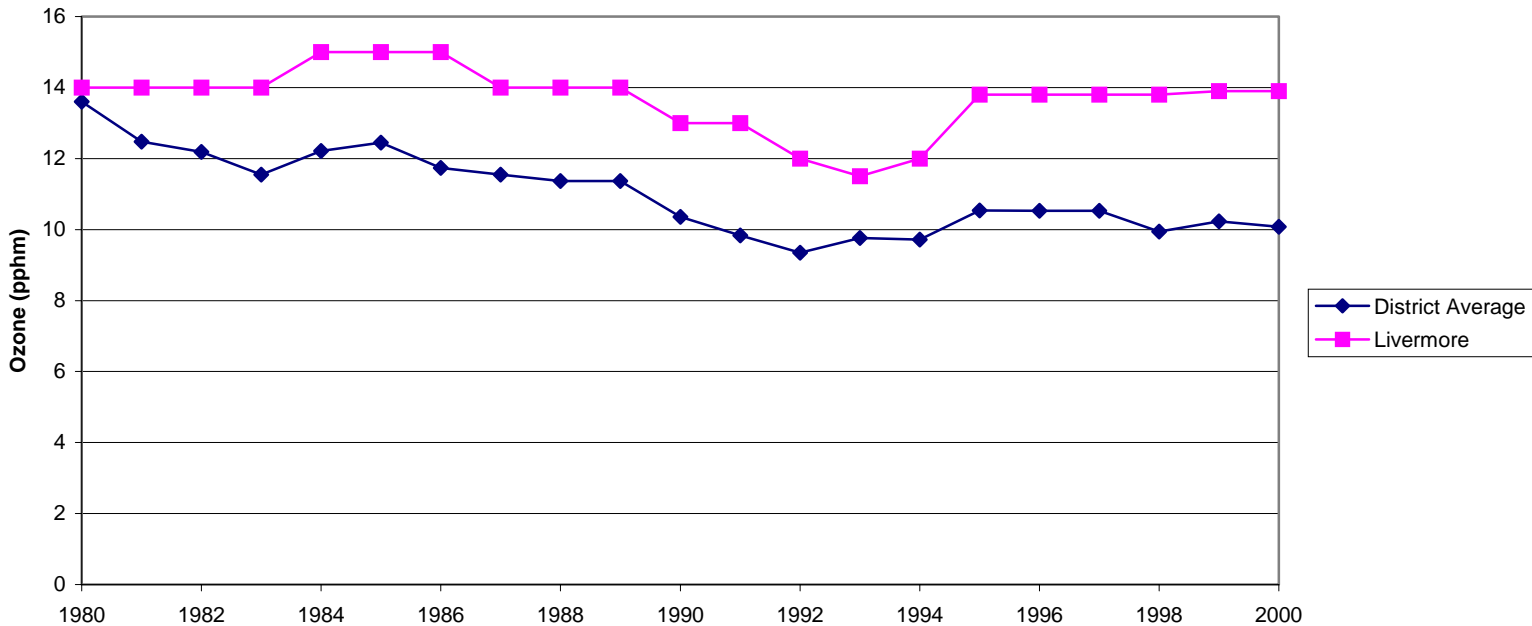
In trend analyses for air quality planning, longer averaging times are employed in an attempt to reveal the emission reduction effects. For example, the calculation of the "design value" is an algorithm that uses three years of data to calculate a more reliable metric for comparison with the ozone standard. In many cases, however, three years is not enough time to eliminate weather-induced bumps in trend data. Figure 4 shows ozone design value trends in the Bay Area over a period of twenty years.

FIGURE 3
2006 LIVERMORE OZONE SENSITIVITY⁹ USING 1995 BASE YEAR



⁹ Isopleths of Livermore peak ozone concentrations (parts per billion) based on photochemical model future-year sensitivity simulations of a September 1989 ozone episode. The contours are scaled to reflect the 1995 design value of 138 ppb in Livermore. Point "A" represents the Bay Area's total anthropogenic emissions and ozone design value for 1995. Point "B1" represents the projected emissions for Year 2006 (considering growth and controls already submitted to EPA for the SIP). Point "B2" includes the effect of new control measures proposed in this Plan. The 124 ppb isopleth represents the design value needed for attainment of the national 1-hour standard. The corresponding VOC inventory level, represented by Point B2', is 460 tons/day, given projected NOx levels.

Figure 4: Trend in Bay Area Ozone Design Values 1980-2000
 1-hour design values for Livermore and average of the 21 long-running District sites



During the period from 1980 to 2000, most Bay Area monitoring sites showed significant reductions in ozone levels. The lower line on the graph shows that District average design values declined about 25%. Sub-regional analysis, not shown here, demonstrates greater improvement in the northern and southern areas, and less in the eastern portions. But progress has not been even, or continuous. Improvement in the design value metric was faster than average from 1980 through '83 and from '89 through '94. It was slower than average, even reversing, from '83 to '85 and from '94 to '95.

The design value trends for Livermore are shown separately because it is the current problem station. As the highest design-value site, it becomes the planning design value for the region. And Livermore ozone has been particularly resistant to improvement efforts in recent years. Figure 4 shows that, after the period of attainment in the early '90s, Livermore's design value jumped up, and has been nearly constant from 1995 through 2000. It actually increased from 138 ppb to 139 ppb in 1999, based on two high readings in that year.

Because the design value derives from a three-year window, Figure 4 does not show the actual year-to-year variability. Figure 5 provides more detail of the annual variations because it shows sequential values of a single-year metric: the second-highest value for each year. Because the form of the national standard allows one exceedance per year per site, the second-high is an appropriate metric to consider for air quality planning. It eliminates most of the extreme events and outlier values that

cannot be usefully addressed in air quality modeling and planning. Figure 5 shows that Livermore's ozone experience is much more volatile than the design value plateau would suggest. In 1997, for example, there were no exceedances of the national ozone standard. In 1999, however, there were two high values, with 144 ppb the second-high.

6) 2000 Ozone Isopleth Analysis

Because ambient air monitoring data are available from the most recent summer, District staff has investigated the possibility of deriving an emission reduction target based on year 2000 ozone experience. This has an apparent benefit of greater currency than the analysis presented earlier in the document, starting from 1995. But starting from 2000 brings some serious problems and uncertainties into the process:

- a) Only partial new information is available for the year 2000 analysis. Other critical elements of air quality planning efforts have been projected from previous analyses, but not updated with real, new data. Other elements not yet available include the activity levels for emission sources, population and employment data from the new census, detailed analysis of episode weather patterns, etc.
- b) The isopleth diagram was originally derived from photochemical modeling simulations for 1997, to test the responsiveness of Livermore ozone levels to different changes in VOC and NOx emissions. This was intended for

a starting point of 1995, and may be less valid for the inventory and ambient conditions that prevailed in 2000.

- c) The planning/analysis window is reduced from ten years to five. As explained in the previous section on ozone air quality trends, the meteorologically-induced variations in ozone levels are more intrusive when shorter time frames are examined. This has the potential to bias results.
- d) The five-year time frame has another significant effect in this analysis. If we start from a year 2000 design value, and use the isopleth procedure to derive an attainment target for the year 2006, the resulting target presumes full attainment by 2006. That is equivalent to compiling a three-year record of attainment during the calendar years 2004, 2005, and 2006. While this would be a desirable outcome, it is a more stringent target than the actual requirements set by EPA and federal procedures. The actual requirement is to provide for attainment by 2006, meaning to achieve by the summer of 2006 precursor emission levels that will result in no station having more than one exceedance of the national standard. This could be the first year of an attainment record that

becomes complete with two subsequent years (2007 and 2008) of comparable low ozone levels. This is in contrast to the test of achieving full attainment by 2006, based on acceptable air quality in 2004 and 2005. Therefore any emission reduction target derived from this analysis is more stringent than that needed for federal planning requirements.

Given these circumstances, the analysis derived from a year 2000 starting point is presented here as additional information in the attainment assessment. Because the formal Livermore design value for 2000 was nearly the same as it was in 1995, and because there are only a few intervening years until 2004 to start the three-year attainment record, the expected inventory reductions do not appear to be adequate to produce full attainment by 2006. Based on expected emission reductions from already adopted measures, plus reductions from new measures shown in this Plan, additional reductions of 26 tons per day of VOC reductions would be needed for attainment. Figure 6 shows the isopleth diagram that produces this estimate.

Figure 5: Trend in Bay Area 2nd Highest Ozone Values 1980-2000
 2nd highest 1-hour values for Livermore and average of the 21 long-running District sites

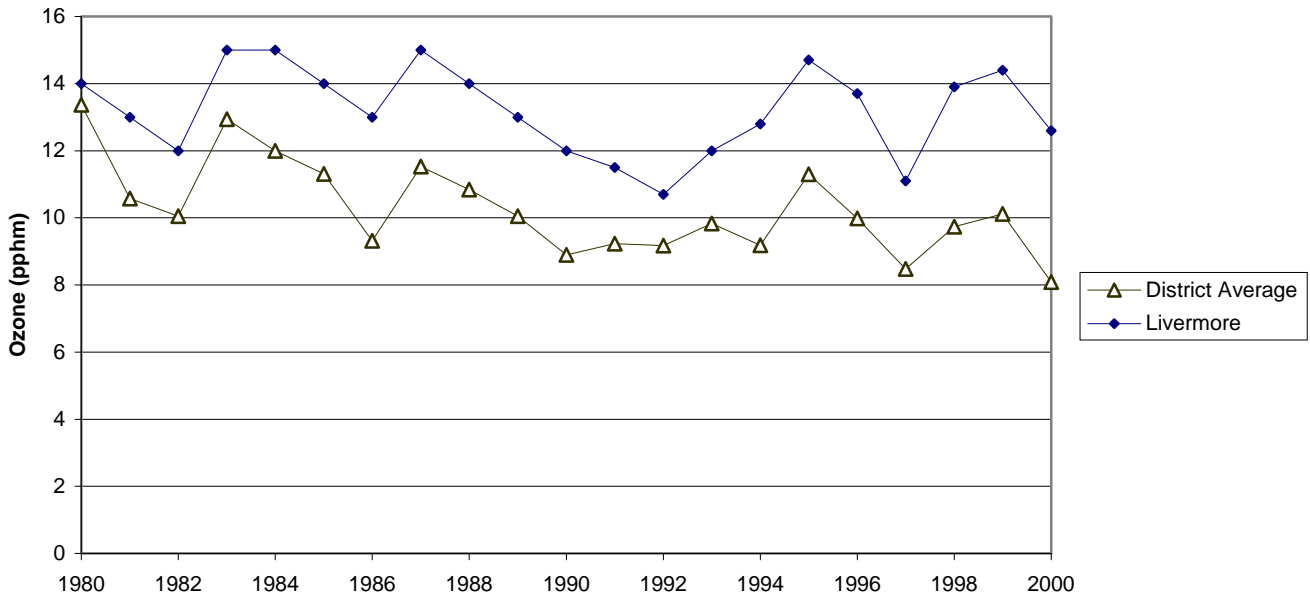
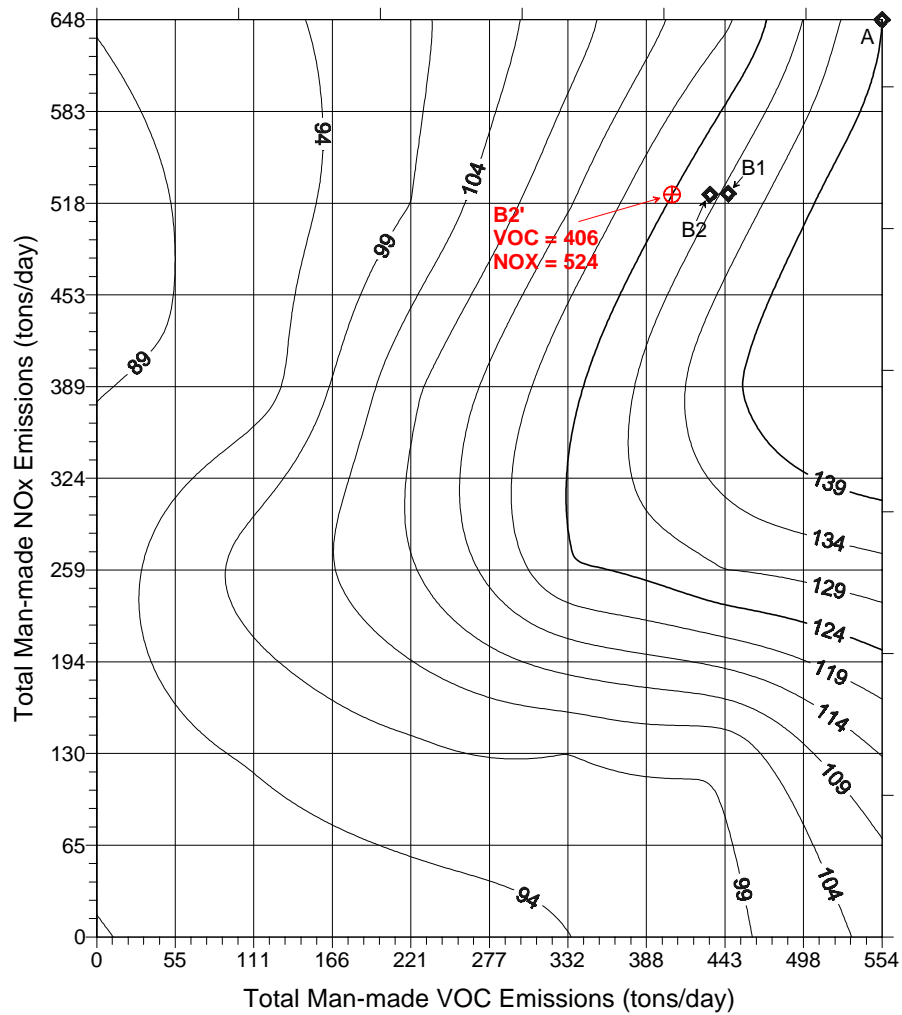


FIGURE 6
2006 LIVERMORE OZONE SENSITIVITY¹⁰ USING 2000 BASE YEAR



¹⁰ Isopleths of Livermore peak ozone concentrations (parts per billion) based on photochemical model future-year sensitivity simulations of a September 1989 ozone episode. The contours are scaled to reflect the 2000 design value of 139 ppb in Livermore. Point "A" represents the Bay Area's total anthropogenic emissions and ozone design value for 2000. Point "B1" represents the projected emissions for Year 2006 (considering growth and controls already submitted to EPA for the SIP). Point "B2" includes the effect of new control measures included in this Plan. The 124 ppb isopleth represents the design value needed for attainment of the national 1-hour standard. The VOC inventory level, represented by Point B2', is 406 tons/day, given projected NOx levels.

Trajectory analysis of Livermore's historic high ozone days indicates a typical ozone episode starts from morning air parcels in the central Bay area. Such parcels move slowly east, through the Dublin Canyon toward Livermore, picking up additional motor vehicle emissions from the freeways and roadways along the path. Photochemistry occurs along the way, and the parcels arrive in Livermore with significant ozone concentrations during the mid-afternoon hours. There are variations on this theme, especially on those hot summer days with easterly flow, when air parcels arrive from other air districts, notably Sacramento or the San Joaquin Valley.

Analysts believe that Livermore ozone is produced primarily from mobile source emissions, with much of the precursor load imported from the central Bay or other distant sources. Analysts also are hopeful that the continuing reductions in motor vehicle emissions attributable to State, federal and local programs will succeed in reducing Livermore's ozone levels during the period covered by this Plan. Though the Bay Area, and especially the Tri-Valley area, has experienced rapid growth in recent years, motor vehicle travel is not expected to continue its rapid growth. System capacity constraints, together with more informed land-use planning, will serve to moderate travel activity. Meanwhile, increasingly stringent vehicle emission standards will continue to cut per-mile emissions for net air quality benefits.

Discussion

The foregoing analyses provide several views of ozone control progress in the Bay Area, and three separate ways to estimate a new emission reduction target for future attainment that are consistent with EPA guidance on Weight of Evidence analysis. Though each method has some technical validity, each has inherent uncertainties as well. While we might wish that they converge to support a specific reduction target, they do not.

Both the 1995 and 2000 isopleth analyses include a high bias, in that the diagrams show that total elimination of man-made precursor emissions (both VOC and NOx) would still leave a residual ozone level of 88 ppb of ozone. In contrast, air monitoring data from remote areas of California and elsewhere show that natural background levels of ozone, in the absence of man-made pollution, are much lower--typically in the range of 40 to 60 ppb. Therefore, the derived emission reduction targets indicated by these diagrams are likely higher than the true values. (See Appendix F for additional information).

The uncertainty reflected in these results highlights the need for the improved tools and improved modeling that the CCOS study can bring to the process. For this Plan, and for the near future, a reasonable course of action is to select a midpoint target for operational use until the new CCOS results become available. Because the rollback calculation does not consider the interplay of VOC and NOx reductions in affecting photochemistry, the choice of a midrange will be limited to the two isopleth analyses.

Attainment Target

The table below shows the mid-range attainment target derived from the two isopleth analyses. The target represents the regionwide VOC inventory level expected to result in attainment of the standard. It is sometimes called the "carrying capacity" of the region.

Year 2006 VOC attainment inventory from 1995 starting point	= 460 tons/day
Year 2006 VOC attainment inventory from 2000 starting point	= 406 tons/day

Year 2006 VOC attainment inventory, mid-range estimate	= 433 tons/day

Based on the data and analytical tools available, 433 tons/day VOC is the best estimate of the inventory level needed for attainment of the national one-hour ozone standard in the Bay Area. Projected Bay Area emissions in 2006, with the new measures proposed in this Plan, will be 432 tons/day.

EPA Modification to Attainment Target

EPA has indicated that it will rely upon the most conservative attainment inventory estimate, or 406 tons/day. EPA has required a commitment to achieve additional emission reductions that would reduce emissions to this level, or to a level determined by future modeling.¹¹ In light of this requirement, the co-lead agencies and ARB commit to adopt measures necessary to achieve 148 tons/day VOC reductions, unless modified by the mid-course review, by the attainment deadline. The co-lead agencies and ARB also commit to conduct a mid-course review by December 15, 2003 that will include an evaluation of the modeling from the Central California Ozone Study and the latest technical information (inventory data, monitoring, etc.) to determine the level of emission reductions needed to attain the one-hour ozone standard. The co-lead agencies and ARB further commit to continue working with U.S. EPA and Bay Area stakeholders in an open, public consultative process to ensure the mid-course review is a comprehensive and thorough evaluation and to assess possible new control measures. Should the mid-course review show that more, equal, or fewer reductions are necessary, the co-lead agencies and ARB commit to submit to U.S. EPA by April 15, 2004 a SIP revision that includes a revised reduction calculation and any additional control measures needed for attainment.

The co-lead agencies and ARB make these commitments with the understanding that U.S. EPA will discharge its responsibilities under the Clean Air Act by undertaking rulemaking to promulgate any VOC measures that are determined to be appropriate for U.S. EPA and needed for ozone attainment in the San Francisco Bay Area.

¹¹ Letter from Jack Broadbent, Region IX USEPA, to Mike Kenny, CARB, dated July 23, 2001.

The co-lead agencies and ARB believe, based on the best technical information available, that identifying new measures that will achieve attainment is particularly challenging for the Bay Area given the level of control already in place. The co-lead agencies and ARB will continue to assess, on an on-going basis, emerging technologies, opportunities for pollution prevention and the reasonable availability of other measures. Through this process, the co-lead agencies and ARB are committed to identify by the mid-course review, specific measures needed for attainment. The record supports the conclusion that the motor vehicle budget in this plan and conformity determinations made under it will be consistent with attainment in the Bay Area. If the specific measures affect the on-road motor vehicle emissions budget, the co-lead agencies and ARB commit to submit the revised budget to U.S. EPA.

Schedule and Expeditious Attainment

Emission reductions in the mobile source sector progress in a fairly regular manner, year-by-year, due in large part to the rate of fleet turnover. Reductions from the new measures in the Plan will not occur until the later years of the planning period because of the time needed to develop and adopt measures, and the additional time needed for the regulated community to install and operate the required controls. Smog Check improvements will depend upon the administrative steps required, and implementation procedures of the Bureau of Automotive Repair. There is no practical way to accelerate the attainment schedule. The year 2006 represents the most expeditious attainment date.

Conclusion

Bay Area emissions of ozone precursors have been declining significantly during past years, and will continue to decline during the period covered by this Plan. New proposed control measures, together with the various regulations and programs already adopted and implemented, will provide for attainment of the national one-hour ozone standard by 2006.

CCOS Modeling Update

By 2003, the region will have a comprehensive set of field data and more advanced tools to apply to the ozone planning process. We expect to have improved photochemical modeling based on the CCOS. That study makes use of field data collected during Summer 2000 ozone episodes, and could be used to model the Livermore exceedances in order to estimate VOC and NOx reductions needed to attain the standard. Therefore, the co-lead agencies will evaluate what is needed to achieve attainment based on accumulated air monitoring data from 2001, 2002 and 2003; and on the CCOS modeling results, which we expect by the end of 2003.

The timeline for conducting the review is as follows:

<i>Date</i>	<i>Milestone</i>
April 2003	ARB develops 2000 base year CCOS modeling episode suitable for use in predicting ozone concentrations in the Bay Area, with a focus on Livermore
June 2003	District and ARB complete modeling protocol to assess attainment.
July 2003	ARB completes work to apply CCOS model to reassess attainment at Livermore site by 2006.
October 2003	Co-lead agencies hold public meeting to present results of modeling and latest ozone monitoring to their boards.
Dec. 15, 2003	Co-lead agencies complete mid-course review
January 2004	Co-lead agency staff release draft inventory, modeling, and control strategy for SIP revision.
March 2004	Co-lead agencies adopt SIP revision for submittal to ARB
April 15, 2004	ARB submits SIP revision to EPA

SECTION 5: CONTROL STRATEGY

Introduction

The 1999 Ozone Attainment Plan included a control strategy designed to achieve additional reductions in VOC emissions of 11 tons per day (tpd) from the baseline projection. The 11 tpd was derived from the ozone isopleth procedure (described earlier) as the additional emissions reductions needed to attain the 1-hour standard. The strategy consisted of 11 control measures, most of which affected stationary sources. All were adopted, implemented and have achieved the 11 tpd VOC reduction. However, the resulting emission reductions were not sufficient to provide for attainment of the standard.

EPA's August 28, 2001 final action identified several consequences of the Bay Area's failure to attain the 1-hour standard, including the need to meet the planning requirements of Clean Air Act Sections 110 and 172. In order for EPA to approve the region's Ozone Attainment Plan, it must provide for attainment and must demonstrate that it includes all reasonably available control measures. This 2001 Plan's control strategy continues progress toward attainment, and demonstrates inclusion of all reasonably available measures.

The emission inventory (Table 4) reflects VOC and NOx reductions from regulations adopted as of December 30, 2000. These include adopted federal, State and Bay Area regulations. Over the 2000 – 2006 period, regionwide VOC will drop by 109 tpd (20%), and NOx emissions will drop by 123 tons per day (19%) due to regulations that have already been adopted, taking into account anticipated growth.

Stationary and Area Source Control Measures

In total, stationary and area source emissions are projected to decline by 24.1 tpd VOC and 23.8 tpd NOx between 2000 and 2006 due to previously adopted regulations. The VOC decline is largely due to three aggressive area source regulations that have been adopted by ARB: Midterm Consumer Products and Aerosol Coatings, Portable Fuel Container Regulations, and Enhanced Vapor Recovery Regulations. These ARB regulations are already adopted and the benefits are reflected in the baseline emission inventory projections in Table 4. A description of each of these regulations follows.

Midterm Consumer Products and Aerosol Coatings (SIP Measures CP-2, CP-3)

These categories include a variety of personal and house-hold products, for example antiperspirants and deodorants, air fresheners, automotive windshield wiper fluids, charcoal lighter fluid, engine degreasers, floor and furniture polishes, glass cleaners, hair care products, aerosol insect repellents, laundry

The control strategy in this plan supplements the 1999 Plan's control strategy by adding a commitment to adopt and implement thirteen additional control measures (seven stationary source measures, one mobile source control measure and five transportation control measures). The additional control measures included in the Plan will be implemented by the BAAQMD, MTC and the Bureau of Automotive Repair (BAR). These agencies have lead responsibility for stationary sources (BAAQMD), transportation control measures (MTC) and the State's Motor Vehicle Inspection and Maintenance Program (BAR).

These new control measures will reduce emissions above and beyond the substantial emission reductions expected from already adopted regulations. The new control measures are projected to reduce VOC emissions by 12.7 tons/day in 2006 and NOx emissions by 0.7 tons/day in 2006.

In addition, the co-lead agencies, in cooperation with ARB and EPA, commit to develop additional control measures as needed to attain the standard by 2006. The current estimate is that additional controls will be needed to achieve a 26 tpd reduction in VOC emissions. This estimate is subject to change based on the mid-course review in 2003.

One of the planning requirements in Section 172 of the Clean Air Act is provision of contingency measures. In the event the 2001 Plan's control strategy does not result in attainment of the 1-hour national ozone standard by 2006, the contingency measures included in Section 6 will automatically be implemented.

pre-wash products, nail polish removers, oven cleaners, and shaving creams. ARB also regulates numerous categories of aerosol coatings, including paint, varnish, and related products dispensed from disposable aerosol containers. Emissions from aerosol paints come from the solvents and propellants used in these products, which are primarily ROG. The consumer product regulations limit, and in some cases phase out, the use of ROG in regulated products. In 1999, ARB adopted additional controls to further reduce emissions from consumer products with phase-in beginning in 2000. ARB also regulates aerosol coatings. The latest standards were adopted in 1998 and take effect beginning in 2002.

Portable Fuel Container Regulations

While emissions from a single portable gas can are small, the emissions from a large number of such containers add up to a meaningful total and contribute significantly to ROG emissions in California. Gas can emissions come from permeation of vapors

through walls in containers made from polyethylene plastic, fumes escaping while fuel is being dispensed, spillage and /or over-filling, spillage and evaporation through secondary vent holes, and evaporation through inadequately capped spouts. ARB adopted new emission and spill-control regulations for portable fuel containers and spouts that will reduce ROG emissions by over 70 percent by 2010. The regulations apply to new gas cans and spouts sold in California starting January 1, 2001.

Enhanced Vapor Recovery Regulations

The storage and transfer of gasoline for vehicle refueling is one of the most significant sources of hydrocarbon emissions in California. Vapor recovery systems are used to capture gasoline

vapors both during the refueling of underground tanks by tanker trucks and refueling of vehicles at gasoline pumps. To address deficiencies in the vapor recovery program, ARB adopted new regulations as part of its enhanced vapor recovery program to improve emission controls at gasoline service stations. Adopted by ARB in March 2000, all new equipment is subject to the regulation which is phased-in starting 2001. Existing equipment must be modified to meet the new standards starting in 2004.

To supplement the emission reductions from already adopted regulations, the BAAQMD is proposing to include seven additional control measures in the SIP (Table 5). These control measures, when adopted and implemented, are expected to reduce VOCs by 8.2 tpd. Control measure descriptions for the proposed new measures are provided in Appendix B.

**TABLE 5
PROPOSED STATIONARY AND AREA SOURCE CONTROL MEASURES**

2001 SIP # (2000 CAP #)	BAAQMD Regulation #	Source Category	Adoption Date	Implementation Date	Estimated VOC Reduction (tpd), 2000 to 2006	Estimated NOx Reduction (tpd), 2000 to 2006
Measures to be adopted by the BAAQMD						
SS-11 (A1)	8-3	Improved Architectural Coatings Rule	2001	2003-2004	2.9	
SS-12 (B2)	8-5	Improved Storage of Organic Liquids Rule	2002	2002	1.9	
SS-13 (A5)	8-14 and 8-19	Surface Preparation and Cleanup Standards for Metal Parts Coating	2002	2003	0.3	
SS-14	8-16	Aqueous Solvents	2002	2003	3.0	
SS-15	TBD	Petroleum Refinery Flare Monitoring	2003	2004	TBD	
SS-16	8-18	Low-Emission Refinery Valves	2003	2004	TBD	
SS-17 (C4)	8-10	Improved Process Vessel Depressurization Rule	2003	2004	0.1	
TOTAL					8.2	0.0

Reasonably Available Control Measures Review

These proposed new measures were identified through the District's reasonably available control measure (RACM) review. Section 172(c)(1) of the Clean Air Act (CAA) requires attainment plans to provide for the implementation of all RACM as

expeditiously as practicable. EPA's August 28, 2001 final action disapproved the RACM demonstration in the 1999 Ozone Attainment Plan. An explanation of the CAA RACM requirement and a revised RACM demonstration are included in Appendix C.

Mobile Source Control Measures

Mobile source measures are intended to reduce emissions from motor vehicles, watercraft, trains, airplanes and some other moveable sources of air pollution. Some encourage the retirement of older, more-polluting technologies and the introduction of new, less polluting technology. Transportation control measures (TCMs), discussed below, differ from mobile source measures in that TCMs attempt to reduce motor vehicle use or activity that leads to higher emissions.

The Air Resources Board's adopted mobile source control program will provide significant reductions in VOC and NOx emissions between 2000 and 2006. The emission inventory projections included in this plan already reflect these reductions. Reductions from source categories such as on- and off-road diesel engines, passenger vehicles, light duty trucks, sport utility vehicles, recreational equipment engines, and lawn and garden equipment will result in reductions of 85 tons per day VOC and 99 tons per day of NOx.

ARB has adopted numerous regulations that reduce mobile source emissions. Following is a summary of adopted ARB mobile source regulations that were not included in the 1999 Plan. These regulations will achieve significant emission reductions between 2000 and 2006, and beyond. The emission reductions are reflected in the baseline emission inventory (Table 4). The summary is presented by category of sources, however, more than one regulation may be associated with any given category.

Low-Emission Vehicle II (M-2)

This category consists of passenger cars, pick-up trucks, minivans, and sport utility vehicles. Because of the increased sales of pick-up trucks, minivans, and sport utility vehicles, ARB's Low-Emission Vehicle II (LEV II) regulations focused on reducing emissions from these previously under-regulated vehicles, as well as reducing evaporative emissions to near-zero levels. U.S. EPA adopted parallel national regulations (known as "Tier II") in 2000. The LEV II and Tier II regulations will be phased in beginning in 2004.

California Reformulated Gasoline Regulations (Phase III)

Gasoline is used in not only on-road vehicles such as passenger cars and pick-up trucks but also light-duty industrial equipment (i.e. forklifts) and recreational vehicles, such as motorcycles and all terrain vehicles. Gasoline producers and importers must produce Phase III reformulated gasoline starting December 31, 2002. The most prominent feature of the Phase III standards is the prohibition of the use of methyl tertiary-butyl ether (MTBE) – an oxygenate used in most California gasoline since 1992. The Phase III standards also modify several gasoline properties to maintain the emission and air quality benefits of the Phase II standards, while increasing refinery flexibility in producing complying gasoline without the use of MTBE. The Phase III regulations were adopted in December 1999 and will become effective December 31, 2002.

On-Road Heavy-Duty Diesel Engines (M-5, M-6, transit bus regulations)

This category includes a range of vehicles from highway trucks to buses with gross vehicle weights greater than 14,000 pounds. In 1995, ARB, U.S. EPA, and engine manufacturers signed a Statement of Principles committing to new national emission standards. ARB and U.S. EPA both adopted standards that reduced emissions by an additional 50 percent. In February 2000, ARB adopted lower emission standards for transit buses that will significantly reduce emissions of NO_x and toxic diesel particulate. The regulation allows transit agencies to choose between a diesel and an alternative fuel path to lower emissions. ARB and U.S. EPA adopted new emission standards for on-road heavy-duty diesel engines which take effect in 2004.

Heavy-Duty Off-Road Diesel Engines (M-9 and M-10)

Heavy-duty off-road diesel engines are used in construction, farming, mining, forestry, and industrial equipment not including

locomotives, marine vessels, or stationary engines. ARB adopted regulations to reduce emissions from new, non-farm engines 175 hp or greater with standards for new engines implemented in 1996, and a second more stringent set of standards taking effect in 2001. Also, U.S. EPA adopted national regulations to further reduce emissions from this category in 1998 with ARB adopting parallel regulations in January 2000.

Gas and LPG Equipment 25 - 175 horsepower (M-11 and M-12)

The category consists of off-road gasoline and liquefied petroleum gas (LPG) equipment greater than 25 horsepower and less than 175 horsepower, including forklifts, pumps, compressors, farm equipment, and construction equipment. Because some of the emissions from this category are from engines under exclusive U.S. EPA control, ARB and U.S. EPA agreed to work together to develop uniform emission standards. ARB adopted regulations in 1998 with U.S. EPA adopting regulations based on, but not as stringent as, the California requirements in 2000. Both the national and California regulations are being phased in beginning in 2000.

Locomotives National Emission Standards (M-14)

This category includes new and in-use locomotives for which federal law preempts California from setting standards. In California's 1994 SIP, ARB assigned U.S. EPA the task of reducing emissions from locomotives by almost 70 percent by 2010. In 1998, U.S. EPA promulgated three sets of standards (Tier 0, Tier 1 and Tier 2). Locomotives built between 2002 and 2004 must meet Tier 1 standards. More stringent Tier 2 standards for new locomotives will take effect beginning in 2005. The national emission standards for new locomotives and new engines used in locomotives will lead to significant emission reductions throughout the State as newer and lower emitting locomotive engines are purchased and as in-use locomotives are remanufactured.

Pleasure Craft Emission Standards (M-16; additional emission reductions for marine pleasurecraft)

Pleasure craft are recreational boats and personal watercraft used on California water bodies and coastal areas. In 1998, ARB adopted regulations to reduce emissions beyond the federal requirements. The California regulations phase-in more quickly than the national standards and ultimately require marine pleasurecraft to meet more stringent emission standards. California emission standards begin implementation in 2001.

Smog Check

In addition to ARB's mobile source regulations, the co-lead agencies propose one new mobile source control measure for the SIP (Table 6). This measure, Motor Vehicle Inspection and Maintenance Program – Opt-In Request for Leak Inspection and Evaporative System Test, will be requested by the BAAQMD for implementation in the Bay Area. In 2006, the proposed control measure would reduce VOCs by 4.0 tpd. A description of this measure is provided in Appendix B.

**TABLE 6
PROPOSED MOBILE SOURCE CONTROL MEASURE**

2001 SIP #	Source Category	Request Date	Implementation Date	Estimated VOC Reduction (tpd), 2000 to 2006	Estimated NOx Reduction (tpd), 2000 to 2006
Measures to be requested by the BAAQMD					
MS-1	Motor Vehicle Inspection and Maintenance Program – Liquid Leak Inspection and Improved Evaporative System Test	2002	2002-2003	4.0	
			TOTAL	4.0	0.0

Transportation Control Measures

Since 1982, the Bay Area’s SIP (State Implementation Plan) has included certain measures called transportation control measures (TCMs) to reduce automobile emissions. A total of 28 measures – including improved transit service and transit coordination, new carpool lanes, signal timing, freeway incident management, and increased state gas tax and bridge tolls – have been carried forward and are now largely completed. A status report on these TCMs (for information purposes only) is included in Appendix D. While TCMs highlight selected strategies that promote mobility and air quality, they play only a limited role in the Bay Area’s overall strategy to reduce measurable emissions.

Most transportation emission reductions are largely accounted for in the Baseline emission inventory of ongoing and committed projects and programs. The Baseline for the region represents transportation improvements and programs that are on the ground and operating now, or have funding and other commitments necessary to become operational between now and 2006. Thus, the Baseline contains, in essence, the Bay Area’s entire transportation infrastructure and services, and the effects of these on mobile source emissions (As the 24 existing TCMs are implemented, they also move into the Baseline. A review of the status of existing TCMs is contained in Appendix D.) These baseline emission benefits are incorporated in the baseline emission inventory projections in Table 4.

As stated earlier, technological improvements in automobile engines and fuels required by California Air Resources Board (CARB) regulations have contributed and will continue to contribute the bulk of the quantifiable emission reductions from mobile sources. Emissions from on road mobile sources are estimated to decline significantly between 2000 and 2006 (about 69.6 tons per day of VOC and 81.1 tons per day of NOx) due to California Air Resource Board (CARB) emission controls. By comparison, the effectiveness of most individual transportation control measures is measured in *tenths* or *hundredths* of a ton per day. These small emission reductions are due to the fact that individual TCMs affect only a small portion of regional travel as well as the fact that TCMs generally do not change transportation

costs, travel time, or convenience sufficiently to produce large scale changes in travel behavior.

The most global transportation measure for improving air quality is the extensive transit system in the Bay Area. Since 1990, transit investments and ridership have both grown. Many major improvements, which have been in the planning stages for decades, were completed during this 10 year span. Table 7 provides a snapshot of major transit improvements and milestones since 1990.

**TABLE 7
BAY AREA TRANSIT TRENDS SINCE 1990**

Operating Statistic	1990	2000	Change
Transit Ridership (millions of annual boardings)	472.8	495.6	4.8%
Revenue Service Miles (thousands)	136,375	153,476 ¹²	12.5%
Public funding (non-farebox operating revenues, thousands of 1990 dollars)	\$676,325	\$753,099 ¹⁰	10.9%
New Services	1990	2000	Change
Total miles of BART	71.5	93.2	30.1%
<i>BART to Dublin/Pleasanton miles</i>	0	13.1	
<i>BART to Colma miles</i>	0	1.6	
<i>BART to Bay Point miles</i>	0	7.0	
Santa Clara Co LRT miles	10.6	28.6	169.8%
Caltrain trains/day	52	78	50.0%

¹² Data is for FY 1998-99.

Capitol Corridor trains/day	0	14	--
ACE Commuter Rail Service trains/day	0	6	--
Vallejo Ferry ferries/day	4	11	175.0%
Larkspur Ferry ferries/day	13	20	53.8%

Attainment Plan, and comments made at six community meetings. A summary of the evaluation of potential control measures is provided in Appendix C.

Another way to consider how seriously the region supports alternative transportation modes and transit in particular is shown in Figure 7. Figure 7 illustrates the projected transportation revenues which are committed to various types of transportation expenditures, based on existing law or voter approved revenues, over the next 25 years as estimated in MTC's 2001 Regional Transportation Plan (RTP). Of the \$61 billion in future committed revenues (in real dollars), transit maintenance, operations and expansion account for 79% of those dollars (note, transit fares are *not* included in this figure.)

Setting a Level of Emissions Reductions to be Achieved by TCMs

State law (Health and Safety Code Section 40233) establishes a process whereby the Air District estimates an emission reduction target to be achieved by MTC through transportation control measures (TCMs) in order to attain ambient air quality standards. The Air District has set the emission reduction target for TCMs in this planning process at 0.5 tons/day of VOC emissions and 0.7 tons/day of NOx emissions. These emission reductions along with reductions from stationary, area and mobile source measures achieve the attainment target resulting from the attainment assessment.

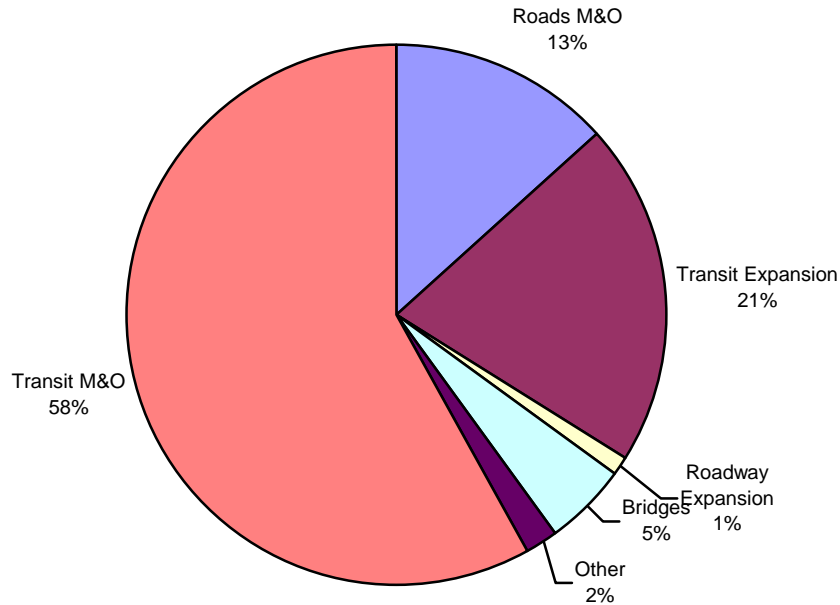
New Transportation Control Measures

For this update of the Federal Ozone Attainment Plan, MTC went through a Reasonably Available Control Measure (RACM) analysis to consider possible new TCMs. In considering new TCMs, the following rules were used:

- The TCM must be economically and technically feasible
- The TCM helps advance attainment. That is, if implemented, it could help achieve emissions reductions sooner.
- It has measurable emission reductions (i.e., ones that are not *de minimis*).
- The potential TCM is available and within the co-lead agency's authority to implement and enforce.

Our analysis included a review of potential strategies listed in Section 108(f) of the Clean Air Act, TCMs contained in EPA's database, review of TCMs from other regions, comments made on the 1999 Ozone Attainment Plan proposing new TCMs, TCMs currently included in the 1997 Bay Area Clean Air Plan prepared by the BAAQMD for compliance with the California Clean Air Act, a review of TCMs from other regions, and comments made by interested parties at workshops held on the draft Ozone

**FIGURE 7
2001 REGIONAL TRANSPORTATION PLAN UPDATE
25 YEAR COMMITTED FUNDS (\$61 BILLION)**



Note: Chart excludes transit fares which contribute to ongoing operating costs

**TABLE 8
PROPOSED TRANSPORTATION CONTROL MEASURES**

2001 SIP #	Control Measure Description	Description & Implementation Steps	Schedule	Estimated VOC Reduction (tpd), 2000 to 2006	Estimated NOx Reduction (tpd), 2000 to 2006
TCM A	Regional Express Bus Program	Program includes purchase of approximately 90 low emission buses to operate new or enhanced express bus services. Buses will meet all applicable CARB standards, and will include particulate traps or filters. MTC will approve \$40 million in funding to various transit operators for bus acquisition. Program assumes transit operators can sustain service for a five year period. Actual emission reductions will be determined based on routes selected by MTC.	FY 2003. Complete once \$40 million in funding pursuant to Government Code Section 14556.40 is approved by the California Transportation Commission and obligated by bus operators	See below	See below
TCM B	Bicycle / Pedestrian Program	Fund high priority projects in countywide plans consistent with TDA funding availability. MTC would fund only projects that are exempt from CEQA, have no significant environmental impacts, or adequately mitigate any adverse environmental impacts. Actual emission reductions will be determined based on the projects funded.	FY 2004 – 2006. Complete once \$15 million in TDA Article 3 is allocated by MTC	See Below	See Below

2001 SIP #	Control Measure Description	Description & Implementation Steps	Schedule	Estimated VOC Reduction (tpd), 2000 to 2006	Estimated NOx Reduction (tpd), 2000 to 2006
TCM C	Transportation for Livable Communities (TLC)	Program provides planning grants, technical assistance, and capital grants to help cities and nonprofit agencies link transportation projects with community plans. MTC would fund only projects that are exempt from CEQA, have no significant environmental impacts, or adequately mitigate any adverse environmental impacts. Actual emission reductions will be based on the projects funded	FY 2004 – 2006. Complete once \$27 million in TLC grant funding is approved by MTC	See Below	See Below
TCM D	Additional Freeway Service Patrol	Operation of 55 lane miles of new roving tow truck patrols beyond routes which existed in 2000. TCM commitment would be satisfied by any combination for routes adding 55 miles. Tow trucks used in service are new vehicles meeting all applicable CARB standards.	FY 2001. Complete by maintaining increase in FSP mileage through December 2006	See Below	See Below
TCM E	Transit Access to Airports	Take credit for emission reductions from air passengers who use BART to SFO, as these reductions are not included in the Baseline	BART – SFO service to start in FY 2003. Complete by maintaining service through December 2006	See Below	See Below
TOTAL				0.5	0.7

Transportation Emissions Budgets

Section 176(c) of the 1990 Clean Air Act Amendments outlines the “conformity” provisions of the Act. Federal actions are required to conform to the SIP’s purpose of eliminating or reducing the severity and number of exceedances of the NAAQS and achieving expeditious attainment of these standards. Federal actions are differentiated into transportation actions by the Federal Highway Administration or the Federal Transit Administration, and all other federal actions.

The current SIP conformity procedures, which outline the process MTC uses to make conformity determinations on the Regional Transportation Plan (RTP) and the Transportation Improvement Program (TIP), as well as ensuring the expeditious implementation of SIP transportation control measures, were approved by EPA on October 21, 1997. The co-lead agencies submitted revised conformity procedures to EPA in 1998, incorporating EPA’s August 15, 1997 amendments to the regulation. As of April 2001, EPA had not taken action on the Bay Area’s revised conformity procedures.

In order to make a favorable conformity finding on the RTP and the TIP, MTC must demonstrate that the motor vehicle emissions are lower than the approved emissions budgets.

Motor vehicle emissions budgets have been established for VOCs, NOx and carbon monoxide. The current VOC and NOx emissions budgets (299 tpd and 251 tpd, respectively) were included in the region’s *Ozone Maintenance Plan* (1994). This plan will establish new VOC and NOx emission budgets for 2006 that would apply for all subsequent years. The new VOC and NOx budgets will be in addition to the current VOC and NOx

budgets, which are based on the *Ozone Maintenance Plan*. The new VOC and NOx budgets will be used in transportation conformity determinations once the budgets are found adequate, which will occur upon the earlier of Plan approval or a separately noticed adequacy finding by EPA. The proposed emission budgets are as follows:

VOC

2006 On Road Motor Vehicle Emissions	168.5
2006 Mobile Source Control Measure Benefits	(4.0)
2006 TCM Benefits	<u>(0.5)</u>
VOC Emissions Budget	164.0

NOx

2006 On Road Motor Vehicle Emissions	271.0
2006 TCM Benefits	<u>(0.7)</u>
NOx Emissions Budget	270.3

The 2006 budgets were based on MTC’s estimate of 2000 – 2010 travel growth. Vehicle activity data include both vehicle miles of travel (VMT) and vehicle trips. County VMT distribution by speed was supplied by MTC. California Air Resources Board applied EMFAC 2000/BURDEN emission factors for 2006 to develop a motor vehicle inventory for that year as shown above. The on-road motor vehicle inventory was then reduced by the benefit of the proposed TCMs and Smog Check Program improvements. It is expected that future conformity determinations of plans and programs would follow this same methodology.

Further Study Measures

As part of future air quality planning, the measures shown in Table 9 will be studied to determine whether significant additional emission reductions could be achieved, and whether implementation is feasible. *Because of uncertainties in the feasibility, costs, and potential emission reductions, their inclusion does not constitute a commitment to adopt and implement measures, or a commitment to reduce emissions.* If

further study indicates these measures may be feasible and yield significant emission reductions, they may be 1) adopted and implemented prior to the 2004 SIP revision; 2) incorporated into the 2004 SIP revision as a control measure; or 3) added to the control strategy in subsequent plan revisions. Brief descriptions of the measures are provided in Appendix E.

TABLE 9
PROPOSED FURTHER STUDY MEASURES
SEE APPENDIX E FOR DESCRIPTIONS

2001 SIP #	Measure
FS-1	Study Potential for Accelerating Particulate Trap Retrofit Program for Urban Buses
FS-2	Update MTC High Occupancy Vehicle (HOV) Lane Master Plan
FS-3	Study Air Quality Effects of High Speed Freeway Travel
FS-4	Evaluate Parking Management Incentive Program
FS-5	Enhanced Housing Incentive Program
FS-6	Further Smog Check Program Improvements
FS-7	Parking Cash Out Pilot Program
FS-8	Refinery Blowdown Systems
FS-9	Refinery Wastewater Systems
FS-10	Organic Liquid Storage Tanks
FS-11	Marine Tank Vessel Activities

Emission Reduction Summary

Tables 10 and 11 provide a summary of the emission reductions expected from already adopted regulations and proposed control measures from 2000 to 2006, the attainment deadline. Figures 8 and 9 illustrate the emissions reductions of VOC and NOx expected from adopted regulations and proposed control measures from 1995 to 2006.

This SIP submittal reflects a commitment to achieve an additional 8.2 tpd reduction in VOC emissions by 2006 through adoption and implementation of *any combination* of the stationary source

control measures listed in Tables 5. It also reflects a commitment to achieve an additional 0.5 tpd reduction in VOC emissions and a 0.7 tpd reduction in NOx emissions by 2006 through adoption and implementation of *any combination* of the transportation control measures listed in Table 8. For stationary source measures, adopted regulations will be submitted to EPA within six months of adoption to fulfill this commitment. TCMs will be implemented through MTC funding allocations in the RTP and TIP, with progress documented in future conformity determinations.

TABLE 10
ESTIMATED 2000 – 2006 EMISSION REDUCTIONS: VOLATILE ORGANIC COMPOUNDS

	Estimated VOC Reduction (tpd), 2000 to 2001	Estimated VOC Reduction (tpd), 2000 to 2002	Estimated VOC Reduction (tpd), 2000 to 2003	Estimated VOC Reduction (tpd), 2000 to 2004	Estimated VOC Reduction (tpd), 2000 to 2005	Estimated VOC Reduction (tpd), 2000 to 2006
Inventory Reduction for Stationary and Area Sources	4.3	7.8	13.7	17.7	22.5	24.1
Inventory Reduction for Mobile Sources	13.6	29.0	43.3	57.3	70.8	84.5
Subtotal – Emission Inventory	17.9	36.8	57.0	75.0	93.3	108.6
Proposed Stationary Source Measures	0.0	1.9	8.1	8.2	8.2	8.2
Proposed Mobile Source Measures	0.0	1.0	3.0	3.5	4.0	4.0
Proposed Transportation Control Measures (A-E)	0.05	0.09	0.16	0.28	0.38	0.5
Subtotal - Proposed Measures	0.1	3.0	11.3	12.0	12.6	12.7
Total	18.0	39.8	68.3	87.0	105.9	121.3

TABLE 11
ESTIMATED 2000 – 2006 EMISSION REDUCTIONS: NITROGEN OXIDES

	Estimated NOx Reduction (tpd), 2000 to 2001	Estimated NOx Reduction (tpd), 2000 to 2002	Estimated NOx Reduction (tpd), 2000 to 2003	Estimated NOx Reduction (tpd), 2000 to 2004	Estimated NOx Reduction (tpd), 2000 to 2005	Estimated NOx Reduction (tpd), 2000 to 2006
Inventory Reduction for Stationary and Area Sources	(21.5)	(13.7)	(5.1)	9.4	17.5	23.8
Inventory Reduction for Mobile Sources	13.8	26.5	47.4	63.1	78.6	99.0
Subtotal – Emission Inventory	(7.7)	12.8	42.3	72.5	96.1	122.8
Proposed Stationary Source Measures	0.0	0.0	0.0	0.0	0.0	0.0
Proposed Transportation Control Measures (A-E)	.07	.14	.24	.40	.54	.70
Subtotal - Proposed Measures	0.1	0.1	0.2	0.4	0.5	0.7
Total	(7.66)	12.9	42.5	72.9	96.6	123.5

FIGURE 8
1995 – 2006 VOC EMISSIONS: EXISTING AND PROPOSED MEASURES

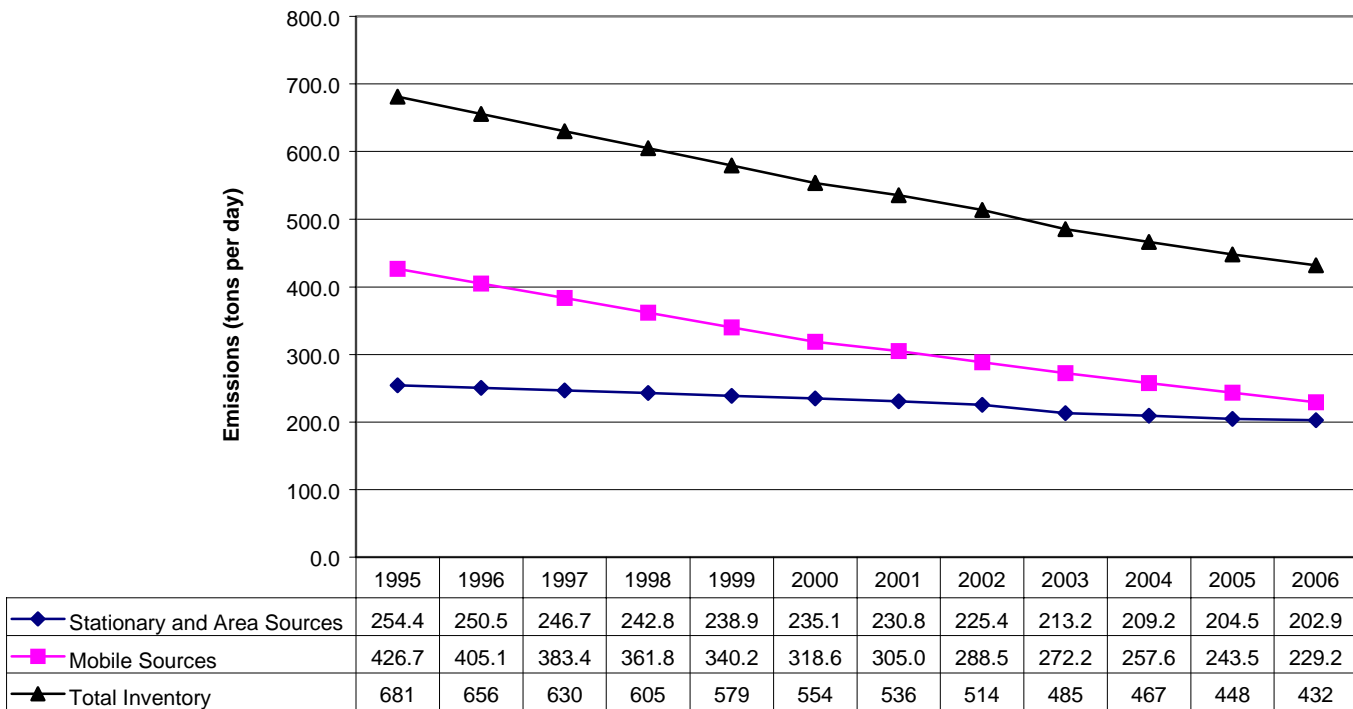
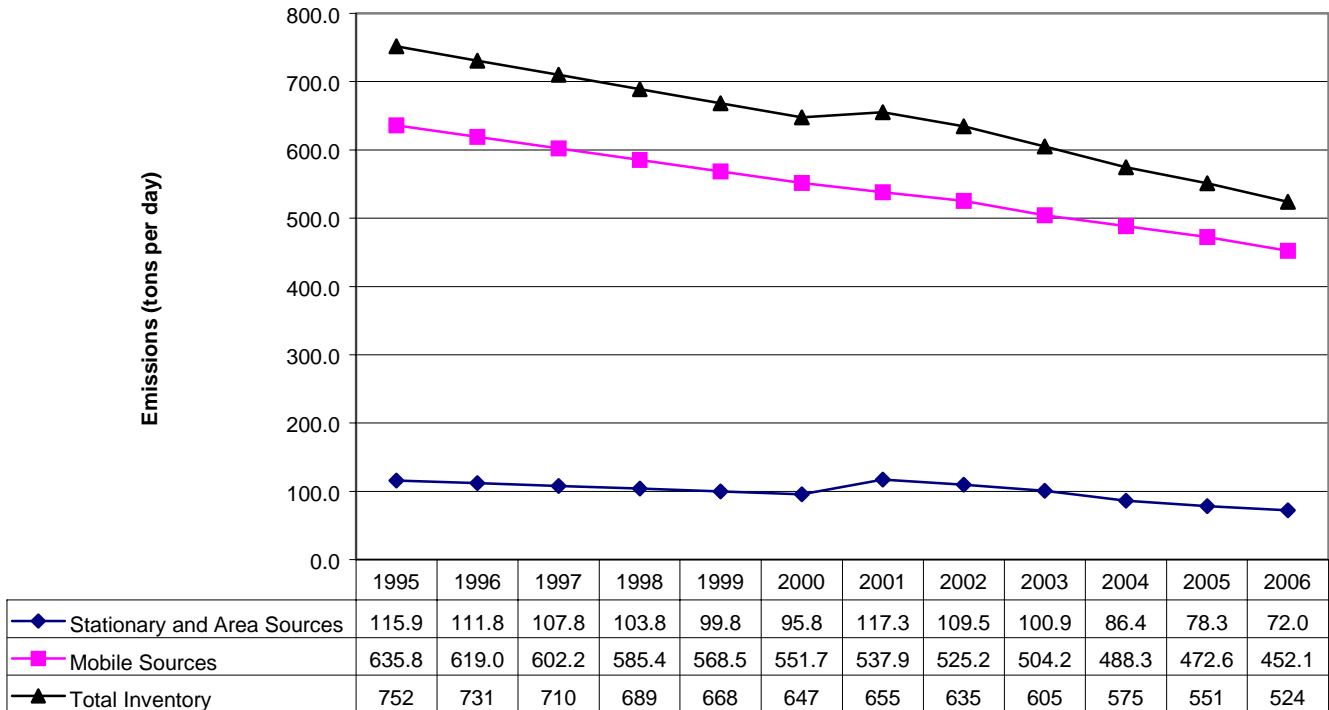


FIGURE 9
1995 – 2006 NO_x EMISSIONS: EXISTING AND PROPOSED MEASURES



Demonstrating Reasonable Further Progress

The overall control strategy in this Plan achieves 121.3 tpd reduction in VOC emissions between 2000 and 2006, the attainment deadline. This results in a 3.8% per year reduction in VOC emissions, which exceeds the Clean Air Act's rate of progress goal of 3% per year.

In the March 30, 2001 *Federal Register* notice, EPA has proposed that if the Bay Area's attainment deadline is 2005 or later, that reasonable further progress be satisfied by "phasing

50% of the needed reductions half way between the time of the attainment demonstration and the attainment date". We are interpreting this proposed requirement as achieving 60.7 tons/day VOC reductions by 2003. The co-lead agencies will report on compliance with this milestone in March 2004.

We are also committing to achieve the full emissions reductions from this Plan's *new* control measures by 2006. The co-lead agencies will report on compliance with this milestone in March 2007. However, because we are submitting a revision to the SIP in 2004, this commitment may be revised.

SECTION 6:
CONTINGENCY MEASURES

Contingency measures are those control measures that take effect if the control measures identified in an attainment plan are not adequate to return the region to attainment by the attainment deadline. EPA has proposed approval of the contingency measures in the 1999 Plan, which include six BAAQMD regulations as well as ARB controls on mobile sources and consumer products (see Tables 18, 19 and 20 in the 1999 Plan). These measures will yield emissions reductions through 2009 and beyond.

Since Clean Air Act Section 172(c)(9) requires the identification of contingency measures as a standard requirement for attainment plans, this Plan must provide contingency measures that provide emissions reductions beyond 2006, the attainment deadline.

In 2006, if the Bay Area records more than one exceedance at a single monitoring site and has not already attained the standard in the 2002 – 2006 timeframe, a requirement to implement

contingency measures would be triggered. The contingency measures identified to meet this requirement include ARB's adopted mobile source controls. These regulations are already adopted and will be implemented without further action by the co-lead agencies, ARB or EPA.

Mobile source measures adopted by ARB will provide significant VOC and NO_x reduction well past the 2006 horizon of this plan.

SECTION 7: FUTURE AIR QUALITY PLANNING

In 2003, the co-lead agencies will evaluate air monitoring and the findings of the Central California Ozone Study. In October 2003, the co-lead agencies will hold a public meeting to present the results of CCOS modeling and the latest air monitoring data. In December 2003, a mid-course review of the Plan will be conducted. The co-lead agencies will prepare a new SIP submittal, including a revised attainment target and new control measures as needed to attain by 2006, by April 2004. (See "Revised Attainment Assessment" section for detail.)

In addition to the existing 1-hour standard, in 1997, EPA published a new national ozone standard – 0.08 ppm – averaged over 8 hours (62 Fed. Reg. 38855). In July 2000, based on air monitoring data from 1997 – 1999, the ARB recommended to EPA a nonattainment designation for the Bay Area for the new 8-hour standard. A plan to attain the 8-hour standard would have been due in 2003. However, a number of issues were litigated in a challenge brought by the American Trucking Association. Certain issues were resolved on appeal to the U.S. Supreme Court, which will probably allow EPA to move forward with setting plan requirements for the 8-hour standard.¹³ The schedule for submitting attainment plans for the 8-hour standard has not been set.

¹³ The EPA Administrator revised the ozone and particulate matter NAAQS in 1997 pursuant to authority given in Section 109(a) of the Clean Air Act (42 U.S.C. § 7401 et seq.). The American Trucking Association ("ATA"), business groups and several states challenged these revised NAAQS on several grounds in a case brought directly to the United States Court of Appeals, District of Columbia Circuit. The D.C. Circuit Court of Appeals ruled, *inter alia*, that (1) EPA's interpretation of Section 109 was an improper delegation of legislative power to the EPA Administrator in violation of the Federal Constitution and thus remanded the new ozone and particulate matter NAAQS to the EPA; and (2) EPA's implementation of the new ozone NAAQS was constrained by provisions in the Clean Air Act, Title I, Part, Subpart 2 (*i.e.*, Sections 181 to 185B; 42 U.S.C. §§ 7511 to 7511f) as opposed to the more general requirements in Subpart 1 *i.e.*, Section 172 et seq.). This case was appealed to the United States Supreme Court and the Supreme Court ruled, *inter alia*, that: (1) the Clean Air Act Section 109(b)(1) does not delegate legislative power to the EPA; and (2) EPA's implementation policy for the new and revised NAAQS is unreasonable and unlawful. By remanding the development of the new NAAQS implementation policy to EPA, the 8-hour national ozone standard must go through a formal rulemaking process before it can be implemented. See *Whitman et al. v. American Trucking Assn. et al.*, 531 U.S. ____ (2001)

Technology-advancing mobile source control measures continue to drive emission rates down, and are projected to result in a 25% VOC reduction and a 20% NO_x reduction from 2005 through 2010. These measures are already adopted and will be implemented without further actions by the co-lead agencies, ARB or EPA.

The California Clean Air Act's (CCAA) 1-hour standard for ozone, 0.09 ppm, is significantly (25%) more stringent than the national 1-hour standard, 0.12 ppm. Pursuant to California Health and Safety Code §40924, the BAAQMD prepares a plan called the *Clean Air Plan* every 3 years to address requirements of the CCAA. The most recent plan was prepared in 2000. The *Clean Air Plan* strategy is to adopt all feasible control measures on an expeditious schedule. The BAAQMD will revise its *Clean Air Plan* in 2003 according to schedules in the California Clean Air Act. Plans and programs prepared for State purposes are not transmitted to EPA and are not part of this plan.

The control measures in this Plan will be helpful in attaining both the federal 8-hour standard and the State 1-hour standard.

Land Use, Transportation and Air Quality

It is now widely recognized that the location, intensity and design of development directly influences the way people travel between home, work, shops, schools and other destinations. In many parts of the region, inadequate housing supply, low density development and separated land uses contribute to long commutes and high automobile use. The co-lead agencies are seeking to encourage compact, infill and transit-oriented development – which places housing, jobs, shops and services closer together and nearer to public transportation. Then, walking, bicycling and transit will become more attractive options for many of our daily trips, and air pollutant emissions will be reduced.

Over the years, the co-lead agencies have implemented numerous programs to address the connection between land use, transportation and air quality. These programs include the following:

- Transportation for Livable Communities Program (MTC)
- Housing Incentive Program (MTC)
- Transportation Fund for Clean Air grants (BAAQMD)
- Subregional Planning Pilot Projects (ABAG)
- Guidance documents and technical assistance (ABAG, BAAQMD, MTC)
- Analysis of alternative land use patterns and transportation and air quality impacts (MTC)

- (State) Clean Air Plan TCMs addressing local land use, bicycle and pedestrian travel, traffic calming (ABAG, BAAQMD, MTC)
- Endorsement of air quality beneficial development projects (BAAQMD)
- Workshops, conferences, symposiums (ABAG, BAAQMD, MTC)

The co-lead agencies will continue to address the land use/transportation/air quality connection through the Smart Growth process currently underway in the region. The three co-lead agencies, in cooperation with other regional agencies, the Bay Area Alliance for Sustainable Development and other stakeholders, have embarked on a Smart Growth process for the San Francisco Bay Area. Through county workshops with local officials and the public, the regional agencies intend to identify: (1) alternative land use patterns that promote infill and transit-oriented development and encourage increased transit use, walking and bicycling, and (2) incentives needed to implement the desired land use changes. The workshops will convene in 2001 and 2002. ABAG will then prepare an alternative set of population and employment projections to reflect the alternative land use patterns. These alternative demographic projections could be incorporated into future regional plans, including the Regional Transportation Plan and air quality plans.

APPENDIX A: ABBREVIATIONS AND TERMINOLOGY

ABAG	Association of Bay Area Governments
ARB	(California) Air Resources Board
BAAQMD	Bay Area Air Quality Management District
BAR	Bureau of Automotive Repair
BEIS	Biogenic Emissions Inventory System
BURDEN	Refers to computer program that uses vehicle activity data along with EMFAC to calculate motor vehicle emissions
CAA	(Federal) Clean Air Act
CAP	(Bay Area 2000) Clean Air Plan
CCAA	California Clean Air Act
DMV	(California) Department of Motor Vehicles
EITAC	Emission Inventory Technical Advisory Committee
EMFAC	Refers to emissions factors used in ARB's motor vehicle emissions inventory model
EPA	(United States) Environmental Protection Agency
Fed. Reg.	<i>Federal Register</i>
I & M	(Motor Vehicle) Inspection and Maintenance Program
MTC	Metropolitan Transportation Commission
NAAQS	National Ambient Air Quality Standards
NO _x	Oxides of Nitrogen
O ₃	Ozone
ppb	Parts per billion
SIP	State Implementation Plan
TCMs	Transportation Control Measures
TPD	Tons per day
VMT	Vehicle miles traveled
VOC	Volatile organic compounds

APPENDIX B: CONTROL MEASURE DESCRIPTIONS

Appendix B of the Bay Area 2001 Ozone Attainment Plan (Plan) includes a description of each new control measure in the Plan (i.e., those measures that are proposed for adoption, implementation, and submittal into the State Implementation Plan). For each transportation control measure, the description includes the implementation date, a description of the measure, and potential environmental, economic or social impacts of the measure. For each stationary, area and mobile source measure, the description includes an estimate of the emission reductions to be achieved from implementing the measure, an estimate of cost

effectiveness, the year of adoption, the implementation date, a description of the control requirements, and possible environmental, economic or social impacts of the measure. ARB measures are not included in this appendix because all of ARB's measures have already been adopted and the estimated emission reductions are already reflected in the baseline emission inventory (Table 4). See brief descriptions of ARB regulations in Section 5: Control Strategy.

Transportation Control Measures

TCM A	Regional Express Bus Program
TCM B	Bicycle / Pedestrian Program
TCM C	Transportation for Livable Communities
TCM D	Expansion of Freeway Service Patrol
TCM E	Transit Access to Airports

Mobile Source Control Measure

MS-1	Motor Vehicle Inspection and Maintenance Program: Liquid Leak Inspection and Improved Evaporative System Test
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Stationary and Area Source Control Measures

SS-11	Improved Architectural Coatings Rule
SS-12	Improved Storage of Organic Liquids Rule
SS-13	Surface Preparation and Cleanup Standards for Metal Parts Coating
SS-14	Aqueous (Water-Based) Solvents
SS-15	Petroleum Refinery Flare Monitoring
SS-16	Low Emission Refinery Valves
SS-17	Improved Process Vessel Depressurization Rule

TRANSPORTATION CONTROL MEASURE A

Measure Name: **Regional Express Bus Program**

Implementation Date: FY 2003

Implementing Agencies: MTC, Transit Operators

Description:

Program assumes purchase of approximately 90 low emission buses to operate regional express bus services (actual service and routes to be determined, based on a review of transit operator applications). The buses will meet all applicable CARB standards and will include particulate traps or filters. MTC will provide \$40 million in funding for bus acquisition. Program contingent on operating funds being provided by express bus operators. TCM A complete once \$40 million in funding pursuant to Government Code Section 14556.40 is approved by the California Transportation Commission and obligated by bus operators.

Other Impacts: Improved mobility for Bay Area residents. Increased accessibility to employment centers.

TRANSPORTATION CONTROL MEASURE B

Measure Name: **Bicycle/Pedestrian Program**

Implementation Date: FY 2004 - 2006

Implementing Agencies: MTC, local cities, counties, and regional owners / managers of recreational bicycle trails such as the East Bay Regional Parks District

Description:

Fund high priority projects in countywide plans consistent with TDA funding availability. MTC would only fund projects that are exempt from CEQA, have no significant adverse environmental impacts or adequately mitigate any significant adverse environmental impacts (projects with adverse environmental impacts that cannot be mitigated would need to secure funding from other sources). Actual emission reductions will be based on the projects funded. This TCM would be implemented once \$15 million in TDA Article 3 funding is allocated by MTC.

Other Impacts: Improved mobility for Bay Area residents. Increased accessibility to recreation sites.

TRANSPORTATION CONTROL MEASURE C

Measure Name: **Transportation for Livable Communities**

Implementation Date: FY 2004 - 06

Implementing Agencies: MTC, local cities and counties

Description:

Program provides planning grants, technical assistance, and capital grants to help cities and nonprofit agencies define and implement transportation projects that support community plans. MTC would only fund projects that are exempt from CEQA, have no significant adverse environmental impacts or adequately mitigate any significant adverse environmental impacts (projects with adverse environmental impacts that cannot be mitigated would need to secure funding from other sources). Complete once \$27 million in funding is approved by MTC.

Other Impacts: Improved accessibility.

TRANSPORTATION CONTROL MEASURE D

Measure Name: **Expansion of Freeway Service Patrol**

Implementation Date: FY 2001

Implementing Agencies: MTC Service Authority for Freeways and Expressways (MTC SAFE), Caltrans and the California Highway Patrol

Description:

Operation of 55 lane miles of new roving tow truck patrols to clear incidents and reduce delay on Bay Area freeways during peak periods. This service encompasses 55 new miles of any combination of services compared to levels operated in 2000. This TCM would be complete by maintaining service through the 2006 attainment year. Trucks used in this service are new vehicles meeting all applicable CARB standards.

Other Impacts: Reduced congestion on freeways. Increase mobility for freeway users.

TRANSPORTATION CONTROL MEASURE E

Measure Name: **Transit Access to Airports**

Implementation Date: FY 2003

Implementing Agencies: BART

Description:

Operation of new BART extension to San Francisco International Airport (SFO) will serve air passengers arriving and departing the airport and provide emission reductions by eliminating a number of auto access trips and vehicle miles traveled. The BART extension is estimated to be operational in FY 2003. These air passenger trips and emission reductions are not accounted for in the Baseline and represent new credits (the MTC travel model does not specifically account for air passenger trips on transit to airports).

Other Impacts: Reduced congestion on freeways. Improved travel time reliability for air passengers trying to catch flights.

CONTROL MEASURE MS-1

Measure Name: **Improved Motor Vehicle Inspection and Maintenance Program: Liquid Leak Inspection and Improved Evaporative System Test**

Emission Reduction Estimates:

Source Category:	Volatile Organic Compounds (tons/day)						
	2000	2001	2002	2003	2004	2005	2006
<i>On-Road Motor Vehicles (Evaporative Emissions Only)</i>	105	98	92	87	82	78	74
Subject to Control*	12.1	12.3	12.5	12.6	12.9	13.1	13.1
Potential Reduction**	0	0	0	0	0.5	2.0	4.0

* EMFAC 2000 Assumption: 1.68% of fleet leaking gasoline at 4.3 grams/mile.

** Source: California Air Resources Board.

Cost Effectiveness: Unknown

Year of Adoption: 2002

Implementation Date: 2002/03

Description:

California's Motor Vehicle Inspection and Maintenance (I & M) Program, "Smog Check", has varying test requirements by geographic area, with more comprehensive and costly tests required in the areas with the worst air quality. The Bay Area is required by federal law to implement a "Basic" I & M Program. Sacramento and San Joaquin Valley cities, as well as Vacaville in Solano County, are required to implement an "Enhanced" I & M Program. Given that some I & M Program tests provide a very cost effective means of reducing mobile source emissions, it is advantageous for the Bay Area to opt into those tests that are likely to yield large VOC emissions reductions.

Several new proposed tests appear especially promising for reducing VOC emissions: (1) a visual inspection test for liquid leaks, (2) a test to determine if the fuel tank's evaporative control system is functioning properly, (3) stricter testing standards (emission cutpoints for passing), and (4) other VOC reduction elements. The Bureau of Automotive Repair (BAR) is already developing test protocols for these new program elements. These tests should be implemented statewide in all I & M test areas: Enhanced, Basic and Change-of-Ownership. If required, BAAQMD will request that the BAR implement these new program elements in the Bay Area, provided the test protocol and related analyses confirm our expectation of cost effective emissions reductions. BAR can adopt the program elements in regulatory form. Reducing evaporative emissions is critical, given that on very hot days, evaporative emissions can exceed exhaust emissions.

Other Impacts:

Repair of fuel line and gas tank leaks would result in reduced gasoline consumption, partially or fully offsetting motorists' additional test costs. Better fuel economy would reduce carbon dioxide and other "greenhouse gas" emissions.

CONTROL MEASURE SS-11

Measure Name: **Improved Architectural Coatings Rule (8-3)**

Emission Reduction Estimates:

Source Category:	Volatile Organic Compounds (tons/day)						
	2000	2001	2002	2003	2004	2005	2006
<i>Buildings and Structures Coating</i>	24.6	24.7	24.6	24.7	24.8	24.9	24.9
Subject to Control	24.6	24.7	24.6	24.7	24.8	24.9	24.9
Cumulative Reduction	0	0	0	2.9	2.9	2.9	2.9

Cost Effectiveness: \$ 1,100 / ton VOC

Year of Adoption: 2001

Implementation Date: 2003/04

Description:

District Regulation 8, Rule 3 controls the volatile organic compound (VOC) content of architectural coatings, which are those coatings used on stationary structures, appurtenances and pavement. In June, 2000, the Air Resources Board (ARB) adopted a Suggested Control Measure (SCM) for architectural coatings. The SCM is based on South Coast AQMD's Rule 1113 revisions adopted in 1996, 1998 and 1999 and on survey data of available coatings. Control Measure SS-11 would adopt the provisions of the SCM into Rule 3. Adoption of the SCM limits will reduce allowable VOC emissions from the largest volume categories of architectural coatings, will redefine and add some categories of coatings, and may provide flexibility options for manufacturers of architectural coatings. During rule development for this measure, the District will continue to apply the District Stratospheric Ozone Policy (Board Resolution 2053) to assure that rule provisions do not allow the use of stratospheric ozone depleting substances or toxic air contaminants as substitute solvents.

Other Impacts:

None expected.

CONTROL MEASURE SS-12

Measure Name: **Improved Storage of Organic Liquids Rule (8-5)**

Emission Reduction Estimates:

Source Category:	Volatile Organic Compounds (tons/day)						
	2000	2001	2002	2003	2004	2005	2006
<i>Storage Tanks</i>	5.4	5.3	5.4	5.4	5.5	5.6	5.7
Subject to Control	5.4	5.3	5.4	5.4	5.5	5.6	5.7
Cumulative Reduction	0	0	1.9	1.9	1.9	1.9	1.9

Cost Effectiveness: \$ 6,350 to \$ 11,900 / ton VOC

Year of Adoption: 2002

Implementation Date: 2002

Description:

Regulation 8, Rule 5 requires vapor loss controls for tanks storing organic liquids. The degree of control required depends upon the size of the tank and the true vapor pressure of the tank contents. New control requirements for slotted guidepoles were included in the 1999 Plan as Measure SS-07 and were implemented by 1999 amendments to Regulation 8, Rule 5. This new measure would require better seals or upgrades upon replacement and more frequent inspections of seals and fittings.

Other Impacts:

This control measure may reduce refinery odor impacts and emissions of benzene, a toxic air contaminant.

CONTROL MEASURE SS-13Measure Name: **Surface Preparation and Cleanup Standards for Metal Parts Coating (8-19)**

Emission Reduction Estimates:

Source Category:	Volatile Organic Compounds (tons/day)						
	2000	2001	2002	2003	2004	2005	2006
<i>Misc. Metal & Small Appliance Clean-up / Large Appliance & Metal Furniture Clean-up</i>	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Subject to Control	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Potential Reduction	0	0	0	0.3	0.3	0.3	0.3

Cost Effectiveness: \$ 1,100 / ton VOC

Year of Adoption: 2002

Implementation Date: 2003

Description:

District Regulation 8, Rule 14 limits the VOC content of coatings applied to large appliances. Regulation 8, Rule 19 applies similar limits for the coating of metal parts. Neither rule includes VOC limits or composite partial pressure limits for cleanup and surface preparation solvents. The South Coast AQMD and a few other California districts have adopted limits for solvents. Some districts also allow, as an alternative, the use of an enclosed solvent cleaner for clean up of spray equipment. The district rules typically include a VOC limit for surface preparation and clean-up solvent of about 70 g/l VOC, which is consistent with the BAAQMD limit for surface preparation solvents for the auto refinishing industry (Regulation 8, Rule 45). Many low-VOC solvents are currently available to meet such a limit. Emission reductions are not expected to be large because the metal parts coating industry already uses aqueous solutions like phosphate rinses or anodizing baths for many surface preparation tasks. During rule development for this measure, the District will continue to apply the District Stratospheric Ozone Policy (Board Resolution 2053) to assure that rule provisions do not allow the use of stratospheric ozone depleting substances or toxic air contaminants as substitute solvents.

Other Impacts:

None expected. Because this industry already uses many aqueous solutions and has containment in place to meet existing discharge limitations, no impacts on water quality are expected.

CONTROL MEASURE SS-14

Measure Name: **Aqueous (Water-Based) Solvents**

Emission Reduction Estimates:

Source Category:	Volatile Organic Compounds (tons/day)						
	2000	2001	2002	2003	2004	2005	2006
<i>Cold Cleaning</i>	6.3	5.9	6.0	5.5	5.5	5.6	5.7
Subject to Control	6.3	5.9	6.0	5.5	5.5	5.6	5.7
Potential Reduction	0	0	0	3.0	3.0	3.0	3.0

Cost Effectiveness: \$ 4000 / ton VOC

Year of Adoption: 2002

Implementation Date: 2003

Description:

Current District Regulation 8, Rule 16 limits the VOC content of cleaning solutions used in cold cleaners. The rule is based in part on South Coast AQMD Rule 1171. The South Coast rule sets a 50-gram-per-liter standard for general cleaning but exempts paper-based gaskets and clutch assemblies from this standard. It also includes a number of specialized cold cleaning categories with standards that vary from 600 grams per liter to 900 grams per liter. Many of these relatively high-VOC limits drop to much more stringent limits in 2005, but a technology assessment is scheduled in 2004 to evaluate whether the more stringent limits are feasible. Because the South Coast rule includes exemptions from its general cleaning standard that permit auto repair facilities, which are responsible for the majority of cold cleaning emissions, to have an organic solvent cold cleaner, and because of BAAQMD experience that enforcing restrictions on what part can be cleaned in the organic solvent cleaner is difficult, the current BAAQMD rule exempts one solvent cleaner per facility from its 50-gram-per-liter standard, but requires all other cleaners to either meet the standard or to have a permit. The BAAQMD and other districts do not require permits for the small remote-reservoir cold cleaners typically found in repair shops. In practical effect, the SCAQMD rule and the BAAQMD rule are similar. On April 19, 2001, the San Joaquin Valley Unified APCD adopted a rule with a 50-gram-per-liter standard, with more limited exemptions than those found in the SCAQMD rule and without the specialty cleaning categories. Though the BAAQMD rule has produced some of the emission reductions that would come from adopting South Coast requirements in the Bay Area, further emission reductions could be achieved by amendments to the BAAQMD rule. Because many types of industry found in the SCAQMD and Bay Area are not found in the San Joaquin Valley, the SJVUAPCD rule does not include provisions for specialty cleaning that are found in the SCAQMD rule and are likely to be necessary in the Bay Area. This measure would remove exemptions for a single solvent cleaner per facility and for solvent cleaners with permits and would require Bay Area adoption of general cleaning requirements like those in the SJVUAPCD rule and specialty cleaning requirements like those in the SCAQMD rule. During rule development for this measure, the District will continue to apply the District Stratospheric Ozone Policy (Board Resolution 2053) to assure that rule provisions do not allow the use of stratospheric ozone depleting substances or toxic air contaminants as substitute solvents.

Other Impacts:

This measure has some potential to increase water quality impacts if users of aqueous cleaners are more likely than users of organic solvent cleaners to illegally discharge spent solutions into wastewater systems.

CONTROL MEASURE SS-15

Measure Name: **Petroleum Refinery Flare Monitoring**

Emission Reduction Estimates:

Source Category:	Volatile Organic Compounds (tons/day)						
	2000	2001	2002	2003	2004	2005	2006
<i>Petroleum Refining Facilities/Flares and Blowdown Systems*</i>	13	13	13	13	13	13	13
Subject to Control	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Potential Reduction	0	0	0	0	TBD	TBD	TBD

Cost Effectiveness: TBD

Year of Adoption: 2003

Implementation Date: 2004

Description:

Refineries use blowdown systems to collect and separate both liquid and gaseous discharges from various refinery process units and equipment. Blowdown systems generally recover liquids and send gases to the fuel gas system for use in refinery combustion. Flares provide a safety and emission control mechanism for blowdown systems when the heating value of the gas stream cannot be recovered due to uncertain or intermittent releases, often during process upsets or emergencies. Flares combust these gases and prevent their direct release to the atmosphere. They are designed to handle large fluctuations in the flow rate and hydrocarbon content of gases. Under normal conditions, flare combustion efficiency is greater than 98%. However, with some accidents and upsets, efficiency may be lower. Regardless of efficiency, combustion of sulfur-containing gases produces sulfur dioxide and other sulfur compounds, which may cause health and odor impacts. Though the District conducted flare monitoring in 1989 and 1989, the flow monitoring tools available then made determining flare emissions extremely difficult. However, newer technologies, particularly ultrasonic flow monitors, have made more accurate determinations possible. In 1998, the South Coast AQMD adopted its Rule 1118 to require refinery flare monitoring. Monitors were installed and operational by late 2000. This measure would involve adoption of a flare monitoring rule similar to the SCAQMD rule.

Other Impacts:

This measure may provide information that would allow refiners to reduce flaring and resulting releases of sulfur dioxide and other compounds with potential for health and odor impacts.

* Emissions vary widely from day to day. This estimate of average daily emissions includes emissions from accidents and process upsets and is based on a District flare study from 1990. Emissions have been calculated from 1988 and 1989 data on volume and BTU content of gas flared at each flare. Different assumptions about efficiency of this and other flares could alter calculated emissions significantly.

CONTROL MEASURE SS-16

Measure Name: **Low-Emission Refinery Valves**

Emission Reduction Estimates:

Source Category:	Volatile Organic Compounds (tons/day)						
	2000	2001	2002	2003	2004	2005	2006
<i>Petroleum Refining Facilities/Fugitives</i>	5.3	5.4	5.4	5.5	5.6	5.7	5.8
Subject to Control	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Potential Reduction	0	0	0	0	TBD	TBD	TBD

Cost Effectiveness: TBD

Year of Adoption: 2003

Implementation Date: 2004

Description:

Current District Regulation 8, Rule 18 requires that refineries, chemical plants, bulk plants, and bulk terminals utilize a leak detection and repair (LDAR) program to minimize fugitive emissions from components like valves, pumps, compressors, pressure relief devices, and connectors. The leak standards in BAAQMD Regulation 8, Rule 18 are the most stringent standards in any California air district rule and range from 100 ppm to 500 ppm, depending on the type of equipment. For valves at new refinery sources, the District requires the installation of best available control technology (BACT), defined as bellows valves, diaphragm valves, quarter-turn valves, live-loaded valves, or other low-emission valves. However, replacements of existing refinery valves are exempt from BACT requirements under the District's permit rule (Regulation 2, Rule 1). This control measure would consist of amendments to Regulation 8, Rule 18 to require that replacement valves meet BACT requirements or that they be "leakless" valves. The measure may also add incentives to Regulation 8, Rule 18 to encourage the early replacement of valves with low-emission valves or "leakless" valves.

Other Impacts:

This measure may reduce refinery odor impacts.

CONTROL MEASURE SS-17Measure Name: **Improved Process Vessel Depressurization Rule (8-10)**

Emission Reduction Estimates:

Source Category:	Volatile Organic Compounds (tons/day)						
	2000	2001	2002	2003	2004	2005	2006
<i>Petroleum Refining Facilities/Fugitives/Vessel Depressurization</i>	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Subject to Control	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Potential Reduction	0	0	0	0	0.07	0.07	0.07

Cost Effectiveness: \$ 1,000 / ton VOC

Year of Adoption: 2003

Implementation Date: 2004

Description:

The current requirement in Regulation 8, Rule 10 for refinery vessel depressurization is to abate emissions until the internal atmosphere reaches 1000 mm Hg (4.6 psig). The vessel may then be vented to the atmosphere even if saturated with hydrocarbon vapors. The measure would require that emissions be abated to a more stringent standard, until the atmosphere reaches a lower internal pressure, or until the hydrocarbon concentration inside the vessel reaches a minimal point. Depressurizations are infrequent events. As a result, daily average emissions are small. However, this control measure may help reduce significant releases of pollutants, including toxic compounds, on those infrequent occurrences.

Other Impacts:

None expected.

APPENDIX C: REASONABLY AVAILABLE CONTROL MEASURE ANALYSIS

Appendix C of the Bay Area 2001 Ozone Attainment Plan (Plan) sets forth the BAAQMD's reasonably available control measure (RACM) analysis for the plan. Section 172(c)(1) of the Clean Air Act (CAA) states that nonattainment plans "...shall provide for the implementation of all reasonably available control measures as expeditiously as practicable (including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology) and shall provide for attainment of the national primary ambient air quality standards."

In 1992, EPA published general guidance (called the General Preamble) describing how it intended to implement the state implementation plan requirements of Title I of the CAA (57 Fed. Reg. 13498). EPA explained that, in reviewing state SIP revisions, it would interpret section 172(c)(1) as requiring states to consider all available control measures and to adopt those measures that are reasonably available for implementation in light of local circumstances. EPA also noted that its interpretation of the RACM requirement would not require the adoption of measures if they would not advance the attainment date or would cause adverse economic or other impacts. EPA stated that the impacts need not be substantial and widespread for a measure to be rejected as not reasonably available. With regard to TCMs, EPA changed its earlier view that TCMs listed in §108(f) of the CAA are presumed to be reasonably available. Instead, TCMs were to be fully evaluated in light of local conditions. EPA also indicated that it "...does not believe that Congress intended the RACM requirement to compel the adoption of measures that are absurd, unenforceable, or impracticable."

In reviewing stationary source measures for possible adoption in the Bay Area, the District employed a *de minimis* standard to ensure the inclusion of measures with potential emission reductions that might help attain the standard while not so minor as to impose administrative burdens that would hinder the effectiveness of the overall effort to adopt measures. (See 66 Fed. Reg. 26929 (May 15, 2001)). This *de minimis* standard is an expression of the EPA policy that the RACM requirement should not compel impracticable measures. It recognizes the CAA requirement that plans must ensure that agencies have adequate personnel, funding, and authority under state and local law to carry them out. (See CAA Section 110(a)(2)(E)(i)). While a single measure may appear to be reasonably available if technologically and economically feasible, if viewed in isolation, its emission reductions may be so minor as to be outweighed by the administrative burdens and sheer impracticability of achieving them. The development of a BAAQMD rule to implement a measure typically requires six months to one year during which emission sources must be located and their emissions estimated or measured; the industrial process must be studied and understood; control technologies must be researched; and regulatory language must be developed, taken to workshops, and ultimately presented to the District's Board of Directors following

procedures required by California law. This process imposes significant burdens on BAAQMD rule development staff, the BAAQMD Board, and the industry to be regulated. In addition, however, because virtually all significant emission source categories in the Bay Area are already regulated, additional emission reductions often come from the regulation of previously unregulated minor emission sources. This requires additional enforcement and legal resources to locate sources, provide compliance information, inspect for compliance, and ensure compliance through available administrative and legal remedies. Even where a measure involves more stringent restrictions on currently regulated sources, minor incremental emission reductions often must come from the use of a new technology, which typically involves difficult determinations regarding feasibility and cost effectiveness during the rule development process. Or the incremental emission reductions may seem so small, given significant emission reductions previously achieved for the sources, that operators of the sources perceive the additional restrictions to be unfair. Furthermore, even though these sources are already regulated, the same additional enforcement and legal resources required to regulate entirely new source categories are often required when operators of sources must use a new technology to comply.

The *de minimis* standard was set at 0.1 ton per day. Even with the more stringent California ozone standard and its mandate to adopt all feasible measures, this is a level below which the BAAQMD has not proceeded with rule development except to ensure statewide uniformity of local air district rules or for policy reasons unrelated to the efficacy of a measure in reducing ozone.

Section 172(c)(1) of the CAA indicates that RACM for stationary sources is reasonably available control technology (RACT) as that term is defined in the CAA. This was the view taken by EPA in its implementation guidance for the pre-1990 CAA (44 Fed. Reg. 20372). That guidance states that RACM "...includes reasonably available control technology (RACT) for stationary sources and reasonably available transportation control measures." In a recent RACM review, EPA has indicated that it continues to take this view. In its "Reasonably Available Control Measures (RACM) Analysis for the Dallas/Ft. Worth Ozone Nonattainment Area" (December, 2000), EPA stated:

"RACT is defined by EPA as the lowest emission rate achievable considering economic and technical feasibility. RACT level control is generally considered RACM for major sources."

To establish RACT levels of controls for major sources, smaller point sources, and area sources, EPA prepares control techniques guidelines (CTGs) pursuant to section 183 of the CAA. In redesignating the Bay Area back to nonattainment for the federal ozone standard, EPA recognized that the BAAQMD had implemented all federal RACT requirements for major

sources and sources subject to CTGs (see 62 Fed. Reg. 66580). This continues to be the case.

Because the District has already implemented RACM for all sources subject to CAA requirements, it must seek additional emission reductions in order to make reasonable further progress as required by section 172(c)(2). In addition to looking at measures developed by the District for state plans, the District specifically reviewed the most ambitious air pollution control efforts in California and in other states, including those by the Texas Natural Resource Conservation Commission for the Dallas-Ft. Worth area and the Houston-Galveston area.

In California, the South Coast AQMD adopted or amended many rules in the period from 1998 to the present (all of which can be found on their website at www.aqmd.gov), but only a few were intended to produce significant VOC reductions. Of the adopted rules, only two affected a VOC source category found in the Bay Area and imposed controls more stringent than existing Bay Area controls. Both of the source categories affected, architectural coating and solvent cleaning, are the subject of new control measures proposed in the 2001 plan (see measures SS-11 and SS-14). Although the SCAQMD adopted VOC rules for two new categories: (1) spray booths at facilities with emissions over 20 tons per year, primarily furniture, fixture, boat, and aerospace manufacturers, and (2) food processors who use organic solvents in sterilization and other processing, these source categories are insignificant in the Bay Area. The SCAQMD also adopted controls for refinery hydrogen plant vents, but Bay Area sources of this type are already controlled as stringently by BAAQMD Regulation 8, Rule 2, which is part of the SIP.

In 1999, the Texas Natural Resource Conservation Commission prepared SIP submittals for the Dallas-Ft. Worth Area and for the Houston-Galveston area. Both Texas plans are primarily NOx control plans. The District reviewed both SIP submittals and found no VOC measure that imposed controls more stringent than those in current BAAQMD regulations. Most proposed or adopted controls are significantly less stringent than existing Bay Area controls. These plans can be found on the Texas agency's website at www.tnrcc.state.tx.us.

EPA's General Preamble and policy memoranda also indicate that, in an agency's RACM analysis, it should carefully consider any measure that a commentor indicates during a public comment period is reasonably available. The following tables sets forth the District's analysis of measures suggested during the public comment periods on the 1999 plan (Section I) and the draft 2001 plan (Section II). Section III includes a table analyzing measures included in the District's 2000 Clean Air Plan for the state ozone standard. In addition, Section IV includes a review of measures suggested by participants in community meetings held after initial adoption of the 2001 Plan by the co-lead agencies.

Reasonably Available Control Measure Review
Commentors' Suggestions for Stationary and Area Source Control Measures

Section I: Review of Comments on 1999 Ozone Attainment Plan

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
1	Aeration of Contaminated Soil	Chesapeake Environmental Group, Inc. <i>(fax, April 26, 1999)</i> Supports control measures SS-09 and SS-10 regarding aeration of contaminated soil and landfill cover.	Suggested control had been implemented at some Bay Area landfills through District permit conditions. Applying the control to all landfills in the region would achieve an estimated 2.68 tpd VOC reduction by 2000. Control measure is reasonably available.	Added to the SIP. <i>(Control measures SS-09 and SS-10 were included in the 1999 Plan, adopted as amendments to Regulation 8, Rule 40 and submitted to EPA.)</i>
2	Controls on Emissions from Pressure Relief Valves (PRV)	Communities for a Better Environment <i>(letter and attachments, January 14, 1999; letter, March 1, 1999)</i> The plan should include a measure to control emissions from pressure relief valves by banning atmospheric venting.	<p>Pressure relief valves (PRVs) are safety devices that release pressure to prevent catastrophic failure of refinery vessels. Prior to 1997, several California air districts (including the BAAQMD) regulated PRVs by requiring inspections of these devices at a specified frequency and by requiring repair of leaks within a period determined by the severity of the leak. In 1997 and 1998, the BAAQMD adopted amendments to Regulation 8, Rule 28 to require that existing PRVs be vented to a control device or that release prevention measures be implemented. With two PRV releases at a single source within a five-year period, control is required. This measure (SS-03) was included in the 1999 Plan.</p> <p>A complete ban on all atmospheric venting of PRVs is not reasonably available. The venting of any significant number of PRVs to gas recovery or flares would require significant redesign of refinery relief systems. For venting to gas recovery, this would mean increased compressor sizing and venting back to the process or to a holding tank to handle extremely large volumes and pressures. For venting to flares, new flare systems would be required. Simply requiring that all existing PRVs be vented to an existing flare might jeopardize the existing relief system at a refinery. Both the necessary new venting and control devices are expensive. The emissions to be controlled are episodic and, though potentially large on a per-event basis, relatively minor on an annual basis (0.1 tons per day). In 1997, the District estimated that cost effectiveness for preventing atmospheric venting was approximately \$38,000 to \$45,000 per ton. No air district in California has banned atmospheric venting. Control measure SS-03, which goes beyond the requirements of any other California air district, requires hazard</p>	Not included in the SIP. <i>(However, control measure SS-03, which required that PRVs be vented to a control device or that release prevention measures be implemented, was included in the 1999 Plan, adopted as amendments to Regulation 8, Rule 28, and submitted to EPA. In addition, the feasibility of the suggested measure and other measures to reduce emissions associated with the refinery blowdown system will be studied pursuant to further study measure FS-8.)</i>

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
			analysis and prevention measures for all PRVs, but controls only for those PRVs that prove to be problematic. Banning atmospheric venting for PRVs is not economically feasible and is therefore not currently a reasonably available control measure. Nevertheless, there may be opportunities to vent more PRVs to the refinery blowdown system. Because this will involve detailed analysis of each refinery, this potential will be examined through further study measure FS-8.	
3	Controls on Emissions from Storage Tanks	Communities for a Better Environment (<i>letter and attachments, January 14, 1999; letter, March 1, 1999</i>) The plan should require improvements in seals and fittings, including those for slotted guidepoles; remove vapor pressure exemptions; require improved tank designs, including conversion of external floating roof tanks to internal floating roofs and mandated vapor recovery; and require controls on tank cleaning.	<p>Controls for slotted guidepoles are reasonably available.</p> <p>The District is working on amendments to Regulation 8, Rule 5 that would incorporate additional requirements for seals and fittings. These controls appear to be reasonably available.</p> <p>The District is also analyzing the extension of control requirements to lower vapor pressure liquids that may be stored in fixed roof tanks. Requiring control for these tanks would mean that the tanks would have to be upgraded or their contents moved to tanks with controls. The current rule already applies to liquids down to 0.5 psia. The only other rule this stringent is the SCAQMD rule; most air districts only regulate liquids with vapor pressure of 1.5 psia and greater. The current test methods cited by all the California rules are accurate down to about 0.5 psia. Though a test method that could be used to identify lower vapor pressure liquids for control has been developed by researchers at the Lawrence Berkeley National Laboratory, the method has not yet been approved by EPA for use with anything other than crude oils. In addition, there are approximately 4000 fixed roof tanks within the District, a majority of which store lower vapor pressure liquids. Though total emissions from these tanks is about 3.0 tons per day, significant emission reductions can only be achieved by control of an enormous number of very small sources, which is not cost-</p>	<p>Added requirements for slotted guidepoles to the SIP. (<i>Control measure SS-07 was included in the 1999 Plan, adopted as amendments to Regulation 8, Rule 5, and submitted to EPA.</i>)</p> <p>Add new requirements for seals, and fittings to the SIP. (<i>Control measure SS-12 is included in the 2001 Plan.</i>)</p> <p>Controls for lower vapor pressure liquids not included in the SIP. (<i>However, the feasibility of the suggested measure and other measures to reduce storage tank emissions will be studied pursuant to further study measure FS-9.</i>)</p>

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
			<p>effective. In 1997, the SCAQMD analyzed the feasibility of a similar measure and determined that potential emission reductions were about 0.4 tons per day with a cost effectiveness of \$1.5 million per ton. This measure appears to be both technologically infeasible and not cost effective at present. It is therefore not a reasonably available control measure. However, further study measure FS-10 will examine whether control of some subset of Bay Area tanks storing lower vapor pressure liquids would produce significant emission reductions.</p> <p>Conversion of external floating roof tanks to internal floating roofs would be enormously expensive and not justified by the difference in control efficiency between the two types of tanks, assuming good seals for both. Requiring vapor recovery for either an internal or external floating roof tank also produces incremental emission reductions that cannot be justified by the expense, again assuming good tank seals. The control effectiveness of internal and external roof tanks with good seals exceeds 90%, while properly operating vapor recovery for tanks can achieve an effectiveness of about 95%. It is much more cost-effective to require good seals, as proposed in control measure SS-12.</p> <p>Control requirements for tank cleaning were added to Regulation 8, Rule 5 in 1993. The rule now permits the use of liquid balancing where the resulting liquid has low vapor pressure (less than 0.5 psia), but otherwise requires an approved emission control system. This suggested control measure has been implemented and is more stringent than the South Coast AQMD rule.</p>	<p>Requirements for conversion of tanks to alternative controls not included in the SIP. <i>(However, the feasibility of the suggested measure and other measures to reduce storage tank emissions will be studied pursuant to further study measure FS-10.)</i></p> <p>Further controls on tank cleaning not included in the SIP. <i>(However, the feasibility of the suggested measure and other measures to reduce storage tank emissions will be studied pursuant to further study measure FS-10.)</i></p>
4	Controls on Emissions from Flares	Communities for a Better Environment <i>(letter and attachments, January 14, 1999; letter, March 1, 1999)</i> The plan should include a measure to reduce emissions from refinery flares through increased gas recovery.	The chief obstacle to flare controls is that flares function as safety devices to reduce pressures and the potential for fire or explosion. If flare controls result in restrictions on the release of hazardous overpressures or otherwise reduce flaring capacity, they have the potential to increase risks. However, sending more gas to a gas recovery system rather than to a flare may not increase risks if the gas recovery system has capacity similar to that of the flare. On new and modified sources at refineries, the District's New Source Review regulation requires that routine process gases be	Requirements for increased gas recovery are not included in the SIP. Requirements for monitoring of refinery flares are added to the SIP. <i>(Control measure SS-15 is included in the 2001 Plan. In addition, the feasibility of the suggested measure and other measures to reduce</i>

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
			<p>vented to a gas recovery system and that a flare be used only during process upsets and breakdowns. A fuel gas recovery system, furnace, or flare used to control vented gases must have a recovery or destruction efficiency not less than 98% by weight.</p> <p>Whether gas recovery has some potential to reduce emissions depends upon whether flare combustion is efficient. The commenter included attachments citing a 1991 Santa Barbara APCD study, an Alberta study, and 1996 research by Leahy, et al (1996) for the proposition that widely-used emission factors underestimate flare emissions. The Santa Barbara study, however, cited 1977 EPA findings that <u>older</u> emission factors probably underestimated flare emissions. The study instead relied on EPA research done in the 1980s that supports the current assumed efficiency of 98%. The cited Alberta study (1996) and a more recent Alberta study (2000) examine flare combustion of oil field solution gas with high liquid content and have little relevance to refineries. The Leahy study developed a theoretical model of flare performance that suggested that flares might have much lower efficiencies than generally assumed. However, more recent research has shown that the Leahy model predicted efficiency of 30% for a flare that was found through remote sensing to have efficiency well above 90%.</p> <p>Other recent information also suggests that current flare emission factors are reasonably accurate. The chief difficulty in determining flare emissions has been the lack of a reliable flare monitoring technology. However, in 1998, after reliable ultrasonic monitoring technology appeared to be available, the South Coast AQMD adopted a flare monitoring rule (Rule 1118). Although it has taken almost three years to get monitors installed and operational, data from the South Coast effort has just begun to be available. South Coast staff state that early data shows that ozone precursor emissions are <u>lower</u> than expected based on the existing emission factors (which assume high efficiency).</p> <p>An estimate of flare emissions, including those from upsets and breakdowns, has been included in the inventory for this Plan (see</p>	<p><i>emissions associated with the refinery blowdown system will be studied pursuant to further study measure FS-8.)</i></p>

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
			<p>discussion in Section 3 of the Plan). Because of the uncertainty about flare emissions and the feasibility of controls on flaring, a control measure to require monitoring of refinery flares and a further study measure for flaring and other emissions associated with the refinery blowdown system are included in the 2001 Plan.</p> <p>The District has estimated that increasing gas recovery to reduce flaring would have a cost effectiveness of approximately \$38,000 per ton. This measure is not considered to be a reasonably available control measure at present. However, this assessment could change after implementation of control measure SS-15 and completion of further study measure FS-8.</p>	
5	<p>Controls on Emissions from Refinery Wastewater Systems</p>	<p>Communities for a Better Environment (<i>letter and attachments, January 14, 1999; letter, March 1, 1999</i>) The plan should include a measure to reduce emissions from refinery wastewater systems through enclosing them and setting tight leak standards.</p>	<p>Most components of refinery wastewater systems are already controlled through compliance with District Regulation 8, Rule 8, District New Source Review requirements, and EPA's National Emission Standard for Benzene Waste Operations (40 CFR Part 61, Subpart FF). In 1998 and 1999, the District analyzed refinery wastewater systems and concluded that the entire wastewater system for each refinery should be analyzed and that it made little sense to focus further controls on specific wastewater system components. This was primarily because further control at one emission point in the system could have the effect of increasing emissions at other emission points. Easily identifiable targets for control no longer exist. Each refinery now has a unique system, and control of any remaining emissions would require detailed analysis of each system, with controls tailored to the system.</p> <p>Refineries still have open wastewater treatment ponds, but enclosing the ponds or replacing them with tanks is not considered to be a reasonably available control measure. The existing ponds are used to meet discharge requirements under NPDES permits required by the federal Clean Water Act. The ponds receive wastewater with very low VOC content (about 20 ppm) and serve to remove both VOCs and non-volatile organic compounds. They appear to remove VOCs with about 90% efficiency. Replacing the ponds with large tanks would allow greater control efficiency for the volatile compounds, but the ponds would still be required for biological control of non-volatile organic compounds. Cost effectiveness would exceed</p>	<p>Not included in the SIP. (<i>However, the potential for additional emission reductions from these sources will be studied pursuant to further study measure FS-9.</i>)</p>

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
			<p>\$100,000 per ton.</p> <p>Because common sources that could be controlled cannot be identified and because the measure is not economically feasible, it is not currently considered to be a reasonably available control measure. However, the potential for additional emission reductions from these sources will be studied pursuant to further study measure FS-9.</p>	
6	<p>Valve and Flange Controls</p>	<p>Communities for a Better Environment (<i>letter and attachments, January 14, 1999</i>) The plan should remove "loopholes" that allow refineries to define components as non-repairable, thus allowing repairable components to avoid the leak standard.</p>	<p>The District amended Regulation 8, Rule 18: Equipment Leaks, on January 7, 1998. The amendments expand the rule to incorporate all fugitive emission sources associated with refinery processes. Non-repairable components are limited to a small percentage of equipment. Allowing some components to be treated as non-repairable so they can be repaired when a unit is brought down for scheduled maintenance avoids the significant emissions that would come from shutdown and startup of a unit just to repair the component. However, it does not benefit a refinery to designate a component as non-repairable if it can be repaired because if non-repairable components are discovered to exceed the allowable percentage, a refinery would be subject to daily penalties for each component beyond the allowed percentage for the entire period that non-repairable components are allowed to remain unrepaired (which can be up to 5 years if emissions are not significant). Because this measure would not produce emission reductions, it is not a reasonably available control measure.</p>	<p>Suggested measure is not included in the SIP. Note, however, that a new control measure (SS-16) affecting fugitive emissions from these sources is added to the SIP. (<i>Control measure SS-16 is included in the 2001 Plan.</i>)</p>
7	<p>Refinery NOx Controls</p>	<p>Communities for a Better Environment (<i>letter and attachments, January 14, 1999</i>) Further NOx controls on refinery boilers should be included.</p>	<p>Refinery boilers are regulated by Regulation 9, Rule 10, which is as stringent as any such rule in California and goes well beyond federal RACT. Since further controls would achieve very limited emission reductions at great expense, this measure is not economically feasible and is not a reasonably available control measure.</p>	<p>Not included in the SIP.</p>
8	<p>Vessel Depressurization Controls</p>	<p>Communities for a Better Environment (<i>letter and attachments, January 14, 1999</i>) Plan should require further controls on refinery vessel depressurization.</p>	<p>District regulations currently require that emissions from vessel depressurization be abated until the internal atmosphere reaches 1000 mm Hg. Further extremely minor emission reductions might be achieved by requiring abatement until the atmosphere reaches a lower pressure or hydrocarbon concentrations drop below a specified level. But the District has determined that potential emission reductions are approximately 0.07</p>	<p>Add new requirements for process vessel depressurization. (<i>Control measure SS-17 is included in the 2001 Plan.</i>)</p>

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
			<p>tons/day or less. However, cost effectiveness of this measure is reasonable at approximately \$1000 per ton. This control measure is reasonably available. This measure is included in the plan as an exception to the policy of not including measures with <i>de minimis</i> reductions because of the concerns expressed by commentators over refinery emissions.</p>	
9	<p>Marine Tank Vessel Controls</p>	<p>Communities for a Better Environment (letter, March 1, 1999) The plan should include a measure to control emissions from marine vessels.</p>	<p>The District already controls emissions from loading, lightering, and ballasting of tankers under Regulation 8, Rules 44 and 46, which set standards comparable to federal MACT standards. The remaining potential category of tanker emissions is purging and gas freeing. Purging is the process of venting hydrocarbon vapors from a tank by opening hatches or using a ship's inert gas generator to expel vapors. Gas freeing is the introduction of air into a tank, generally following purging and generally to allow personnel entry. In 1999, the District reviewed data for all 1998 Bay Area tanker arrivals and concluded that purging in the Bay Area was an insignificant source of emissions because (1) virtually all tankers in the Bay Area fleet have inert gas systems that allow them to inert rather than purge tanks for safety, (2) tankers follow international safety guidelines that recommend against routine purging, (3) purging is unnecessary and costly except when repairs to a tank are necessary, (4) most repair work is now done outside the Bay Area, (5) Bay Area terminals prohibit purging, and (6) any purging that occurs is along tanker routes at least 50 miles offshore. Because no further emission reductions appear achievable, this measure is not a reasonably available control measure.</p>	<p>Not included in the SIP. (However, further study measure FS-11 has been included in the 2001 Plan to examine the potential for any emission reductions from controlling less volatile cargoes and from controlling purging.)</p>
10	<p>South Coast Rules: 1122: Solvent Degreasers 1171: Solvent Cleaning 1138: Restaurant Emissions 1173: Fugitive Emissions 463: Storage Tanks 1145: Plastic, Rubber, Glass Coating</p>	<p>Golden Gate University – Environmental Law and Justice Clinic (letter, March 1, 1999) The plan should include measures based on “more protective” South Coast rules.</p>	<p>1122 and 1171. The BAAQMD conducted a technical assessment of the available aqueous cleaning options in adopting 1998 amendments to BAAQMD Regulation 8, Rule 16 and concluded that viable aqueous solutions were then unavailable for certain materials and contaminants that are commonly encountered in many maintenance and repair operations. As a result, rules setting a low-VOC standard (typically 50 grams per liter) for solvent cleaning had to include exemptions that have the effect of undermining the standard. For example, South Coast Rule 1171 exempts paper-based gaskets and clutch assemblies from its 50-gram-per-liter standard. Until recently, the result was that auto repair facilities generally had an organic solvent cleaner. The BAAQMD experience has been that</p>	<p>Add new requirements for solvent cleaning to the SIP. (Control measure SS-14 is included in the 2001 Plan.)</p>

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
	1118: Refinery Flares		<p>once such a cleaner is in place, it is extremely difficult to enforce restrictions on the parts that can be cleaned in the solvent cleaner. Recognizing this, the current BAAQMD rule exempts one solvent cleaner per facility from its 50-gram-per-liter standard, but requires all other cleaners to either meet the standard or to have a permit. The BAAQMD and other districts do not require permits for the small remote-reservoir cold cleaners typically found in repair shops.</p> <p>In practical effect, the SCAQMD rule and the BAAQMD rule are similar, and the BAAQMD rule has produced many of the emission reductions that would come from adopting the South Coast requirements in the Bay Area. Nevertheless, further emission reductions could be achieved by a rule without the exemptions found in the SCAQMD and BAAQMD rules. On April 21, 2001, the San Joaquin Valley Unified APCD adopted a rule with a 50-gram-per-liter standard for general cleaning, with an exemption only for extremely small cleaners (surface area less than 1 square foot). Because many types of industry found in SCAQMD and the Bay Area are not found in the San Joaquin Valley, the SJVUAPCD rule does not include provisions for specialty cleaning that are found in the SCAQMD rule and are likely to be necessary in the Bay Area. Adoption of general cleaning requirements like those in the SJVUAPCD rule and specialty cleaning requirements like those in the SCAQMD rule is a reasonably available control measure for the Bay Area.</p> <p>1138. Based on emission testing done in the South Coast, controls on restaurant operations are not considered to be cost effective for control of VOCs. The estimated cost effectiveness of charbroiling controls like those in the SCAQMD is \$38,000 per ton for VOCs. This is not a reasonably available control measure.</p> <p>1173. South Coast Rule 1173 is less stringent for fugitive emissions than the Bay Area's Regulation 8, Rule 18, with one exception. Under the South Coast rule, all leaking components must be repaired within certain time frames. Under the Bay Area rule, a small percentage of leaking components are allowed to be placed on a "turn around list" if they cannot be repaired without shutting the refinery unit down. The benefit of the Bay</p>	<p>Not included in the SIP.</p> <p>Not included in the SIP.</p>

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
			<p>Area strategy is that the significant emissions associated with shutdown and startup of a unit are avoided until such time as the unit can be brought down for scheduled maintenance. This is not a reasonably available control measure.</p> <p>463. The SCAQMD rule includes more stringent tank seal requirements that are proposed to be incorporated into the Bay Area SIP through control measure SS-12. This is a reasonably available control measure.</p> <p>1145. The few Bay Area facilities that are involved in coating of rubber or glass are controlled as stringently as required by Rule 1145 by either permit condition or the limitations of Bay Area Regulation 8, Rule 4: General Solvent and Surface Coating Operations. There are no emission reductions that can be achieved and this is therefore not a reasonably available control measure.</p> <p>1118. This rule requires emissions monitoring for refinery flares. This is a reasonably available control measure.</p>	<p>Include in the SIP. <i>(Control measure SS-12 is included in the 2001 Plan.)</i></p> <p>Not included in the SIP.</p> <p>Include in the SIP. <i>(Control measure SS-15 is included in the 2001 Plan.)</i></p>

Section II: Review of Comments on Draft 2001 Ozone Attainment Plan

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
11	<p>Controls on Emissions from Pressure Relief Valves (PRVs)</p>	<p>Golden Gate University – Environmental Law and Justice Clinic (<i>letter, June 4, 2001</i>) and attachment from Communities for a Better Environment (<i>letter to EPA, May 14, 2001</i>) The plan should include a measure to control emissions from pressure relief valves by banning atmospheric venting and by requiring additional monitoring.</p>	<p>This proposal has the potential to increase risks. CBE made this same comment on the 1999 Plan, and a response to the earlier comment is included in Section I above. As noted in the response to the earlier comment, the BAAQMD is the only air district in California to impose any control requirements on emissions from PRV releases, as distinguished from leaks through PRVs. But the District regulation (Regulation 8, Rule 28) stops short of banning atmospheric venting of PRVs.</p> <p>During the development of this rule, the question of requiring control for existing PRVs was carefully considered. The Contra Costa Health Department, charged with responsibility for refinery safety, strongly objected to requiring existing PRVs to go to any mitigation device. Both they and District refinery engineers felt strongly that a requirements for existing PRVs to vent to controls would increase risk rather than reduce it because it had the potential to jeopardize existing relief systems. The rule therefore focuses on PRVs at problem sources where there have actually been releases while avoiding the risks associated with a general requirement to control a significant number of existing PRVs.</p> <p>In responding to CBE's earlier comments, the District noted that a ban on atmospheric venting for any significant number of existing PRVs would require new flares or expansion of fuel gas recovery capacity. In its May 14, 2001 letter, CBE questions the District conclusion that cost effectiveness of these controls would be approximately \$38,000 to \$45,000 per ton. It is indeed true that some of the data for the District's estimate came from a report prepared by consultants to WSPA and it is true that WSPA is an industry trade group. However, costs for controls are easily verified using EPA computer programs and the Vatavek cost index. The District reviewed the consultant's data and found it reasonable. Even Dr. Phyllis Fox, cited by CBE for the proposition that minor piping changes are all that is necessary, noted the need for additional relief system capacity. This need for additional relief capacity is what makes the CBE proposal complicated and expensive.</p>	<p>Not included in the SIP. (<i>However, control measure SS-03, which required that PRVs be vented to a control device or that release prevention measures be implemented, was included in the 1999 Plan, adopted as amendments to Regulation 8, Rule 28, and submitted to EPA. In addition, the feasibility of the suggested measure and other measures to reduce emissions associated with the refinery blowdown system will be studied pursuant to further study measure FS-8.</i>)</p>

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
			<p>CBE cites comments by Dr. Fox to the effect that the cost effectiveness figures ignore indirect costs of PRV lifts related to personal and property injuries. But most district rules produce benefits by reducing injuries to people and property and improving public health. Cost effectiveness is not a cost-benefit analysis; it is a ranking tool that is used by air districts to determine how to prioritize pollution control measures.</p> <p>CBE claims that PRV lifts are not monitored or reported and suggests that the District should improve monitoring requirements. CBE cites a District rule effectiveness study discussed above for the proposition that none of the refineries have systems for reporting PRV lifts. But the cited study dates from reporting done from 1992 to 1994 at a time when the reporting requirement was new and the regulatory language in effect was unclear. It was only with the amendment of Regulation 8, Rule 28 in 1997 and 1998 that reporting requirements for PRV lifts were clarified.</p> <p>There are a number of checks on PRV lift reporting that ensure that most lifts are reported. First, the refineries are obligated to report PRV lifts under Regulation 8, Rule 28. Failure to report is a violation subject to penalties. Second, larger PRVs that vent to the atmosphere and therefore have the potential for significant emissions produce a sound like a loud siren when they lift. These lifts are hard to miss. Third, District inspectors are in the refineries every day and are in a position to hear PRV lifts. Fourth, PRV lifts are often connected with episodes that are detected by continuous emission monitors or parametric monitors. These episodes must be reported under District Regulation 1. Fifth, many of the PRVs, and particularly the larger ones, are associated with pressurized vessels that have continuous pressure monitoring. These pressure records can be examined to determine whether pressures have exceeded PRV pressure set points. PRV lifts appear in the records as sharp pressure declines following pressure peaks. Finally, PRV lifts are not so common as one might suppose because avoiding these lifts is of primary importance to refinery operators, as they indicate that pressures have approached dangerous levels.</p>	

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
			<p>CBE states that PRVs appear to be involved in many industrial accidents. It is, of course, not surprising that PRVs are involved in industrial accidents: they are designed to relieve overpressures that result from upsets or accidents. Their operation helps to ensure that accidents are no worse than they are.</p>	
12	<p>Controls on Emissions from Flares</p>	<p>Golden Gate University – Environmental Law and Justice Clinic (<i>letter, June 4, 2001</i>) and attachment from Communities for a Better Environment (<i>letter to EPA, May 14, 2001</i>) The plan should include a measure to reduce emissions from refinery flares through increased gas recovery, use of cascading flares, and improved monitoring.</p>	<p>CBE made this same comment on the 1999 Plan. See the response to the earlier comment in Section I above.</p> <p>CBE cites an EPA enforcement alert suggesting that flaring may violate the Clean Air Act under certain circumstances. The document states that flaring in routine, nonemergency situations may not be good pollution control practice. As noted in the response to CBE's earlier comment, the District's New Source Review regulation requires for new and modified sources that routine process gases be vented to a gas recovery system and that a flare be used only during process upsets and breakdowns. With new sources, it is possible to build in sufficient gas recovery capacity to ensure that gas that would otherwise go to flares is recovered by the fuel gas system so that flares are only needed for upsets and emergencies. The EPA alert is concerned with flaring by new sources subject to New Source Performance Standards that nevertheless engage in routine flaring. This type of flaring activity by new sources would violate both the NSPS and District regulations. There is therefore an existing enforcement mechanism to limit flaring to the extent that the sources involved are subject to the NSPS or to District New Source Review requirements.</p> <p>CBE cites a Santa Barbara APCD study that suggests that flaring can be decreased by increasing gas recovery. This is unquestionably true. The question is whether this is feasible and reasonably available for existing sources. The example given in the Santa Barbara study was for Canadian refineries that were significantly modified.</p> <p>CBE suggests requirements for cascading flares. Cascade flow control flares use banks of burners that allow more precise control of combustion than typical open pipe flares. They may offer very slight improvements in combustion efficiency over the typical steam-assisted flare found in most</p>	<p>Requirements for increased gas recovery not included in the SIP. Requirements for monitoring of refinery flares are added to the SIP. (<i>Control measure SS-15 is included in the 2001 Plan. In addition, the feasibility of the suggested measure and other measures to reduce emissions associated with the refinery blowdown system will be studied pursuant to further study measure FS-8.</i>)</p>

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
			<p>refineries, but they tend to have higher NOx emissions. As noted in response to the earlier CBE comment, the District requires all new flares, regardless of type, to have a combustion efficiency of 98% or greater. Any incremental benefit in using this type of flare would be minimal.</p> <p>CBE questions the District estimate included in the Draft 2001 Plan that flare emissions are 0.1 tons per day. But this estimate did not include emissions from large flaring events due to process upsets and accidents. CBE's questions about emissions led the District to monitor flares in 1988 and 1989. The difficulty then, however, was that the available methods did not permit accurate estimates of flare gas flow rates. Nevertheless, the District has included an estimate of all flaring emissions in the Revised Plan. The estimate is based on the 1988 and 1989 work and may not be representative of current emissions (see the discussion in Section 3 of the Plan). However, with the advent of ultrasonic flow monitors, refinery flare monitoring now appears to be a reasonably available control measure, and flare monitoring requirements are proposed for inclusion in the 2001 Plan.</p>	
13	Controls on Emissions from Storage Tanks	<p>Golden Gate University – Environmental Law and Justice Clinic (<i>letter, June 4, 2001</i>) and attachment from Communities for a Better Environment (<i>letter to EPA, May 14, 2001 plus attachment to that letter</i>) The plan should require improved tank designs, including conversion of external floating roof tanks to internal floating roofs and mandated vapor recovery; require improvements in seals and fittings; remove vapor pressure exemptions; and require controls on tank cleaning.</p>	<p>CBE made this same comment on the 1999 Plan (see staff review of suggested measure 3).</p> <p>In an October 12, 1999 letter to the District (attached to the 5/14/01 letter to EPA), CBE states that source testing should be used to determine vapor pressure of liquids to ensure that liquids are properly exempted from the District's storage tank rule (which exempts liquids with vapor pressure under 0.5 psia). But this is the very problem with this measure: there is no approved test method for determining vapor pressure in this range. In addition, however, reducing emissions from liquids in this vapor pressure range would be impractical because there are approximately 4000 fixed roof tanks in the District, many of which store lower vapor pressure liquids. Control would only be practical if a significant number of very large tanks storing liquids in this vapor pressure range could be identified. Although there were thought to be as many as 25 such tanks storing liquids in this vapor pressure range, the number now appears to be much smaller based</p>	<p>Add new requirements for seals, and fittings to the SIP. (<i>Control measure SS-12 is included in the 2001 Plan. In addition, the feasibility of the suggested measure and other measures to reduce storage tank emissions will be studied pursuant to further study measure FS-10.</i>)</p>

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
			on updated information gathered for Title V applications. As a result, no significant emission reductions appear to be available. In 1997, the SCAQMD analyzed the feasibility of a similar measure and determined that potential emission reductions were about 0.4 tons per day with a cost effectiveness of \$1.5 million per ton.	
14	Vessel Depressurization Controls	Golden Gate University – Environmental Law and Justice Clinic (<i>letter, June 4, 2001</i>) and attachment from Communities for a Better Environment (<i>letter to EPA, May 14, 2001</i>) Plan should require further controls on refinery vessel depressurization.	CBE made this same comment on the 1999 (see staff review of suggested measure 8).	Add new requirements for process vessel depressurization. (<i>Control measure SS-17 is included in the 2001 Plan.</i>)
15	Controls on Emissions from Refinery Wastewater Systems	Golden Gate University – Environmental Law and Justice Clinic (<i>letter, June 4, 2001</i>) and attachment from Communities for a Better Environment (<i>letter to EPA, May 14, 2001</i>) Please see earlier comments for controls on wastewater ponds.	CBE made this same comment on the 1999. This is not a reasonably available control measure (see staff review of suggested measure 5).	Not included in SIP. (<i>However, the potential for additional emission reductions from these sources will be studied pursuant to further study measure FS-8.</i>)
16	Controls on Emissions from Refinery Valves, Connectors, Pumps, and Compressors	Golden Gate University – Environmental Law and Justice Clinic (<i>letter, June 4, 2001</i>) and attachment from Communities for a Better Environment (<i>letter to EPA, May 14, 2001</i>) Please see earlier comments for controls on valves, connectors, pumps, and compressors.	CBE made this same comment on the 1999. The suggested measure is not a reasonably available control measure (see staff review of suggested measure 6).	Add new requirements affecting fugitive emissions from valves to the SIP. (<i>Control measure SS-16 is included in the 2001 Plan.</i>)

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
17	<p>South Coast Rules: 1632: Pilot Credit Generation Program for Hotelling Operations 1191-1196: Fleet Rules for Public Fleets, Transit Buses, School Buses, Refuse Haulers, Airport Ground Access</p>	<p>Golden Gate University – Environmental Law and Justice Clinic (<i>letter, June 4, 2001</i>) and attachment from Communities for a Better Environment (<i>letter to EPA, May 14, 2001</i>) Plan should include a ship hotelling credit measure like that adopted by the SCAQMD and vehicle fleet rules like those adopted by the SCAQMD.</p>	<p>In comments on the 1999 Plan, CBE suggested review of South Coast AQMD rules for possible RACM (see staff review of suggested measure 10).</p> <p>CBE suggests that the Bay Area should adopt a credit measure for ship hotelling operations (operations like lighting, ventilation, loading, and unloading that are conducted while a ship is docked or anchored and that typically use power generated by the ship's engines). However, as a mobile source credit measure, Rule 1632 produces no net reduction in emissions. It simply allows reductions in hotelling emissions as credits against other required emission reductions. Unlike the SCAQMD, the BAAQMD allows very limited use of such mobile source credits for compliance with stationary source rules. This is not a reasonably available control measure as it produces no emission reduction.</p> <p>CBE suggests that the Bay Area should adopt vehicle fleet rules like those adopted by the South Coast AQMD. ARB is proposing statewide fleet rules for areas outside the SCAQMD and has already adopted a transit bus rule. It will be proposing other fleet rules in the future.</p>	<p>Not included in SIP.</p>
18	<p>Controls on NOx Emissions from Small Boilers</p>	<p>Sacramento Metropolitan Air Quality Management District (<i>letter June 4, 2001</i>) The Plan should include NOx controls on small boilers.</p>	<p>The Bay Area strategy has been to control larger boilers to more stringent levels, which results in greater overall NOx reductions than controlling all boilers (small and large) to the 30 ppm BARCT level found in the Sacramento rule and most other air district rules. This measure would produce NOx reductions and would not advance the attainment date. It is therefore not a reasonably available control measure.</p>	<p>Not included in the SIP.</p>
19	<p>Controls on NOx Emissions from Small IC Engines</p>	<p>Sacramento Metropolitan Air Quality Management District (<i>letter June 4, 2001</i>) The Plan should include NOx controls on small (50 to 250 brake horsepower) internal combustion engines.</p>	<p>The District revised its permit regulation in 2000 and has begun permitting these engines. The District will be in a position to evaluate the feasibility of NOx controls when that effort is complete. This measure would produce NOx reductions and would not advance the attainment date. It is therefore not a reasonably available control measure.</p>	<p>Not included in the SIP.</p>

Section III: Review of District Measures from 2000 Clean Air Plan (2000 CAP)

This section is a review of measures included in the Bay Area 2000 Clean Air Plan (CAP), the BAAQMD's most recent plan to attain the more stringent California ozone standard. Measures included in the CAP are intended to satisfy California requirements for adoption of all feasible measures.

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
20	Improved Automobile Refinish Coatings Rule (8-45)	Bay Area 2000 Clean Air Plan Control Measure #A21	This measure would adopt a more stringent standard for multi-stage topcoats into BAAQMD Regulation 8, Rule 45 (Automobile Refinish Coatings). The cost effectiveness of this measure is \$35,000 per ton and is therefore not cost effective. This is not a reasonably available control measure.	Not included in the SIP.
21	Improved Wood Products Coatings Rule (8-32)	Bay Area 2000 Clean Air Plan Control Measure #A22	<p>This measure would adopt more stringent standards for clear topcoats used by custom cabinet shops, custom millwork manufacturers, furniture manufacturers, and other manufacturers of wood products. The only air district in California with a clear topcoat VOC limit more stringent than the current BAAQMD limit of 550 grams per liter is the Ventura County APCD, with a limit of 275 grams per liter.</p> <p>The Ventura district has no significant furniture or woodworking industry, unlike the BAAQMD and the SCAQMD. Total emissions are less than 0.2 tons per day with the majority of emissions coming from refinishing facilities, for which the rule sets a limit of 680 grams per liter.</p> <p>The South Coast AQMD has a limit of 550 or 680 grams per liter, depending upon the sealer/topcoat option chosen and the effect of averaging allowed by the rule. Until 1996, the South Coast rule had a 275 gram per liter limit that was to take effect in July 1996. This is the limit upon which the Ventura rule was based. After a technology review, the SCAQMD rule was amended to delay the 275 grams per liter limit to July 2005. The limit was delayed because it is not technologically feasible. The future limit will not take effect unless a technology review finds that it has become feasible. The lack of any significant industry in Ventura County meant that the Ventura district never had to conduct a technology review. The measure is not technologically feasible and is therefore not a reasonably available control measure.</p>	Not included in the SIP.

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
22	VOC Limits for Concrete Coating Operations	Bay Area 2000 Clean Air Plan Control Measure #A23	<p>This measure was proposed in the 2000 CAP because a review of the BAAQMD miscellaneous coatings inventory revealed a number of operations that coat concrete. At the time the CAP was developed, it appeared that some of these operation might be able to achieve emission reductions by using lower-VOC coatings and form release compounds. The District has reviewed this inventory again, identified facilities, and calculated emissions. This review showed that emissions from concrete coating operations are currently less than 0.05 tons per day. In addition, these sources have not been subject to any of the District's coating rules, and development and implementation of this measure would require a significant effort to develop basic data for rule development and a significant commitment of enforcement and legal resources to enforce any new regulation developed through the effort. Because potential emission reductions are <i>de minimis</i>, and the procedural, administrative, and regulatory burdens are substantial, this is not a reasonably available control measure.</p>	Not included in the SIP.
23	Improved Residential Water Heater Rule (9-6)	Bay Area 2000 Clean Air Plan Control Measure #D8	<p>BAAQMD Regulation 9, Rule 6 requires that new water heaters meet an emission standard of 40 nanograms of NOx per joule of heat output. The SCAQMD has now lowered its NOx standard for residential water heaters to 20 nanograms per joule effective in 2002 and to 10 nanograms per joule effective in 2005. The limits are based on new burner technologies that are expected to be available when the new standards take effect. The measure is therefore a technology-forcing measure.</p> <p>This measure was proposed to comply with NOx transport mitigation requirements under California law. This measures would not advance the attainment date. It is therefore not a reasonably available control measure.</p>	Not included in the SIP.

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
24	Seasonal Limitations on Organic Liquid Storage Tank and Wastewater Separator Cleaning and Refinery Shutdowns	Bay Area 2000 Clean Air Plan Control Measure #G3	<p>This measure would require that discretionary activities such as organic liquid storage tank cleaning, wastewater separator cleaning, and refinery unit shutdowns be controlled or conducted outside the summer ozone season. However, because refineries maximize production during the summer, which is the peak driving season, and schedule these activities at other times, emission reductions are unlikely during summer months. In addition, control measure SS-17 (process vessel depressurization) achieves much of the emission reduction that would be produced by the measure. There appear to be no emission reductions that can be reasonably forecast to occur during the summer. In addition, even if emissions were to occur in the summer, this measure would simply shift emissions from the ozone season to a different time during the year. This could slightly increase exposure to toxic compounds during those times and does not achieve the actual emission reductions achieved by control measure SS-17. Because emission reductions are <i>de minimis</i>, this is not a reasonably available control measure.</p>	Not included in the SIP.

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
25	Improved Aerospace Coatings Rule (8-29)	Bay Area 2000 Clean Air Plan Further Study Measure #A3	<p>BAAQMD Regulation 8, Rule 29 now has less stringent standards than the corresponding South Coast rule for several categories: fuel tank coating, surface prep and cleanup solvent, paint stripping, PC board fabrication, strippers and maskants for electronic component fabrication, and high temperature adhesive bonding primer. But the SCAQMD has had to extend compliance dates for fuel tank coating and adhesive bonding primers until 2002 because the limits are not technologically feasible at present. The SCAQMD vapor pressure limitations for surface prep and cleanup solvent produce no emission reductions, since most of the commonly used solvents have a vapor pressure lower than the rule limit. In addition, coating usage in several of these categories is so small that it would be subject to low usage exemptions under both the SCAQMD and BAAQMD rules.</p> <p>With the closure of Bay Area military bases and the transfer of much of United Airlines' maintenance work to facilities outside the Bay Area, total aerospace coating industry emissions are 0.1 ton of per day. Emission reductions from this measure would further reduce emissions by less than 0.01 tons per day. The rule development and enforcement efforts to achieve these reductions would be difficult because compliance would require the use of new technologies. Because emission reductions are <i>de minimis</i>, and the procedural, administrative, and regulatory burdens are substantial, this is not a reasonably available control measure.</p>	Not included in the SIP.
26	Improved Surface Coating of Plastic Parts and Products Rule (8-31)	Bay Area 2000 Clean Air Plan Further Study Measure #A6	<p>The South Coast AQMD rule, unlike the BAAQMD rule, also extends to coating of glass and rubber products. A review of the BAAQMD miscellaneous coating category shows emissions from facilities that coat glass (chiefly mirror manufacturers) to be less than 0.05 tons per day. No facilities that coat rubber were identified. In addition, these sources have not been subject to any of the District's coating rules, and development and implementation of this measure would require a significant effort to develop basic data for rule development and a significant commitment of enforcement and legal resources to enforce any new regulation developed through the effort. Because emission reductions are <i>de minimis</i>, and the procedural, administrative, and regulatory burdens are substantial, this is not a reasonably available control measure.</p>	Not included in the SIP.

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
27	Draining of Liquid Products / Sumps and Pits	Bay Area 2000 Clean Air Plan Further Study Measure #C8	This measure was included in the 2000 CAP as a further study measure. It consolidated remaining wastewater measures from prior CAPs after elements of each were implemented. Because the emission reductions expected from these remaining elements were found to have already occurred in response to EPA's National Emission Standard for Benzene Waste Operations, the measures offered no potential emission reductions. In addition, a BAAQMD analysis of refinery wastewater systems concluded that it made little sense to focus on control of anything short of the entire refinery wastewater system. And because no specific controls could be identified, the analysis recommended further study of each refinery's unique wastewater path to determine whether any additional emission reductions can be achieved by control of these systems. This measure does not identify any feasible controls or emission reductions and is therefore not a reasonably available control measure.	Not included in the SIP.
28	Easing of Administrative Requirements for Use of Lower Emitting Technology	Bay Area 2000 Clean Air Plan Further Study Measure #F7	This control measure was added by the 1997 update to the CAP. It proposed that the District would ease administrative requirements, typically record keeping or monitoring requirements, for facilities that use technology with emissions lower than other technologies allowed by a particular rule. The measure primarily contemplated coating facilities that might use lower-emitting water borne coatings when the applicable rule sets limits that would allow use of solvent borne coatings. However, this control measure is constrained by EPA policies regarding record keeping. In addition, it is impossible to quantify emission reduction potentials or enforce reductions made, as sources have the option of returning to higher emitting technology and adopting administrative procedures commensurate with the appropriate rule standards. Because no emission reductions can be identified, this measure is not a reasonably available control measure.	Not included in the SIP.

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
29	Limitations on Solvents Based on Relative Reactivities	Bay Area 2000 Clean Air Plan Further Study Measure #F8	This measure proposes replacing existing mass limitations on emissions from surface coating or other processes involving solvent evaporation with limits based on the relative contribution of the solvents in ozone formation (called "relative reactivity"). Although ARB has incorporated a relative reactivity approach into its Consumer Products Regulation, it is a significant departure from the long-standing approach of limiting VOC emissions based on total mass, regardless of reactivity. To date, EPA has opposed this approach. Implementation of a reactivity-based approach to VOC regulation would require considerable inter-agency policy consensus among ARB, EPA, and local air districts that appears unlikely in the near term. This measure does not identify any potential emission reductions and is not a reasonably available control measure.	Not included in the SIP.

Section IV: Review of Comments from Community Meetings on 2001 Ozone Attainment Plan

This section is a review of measures suggested at community meetings held in East Palo Alto, Richmond, San Francisco, San Jose, Livermore, and Vallejo between August 23 and August 30, 2001 and in letters received after initial adoption of the 2001 Plan by the co-lead agencies on July 18, 2001.

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
30	Controls on NOx from Electric Power Plants	Communities for a Better Environment (<i>letter to Dr. Alan Lloyd and ARB Board Members, August 9, 2001</i>) The plan should include a measure to limit electric power plant NOx emissions to 1.5 ppm using ammonia-free technology, as required in Massachusetts.	Massachusetts requires new power plants to meet a NOx limit of 2 ppm. This is a Best Available Control Technology (BACT) standard that applies only to new power plants and is therefore not a reasonably available control measure for existing power plants. The BAAQMD applies this same BACT standard for new power plants. For existing power plants, Massachusetts' requirements (found in 310 Code of Massachusetts Regulations 7.29) are significantly less stringent than current BAAQMD requirements. Because this suggested measure would not achieve any emission reductions beyond those achieved by Bay Area regulations, it is not a reasonably available control measure.	Not included in the SIP.
31	Controls on Emissions from Pressure Relief Valves (PRVs)	Communities for a Better Environment (<i>letter to Dr. Alan Lloyd and ARB Board Members, August 9, 2001</i>) The plan should include a measure to control emissions from pressure relief valves by banning atmospheric venting and by requiring rupture discs with tell-tale indicators [to monitor PRV lifts].	A ban on atmospheric venting was proposed by CBE in comments on the 1999 Plan and in an attachment to a Golden Gate University comment on the Draft 2001 Plan (see staff review of suggested measures 2 and 11 above). This is not a reasonably available control measure. However, CBE has augmented its earlier comments by suggesting the use of rupture discs with tell-tale indicators as a monitoring device for PRV lifts. CBE made this same suggestion in 1997 during the development of BAAQMD Regulation 8, Rule 28 (the only controls on PRV venting emissions in California). At the time, the District concluded that fragments from rupture discs can jam a PRV open, thereby increasing emissions. However, some vendors of rupture discs claimed that this problem can be overcome with improved designs. Because of the risks and uncertainty, requirements for rupture discs were not adopted in 1997. Though this measure is not a reasonably available control measure at present, an examination of it and other measures to reduce flows to the refinery blowdown system is included in further study measure FS-8.	Not included in the SIP. (<i>However, control measure SS-03, which required that PRVs be vented to a control device or that release prevention measures be implemented, was included in the 1999 Plan, adopted as amendments to Regulation 8, Rule 28, and submitted to EPA. In addition, the feasibility of the suggested measure and other measures to reduce emissions associated with the refinery blowdown system will be studied pursuant to further study measure FS-8.</i>)

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
32	Controls on Emissions from Flares	Communities for a Better Environment (<i>letter to Dr. Alan Lloyd and ARB Board Members, August 9, 2001</i>) The plan should include a measure requiring minimization of flaring through increased gas recovery and requiring video monitoring of flares.	This measure was proposed by CBE in comments on the 1999 Plan and in an attachment to a Golden Gate University comment on the Draft 2001 Plan (see staff review of suggested measures 4 and 12). Though reducing emissions from flares is not a reasonably available control measure at present, an examination of the feasibility of reducing flaring is included in further study measure FS-8. CBE augments its earlier comments by suggesting the use of video monitoring of flares with access through the internet. Video monitoring does not result in emission reductions and is therefore not a reasonably available control measure. However, the use of video monitoring will be explored as a rule enforcement and compliance measure during the implementation of control measure SS-15.	Requirements for increased gas recovery not included in the SIP. Requirements for monitoring of refinery flares are added to the SIP. (<i>Control measure SS-15 is included in the 2001 Plan. In addition, the feasibility of the suggested measure and other measures to reduce emissions associated with the refinery blowdown system will be studied pursuant to further study measure FS-8.</i>)
33	Vessel Depressurization Controls	Communities for a Better Environment (<i>letter to Dr. Alan Lloyd and ARB Board Members, August 9, 2001</i>) The plan should include a measure to eliminate emissions from depressurization.	This measure was proposed by CBE in comments on the 1999 Plan and in an attachment to a Golden Gate University comment on the Draft 2001 Plan (see staff review of suggested measures 8 and 14). Further control of emissions from vessel depressurization is a reasonably available control measure and has been included in the 2001 Plan.	Add new requirements for process vessel depressurization. (<i>Control measure SS-17 is included in the 2001 Plan.</i>)
34	Controls on Emissions from Storage Tanks	Communities for a Better Environment (<i>letter to Dr. Alan Lloyd and ARB Board Members, August 9, 2001</i>) The plan should include a measure for further control of emissions from storage tanks through vapor recovery or the installation of fixed roofs on external floating roof tanks and through control of emissions from tank cleaning.	This measure was proposed by CBE in comments on the 1999 Plan and in an attachment to a Golden Gate University comment on the Draft 2001 Plan (see staff review of suggested measures 3 and 13). As discussed previously above, this measure is not currently a reasonably available control measure. However, another measure to reduce storage tank emissions - more stringent requirements for tank seals - is included in control measure SS-12.	Add new requirements for seals, and fittings to the SIP. (<i>Control measure SS-12 is included in the 2001 Plan. In addition, the feasibility of the suggested measure and other measures to reduce storage tank emissions will be studied pursuant to further study measure FS-10.</i>)

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
35	Marine Tank Vessel Controls	Communities for a Better Environment (<i>letter to Dr. Alan Lloyd and ARB Board Members, August 9, 2001</i>) The plan should include a measure to require marine vapor recovery for loading of all cargoes, regardless whether the emission factor for the cargo is above or below 2 lbs/1000 barrels; the measure should also prohibit vessel purging.	<p>BAAQMD Regulation 8, Rule 44 requires control for loading of specified cargoes (gasoline, gasoline blending stocks, aviation gas, JP-4 aviation fuel, and crude oil). The rule requires that emissions be limited to 2 lbs/1000 barrels or reduced by 95%. The cargoes subject to the rule are the only cargoes loaded in significant quantities for which emission reductions are certain to be significant (although JP-4 is no longer used by military aircraft and is no longer loaded). For example, EPA's AP-42 emission factor for uncontrolled gasoline loading is 75 lbs/1000 barrels, though the factor can be several times higher, depending upon loading and tank conditions. Making liquids for which emissions are less than 2 lbs/1000 barrels subject to the rule would result in no emission reductions, since the rule requires that emissions be limited to 2lbs/1000 barrels or reduced by 95%. Aside from liquids already subject to the rule, the only other liquids that appear to be loaded in the Bay Area in significant quantities are distillate oil and residual oil, according to U.S. Army Corps of Engineers waterborne commerce data. EPA emission factors for loading these materials are 0.2 lbs/1000 barrels for distillate oil and 0.002 lbs/1000 barrels for residual oil. However, based on a test of vessel loading in the Los Angeles area, the EPA emission factors may understate emissions. As a result, the 2001 plan includes further study measure FS-11, through which the District would examine whether there are any potential emission reductions that could come from controlling these relatively non-volatile cargoes.</p> <p>CBE proposed controls on marine tank vessel purging in comments on the 1999 Plan. This is not a reasonably available control measure (see staff review of suggested measure 9). However, further study measure FS-11 includes a reexamination of this issue.</p>	Not included in the SIP. (<i>However, further study measure FS-11 has been included in the 2001 Plan to examine the potential for any emission reductions from controlling less volatile cargoes and from controlling purging.</i>)

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
36	Controls on Emissions from Refinery Valves, Connectors, Pumps, and Compressors	Communities for a Better Environment (<i>letter to Dr. Alan Lloyd and ARB Board Members, August 9, 2001</i>) The plan should include a measure to eliminate exemptions from the standards so that current standards apply to all devices.	This measure was proposed by CBE in comments on the 1999 Plan. This is not a reasonably available control measure (see staff review of suggested measure 6).	Suggested measure is not included in the SIP. Note, however, that a new control measure (SS-16) affecting fugitive emissions from these sources is added to the SIP. (<i>Control measure SS-16 is included in the 2001 Plan.</i>)
37	Controls on Emissions from Refinery Wastewater Systems	Communities for a Better Environment (<i>letter to Dr. Alan Lloyd and ARB Board Members, August 9, 2001</i>) The plan should include a measure to require large wastewater units to be vented to gas recovery systems and to require the entire wastewater system to be enclosed, including front-end drainage and back-end ponds.	This measure was proposed by CBE in comments on the 1999 Plan and in an attachment to a Golden Gate University comment on the Draft 2001 Plan. This is not currently a reasonably available control measure (see staff review of suggested measures 5 and 15). Though reducing emissions from refinery wastewater systems is not a reasonably available control measure at present, an examination of the feasibility of reducing these emissions is included in further study measure FS-9.	Suggested measure is not included in the SIP. (<i>However, further study measure FS-9 to examine the potential for additional emission reductions from these sources is added to the SIP.</i>)
38	Refinery NOx Controls	Communities for a Better Environment (<i>letter to Dr. Alan Lloyd and ARB Board Members, August 9, 2001</i>) The plan should include a measure to require all refinery boilers to meet a 10 ppm standard with no averaging between different units.	This measure was proposed by CBE in comments on the 1999 Plan (see staff review of suggested measure 7). The BAAQMD refinery boiler rule (Regulation 9, Rule 10) is as stringent as any in California, and meets federal RACT requirements. Further NOx reductions would not advance the attainment date, and this is not a reasonably available control measure.	Not included in the SIP.

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
39	Subsidize Smog Check Repairs for Low Income Drivers	Communities for a Better Environment (<i>letter to Dr. Alan Lloyd and ARB Board Members, August 9, 2001</i>) The plan should include a measure to subsidize Smog Check vehicle repairs for low-income drivers.	The California Bureau of Automotive Repair (BAR) already operates a program called the Consumer Assistance Program (CAP) to provide repair subsidies for low-income drivers. This program, or any similar program, would not produce any emission reductions beyond those already attributable to the Smog Check program and is therefore not a reasonably available control measure. However, it does reduce the burden of the program on low-income drivers.	Not included in the SIP.
40	Vapor Recovery for Aircraft Fueling	Public Comment (<i>East Palo Alto community meeting, August 23, 2001</i>) The plan should include vapor recovery for aircraft fueling.	There are two main types of aircraft refueling in the Bay Area: jet refueling with kerosene-type jet fuel and general aviation refueling with aviation gas. Because the volatility of jet fuel is extremely low - similar to that of diesel - emissions from fueling of jets are minimal. Aviation gas, used for fueling general aviation, is generally only slightly less volatile than automotive gasoline and therefore may produce emissions similar to automotive fueling. However, aviation gas throughput in the Bay Area is a tiny fraction of that for automotive gasoline. ARB has estimated that statewide emissions from general aviation, including all engine and fueling emissions, are only 5 tons per day. Fueling emissions in the Bay Area are a small fraction of that total. Even were these emissions significant, controlling the emissions would be difficult. This is because requiring the installation of Phase II vapor recovery (the system for transfers into a vehicle or aircraft) would involve questions of safety over which the Federal Aviation Administration has jurisdiction. Note, however, that Phase I vapor recovery (the system for fuel transfers into storage tanks at a refueling facility) does not raise these same issues. Phase I vapor recovery for aviation gas deliveries is already required for airports under BAAQMD regulations. This suggested control measure is not a reasonably available control measure.	Not included in the SIP.
41	Controls on NOx from Electric Power Plants	Public Comment (<i>San Francisco community meeting, August 27, 2001</i>) The plan should include NOx controls on power plants.	BAAQMD Regulation 9, Rule 11 imposes extremely stringent controls on NOx emissions from power plants. No California air district regulation on existing power plant is more stringent than the BAAQMD regulation, which is significantly more stringent than controls in other states. The plan does not include these controls because, though they further other air quality goals, they would not advance the attainment date for the national ozone standard. They are therefore not a reasonably available control measure.	Not included in the SIP.

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
42	Eliminate Emission Reduction Credits	Public Comment (<i>letter from Leonard R. Trimlett delivered at San Francisco community meeting, August 27, 2001</i>) The plan should eliminate emission reduction credits.	The only uses for emission reduction credits within the BAAQMD are for meeting state and federal new source offset requirements and for compliance with certain future compliance dates in two District NOx regulations (Regulation 9, Rules 10 and 11). In addition, state law requires that air districts allow the use of credits. The elimination of credits would make it difficult for new modern plants to locate within the District, since credits provide one of the only means that many new facilities have of meeting offset requirements (which implement the State's and the District's no net increase in emissions policy). These new facilities generally replace older, higher-emitting facilities. Elimination of credits would mean, for example, that new power plants could not be built in the most appropriate locations and that demand for increased power would have to come from existing, dirtier facilities. The use of interchangeable emission reduction credits allow facilities subject to Regulation 9, Rules 10 and 11 to comply with the stringent NOx requirements in those rules by making reductions at other sources, where costs are lower, or through early implementation of controls. Eliminating credits used for these purposes would produce no net reduction in emissions and would violate federal and state new source review requirements.	Not included in the SIP.
43	Require SCONOx for all Power Plants	Public Comment (<i>Livermore community meeting, August 29, 2001</i>) The plan should require SCONOx for all power plants.	Pursuant to 42 U.S.C. §7479, best available control technology (BACT) means "an emission limitation" rather than a particular pollution control technology. The District requires BACT for all new power plants. For the large combined cycle turbines generally used in new power plants, BACT for NOx is defined as 2 ppm. There is no need or requirement to specify any particular technology to meet this BACT level, even though 2 ppm can be met by SCONOx or dry low-NOx combustors with selective catalytic reduction (SCR). SCONOx is simply one NOx control technology that can be used for power plants. Because all of the available NOx control technologies involve tradeoffs, the District properly specifies an emissions limit to be met rather than a specific technology when applying BACT to new sources. This is important as it encourages the development of other competing technologies. Because requiring a specific control technology would not produce additional NOx reductions, this is not a reasonably available control measure.	Not included in the SIP.

	Suggested Measure	Source of Suggested Measure	Staff Review	Conclusion
44	Marine Tank Vessel Controls	Public Comment (<i>Vallejo community meeting, August 30, 2001</i>) The plan should include a measure to require marine vapor recovery for loading of all cargoes.	See staff review for suggested measure 35. This is not a reasonably available control measure at present.	Not included in the SIP. (<i>However, further study measure FS-11 has been included in the 2001 Plan to examine the potential for any emission reductions from controlling less volatile cargoes and from controlling purging.</i>)
45	Require Controls on Off-Gassing from Materials Used in New Car Interiors	Public Comment (<i>Vallejo community meeting, August 30, 2001</i>) The plan should consider off-gassing from upholstery, carpet, and other materials used in new car interiors.	Some research has been done to identify the sources of volatile organic compounds found in a car's interior. This work suggests that many of the compounds come from volatilization of lubricants and from off-gassing of materials used in the automobile interior. The primary materials used are vinyl, nylon, synthetic rubber, and polyurethane foam. This off-gassing appears to decline as the vehicle ages. While in the relatively small volume of a car interior, these compounds may be objectionable, their total mass is too small to contribute in any significant way to ozone formation. In addition, because the mass emissions are so small, control would not be cost effective. For those concerned about exposure to these chemicals, a car could be aired out briefly before driving, particularly on hot days, when volatilization and off-gassing would be higher.	Not included in the SIP.

Transportation Control Measures

TCMs considered for RACM analysis in Section I of this RACM analysis focus on Section 108(f) of the Clean Air Act, but are augmented as necessary to reflect comments from::

April 27th MTC sponsored workshop on TCMs for the updated *Ozone Attainment Plan* at workshop,

- TCMs in the 1997 Bay Area Clean Air Plan, comments made at an May 30th workshop on the Draft Ozone Attainment Plan,
- Comments from EPA staff,
- Review of potential TCMs in EPA’s TCM database (on EPA’s website)

TCMs contained in the South Coast Air Quality Plan

Attendees at the April 27th TCM Workshop and/or commenter on 1999 Draft/Final Ozone Attainment Plan:

Name	Affiliation
	League of Woman Voters
Mark Brucker	US EPA
Dave Cosey	Caltrans District 4
Nancy Jewell Cross	AC Transit
Michael Cunningham	Bay Area Council
F. Gallo	NAACS2
Jim Gleican	AC Transit
John Holtzclaw	Sierra Club
Sherman Lewis	Sierra Club
Jonathan Marsh	
Roy Nakadegawa	BART
Martha Olson	Urban Habitat
Sara Procacci	SF Muni
Larry N. Rennacker	
Hank Resnik	Sierra Club
David Schonbrunn	TRANSDEF
Catherine Showalter	RIDES for Bay Area Commuter
Gail Staba	Port of Oakland
Ed Stewart	San Francisco County Transportation Authority
Thanh Tu	Caltrans District 4
Stanley Yung	Earthjustice Legal Defense Fund

Section I: Review of Section 108(f) Measures from the Clean Air Act¹⁴

Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>1 Programs for improved public transit: (General)</p>	<p>In SIP as TCMs 1, 2, 3, 7, 17,18, 19, 21 and 22. (Also in Baseline).</p> <p>New measure proposed as TCM A (Regional Express Bus Program). The level of transit funding is set by the Regional Transportation Planning process and, when considered by mode, receives the largest share of public transportation funding. (See discussion in updated Ozone Attainment Plan on transit funding amounts.)</p> <p>Transit ridership in region continues to increase. Funding alone also does not increase transit ridership. Ridership is affected by a large range of factors, such as location and amount of job and population growth, the costs and travel times of other travel options, and transit service reliability, etc. Any ridership growth will require that existing transit vehicles and facilities continue to be maintained, which is a key policy and funding priority within MTC's Regional Transportation Plan. Some areas where transit needs are most evident, such as increasing late night service and weekend service, would not have significant air quality benefits. Individual transit concepts are discussed below</p>	<p>Varies. Depends on service levels, ridership and the magnitude of any shift to transit from prior auto users. New diesel bus service that is not well utilized could increase NOx</p>	<p>MTC (partial). Through planning and selected funding decisions. Transit boards have authority to establish fares and implement service improvement programs. Funding for significant service expansion or reduced fares would require new operating funds from: a) legislative or voter approval of new operating revenues, b) transit productivity improvements, c) deferring equipment and facility maintenance, or d) raising fares</p>	<p>Yes</p>	<p>Many transit measures currently included in SIP. Recommend new TCM A for updated Ozone Attainment Plan</p>

¹⁴ While the measures shown in this section are from Section 108(f) of the Clean Air Act, they have been expanded upon based on proposals made for 1999 draft and final *Ozone Attainment Plan*, and proposals made at an MTC sponsored workshop on TCMs for the updated *Ozone Attainment Plan* at workshop, held April 27, 2001, and a review of TCMs in the 1997 Bay Area Clean Air Plan, comments made at an May 30th workshop on the Draft Ozone Attainment Plan, comments from EPA staff, review of potential TCMs in EPA's TCM database (on EPA's website, and TCMs contained in the South Coast Air Quality Plan.

Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>1a Programs for improved public transit</p> <ul style="list-style-type: none"> ▪ Transit service increases (new routes/frequency) 	<p>In SIP Baseline as:</p> <ul style="list-style-type: none"> ▪ TCM 1 (Reaffirm commitment to 28% transit ridership increase between 1978 and 1983), ▪ TCM 2 (Support post-1983 improvements in operator's five year plans). ▪ TCM 3 (Seek to expand and improve public transit beyond committed levels) ▪ TCM 17 (Continue October 1989 Post Earthquake Transit Service ▪ TCM 19 (Upgrade Caltrain service to 66 trains/day, expand to Gilroy) <p>Other Baseline or committed transit service increases: Local Bus Expansion:</p> <ul style="list-style-type: none"> ▪ AC Transit enhanced bus service funded by new sales tax ▪ Santa Clara VTA bus fleet expansion funded by new sales tax <p>Rail Expansion</p> <ul style="list-style-type: none"> ▪ BART extension to SFO ▪ Increase in daily commute period BART trains from 56 to 60 ▪ SF MUNI Third Street LRT extension in Bayshore Corridor ▪ Santa Clara LRT extensions: Tasman East LRT, Capitol LRT Extension, Vasona LRT extension ▪ Additional expansion of Caltrain service beyond TCM 19 assumption of 66 trains/day to 80 trains/day. 	<p>Transit ridership and emission reductions associated with transit service improvements are estimated using MTC's travel demand forecasting model and are included in the Baseline.</p> <p>Transit service that attracts significant numbers of auto users can reduce emissions.</p>	<p>Authority to increase services lies with transit operators, not the three co-lead agencies.</p> <p>Most of major transit service increases due to voter-approved sales tax measures(e.g., \$2.0 billion for transit improvements between Fremont BART and San Jose)</p>	<p>Yes</p>	<p>Baseline includes numerous programs and projects to increase transit service. Conversion of Baseline projects into TCMs will not advance attainment, since these projects are funded and being implemented.</p>

	Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
1b	<p>Programs for improved public transit</p> <ul style="list-style-type: none"> ▪ More express/rapid bus service 	<p>As part of Governor's Transportation Congestion Relief Program (AB2928) MTC received \$40 million to be spent in this effort.</p>	<p>(See comments for measure 1a above)</p>	<p>(See comments for measure 1a above)</p>	<p>Yes</p>	<p>Included as new TCM A (Regional Express Bus service) for updated Ozone Attainment Plan</p>
1c	<p>Programs for improved public transit</p> <ul style="list-style-type: none"> ▪ Intercity rail service improvements 	<p>In SIP Baseline as:</p> <ul style="list-style-type: none"> ▪ TCM 18 (Sacramento-Bay Area Amtrak Service assumes 3 roundtrips/day). Actual service is now up to 7 roundtrips/day. ▪ In addition, the Baseline incorporates the new Stockton to San Jose intercity rail service, which began 10/98. Currently three roundtrip trains/day operate. 	<p>(See comments above)</p>	<p>Co-lead agencies don't have legal authority to increase transit services. Authority lies with transit operators.</p> <p>Operating funds come from agencies other than MTC (State and counties through sales tax measures)</p> <p>State has proposed increasing Capitol Corridor service in the future.</p>	<p>Yes</p>	<p>Intercity rail service improvements are part of the Baseline. Conversion of Baseline projects into TCMs will not advance attainment, since these projects are already operated or funded and will be implemented.</p>

Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>1d Programs for improved public transit:</p> <ul style="list-style-type: none"> ▪ Increase ferry services 	<p>In SIP Baseline as:</p> <ul style="list-style-type: none"> ▪ TCM 17 (Continue October 1989 Post-Earthquake Transit Services including the Alameda/Oakland and expanded Vallejo ferry service). These services are operating today and incorporated into the Baseline. Vallejo operates three round trips/day. Additional ferry service being studied by new SF Bay Area Water Transit Authority but no funding has been identified 	<p>No. Current ferry technology relies on diesel fueled engines, with minimal emission control methodologies, and potential NOx issues. Therefore, not a significant source of emission reductions</p> <p>(See also comments for measure 1a above)</p>	<p>Transit operators and cities. MTC provides limited funding through bridge tolls.</p>	<p>Yes</p>	<p>Ferry services operating in Baseline. Further increases would depend on new operating funds.</p> <p>Conversion to TCM will not advance attainment, since no new operating funds available.</p>
<p>1e Transit access to airports</p>	<p>Ongoing programs in Baseline to maintain and increase transit access to airport.</p> <p>Major project coming online with the BART extension to the San Francisco Airport. Propose new TCM E: accounts for future air passenger trips to the San Francisco Airport on BART.</p>	<p>Air passenger emission reductions for passengers taking BART to SFO not accounted for in Baseline. Therefore, this measure takes credit for reductions starting in 2002 or the actual time BART begins service.</p>	<p>BART project currently under construction.</p>	<p>Yes</p>	<p>Recommend as new TCM E- Transit Access to Airports</p>

Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>1f Programs for improved public transit:</p> <ul style="list-style-type: none"> ▪ Shuttles to transit 	<p>Currently there are over 50 publicly funded shuttle routes serving various Caltrain stations and linking Caltrain with employment and shopping sites. Several employer financed shuttles link BART with employment sites. Also a significant component of many public bus systems is feeder service to fixed rail systems (AC Transit, SamTrans, CCCTA, LAVTA , etc.) These are all operating today and in the Baseline</p>	<p>(See comments for measure 1a above)</p>	<p>(See comments for measure 1a above)</p> <p>Shuttles are joint public/private efforts, generally operated by transit operators using existing transit funds from local, regional (MTC, BAAQMD) and/or private services. Co-lead agencies don't have authority to operate transit.</p>	<p>Yes</p>	<p>Activity ongoing in Baseline. Conversion of Baseline projects into TCMs will not advance attainment, since no new operating funds have been identified to increase service.</p>
<p>1g Productivity Improvements</p>	<p>In Baseline as TCM 2. There are many different forms of productivity improvements:</p> <ul style="list-style-type: none"> • Reliability /on time performance • Operating efficiencies to save costs • Marketing • Information • Management decision making tools • Labor agreements/privatization of some service <p>Route restructuring, etc</p>	<p>Difficult to predict and depends on measure or combination of measures since in most cases ridership effects are indirect.</p>	<p>Yes. MTC annually adopts a Productivity Improvement Program which defines what steps transit operators will take. Implementation is responsibility of operator. This effort has been ongoing since late 70's.</p>	<p>Yes</p>	<p>Activities ongoing in Baseline. Inclusion of additional measures as TCM would not advance attainment.</p>

Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>1h Programs for improved public transit:</p> <ul style="list-style-type: none"> ▪ Transit information and service coordination improvements ▪ Fare Incentives ▪ Youth Transportation 	<ul style="list-style-type: none"> ▪ In Baseline as TCM 21 (Regional Transit Coordination) TCM 21 and TCM 22 (Expand Regional Transit Connection Service) . Ongoing activities include: ▪ TransLink®, when implemented in 2002, will enable transit patrons to use a contactless smart card to ride any of the 25 transit operators in the region. ▪ RTC Clearinghouse a program that distributes tickets to 200 employers and sells \$10 million worth of tickets annually ▪ Commuter Check program for employers has sold over \$50 million in tickets since inception ▪ Implementation of MTC schedule and fare coordination mandates, which includes adopting rules and regulations for schedule and fare coordination and requires transit operators enter into joint fare revenue sharing agreements with connecting systems. All agreements are in place. ▪ TravInfo®, the regional telephone number, provides a single telephone number (817–1717) for information related to traveling in the nine-county Bay Area. ▪ All transit operators have fare discounts of various types. 	<p>(See comments for measure 1a above)</p>	<p>Yes. MTC requires coordination improvements Also, all transit operators currently offer discounts for youth and school children. Fare incentives can only be authorized by transit operators.</p>	<p>Yes</p>	<p>Extensive program of reduced fare transfer arrangements and coordination activities already in place.</p> <p>There are no additional activities that would significantly advance attainment.</p>

Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>2 Restriction of certain roads or lanes to, or construction of such roads or lanes for use by passenger buses or high-occupancy vehicles (HOV)</p> <ul style="list-style-type: none"> • Construction of new HOV lanes ▪ Increase enforcement ▪ Increase occupancy requirements of some lanes to 3+ ▪ Conversion of existing HOV lanes to bus-only lanes ▪ Utilization of freeway shoulders for peak-period express bus use ▪ Commercial vehicle buy-in to underutilized HOV lanes ▪ Congestion pricing or value pricing of HOV lanes 	<p>New HOV lanes In Baseline as TCMs 4 & 20</p> <p>Baseline also includes 151 lane miles of new carpool lanes programmed in the TIP (18 miles in operation, 133 more programmed in TIP) beyond the 285 lane miles included in TCMs 4 and 20 (See Appendix D).</p>	<p>Yes. Depends on specific HOV lane effectiveness in terms of improving travel time and increasing vehicle occupancy.</p> <p>Limiting HOV lane to buses or raising occupancy requirements to 3+ people in a vehicle could increase congestion on mixed-flow lanes and adversely affect air quality. Increased enforcement would have an indirect effect on carpool formation by increasing travel times for legitimate HOV lane users.</p>	<p>Yes. MTC can recommend HOV designation and approve projects that are consistent with the RTP..</p>	<p>Yes</p>	<p>Currently included in the SIP Baseline. Conversion of projects currently in the Baseline into TCMs will not advance attainment, since these projects are already funded and will be implemented</p> <p>Other items not reasonably available without additional information. Therefore, propose review of HOV policies as a Further Study Measure.</p>

Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>3 Employer-based transportation management plans, including incentives</p> <ul style="list-style-type: none"> • Commute alternatives (and requirements for employers to implement) • Guaranteed ride home programs • Telecommuting • Flexible work hours • RTC/Commuter check • Participation in Spare the Air efforts • Proximate commuting education programs 	<p>In SIP as TCMs 5, 9, 22 and 23.</p> <p>MTC funds the regional ridesharing program (RIDES for Bay Area Commuters), which supports employer-based transportation programs. Employers may include incentives and opportunities for employees to work closer to their home, when employers offer multiple worksites (proximate commuting education programs).</p> <p>MTC contributes funding to the Air District's Spare the Air campaign that notifies employers who in turn notify their employees of the need to use commute alternatives when high ozone levels are predicted.</p> <p>Employer receptivity to telecommuting and flexible work hours varies among employers and even among job classifications within a single employer depending upon job requirements.</p>	<p>Varies. A strong regulatory program (i.e., employer trip reduction regulations) can be a significant source of emission reductions. Voluntary programs much less so.</p> <p>Flexible work hours may have only limited impact on an employee's ability to rideshare or take transit.</p> <p>May not be an option for many employees</p>	<p>No regulatory authority. MTC works with employers indirectly through dissemination of information and assistance with ridesharing RIDES for Bay Area Commuters works directly with employers and their representatives.</p> <p>State law eliminates BAAQMD ability to require employer based trip reduction programs. State law already allows parking cash-out under certain conditions.</p> <p>Telecommuting policies are determined by employers.</p>	<p>Regulations that employers fund commute alternatives may be economically infeasible for certain businesses. However, no regulatory authority to require.</p> <p>If agreed to by employer, such programs are feasible. Often such programs as telecommute; flexible work hours and shifting of work sites are included in employer/employee employment and/or labor contracts.</p>	<p>A number of employer assistance programs are currently included in the SIP and Baseline. These include TCM 5 (support ridesharing efforts), TCM 10 (information program for Local Governments) TCM 22 (expand Regional Transit Connection Services), TCM 23 (Employer Audits), which resulted in the formation of Bay Area Corporate Employee Managers Group.</p> <p>Voluntary employer efforts are not enforceable. Mandatory, enforceable programs are not permissible under State law.</p>

Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>4 Trip-reduction ordinances</p>	<p>Not feasible or reasonably available because California State Law prohibits employer based trip reduction ordinance programs (SB 437). A number of employers continue to provide exemplary trip reduction programs on a voluntary basis.</p>	<p>Yes</p>	<p>None. California State Law prohibits employer based trip reduction ordinance programs (SB 437)</p>	<p>No. State law prevents implementation</p>	<p>Measure not legally available.</p>

Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>5 Traffic flow improvement programs that achieve emissions reductions.</p> <ul style="list-style-type: none"> ▪ Signal timing ▪ Freeway Traffic Management ▪ Freeway Incident Management ▪ Freeway Service Patrol 	<p>In SIP and Baseline as TCMs 24, 25, 26. Also propose to add new TCM D (Expansion of Freeway Service Patrol)</p> <p>Traffic flow improvements are an ongoing program. Many improvements funded directly by cities/counties. MTC has achieved the level of upgrading and coordination of signals anticipated in TCM 24. MTC continues to implement TCM 25 by providing technical assistance to local cities through the Traffic Engineering Technical Assistance Program and through an ongoing arterial operations committee. Since 1999, MTC has programmed \$34.3 million in Federal and State funds for signal timing and coordination projects.</p> <p>Also:</p> <ul style="list-style-type: none"> ▪ MTC, Caltrans, and CHP currently maintain a 362 lane-mile system of roving tow trucks on freeways during the commuter period to assist motorists and reduce congestion from incident delays, which also decrease emissions. ▪ Caltrans and MTC are working to implement a regionwide Traffic Management Center to better detect and manage incident delays. 	<p>Yes, although some of reductions may be slightly offset by increased travel.</p>	<p>Yes through MTC allocation of funds.</p> <p>However, authority for specific traffic improvements and signal programs are with local municipalities.</p>	<p>Yes. Arterial signal improvements and freeway incident management program are feasible.</p>	<p>Efforts ongoing and in Baseline.</p> <p>Recommend new TCM that expands existing Freeway Service Patrol (TCM D—Expansion of Freeway Service Patrol)</p>

Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>6 Fringe and transportation corridor parking facilities serving multiple-occupancy vehicle programs or transit service.</p>	<p>In SIP and Baseline as TCM 7 and 8. Extensive program in place and operating:</p> <p>Currently over 100 park and ride lots operate in the region with approximately 6,300 spaces.</p> <p>Over 50,000 park and ride spaces are provided at Caltrain commuter rail, BART and Guadalupe Corridor light rail stations.</p> <p>In addition, the TIP includes funding for 14 park and ride lots.</p>	<p>De minimis—likely less than .01 tons/day. Park and ride lots are not a strong inducement to ridesharing, except at rail stations. Emission reductions for rail transit are tempered by auto engine starts to drive to transit.</p>	<p>Yes. MTC through funding actions. Caltrans, transit operators or local agencies implement.</p>	<p>Yes</p>	<p>Currently included in the SIP and in Baseline.</p> <p>Lots not currently in TIP would take a number of years to plan and implement and would not advance attainment date.</p>

Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>7 Programs to limit or restrict vehicle use in downtown areas or other areas of emissions concentration particularly during periods of peak use.</p>	<p>Reference to emission concentrations, suggests this is a CO control strategy, which is not relevant to the Ozone Attainment Plan. However, some cities impose restrictions on commercial vehicles during peak periods in congested Central Business Districts.</p>	<p>De minimis—likely less than .01 tons/day. Impact on reducing ozone precursor emissions is de minimis since restrictions may increase emissions due to circuitous driving at congested speeds. Such measures have not demonstrated ability to reduce overall regional VMT or auto starts.</p>	<p>Authority for such action rests with local municipalities and cannot be imposed by MTC.</p>	<p>Yes</p>	<p>Not proposing inclusion in the updated Ozone Attainment Plan since these programs would have <i>de minimis</i> impact on reducing air quality emissions due to their impact of redirecting rather than reducing VMT.</p>
<p>8 Programs for the provision of all forms of high-occupancy, shared-ride services</p>	<p>Measure in SIP and Baseline as TCM 5. MTC's continues to fund ride-sharing services by contracting with RIDES for Bay Area Commuters. The Regional Rideshare Program helps the public and employers develop and implement viable carpool and vanpool programs, and encourage use of public transportation. MTC monitors and evaluates the program and its services to make sure that effective and efficient services are being implemented. MTC also encourages the regional program to coordinate with local TDM programs to maximize return on investment.</p>	<p>De minimis—likely less than .01 tons/day. Given that availability of ridematching services and vanpool formation assistance are a convenience but not the main inducements to ridesharing.</p>	<p>MTC funds regional rideshare support activities</p>	<p>Yes</p>	<p>Currently included in the SIP and Baseline through TCM 5 and ongoing rideshare activities.</p>

Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>9 Programs to limit portions of road surfaces or certain sections of the metropolitan area to the use of non-motorized vehicles or pedestrian use, both as to time and place:</p> <ul style="list-style-type: none"> ▪ Traffic Calming 	<p>This appears to be more applicable as a CO control strategy, which is not relevant to the Ozone Attainment Plan.</p> <p>Currently, many arterials throughout the Bay Area include striping for bike lanes. Also many jurisdictions have local bike plans and have developed a system of bike lanes.</p> <p>A number of local jurisdictions have implemented traffic calming.</p>	<p>De minimis—less than .01 tons/day. Mode shift impacts of such restrictions or facilities insignificant for ozone.</p> <p>Traffic calming is a useful strategy for neighborhood livability, but might result in diverting traffic from one neighborhood to another without an overall reduction in travel; thus regional emissions are not reduced.</p>	<p>Authority to limit use rests with local municipalities or park districts and cannot be imposed by MTC.</p>	<p>Yes</p>	<p>Not proposing inclusion in the updated Ozone Attainment Plan since these programs would have <i>de minimis</i> impact on reducing air quality emissions since overall VMT not reduced. Bicycle related activities are proposed as new TCM B. (See discussion for Measure 10).</p>

Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>10 Programs for secure bicycle storage facilities and other facilities, including bicycle lanes, for the convenience and protection of bicyclists, in both public and private areas</p>	<p>Ongoing bicycle programs are included in Baseline and funded by both MTC (TDA Article 3 and STP/CMAQ) and Air District (TFCA). MTC requires bicycle committees and plans as condition for counties to receive TDA bicycle funds. All Bay Area counties have established bicycle committees.</p> <p>All counties and major cities have designated staff to oversee bicycle programs.</p> <p>All Bay Area counties and many cities have adopted comprehensive bicycle plans. Air District funded citywide bicycle parking plan in San Jose.</p> <p>Bay Area transit operators have installed bus bike racks and/or allow bikes in buses/vessels with low passenger loads.</p> <p>New Benicia and Carquinez bridges will have bike lanes. Dumbarton Bridge allows bicycle access. The Bay Bridge Task Force recommended that the new eastern span of the Bay Bridge should include a two-way bike/ped path, and recent legislation requires evaluation of bike access on the western span. The BCDC permit for the Hayward/San Mateo bridge requires a bike shuttle once the bridge is widened. Golden Gate Transit buses provide some bike access on Richmond/San Rafael bridge. MTC is evaluating other bike access options for this bridge. Also proposed for inclusion in the updated Ozone Attainment Plan as new TCM B (Bicycle/Pedestrian program).</p>	<p>Minor—in the range of up to .03 to .05 tons/day.</p> <p>Bicycle trips account for approximately 1.2% of total weekday trips. Thus, policies focused on bicycle trips affect a small proportion of the daily regional travel.</p>	<p>MTC and Air District (partial) through funding allocations.</p> <p>Local jurisdictions can require such facilities as part of development review process.</p>	<p>Yes</p>	<p>Extensive program in Baseline.</p> <p>Updated Ozone Plan would add new TCM (TCM B) that recognizes ongoing efforts toward improving bicycle program</p>

Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>11 Programs to control extended idling of vehicles.</p>	<p>Measure in SIP as TCMs 24 and 25 (see discussion under "5" above related to signal timing and emission reductions from reduced idling)</p> <p>Caltrans FastTrak automated toll collection on Bay Bridges will also reduce idling at these facilities. Program is operational on Bay Bridge and is being expanded.</p>	<p>Yes, in relation to arterials and automated toll collection.</p>	<p>MTC (partial). Through funding of arterial improvements. MTC does not have authority to regulate vehicle idling at private businesses such as drive-through facilities</p>	<p>Yes</p>	<p>In Baseline. No activities available, which would advance attainment.</p>
<p>12 Reducing emissions from extreme cold-start conditions;</p> <ul style="list-style-type: none"> ▪ Preferential parking at rail stations for electric vehicles. 	<p>Cold start emission reductions primarily achieved through continuing advances in engine technology. Also, strategy more appropriate for control of CO emissions during cold weather, which is not relevant to Ozone Attainment Plan. Pre-heating of catalytic converters for ozone reduction may be a future technological advance.</p> <p>Preferential parking for electric cars provided at some BART stations. Caltrain is currently evaluating proposals from Stanford University and Toyota for programs to encourage electric vehicles.</p>	<p>Unknown. Preferential parking for electric vehicles would not stimulate use of hybrid vehicles, which may be the more popular low emission vehicle in the near term.</p>	<p>California Air Resources Board through regulations for engine manufacturers.</p> <p>Preferential parking decisions reside with the owner/ operator of public and private lots.</p>	<p>Yes</p>	<p>Not significant ozone strategy, thus not included in SIP</p>

Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>13 Programs and ordinances to facilitate non-automobile travel, provision and utilization of mass transit, and to generally reduce the need for single-occupant vehicle travel, as part of transportation planning and development efforts of a locality, including programs and ordinances applicable to new shopping centers, special events, and other centers of vehicle activity.</p> <ul style="list-style-type: none"> ▪ New developments should be required to support transit connections ▪ Expanded network of sidewalks and crosswalks to improve pedestrian access ▪ Support local Clean Air Plans, Policies and Programs ▪ Only fund transportation projects that do not support sprawl ▪ Promote SMART Growth 	<p>In SIP as TCMs 10, 27 and 28. MTC supports local efforts to combine transportation and land use solutions through its Transportation for Livable Communities planning and capital grants program funded in the TIP. Arterial improvement projects typically include sidewalks and measures to provide pedestrian access. Also proposed for inclusion in updated Ozone Attainment Plan as TCM C (Transportation for Livable Communities), which would extend program beyond current TEA 21 expiration of 2003.</p> <p>ABAG, in conjunction with MTC and regional agencies, is developing an alternative land-use scenario (SMART Growth scenario) for regional planning.</p> <p>Local jurisdictions, not MTC, have authority to condition development approvals. Suggestion that MTC not support transportation projects that promote sprawl lacks a nexus to air quality. Suburban development and job growth can work to lower VMT by shortening commute trips for workers in these areas as has been shown in prior Census data. Some transportation expansion projects may be necessary to achieve non-air quality goals or are mandated through voter approved County sales tax measures for transportation improvements.</p>	<p>Unknown given broadness of measure. Such efforts generally apply to new developments, as noted in Section 108(f) description. Given new development represents a small portion of overall regional development, such programs and ordinances will have low near-term impact on overall emissions</p> <p>Effects of SMART Growth scenario (under development) on emission cannot be determined at this time and most of effects would be beyond the 2006 attainment date.</p>	<p>MTC can provide incentives and guidance, but cannot mandate local ordinances or programs.</p> <p>Using MTC funding authority to force local regulations that ostensibly reduce VMT would over step authority assigned to MTC by state legislature</p> <p>Further, Section 131 of the Clean Air Act specifically states “Nothing in this Act constitutes an infringement on the existing authority of counties and cities to plan or control land use, ...nothing... provides or transfers authority over such land use”</p>	<p>Yes; however, see discussion on Authority.</p>	<p>Elements of measure included in SIP.</p> <p>Updated Ozone Attainment Plan would add new TCM that recognizes ongoing efforts (TCM C-Transportation for Livable Communities). Programs provide an incentive program for local entities to design and implement pedestrian/transit friendly developments.</p>

Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>14 Programs for new construction and major reconstruction of paths, tracks, or areas solely for use by pedestrian or other non-motorized means of transportation when economically feasible and in the public interest. For purposes of this clause, the Administrator shall also consult with the Secretary of the Interior</p>	<p>Proposed for inclusion in updated Ozone Attainment Plan as new TCM B (Bicycle/ Pedestrian program).</p> <p>Also in Baseline since a number of localities around Bay Area have extensive bike/trail systems. Supported through locally funded initiatives and MTC's TLC program, which can improve pedestrian and non-motorized circulation. (See discussion for Measure 10)</p>	<p>Minor—in the range of up to .03 to .05 tons/day. Use of dedicated bicycle/ pedestrian paths account for a small proportion of the roughly 10% of daily trips made by bicycles and walking. However, opportunity exists for increasing emission reduction benefits.</p>	<p>MTC (partial) through funding incentives.</p>	<p>Yes</p>	<p>Addressed in new TCM B (Pedestrian/ Bicycle program).</p>

Section II: Review of other potential TCMs¹⁵

Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>15 Intermittent Control Measure/Public Education</p> <ul style="list-style-type: none"> ▪ Freeway speed limit enforcements on high ozone alert days ▪ Spare the Air Campaign 	<p>Measure is currently operating as the BAAQMD's Spare-the-Air program, thus in the Baseline. EPA regulations limit the amount of emission reduction assumed for voluntary episodic control measures (maximum of 3 percent of the emissions reductions needed to attain the standard), and require enforceable backup strategies. Further, the monitoring of effectiveness, which is required if such measures were included in SIP, is difficult to perform. This measure would continue in the Baseline.</p> <p>Freeway speeds in excess of 55 mph may produce disproportionately high levels of ozone precursors.</p>	<p>Difficult to ascertain without detailed survey information. (See G. Harvey "Transportation Control Measures for the San Francisco Bay Area: Analysis of Effectiveness and Costs", July 1991)</p> <p>High-speed travel on freeways could be a significant source of emissions, but needs further evaluation using the latest motor vehicle emission factors.</p>	<p>MTC and BAAQMD support Spare the Air program through CMAQ and TFCA funding.</p> <p>Enforcement of episodic speed limits for predicted high ozone days would require additional funding resources and statutory authorization.</p>	<p>Likely, but how the most effective elements such as freeway speed enforcement can actually be done needs to be further studied before a definitive answer can be known.</p>	<p>Spare-the Air program not proposed for inclusion in updated Ozone Attainment Plan; however, strategy ongoing in Baseline.</p> <p>Propose a "Further Study" measure to consider air quality impacts due to enforcement of speed limits on high ozone alert days.</p>

¹⁵ Measures shown in this section are from proposals made for 1999 draft and final Ozone Attainment Plan, proposals made at an April 27th MTC sponsored workshop on TCMs for the updated Ozone Attainment Plan at workshop, and a review of TCMs in the 1997 Bay Area Clean Air Plan, comments made at an May 30th workshop on the Draft Ozone Attainment Plan, comments from EPA staff, review of potential TCMs in EPA's TCM database (on EPA's website, and TCMs contained in the South Coast Air Quality Plan

Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>16 Conduct Demonstration Projects</p> <ul style="list-style-type: none"> ▪ Low emission vehicles ▪ Electronic Toll Collection 	<p>A state Clean Air Plan TCM that promotes demonstration projects. Specifically cited are electronic toll collection and low-emission vehicles.</p> <p>Electronic toll collection (FASTRAK) has been implemented on all Bay Area toll bridges and is in the Baseline (see discussion under “11”). Low emission vehicle projects are being funded by the BAAQMD and are mandated by the California Air Resources Board for the entire California vehicle fleet. Therefore, inclusion in the Bay Area SIP is unlikely to accelerate the attainment date.</p>	<p>Varies. Depends upon actual project. Demonstrations in themselves have little impact on regional emissions. Their benefit occurs when demonstrations prove feasible and are implemented.</p>	<p>Varies. Depends upon actual project and project sponsor.</p>	<p>Varies. Demonstration projects are intended, in part, to test the economic and technical feasibility</p>	<p>Not proposed for inclusion into the updated Ozone Attainment Plan. FASTRAK is in the Baseline. Manufacture of low emission vehicles required pursuant to California ARB rules and regulations.</p>

Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>17 Pricing</p> <ul style="list-style-type: none"> ▪ Higher bridge tolls ▪ Congestion pricing ▪ Higher gasoline taxes ▪ Variable pricing on Spare-the-Air days or during ozone season (gas tax, tolls, other) 	<p>While prior analysis have indicated pricing very effective for changing travel behavior and, thus, reducing emissions pricing must be relatively high to do so. Gasoline costs fluctuate with demand/supply, but are currently the highest in recent time, without additional taxes.</p> <p>Congestion pricing has been studied in several corridors (Bay Bridge, Route 101 in Sonoma and Marin counties, and I-680, which is currently underway). Currently no legislative support is evident. Past efforts to find a legislator to carry a bill have not been successful.</p> <p>Legislature is considering extending the current \$2 bridge toll beyond 2008 (its current expiration date) for earthquake retrofit purposes.</p>	<p>Yes, when prices set sufficiently high.</p> <p>Higher bridge tolls would, however, affect only a modest proportion of regional travel. Congestion pricing would also be corridor-specific and affect a portion of regional travel.</p> <p>Acceptable levels for a regional gasoline tax may be in the 2-3 cent range, which would have limited affect on driving.</p>	<p>MTC has authority to propose to the voters a 10-cent gasoline tax increase, but polling indicates limited voter support (under state law, a 2/3 voter approval required).</p> <p>MTC may recommend, but state legislature must approve bridge toll increases including congestion pricing.</p> <p>State legislature has authority to impose smog-based vehicle registration fees or increase state/federal gas taxes.</p>	<p>Unknown. Some measures that involve large-scale price increases, could have adverse social and economic impacts</p>	<p>Not proposed for inclusion into the updated Ozone Attainment Plan.</p> <p>Given extensive policy discussions required and length of time necessary for consensus, it is unlikely these measures would advance attainment. Also voter or legislative outcome cannot be assumed.</p>

Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>18 Parking Reform</p> <ul style="list-style-type: none"> ▪ Paid parking at all work sites ▪ Peak period fees ▪ Change parking requirements for new development ▪ Paid parking at all transit stations ▪ Park and Ride lots ▪ Expand employer Parking cashout programs 	<p>Past studies by MTC indicate that the cost of parking is a significant factor in the mode choice decision. Parking restrictions or significant fees can impact auto trips, VMT and thus air quality.</p> <p>Most parking supply is subject to private business or municipal control. Measures that would restrict or charge for parking are also under private or municipal control, except for the state mandated parking cashout program, which applies to certain types of business parking space. Issues with imposing parking charges at employer sites, include the overall impact on business in terms of attracting and retaining employees, creating economic advantage for some employers if all employers are not required to have parking fees, and the effect on, local decision making and business/ labor agreements.</p>	<p>Yes. Prior MTC analysis has demonstrated the impact parking charges at employer sites have on air quality emission reductions.</p>	<p>State legislature has not granted any of the co-lead agencies policy or program authority to intervene in the area of parking fees. Parking ordinances, charges and development ratios are under the control of local municipalities. State law already requires private employers who lease parking to provide a parking cashout.</p> <p>MTC has indirect authority to condition certain funding approvals subject to caveats under "General Comments" However, legislature has prohibited imposing trip reduction strategies on employers, either directly or indirectly.</p>	<p>Technical ability to impose parking charges exists at the local level, particularly in relation to publicly owned space.</p> <p>Economic impacts on local agencies/ employers, and retail business that depends on an adequate supply of inexpensive parking unknown, but potentially adverse. New parking regulations would create new enforcement responsibilities and costs of an unknown magnitude.</p>	<p>No measures proposed for updated Ozone Attainment Plan. However, propose a "Further Study" measure to consider a Parking Charge Management Program, which will review parking, policies and pricing/ incentive options.</p> <p>Time necessary to obtain commitments from over 100 Bay Area cities and counties and numerous Bay Area businesses would likely prevent advancement of the attainment date.</p> <p>Parking cash out demonstration would be a further study measure.</p>

Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>19 Imposition of TCMs through indirect application of MTC authority. Concept is for MTC to impose TCMs through conditioning funding of federal or state money and/ or grant approvals.</p> <ul style="list-style-type: none"> ▪ Only fund transportation projects within cities and counties that control growth or have "smart growth" ▪ Only fund transit expansion in cities/counties where transit incentives are offered (cash out, commute checks) ▪ Only fund transportation system expansion in cities where market rate parking is in effect 	<p>While many of the specific control strategies have been discussed under other headings, the method for implementing these strategies is significantly different in this TCM. Rather than accomplishing air quality improvements through providing travel alternatives and incentives, this measure would be imposed through withholding of transportation funding subject to MTC control based on some preset criteria.</p> <p>There are numerous policy and practical issues that arise. Some transportation services may be necessary, regardless of air quality issues, to comply with Federal, State regulations, assure funding equity, or meet economic and environmental goals. Such a withholding policy would prohibit MTC's ability to address these goals. Many transportation projects serve travelers outside the jurisdiction of a particular municipality, and thus could unfairly penalize these travelers. A blanket policy could have other unintended impacts and would overstep MTC statutory authority with respect to local control, and business/ labor agreements.</p>	<p>Unknown. While there could be some air quality benefits, there could also be adverse affects from delaying air quality beneficial projects until conditions are met.</p>	<p>MTC has certain statutory authority to condition funding approvals, but such conditions have been applied to specific transportation projects, related to MTC's requirements to find these projects consistent with the RTP. Imposition of conditions, which would have effect of usurping local control, would likely be challenged.</p> <p>MTC conditions would have no effect on substantial number of transportation projects and programs, which are locally financed. These include sales tax revenues, fares, direct gas tax subventions and property taxes. Thus, ability to control not complete.</p> <p>MTC denial of funds based solely on potential and undefined air quality impacts would result in a significant extension of MTC authority without statutory foundations, and delay other worthwhile projects.</p>	<p>Unknown. The proposed requirement may be challenged or in conflict with state law.</p> <p>Requirement may be economically infeasible for certain businesses subject to requirements.</p> <p>"Regulatory" control measures may have perverse impacts and result in regulatory costs, compliance/ monitoring costs and unanticipated impacts.</p>	<p>No change. Significant legal and practical considerations would make timely implementation difficult and therefore unlikely to advance attainment date.</p>

Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
20 Special Events Transportation	<p>Plan for improved mass transit during special events such as sporting events, entertainment events, etc.</p> <p>Ongoing special events of a minor nature (sporting events, concerts) typically are located at locations with mass transit (Oakland Coliseum, PacBell Park, San Jose arena) or incorporate mass transit planning. Major events are addressed when announced.</p>	<p><i>De minimis</i>. Likely less than .01 tons/day. By its nature special events are intermittent and involve only a small percentage of Bay Area population. Very major events (World Cup soccer and Olympic events) involve massive planning by MTC and other transportation agencies, and may have significant impact on emissions for the duration of the event, but their ongoing emission reduction benefit remains small. The region is making a bid for the 2012 Olympics, and, if successful, MTC will play a lead transportation-planning role.</p>	Yes	<p>Lack of transit operating funds constrains the ability to increase transit services for numerous special events. MTC typically can coordinate and lobby on behalf of operators for transit assistance for very major events.</p>	<p>No change. Not recommended as a control strategy due to the <i>de minimis</i> emission benefit likely to be realized given the intermittent nature of such events.</p>

Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
21 Transit Access to Airports	<p>The Bay Area's Regional Transportation Plan includes a number of very significant projects to improve transit access to airports. Perhaps the most significant is the BART extension to the San Francisco Airport. The air quality benefit due to this project is not captured by existing MTC travel models, which do not have air passengers as a separate trip purpose. Therefore these emission estimates need to be made "off model", using prior studies. Thus, we anticipate additional air quality benefits will accrue to the region when the BART to San Francisco Airport extension is completed and in operation in 2002.</p>	Yes	Yes	Yes	<p>Include a new TCM E: Transit Access to Airports, which takes credit for previously unaccounted for trips to the San Francisco Airport due to the BART to SF Airport extension.</p>

Section III: Proposed TCMs Per Comments Made In May 30th Workshop Or In Written Comment Letters

Commentor	Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>1. David Schonbrunn -Comment Letter to MTC April 27th</p>	<p>Establish a Commuter Choice program for agency employees (parking related suggestions):</p> <ul style="list-style-type: none"> ▪ Reduce parking ratio requirements or maintains a “comparable” reduction in SOV commuting. ▪ Require local ordinance to make residential and commercial rental property parking available only by separate lease ▪ Implement market-based charges for agency-owned public parking lots. ▪ Raise commercial lot parking tax for peak period. 	<p>See discussion for Measure 18, Section 2</p>				

Commentor	Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>2. David Schonbrunn-Comment Letter to MTC April 27th</p>	<p>2) Require TDM/TSM commitments by requiring any agency receiving funds for improvement project to:</p> <ul style="list-style-type: none"> ▪ Make a permanent employee Commuter Choice program a mandatory condition of approval for any land-use entitlement or use permit for an employment site with 10 or more employees ▪ Require Commuter Choice programs to meet minimum requirements established by MTC. 	<p>“Regulatory” control measures may have perverse impacts (i.e., result in regulatory costs, compliance/ monitoring costs and unanticipated impacts).</p> <p>See discussion for Section 2, Measure 19.</p>	<p>Unknown. Many agencies have such programs already.</p>	<p>California State Law prohibits employee based trip reduction ordinance programs (SB 437). To the extent this proposal conflicts with state law, it would be unenforceable.</p> <p>Local jurisdictions must determine appropriate traffic mitigation measures for new development. MTC does not have authority to infringe on these local decisions</p> <p>The majority of transportation funding is locally generated and controlled, thus, MTC related conditions would not apply to many transportation fund sources such as sales tax revenues, fares, direct gas tax subventions and property taxes.</p>	<p>Unknown. The proposed requirement may be challenged or in conflict with state law.</p> <p>Requirement may be economically infeasible for certain businesses</p>	<p>No Change.</p> <p>While measure suggested is somewhat different from employer based trip reduction programs (see analysis for suggested TCMs 3 and 4) in implementation, same legal issues are raised. Therefore, likely to conflict with existing law.</p> <p>Baseline and SIP contain incentive programs such as ridersharing services (TCM 5)</p>

Commentor	Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>3. David Schonbrunn -Comment Letter to MTC April 27th</p>	<p>3) Require TDM/TSM commitments by requiring any agency receiving funds or improvement project to:</p> <ul style="list-style-type: none"> ▪ Require major new development to provide permanent connections to transit. Provide incentives to locate major new development near frequent transit service 	<p>Many city ordinances require transit amenities as mitigation.</p> <p>MTC frequently comments on development EIRs to encourage such efforts. MTC's has established a Transportation for Livable Communities/ Housing Incentives grant program to encourage transit oriented designs.</p>	<p>Modest. Such efforts generally apply to new developments. Given new development represents a small portion of overall regional development, such programs and ordinances will have low impact on emissions</p>	<p>Authority for specific design and location of development is based with local municipalities.</p> <p>Requiring developers or employers to commit to long term funding to operate a transit connection may be economically infeasible.</p>	<p>Transit connections are often in EIRs for new development as mitigation. However, requirement to fund transit service may be economically infeasible for certain businesses.</p>	<p>Proposed for Updated Ozone Attainment Plan as incentive approach, not regulatory, as new TCM C (Transportation for Livable Communities/ Housing Incentives Program), which provides funding for local entities to design and implement pedestrian/ transit friendly developments.</p>

Commentor	Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>4. David Schonbrunn -Comment Letter to MTC April 27th</p>	<p>4) Require TDM/TSM commitments by requiring any agency receiving funds or improvement project to:</p> <ul style="list-style-type: none"> ▪ Secure local agency support for assisting surface transit vehicles to move faster through traffic, thereby making transit more competitive with SOV (through signal preemption for transit vehicles) 	<p>Local agency support is not key determinant. Transit operator must have program to track location of buses and initiate a signal preempt if buses are behind schedule. This is a major capital investment for an operator which must be weighed against other capital needs. However, several transit signal preemption projects have been funded in Alameda, Napa and Santa Clara counties.</p>	<p><i>De minimis.</i> Less than 0.01 tons/day. Related to effect of improved schedule adherence on increasing transit ridership for specific routes where preemption is available.</p>	<p>MTC has authority to provide funding incentives to support transit programs and improvements. It is not clear that a regulatory approach as suggested is warranted, as transit operators routinely work with local jurisdictions on transit issues.</p>	<p>Signal preemption is technically feasible, but may not be economically feasible, given capital investment required, for some operators.</p>	<p>Not proposed as new measure. However, ongoing MTC signal improvement programs (TCMs 24 and 25) allow for transit signal preemption projects as supported by local agencies.</p>

Commentor	Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>5. David Schonbrunn -Comment Letter to MTC April 27th</p>	<p>5) Provide more funding for urban transit service,</p> <ul style="list-style-type: none"> ▪ Set ridership targets ▪ Alter funding equity targets 	<p>The level of transit funding is set by the regional transportation planning process. A transit operator's funding is affected by the need for replacement of vehicles and facilities and, where expansion of service is contemplated, by the ability of the transit operator to sustain the service with the resources available. (See RACM Analysis for Section 1, Measure 1 on Baseline transit programs.)</p> <p>Transit ridership does not necessarily increase with transit funding. Ridership is strongly impacted by economic factors such as job and population growth</p>	<p>Varies: Transit system expansion, which attracts significant new riders from autos, can reduce emissions. However, expansion in non-prime transit markets can result in increases in NOX emissions.</p>	<p>Varies. MTC has authority over most transit capital funding and a smaller proportion of operating funds. In several instances, the share of operating funds provided to transit properties is determined by state legislation and alteration of these formulas would require legislative action. MTC has no direct authority over ridership.</p> <p>The allocation of operating funds to specific routes and services is primarily controlled and directed by transit operators in accordance with statutory laws and regulations. These funds (which are fully committed to current and committed transit operations) include sales taxes, property taxes, TDA funds and fares. Funding to increase service would require new operating funding</p>	<p>Yes. However, alterations of funding would require new revenue sources and new equity targets between transit operators would generally require state legislative approval.</p> <p>Achievement of specific ridership targets cannot be controlled, given wide range of variables that affect transit usage.</p>	<p>MTC has continuously advocated for increased transit funding. Creating a new TCM would not change this effort.</p>

Commentor	Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>6. David Schonbrunn -Comment Letter to MTC April 27th</p>	<p>Congestion pricing on bridges. Use funds for transit</p>	<p>MTC undertook a feasibility study in 1993, which recommended a demonstration project on the SF-Oakland Bay Bridge. However, increasing tolls in the peak period would require legislative approval, and MTC could not find a sponsor for the bill.</p>	<p>Modest. Bridge travel is only a portion of regional travel. Higher peak tolls may merely shift some autos to offpeak and not reduce emissions. However, revenues could be used to enhance transit service which could have air quality benefits.</p>	<p>No. MTC would need State legislative approval and federal DOT approval to implement</p>	<p>Unknown. Technical feasibility remains to be tested. That was the purpose of the demonstration project</p>	<p>Not proposed based on history of issue and lack of MTC authority to make an enforceable SIP commitment.</p> <p>While MTC has conducted studies, legislative and public support does not exist. Thus this measure is unlikely to advance the attainment date.</p>
<p>7. David Schonbrunn -Comment Letter to MTC April 27th</p>	<p>Smart Growth Initiative: Commit a percentage of funds and convene advisory group.</p>	<p>Studying land use is not a TCM that will affect the attainment in the needed timeframe. This fact notwithstanding, such efforts are underway under the sponsorship of ABAG, which is developing a regional smart growth land use plan.</p>	<p>To be determined based on the land use scenario developed by the SMART Growth project.. The potential for emission reductions depends on the magnitude of change a SMART Growth scenario would represent compared to existing land use patterns predicted by ABAG.</p>	<p>Authority for any actual changes in land use patterns would rest with local government.</p>	<p>Yes</p>	<p>Land use issues are primarily addressed in new TCM C (Transportation for Livable Communities) and in the recommendations for further study.</p>

Commentor	Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>8. David Schonbrunn -Comment Letter to MTC April 27th</p>	<p>Reestablish legislative authority for Trip Reduction Ordinance: MTC and BAAQMD to lobby for authority to charge for parking spaces</p>	<p>Such efforts are not likely to be successful, given the legislative history on this topic.</p> <p>However, the concept to encourage parking charges has been incorporated into a further study measure.</p>	<p>None, as a legislative initiative. However, see discussion in this section on the emission impacts of parking charges and incentive programs.</p>	<p>If legislative approval re-granted, would be administered by Air District. The state legislature has prohibited mandatory trip reduction ordinances</p>	<p>Not Applicable.</p>	<p>See "RACM Conclusion" for suggested TCMs 3 and 4.</p>
<p>9. David Schonbrunn -Comment Letter to MTC April 27th</p>	<p>9) Indirect Source Review: BAAQMD review major transportation projects</p>	<p>Currently transportation projects are required to undergo several levels of air quality analysis, including a regional conformity analysis for projects in the RTP and TIP; Projects subject to CEQA and NEPA undergo a project-level air quality analysis, which includes identification of mitigation strategies</p>	<p>Unknown. Unclear how proposed activity will reduce emissions. No direct link to reducing emissions proposed.</p>	<p>MTC and the BAAQMD typically comment on transportation environmental documents. Transportation projects do not fall under the category of indirect sources.</p>	<p>Yes</p>	<p>No change. Transportation projects already subject to air quality review at several levels.</p>
<p>10. David Schonbrunn -Comment Letter to MTC April 27th</p>	<p>Major Investment Study requirements: Require analysis of LUTRAQ land-use alternative.</p>	<p>Not a TCM. Major Investment Study guidelines prepared by MTC and Bay Area transportation agencies already allow for alternative land-use scenarios. However, without linkage to a policy commitment (i.e., local commitment to change land-use policies), such analysis is only informative.</p> <p>ABAG is working with regional agencies to develop a 'Smart Growth' land use vision for the Bay Area. Once adopted by ABAG, such a scenario will be the basis for analysis of transportation projects.</p>	<p>No. Requirement to analyze has no emission impacts. No direct link to emission reductions proposed.</p>	<p>Yes. No change is needed for analytical purposes.</p> <p>MTC has no requirement to use other than ABAG's adopted forecasts. However, MTC has voluntarily conducted three such regional analyses in the past.</p>	<p>Not applicable</p>	<p>No change. Current practice permits such analysis.</p>

Commentor	Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
11. David Schonbrunn -Comment Letter to MTC April 27th	Improve MTC's transportation ability to accurately predict future conditions	Not a TCM. MTC is continually in the process of improving its transportation planning capabilities through acquisition of new travel data, peer and public review of its transportation forecasting models, etc.	No. Proposal has no air quality emission reduction capability.	MTC develops the model.	Not applicable.	No change Current practice permits such improvements.

Commentor	Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>12. Norman Rolfe-San Francisco SPUR organization -Comment made at May 30th workshop</p>	<p>Spend funds to electrify bus routes, Caltrain. Rebuild Transbay Terminal</p>	<p>Capital expenses for electrification would be significant, and there are currently insufficient local funds to implement electrification. Both Caltrain electrification and MUNI transit enhancements are included in the long-range Regional Transportation Plan.</p> <p>Rebuilding of the Transbay Terminal has been studied and a concept plan has been developed. San Francisco is now trying to secure funding., but project would not be complete by 2006.</p>	<p>Since electrification is appropriate for only a few major bus corridors, the air quality effects, related to NOx, would be small. Electrification of Caltrain cannot be achieved by 2006 since there is a funding shortfall. Thus, potential emission reductions are beyond the attainment period.</p> <p>Rebuilding of Transbay Terminal will have no air quality benefits unless accompanied by expanded transit service (see discussion for Measure 1, Section 1), since it will simply replace an existing facility.</p>	<p>Yes</p>	<p>Yes, provided sufficient funds can be identified.</p>	<p>No change. Not available for reducing emissions between 2000 and 2006.</p>

Commentor	Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>13. John Holtzclaw-Sierra Club-E-mail comment dated 6/1/01</p>	<p>Fund only transportation system expansions within city or counties that have zoning to stop sprawl growth and implement smart growth</p>	<p>See prior responses for Measure 19, Section 2 and response above to Mr. Schonbrunn comments. Regarding transit expansion, MTC has adopted Resolution No. 3357 (Regional Transit Expansion Program Criteria), which includes criteria requiring documentation of supportive land use policies and evaluation methodology for transit expansion projects.</p> <p>ABAG, in conjunction with MTC and other regional agencies, is developing an alternative Smart Growth scenario for regional planning. Once adopted this scenario would be incorporated into regional transportation and air quality plans.</p>	<p>Impact on emissions could be adverse, as transportation improvements that are potentially beneficial from an air quality standpoint could also be stopped. There could also be equity issues in that these conditions would penalize travelers from cities who had complied and most rely on transportation facilities in cities that do not.</p>	<p>MTC has authority to condition certain funding approvals, related to a project's consistency with the Regional Transportation Plan. However, like measures proposed by other commenter above, this has potential legal issues associated with local control and potential that MTC is overstepping its authority.</p>	<p>Unknown. May have significant economic impacts by limiting transportation infrastructure.</p>	<p>Significant practical and legal issues. SMART Growth is being studied and will produce a regional consensus on how to proceed on this issue next year. A new TCM C (Transportation for Livable Communities/ Housing Incentive Program) has been proposed for the updated Ozone Attainment Plan to encourage so-called smart growth projects.</p> <p>Also, a "Future Study" measure would evaluate ways to enhance the Housing Incentive Program.</p>

Commentor	Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>14. John Holtzclaw-Sierra Club-E-mail comment dated 6/1/01</p>	<p>Fund only transit expansion within cities or counties where 80% of employees are offered parking cash out for commuter check.</p> <p>Fund only transportation system expansions within cities or counties where 80 percent of non-residential parking places are metered or otherwise charged for at market rates.</p>	<p>See discussion for Measure 18, Section 2</p>				

Commentor	Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>15. John Holtzclaw-Sierra Club-E-mail comment dated 6/1/01</p>	<p>Expand no highways or build new high occupancy vehicle lanes that are not bus only.</p>	<p>The SIP currently contains two TCMs that encourage carpool use consistent with Section 108(f) of the Clean Air Act, which identifies carpool lanes as an effective TCM. For this reason, prohibition of carpools from using lanes would be inconsistent with existing TCMs in SIP, which do not restrict use of HOV lanes.</p>	<p>Unknown. Would depend on the capability of buses using lanes to generate new riders, which in turn would be affected by specific markets served, and travel time savings offered by buses. If bus-only lanes resulted in increased congestion in mixed flow lanes, emission improvements would not occur.</p>	<p>Limited. Few new mixed flow highway lanes are proposed or under construction. Most regional highway expansions are at spot locations to reduce bottlenecks and improve safety, or add carpool lanes. Several highway projects have been approved by voters in local sales tax elections, with project definitions that did not include bus-only facilities.</p> <p>Individual highway projects are evaluated through the state and federal environmental process, and this is the appropriate venue to discuss alternative operational strategies for specific facilities, given existing and future conditions in the travel corridor.</p>	<p>New lanes may be in areas where it is not possible to fill a bus. Further, there would be operational issues where these lanes join existing carpool lanes, which could cause confusion for carpools who would need to exit lanes where bus only lanes start. This could lead to a negative public reaction. Highway projects often address local congestion relief (bottlenecks), improve safety or improve local access. Thus, to subject all highway projects to these conditions could result adverse safety and economic impacts, and represent a cost-inefficient use of public funds, if the lanes are poorly utilized by buses</p> <p>State law (SB 45) requires State Transportation Improvement funding (the major funding mechanism for roadways) equity targets be achieved within counties: Prohibiting certain project types may cause short-term problems meeting state equity funding requirements for certain counties within this region.</p>	<p>Recommended as a further study measure.</p>

Commentor	Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
16. Rebecca Kaplan-Bay Area Transportation Land Use Coalition-Comments made at May 30th Workshop	Require bike parking Have better transit interconnects and information	MTC is adding a bike/pedestrian TCM (TCM B) Transit coordination and interconnections are addressed in existing TCMs. See discussion for improved public transit measures 1a through 1f, Section 1.	No for bicycle parking. See other Sections for transit coordination RACM.	Local jurisdictions can require bike parking when they approve new developments.	Yes	Not included because of minor emission reductions and fact that local authority already exists.
17. Nancy Jewell Cross	Have bicycle related TCMs	MTC is adding a bike/pedestrian TCM (TCM B). See Measure 10, Section 1 for further discussion of bicycle TCMs				
18. José Luis Moscovich, Executive Director, San Francisco Transportation Authority, May 3, 2001	MTC should develop a parallel TCM to the Regional Express Bus Program, which includes bus rapid transit as a strategy.	The Regional Express Bus Program does allow for funding bus rapid transit services on arterials.	Minor, since number of rapid bus corridors is limited.	Yes	Yes	Included as new TCM A: (Regional Express Bus Program)

Commentor	Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>19. José Luis Moscovich, Executive Director, San Francisco Transportation Authority, May 3, 2001</p>	<p>MTC should include increased tolls on Bay Area bridges as a TCM.</p> <p>Caltrain electrification should be considered a TCM</p>	<p>See Measure 17, Section 2 for RACM analysis of pricing strategies.</p> <p>Increasing tolls could impose a burden on commuters who do not have other options for travel and could, if set too high, affect the economic attractiveness of San Francisco as a place to work, shop, and recreate.</p> <p>See Measure 12, Section 3 for RACM analysis of Caltrain electrification</p>				
<p>20. Mike Bullock: e-mail comment 5/13/01</p>	<p>Propose/ support parking cashout programs</p>	<p>Parking cashout for leased parking is required under state law for employers having such space.</p>	<p>See discussion for Measure 18, Section 2</p>			
<p>21. Roy Nakadegawa : e-mail comment 4/30/01</p>	<p>MTC should implement pricing strategies.</p>	<p>See discussion for Measure 17, Section 2</p>				
<p>22. Roy Nakadegawa : e-mail comment 4/30/01</p>	<p>BART should charge for parking. Implement shuttle services.</p>	<p>See discussion for Measure 18, Section 2</p>				

Commentor	Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
<p>23. Roy Nakadegawa : e-mail comment 4/30/01</p>	<p>MTC needs to develop better transportation management of development and land use as priority in allocating funds.</p> <p>Transportation planning needs to be integrated to land use regionally.</p> <p>Allocate funds based on "sound" zoning.</p>	<p>The regional SMART Growth project will identify what can be achieved in the way of new land use assumptions about the future. Once adopted by ABAG these will be used as the basis for transportation planning and decisions.</p>	<p>Unknown, but not in the short term of the attainment plan.</p>	<p>Local agencies have authority. MTC can facilitate with programs like TLC and HIP.</p>	<p>Yes if supported by local jurisdictions and their plans and zoning powers.</p>	<p>Significant practical and legal issues if MTC were to condition transportation funding as discussed in other measures above. A new TCM C (Transportation for Livable Communities/ Housing Incentive Program is proposed for the updated Ozone Attainment Plan to encourage so-called smart growth projects.</p> <p>See also Section 7: Future Planning. Smart Growth is identified as a future planning effort.</p>

Section IV: Review of Comments from Community Meetings on 2001 Ozone Attainment Plan

This section is a review of measures suggested at community meetings held in East Palo Alto, Richmond, San Francisco, San Jose, Livermore, and Vallejo between August 23 and August 30, 2001 and in letters received after initial adoption of the 2001 Plan by the co-lead agencies on July 18, 2001.

Commentor	Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
24. CBE Letter to CARB August 9, 2001	<ul style="list-style-type: none"> ▪ Require transit operators and MTC adopt plans and provide sufficient funding to increase transit ridership by 15% regionally and 25% in low income communities 	<p>Similar to previous RACM suggestions for transit (see Section I, Review of CAA Section 108(f) measures, Item 1). Preparation of plans would identify strategies that might be helpful to achieve further ridership increases; however, actual emission reductions would depend on the specific strategies and whether new funds would be required to implement them.</p>	<p>None, unless strategies could be funded. Deploying new service that is underutilized could have some offsetting adverse air quality impacts.</p>	<p>Transit operators</p>	<p>Increasing ridership by the amounts stipulated would likely require substantial new funding. Requiring MTC to provide sufficient funds to implement plans would not be economically feasible, because no such new funding currently exists.</p>	<p>Not reasonably available; no source of operating funds currently available that could generate revenues sufficient to meet stipulated targets.</p>

Commentor	Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
25. CBE Letter to CARB August 9, 2001	<ul style="list-style-type: none"> ▪ Require new developments to provide and fund permanent connections to transit 	Similar to previous RACM suggestions for transit (see Section I, Review of CAA Section 108(f) measures, Item 13).	Unknown, since the universe of future projects for which this type of measure might apply is not known.	Local governments (over 100 in Bay Area) have approval authority over new development. MTC and transit operators can encourage, but not require, these services where they make sense.	May not be economically feasible for some developments that are not near transit, or even for developments that are, if the development must pay the full capital and operating cost of the transit connection, which can be substantial. Such development costs and long term financial commitments could discourage needed housing or commercial improvements in a community.	Not reasonably available due to potentially significant region wide economic impacts.
26. CBE Letter to CARB August 9, 2001	<ul style="list-style-type: none"> ▪ Require large employers to subsidize transit costs of their employees equivalent to parking subsidies 		Unknown. Would vary depending on employer size and number of employees that have transit as a reasonable option for their commute	California law prohibits regulation of employers for purpose of reducing employee trips (Health and Safety Code Sec. 40717.9). Such subsidies cannot be required under current state law, except in the limited situations where parking cash out legislation applies.	Strategy may also be economically infeasible for some employers, depending on number of eligible employees.	Not reasonably available beyond existing state law

Commentor	Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
27. CBE Letter to CARB August 9, 2001	<ul style="list-style-type: none"> ▪ No net increase in vehicle miles of travel per capita. 	Proposed measure does not indicate a specific strategy. Limiting future growth in VMT or VMT per capita in the face of expected population and job growth is problematic. Reducing the rate of growth in VMT is a more realistic expectation, but VMT growth will continue to be influenced much more by economic growth than by TCMs. Strategies to achieve this goal would have to involve extreme pricing or regulations on travel.	Yes, if such a goal could be achieved	None, at levels of control needed to have no net increase effect VMT.	No. Strategies that would result in no increase in VMT or VMT per capita are likely to have severe economic impacts because of pricing or regulatory approaches.	Not reasonably available due to economic impacts and legal issues that would likely take significant time to resolve, and therefore not advance attainment date.
28. CBE Letter to CARB August 9, 2001	<ul style="list-style-type: none"> ▪ No backsliding on TCMs; Replace TCMs 6, 11, 12, and 16 with equivalent measures. 	EPA's August 28, 2001 action to disapprove the proposed 1999 SIP also eliminated these TCMs; emission reductions are in baseline and do not need replacement.				Elimination of TCMs was made according to criteria in CAA and do not need replacement.
29. Public at various community meetings	<ul style="list-style-type: none"> ▪ Stop collecting Bridge tolls to reduce emissions from stop and go traffic and vehicle idling. 	FASTRAK on bridges is being implemented to collect tolls electronically and will not require vehicles to stop at toll booths. Tolls revenues are required to cover a multitude of bridge maintenance and seismic repair costs as well as providing funding for transit.	No, since demand on bridges exceeds capacity, cars would still be backed up on the bridges themselves. Where demand does not yet exceed capacity (e.g. Antioch and Richmond-San Rafael bridges) emission benefits of not collecting tolls would be de minimis and not collecting tolls might result in increased traffic.	Yes, Caltrans/State Legislature	Not economically feasible given the central role tolls play in financing bridge operations, maintenance and seismic retrofit; as well as transit in bridge corridors.	Not reasonably available given economic impacts and de minimis reductions in emissions.

Commentor	Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
30. Public at various community meetings	<ul style="list-style-type: none"> Provide more express bus service beyond the \$40 million in state Traffic Congestion Relief funding (TCRP) 	<p>The existing \$40 million is capital funding is from the Governor's TCRP program and is for the purchase of new buses; transit operators must still have the financial capacity to operate the buses. Few, if any, operators have surplus funds available that could be used to significantly expand the \$40 million initial program when other system needs are considered (e.g., bus and facilities replacement, operating costs of other routes, etc).</p>	<p>Depends on the service or services provided if new funding identified. The routes that will be initially operated provide some of the best immediate opportunities for this type of service, and other potential services may not be as effective in generating new transit riders.</p>	<p>Yes, individual transit operators</p>	<p>Not economically feasible, since there is no source for additional operating funds to significantly expand the initial express bus system.</p>	<p>Expanded express bus service not reasonably available given existing financial constraints.</p>
31. Public at various community meetings	<ul style="list-style-type: none"> Express buses on freeway shoulders 	<p>Allow buses to use freeway shoulders to avoid congestion in adjacent lanes</p>	<p>No, de minimis since the number of freeway locations where shoulders could be used is expected to be very limited.</p>	<p>Caltrans would need to allow use of shoulders</p>	<p>Yes</p>	<p>De minimis air quality impacts</p>
32. Public comment at Livermore meeting	<ul style="list-style-type: none"> Provide express bus service from under used Livermore area park and ride lots to Dublin/ Pleasanton BART station 	<p>Idea would be to use several park and ride lots along I-580 to run frequent shuttles to BART's Dublin/Pleasanton lot, which fills up very early. Frequent shuttle service to BART, if provided by the local transit operator, would likely require new financial resources due to ongoing local service commitments.</p>	<p>No, would be de minimis for a single application, such as the Livermore area proposal.</p>	<p>Yes, transit operators</p>	<p>No, given lack of operating funds.</p>	<p>De minimis emission reductions.</p>

Commentor	Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
33. Public comment at Livermore meeting	<ul style="list-style-type: none"> Erect portable screens on freeways next to incidents to screen activity from passing traffic 	Measure intended to avoid gawking resulting traffic slowdowns around incidents (disabled vehicles or accidents) by placing screen between incident and passing traffic; based on limited Caltrans experience with concept, it appears screen itself may cause slow downs as motorists attempt to see what is behind it.	No, de minimis	Yes, Caltrans or fire departments	Yes	De minimis emission reductions.
34. Public comment at Vallejo meeting; also in Trimlett letter to Air District of August 27, 2001	<ul style="list-style-type: none"> Eliminate bottlenecks on freeways as a means to speed up traffic; concept includes freeways that do not have same number of lanes in both directions (e.g. Caldecott Tunnel) 	Freeway bottlenecks can take many different forms, but in general, the highest priority improvements are currently included in MTC's Regional Transportation Plan and three year funding program (the TIP). The effects of these projects on traffic and emissions are modeled by MTC as part of the baseline. Major new projects that are not currently in regional plans and the funding pipeline would take many years to plan and deliver beyond the attainment deadline.	Depends on specific project.	Generally Caltrans for freeway projects, but may also include county traffic authorities who control local sales tax funds for transportation.	If projects not already identified in regional plans and programs, money would not be available.	New projects not included in the current emissions analysis would take a number of years to develop and deliver, and thus would not advance attainment date.
35. Public comment at Vallejo meeting	<ul style="list-style-type: none"> Subsidize late night taxi service from transit 	Would be minor inducement for transit use; may require new funding	No, de minimis given limited number of users such a service would likely benefit.	Transit operators if included as adjunct to existing services	Not economically feasible, unless new operating funds can be identified	Air quality effects would be de minimis
36. Leonard R. Trimlett letter to Air District August 29, 2001	<ul style="list-style-type: none"> Increase signal timing programs 	An existing TCM. MTC programs have already resulted in a significant number of signals being retimed throughout Bay Area. Funded signal timing projects are in the baseline. Another existing TCM will continue to fund periodic updates of signal timing plans to reflect changing traffic conditions over time.	Yes	Yes, individual local jurisdictions	Yes	An existing TCM.

Commentor	Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
37. Leonard R. Trimlett letter to Air District August 29, 2001	<ul style="list-style-type: none"> ▪ Eliminate freeway carpool lanes to provide more capacity for all cars. 	Notwithstanding the fact that HOV lanes are a statutorily identified TCM in the federal Clean Air Act, (and included in previous Bay Area air quality plans), an elimination of these lanes would foreclose future options to increase carpooling and express bus service on these lanes..	No, elimination of HOV lanes would discourage public interest in carpooling and express buses, eventually creating additional freeway traffic and congestion.	State Legislature/ Caltrans could decide to eliminate HOV lanes.	Yes	Because of potentially adverse air quality effects, elimination would not advance attainment date.
38. Public Comment at Livermore meeting	<ul style="list-style-type: none"> ▪ Extend BART to Livermore 	Extend BART to divert auto trips from heavily trafficked I-580 corridor. This project would take many years to plan and implement. No funding has been identified.	Depends on amount of auto diversion and whether some riders are diverted from other transit modes (e.g. express buses and ACE commuter trains)	Yes, BART	Project could cost as much as \$900 million; no funds have been identified	Would not accelerate attainment date
39. Public Comment at Livermore meeting	<ul style="list-style-type: none"> ▪ Expand ACE service from San Joaquin County; connect ACE with BART 	Similar to above, the purpose would be to divert auto trips in the I-580 corridor destined to the Tri-Valley and Silicon Valley to transit; additional funding needed to add trains and operate service; funding does not currently exist for expanded ACE or connecting ACE to BART	Depends on amount of service that can be provided; currently service carries about 2,500 people.	Yes, ACE and BART	Not economically feasible, due to lack of sufficient funds to expand service or connect BART and ACE.	Not economically feasible
40. Public Comment at Livermore meeting	<ul style="list-style-type: none"> ▪ Limit truck traffic during commute hours 	This strategy appears to be directed more at traffic congestion than air quality, since truck emissions would still be produced, but at different hours of the day.	No, de minimis if emissions not eliminated, but merely shifted in time of occurrence.	State Legislature and Caltrans	Economic impacts could be significant for operations of shippers and receivers.	Reductions would be de minimis

Commentor	Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
41. Public Comment at Livermore meeting	<ul style="list-style-type: none"> ▪ Charge tolls for heavy trucks on I-580 	Strategy would seek to reduce truck trips or cause a diversion of truck carried freight to rail. Tolls may or may not accomplish this objective, since any additional tolls/charges would likely be passed on to end user.	No, for reasons in previous column.	USDOT regarding tolls on interstate highway facilities; State Legislature and Caltrans	Potentially significant economic impacts if tolls are set high enough to discourage truck trips in corridor.	Not reasonably available given length of time needed to address political and legal questions relative to the attainment deadline and potentially significant economic impacts.
42. Public Comment at East Palo Alto meeting	<ul style="list-style-type: none"> ▪ Provide free bicycles at train depots 	Would seek to encourage non motorized access to train stations	No, de minimis, given small number of trips likely to be affected within the region	Yes, transit operators	Yes	Reductions would be de minimis
43. Public Comment at East Palo Alto meeting	<ul style="list-style-type: none"> ▪ Provide equitable funding for transit between suburbs 	Not clear what issue is being addressed with this suggested TCM. Various transit operators already provide suburb-to -suburb and inter city services.	Unknown	Depends on source of funding and who decides.	Not economically feasible if it requires funding significantly beyond current levels to transit operators.	Assuming TCM would ultimately involve significant new service, it would not be economically feasible.

Commentor	Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
44. Public Comment at Richmond meeting	<ul style="list-style-type: none"> ▪ Speed up transit service to increase use 	This suggested TCM involves portions of other TCMs, including regional express bus/rapid bus on arterials and signal coordination and/or preemption. Regional express buses operate on freeway HOV lanes to gain time advantages, several rapid bus projects are in the planning stages, and signal coordination plans (an existing TCM) will benefit both autos and transit on arterials.	Improved speed is one factor, but others also contribute significantly to transit use, such as fares, schedule reliability, safety/security, etc.	Cities, transit operators	Yes	Capability to speed up transit already exists in other existing TCMs.
45. Public Comment at Richmond meeting	<ul style="list-style-type: none"> ▪ Transportation system management is coordinated and less costly 	Transportation system management applies to a broad set of strategies for roads, transit, and customer programs. Suggestion is not defined well enough to evaluate	Yes, as a broad category	Depends on strategy	Generally yes, but depends on strategy	Suggestion not well enough defined.
46. Public Comment at San Francisco meeting	<ul style="list-style-type: none"> ▪ Implement tolls for local roads 	Tolls, if set high enough, may discourage some types of vehicle trips. Tolling all local roads would create significant economic and equity issues. Tolls have classically been used to finance some new roads, primarily freeway or expressway types of facilities, when other revenues are not available.	Yes, it tolls high enough	Local cities/counties who control roads	No, given the fact that there would need to be extensive investment in infrastructure to collect tolls and a plethora of coordination and equity issues with individual jurisdictions having their own polices about tolls. Unknown and potentially adverse economic impacts as well.	Not technically or economically feasible.

Commentor	Suggested Measure	General Comments	Significant source of emission reduction?	Authority to implement measure?	Economically and Technically feasible?	RACM Conclusion
47. Public Comment at San Francisco meeting	<ul style="list-style-type: none"> ▪ Put FASTRAK on all lanes on all bridges 	Speeding up cars through the toll plaza this would not significantly reduce emissions from stop and go traffic which would be backed up on the bridge itself. Also, some lanes would always need to be available for those bridge users who don't have FASTTRAK. (See also Item 30 in this section).	No, de minimis.	Yes, Caltrans	No, not technically feasible for all lanes	De minimis given that FASTRAK would not eliminate backups on the bridges themselves which would lead to increased emissions.
48. Public Comment at San Francisco meeting	<ul style="list-style-type: none"> ▪ Require flexible work schedules to spread out the commute 	Reduce congestion and thus emissions during commute period, by requiring employers to allow workers to arrive and depart outside the peak commute period. (See Section I, Item 3)	Potentially if significant numbers of auto trips shift out of the peak, resulting in freer flow of traffic, or use transit.	No, such requirements cannot be placed on employers under state law. Work schedule issues are the purview of individual companies and subject to their labor agreements.	Economic impacts on businesses required to extend hours of operations unknown, but potentially significant.	Not available, would need change in state law to require employers to use flextime.

APPENDIX D: STATUS OF TRANSPORTATION CONTROL MEASURES

Appendix D of the Bay Area 2001 Ozone Attainment Plan (Plan) provides an update on the status of federal transportation control measures (TCMs) for San Francisco Bay Area, as of April 2001. There have been 28 federal TCMs, 12 of which date from the 1982 Bay Area Air Quality Plan, and 16 of which were added by court order in 1991 pursuant to litigation over the 1982 Plan (*Sierra Club v. MTC*). A status report on TCMs is regularly provided in MTC's conformity determinations for both the Transportation Improvement Program and the Regional Transportation Plan.

The following tables summarize the status of all 28 TCMs. Table A summarizes the total emission reductions estimated to be generated by the original 12 TCMs from the 1982 Bay Area Air

Quality Plan, and compares these reductions to the original emission reduction target.

Table B shows emission reductions estimated to be generated from the 16 contingency TCMs adopted in 1991 to make up the shortfall, as calculated in 1987, in emission reductions from TCMs 1 through 12. As shown in Table B, many contingency TCMs are estimated to have "overachieved" their original emission reduction targets, since many programs have gone beyond what was envisioned in 1991.

Tables C and D give a status report on TCMs contained in the SIP, and demonstrate that many TCMs have been fully implemented.

Table A: Emission Reductions from TCMs in 1982 Bay Area Air Quality Plan

		<u>Tons/day</u>
Total estimated emissions reductions from 1982 Plan TCMs (see Table C)	VOC	2.69
	NOx	2.79
Estimated TCM emissions reductions actually achieved by 1987 ¹⁶	VOC	1.80
	NOx	1.98
Shortfall in emission reductions to be made up by contingency TCMs	VOC	(.89)
	NOx	(.81)

Table B: Projected Emission Reductions from 1991 Contingency TCMs (MTC Resolution No. 2131)

		<u>Tons/Day</u>	
Total projected emissions reductions from contingency TCMs available to make up shortfalls in TCMs 1-12	VOC	3.83	
	NOx	3.08	
Additional emission reductions due to overachievement of contingency TCMs¹⁷	TCM 14: Additional emission credit due to increasing tolls to \$2.00 on other state toll bridges (Dumbarton, San Mateo, Richmond, Carquinez, Benicia/Martinez and Antioch). Also credit for increase in Golden Gate Bridge tolls from \$2.00 to \$3.00	VOC	0.16
		NOx	0.34

¹⁶ Per 1987 Bay Area Reasonable Further Progress Plan report.

¹⁷ Emission calculations using EMFAC 7G emission factors.

	TCM 15: Additional emission credit is warranted for an additional increase in the Federal gasoline tax of 4.2 cents on 10/1/93.	VOC NOx	0.36 0.44
	TCM 16: Additional emission credit from the BART to Bay Point, BART to SFO, BART to Dublin, and Tasman LRT extension.	VOC NOx	0.16 0.36
	TCM 18: Additional emission credit due to increase to seven trains/day.	VOC NOx	0.03 0.02
	TCM 20: Additional emission credit based on an additional 151 HOV lane miles (current and programmed) beyond what was envisioned in TCM 20.	VOC NOx	0.11 <u>0.12</u>
	Total estimated emission reductions from overachieving contingency TCMs	VOC NOx	0.82 1.28

In addition to the above overachieving TCMs, MTC, Caltrans and the CHP have initiated and expanded the Freeway Service Patrol roving tow truck service to its current scope of 362 lane miles. The emission reductions calculated for this service are significant. VOC emission reductions are approximately 0.49 tons/day and for NOx 1.25 tons/day.¹⁸

Table C: TCMs from 1982 Bay Area Air Quality Plan¹⁹

TCMs from 1982 Bay Area Clean Air Plan	TCM Status	Estimated Emission Reductions (tons/day) ²⁰
TCM 1 Reaffirm commitment to 28% transit ridership increase between 1978 and 1983	Emission reductions in Baseline Annual transit boardings in 1978 were 333.6 million. In 2000, they were 495.6 million for a total increase of 48.6%.	Included in 1979 baseline. No additional credit taken

¹⁸ Analysis done by California PATH (California Partners for Advanced Transit and Highways Research Report UCB-ITS-PRR-95-5, February 1995) for Beat 3.

¹⁹ Shortfalls in emissions reductions projected for the original 12 TCMs were more than made up for by the 16 contingency TCMs adopted in 1990. These shortfalls and the contingency TCMs reductions that eliminated the shortfalls, are not reiterated in this table.

²⁰ For TCMs 1 through 12, emission reductions shown are from published figures in the *1982 Bay Area Air Quality Plan* for 1987. These calculations were made using older EMFAC emission factors.

<p>TCM 2</p> <p>Support post-1983 improvements identified in transit operator's five year plans and, after consultation with the operators, adopt ridership increase targets for the period 1983 through 1987</p>	<p>This TCM was implemented to the extent possible, but by its own terms, it is now out of date. Emission reductions in Baseline. (Note: Baseline also includes reductions from funded portions of operator Short Range Transit Plans.)</p>	<p>VOC: 0.72 NOx: 1.04</p>
<p>TCM 3</p> <p>Seek to expand and improve public transit beyond committed levels</p>	<p>Emission reductions in Baseline</p> <p>Between FY 83/84 and FY 1998/99 fixed-route and paratransit fleets expanded from 3,751 vehicles to 4,725 or 26%.</p>	<p>VOC: 0.37 NOx: 0.54</p>
<p>TCM 4</p> <p>Continue to support development of HOV lanes (see also TCM 20)</p>	<p>Emission reductions in Baseline:</p> <p>HOV lanes in operation by 1990--</p> <p>Alameda County</p> <ul style="list-style-type: none"> • I-80, westbound approach to Bay Bridge toll plaza and bypass of metering lights • Route 84, westbound approach to Dumbarton Bridge toll plaza (one HOV lane, two or more occupants) • Route 92, westbound approach to San Mateo Bridge toll plaza <p>Contra Costa County</p> <ul style="list-style-type: none"> • I-580/Knox Freeway, Bayview Avenue to Harbor Way <p>Marin County</p> <ul style="list-style-type: none"> • Route 101, from Richardson Bay Bridge to Tamalpais Drive (southbound morning, northbound afternoon) • Route 101, North San Pedro to Miller Creek <p>San Francisco</p> <ul style="list-style-type: none"> • I-80, Sterling Street eastbound on-ramp to Bay Bridge (afternoon operation only) • I-80, busway from Bay Bridge to Transbay Terminal (buses only) • I-280, Sixth Street to Army Street (southbound HOV lane, operates throughout the day, three or more occupants). <p>Santa Clara County</p> <ul style="list-style-type: none"> • Route 237, Route 880 to Lawrence Expressway (westbound morning, eastbound afternoon HOV lanes, two or more occupants) • Route 101, Guadalupe Expressway to San Mateo county line (HOV lanes, two or more occupants) <p><u>Santa Clara County Expressway System as of February 1990</u></p> <ul style="list-style-type: none"> • San Tomas Expressway, Route 17 to Route 101 (HOV lanes, two or more occupants); and • Montague Expressway, Route 101 to Route 680 (HOV lanes, two or more occupants) 	<p>No emission credit taken</p>

<p>TCM 5 Support RIDES' Efforts. (Emission reduction included in baseline.)</p>	<p>Emission reductions in Baseline RIDES for Bay Area Commuters continues to operate under contract to MTC</p>	<p>Included in 1979 baseline. No additional credit taken</p>
<p>TCM 6 Continue efforts to obtain funding to support long-range transit improvements (see TCM 16). (No emission reductions taken, implementation assumed beyond 1987.)</p>	<p>TCM deleted per August 28, 2001 EPA action on 1999 Ozone Attainment Plan.</p>	
<p>TCM 7 Preferential Parking. (Emission reductions assumed in baseline.)</p>	<p>Emission reductions in Baseline This TCM entails construction of preferential parking for carpools, transit users and vanpools. Currently over 100 park and ride lots operate in the region with approximately 6,300 spaces. Thus, the original goal of opening 17 new lots has been exceeded.</p> <p><u>Parking Facilities Provided by Transit Operators</u></p> <p>A large number of park-and-ride lots are provided at Caltrain commuter rail, BART and Guadalupe Corridor light rail stations.</p> <ul style="list-style-type: none"> • Caltrain commuter rail service provides over 4,000 parking spaces. This figure does not include parking spaces in the five stations operated by SCVTA. • BART provides 42,000+ parking spaces for its transit patrons at its stations. Due to parking deficiencies, BART has continued to expand its facilities. At certain stations, BART has established and actively enforces designated areas for carpools and vanpools. • For its bus and light rail system, Santa Clara Valley Transportation Authority (SCVTA) operates 19 district-owned or leased park-and-ride lots (including lots at 10 of the 32 Santa Clara Valley Transportation Authority light rail stations) providing a total of 7,043spaces. The lots also serve as staging areas for carpooling. 	<p>Included in 1979 baseline. No additional credit taken</p>
<p>TCM 8 Shared Use Park And Ride Lots</p>	<p>Emission reductions in Baseline TCM 8 is a program to use share park and ride lots for transit/carpooling. Approximately 18 shared used park and ride lots are operating with a combined total of approximately 1,100 parking spaces</p>	<p>VOC: 0.04 NOx: 0.05</p>

<p>TCM 9 Expand Commute Alternatives</p>	<p>Emission reductions in Baseline</p> <p>TCM 9 seeks to involve the private sector by encouraging employers to appoint Commute Coordinators who can disseminate information on commute alternatives.</p> <p>More than two employee transportation coordinator training classes per year were conducted between 1983 and 1987. MTC turned over this program to RIDES in FY 1987–88 and it continued until June 1994.</p>	<p>VOC: 0.87 NOx: 0.89</p>
<p>TCM 10 Information Program For Local Government</p>	<p>Emission reduction assumptions in Baseline</p> <p>MTC published the following:</p> <p><i>Traffic Mitigation Reference Guide</i> (1984). Discusses how local governments can incorporate traffic mitigation into their development review processes.</p> <p><i>A New Game plan for Traffic Mitigation</i>. (1988). Presents a case study of the Bay Area's experience with the deployment of traffic mitigation efforts.</p> <p><i>Key Considerations for Developing Local Government TSM Programs</i>. (1988). Detailed guidance for jurisdictions considering trip reduction ordinances.</p> <p><i>What we Know and Don't Know About Traffic Mitigation Measures</i>. (1990). Updated information on traffic mitigation processes.</p>	<p>VOC: 0.69 NOx: 0.27</p>
<p>TCM 11 Gasoline Conservation Awareness Program (GasCAP).</p>	<p>TCM deleted per August 28, 2001 EPA action on 1999 Ozone Attainment Plan.</p> <p>Would continue as a CO strategy</p>	
<p>TCM 12 Santa Clara Commuter Transportation Program. (A downtown San Jose CO control strategy.)</p>	<p>TCM deleted per August 28, 2001 EPA action on 1999 Ozone Attainment Plan.</p> <p>Would continue as a CO strategy</p>	

TCM From Resolution No. 2131	TCM Status	Estimated Emission Reductions (tons/day) ²¹
<p>TCM 13 Increase Bridge Tolls to \$1.00 on all Bridges</p>	<p>Emission reductions in Baseline</p> <p>Bay Area voters approved Regional Measure 1 in November 1988.</p> <p>Toll increase to \$1.00 on all seven state-owned bridges became effective on January 1, 1989.</p>	<p>VOC: 0.19 NOx: 0.24</p>

²¹ For TCMs 1 through 12, emission reductions shown are from published figures in the *1982 Bay Area Air Quality Plan* for 1987. These calculations were made using older EMFAC emission factors.

<p>TCM 14 Bay Bridge surcharge of \$1.00</p>	<p>Emission reductions in Baseline. Reductions exceed those anticipated in original TCM due to toll increases on all state owned bridges and Golden Gate Bridge.</p> <p>Effective January 1998, a \$1 bridge surcharge was approved by the Legislature and will be in effect for eight years.</p>	<p>VOC: 0.15 NOx: 0.28</p>
<p>TCM 15 Increase State Gas Tax by 9¢</p>	<p>Emission reductions in Baseline</p> <p>State voters approved the gas tax increase in June 1990.</p>	<p>VOC: 0.57 NOx: 0.84</p>
<p>TCM 16 Implement MTC Resolution 1876, Revised New Rail Starts Agreement. (BART extension to Colma only)</p>	<p>TCM deleted per August 28, 2001 EPA action on 1999 Ozone Attainment Plan.</p>	
<p>TCM 17 Continue October 1989 Post-Earthquake Transit Services</p> <p>Ferry Service: preserve new ferry service initiated after the earthquake. This measure only takes emission credit for the Alameda/Oakland and expanded Vallejo ferry service initiated after the 1989 earthquake.</p> <p>BART: Continue expanded peak-period service, including extended hours of peak service on four lines and added trains to the peak period.</p>	<p>Emission reductions in Baseline. Emission reductions exceed those originally anticipated due to higher service levels currently provided.</p> <p>In May 1997, two new 300-passenger vessels were added to the Vallejo-San Francisco ferry service. This allowed three a.m. departure trips from Vallejo and three return trips from San Francisco. One new Alameda-San Francisco 400-passenger went into service in October 1997. In addition, the Harbor Bay Maritime Inc., a private company that initiated service between Bay Farm Island in Alameda and San Francisco in March 1992, is currently being funded by 3% bridge tolls and local funds from the city of Alameda. One new high-speed catamaran began service in September 1998 between Larkspur and San Francisco.</p> <p>The City of Alameda and the Ports of Oakland and San Francisco have all completed various ferry terminal improvements.</p> <p>Currently BART is operating:</p> <ul style="list-style-type: none"> • Extra hour of commute service during weekday on two lines (6 am to 7 p.m.). • Early system start-up on weekdays and Sunday. • Faster running speeds (no increase in capacity). <p>Additionally, BART increased peak period trains to 56 by mid 1997 and it is planning a further increase to 75 trains when the SFO/Millbrae station opens.</p>	<p>VOC: 0.27 NOx: 0.37</p>

<p>TCM 18 Sacramento-Bay Area Amtrak Service</p>	<p>Emission reductions in Baseline. Emission reductions exceed those originally anticipated due to higher service levels currently provided.</p> <p>TCM anticipated 3 round trips/day</p> <ul style="list-style-type: none"> • Service started December 1991 with three trains per day. In April 1996, service increased to 4 round trips per day between Sacramento and Oakland, three round trips between Oakland and San Jose, and one daily trip extending to Colfax. • Fifth and sixth trains between Sacramento and Oakland started in October 1998. • Seventh train was put into service in April 2000. 	<p>VOC: 0.07 NOx: 0.15</p>
<p>TCM 19 Upgrade Caltrain Peninsula Service (Assumes 66 trains/day and service extended to Gilroy)</p>	<p>Emission reductions in Baseline. Emission reductions exceed those originally anticipated due to higher service levels currently provided.</p> <p>Caltrain service was extended south to Gilroy on July 1992 with four daily round trips.</p> <p>In July 1997, Caltrain began operating 66 weekday trains.</p> <p>Currently, Caltrain operates 78 trains/day with plans for expansion to 120/day.</p>	<p>VOC: 0.11 NOx: 0.17</p>
<p>TCM 20 Regional HOV System Plan Improve HOV lane system by developing and implementing MTC HOV Lane Master Plan. TCM assumed net increase of 221 HOV lane miles since 1990.</p>	<p>Emission reductions in Baseline</p> <p>In April 1990, MTC adopted the <i>2005 HOV Lane Master Plan</i>. At that time the HOV lane system was 64 miles. The HOV Lane Master Plan update identified implementation of 285 miles of HOV lanes since 1990, or a net addition of 221 miles. Currently 303 lane miles of HOV are operating with 133 more programmed.</p>	<p>VOC: 0.25 NOx: 0.33</p>

<p>TCM 21</p> <p>Regional Transit Coordination</p> <p>Emission credits taken for multiple coordination initiatives including fare and service coordination, and reduced fare BART/bus transfers</p>	<p>Emission reductions in Baseline</p> <p>MTC supported a bridge toll bill (SB 2100), which provided funds for reduced bus/BART fares. The bill did not pass the legislature.</p> <p>The Commission's adopted Transportation and Coordination Implementation Plan incorporates a series of coordination projects including:</p> <ul style="list-style-type: none"> --TransLink®, when implemented in 2002, will enable transit patrons to use a contactless smart card to ride any of the 25 transit operators in the region. --Regional Transit Discount Card Program—changes to the program to save costs by eliminating fraudulent use of transit discounts by ineligible individuals. --BART express bus service program transfers operation of this service to local operators to eliminate duplication of service. • MTC has implemented SB 602 (Kopp) schedule and fare coordination mandates. Bill requires MTC to adopt rules and regulations for schedule and fare coordination and to have transit operators enter into joint fare revenue sharing agreements with connecting systems. • TravInfo®, the regional telephone number, provides a single telephone number (817-1717) for information related to traveling in the nine-county Bay Area. 	<p>VOC: 0.05</p> <p>NOx: 0.09</p>
<p>TCM 22</p> <p>Expand Regional Transit Connection (RTC) Services</p>	<p>Emission reductions in Baseline. Reductions exceed those anticipated in original program.</p> <p>Currently, RTC serves approximately 200 employers in the region and sells about \$10 million worth of transit tickets annually.</p> <p>Since January 1998, MUNI assumed responsibility for operating and managing this project.</p> <p>Commuter Check began in September 1991 and cumulative sales to date are nearly \$50 million.</p>	<p>VOC: 0.06</p> <p>NOx: 0.09</p>

<p>TCM 23</p> <p>Employer Audits</p> <p>TCM intended to identify high visibility companies who can act as “pacesetters” or models for effective employee Commute Alternatives Programs; build networks for employers/other institutions.</p> <p>Review and enhance programs; provide audit reports to document results</p>	<p>Emission reductions in Baseline</p> <p>The Employer Audits Program resulted in the formation of the Bay Area Corporate Employee Transportation Managers Group in 1991. This group is composed of corporate transportation managers from some of the largest companies in the Bay Area including Lockheed, Hewlett Packard, PG&E, and Chevron. RIDES acted as the coordinator of the group’s activities and meetings, which ended in February 1998. Currently, RIDES continues to support voluntary employer-based trip reduction programs.</p> <ul style="list-style-type: none"> The Employer Network CMAQ Project was completed in 1995. After the project was completed, the Corporate Group invited large employers from the hospital, colleges and universities and public employees networks to joins their group. The bicycle program was funded by AB 434 in FYs 1994-95 and 1995-96, but currently, it is no longer funded as a separate program and RIDES has incorporated it into its ongoing operations. In addition to helping with the annual “Bike to Work Day” promotion, RIDES assists individuals requesting bicycling information, referrals to advocacy groups, bike/transit options and/or bike buddy matchlists. <p>TDM managers for some Bay Area cities meet on a quarterly basis:</p> <ul style="list-style-type: none"> To provide a forum for dissemination of information to public and private industry representatives (ETCs) involved in implementing TDM services. To provide information and referral resource to assist public agencies and private organizations to implement local TDM activities. To inform employers and public agencies that these assistance services are offered by the Regional Rideshare Program. 	<p>VOC: 0.16</p> <p>NOx: 0.22</p>
<p>TCM 24</p> <p>Expand Signal Timing Program to New Cities</p>	<p>Emission reductions in Baseline</p> <p>Emission assumptions for this TCM are based on a target of timing signals that affect 60% of the regional VMT. The Bay Area has approximately 5,500 traffic signals in the Bay Area. Based on funding to date, the target has been achieved.</p>	<p>VOC: 1.42</p> <p>NOx: (0.05)</p>

<p>TCM 25</p> <p>Maintain Existing Signal Timing Programs on Local Streets</p>	<p>Ongoing activities are intended to implement TCM 25 to maintain signals and include:</p> <ul style="list-style-type: none"> • The 2001 TIP programmed \$ 34.3 million for signal upgrade, coordination and timing projects. • Formed an Arterial Operations Improvement Advisory Committee (AOIAC) to advise MTC on how to better address the traffic signalization needs of local jurisdictions. • MTC established a Traffic Engineering Technical Assistance Program (TETAP) for cities to utilize. The 2001 TIP programmed \$750,000 in STP funds to continue TETAP requests. Future programming needs are estimated at \$1.2 million/year. 	
<p>TCM 26</p> <p>Incident Management on Bay Area Freeways</p> <p>TCM addresses the reduction delay through reduction of incidents and accidents on Bay Area freeways. Emission reductions are assumed from Caltrans' Traffic Operation System for 45-mile Cornerstone Project.</p>	<p>Emission reductions in Baseline Emission</p> <p>The Cornerstone project is funded, in place and operational as of December 1999.</p>	<p>VOC: 0.36</p> <p>NOx: 0.08</p>
<p>TCM 27</p> <p>Update MTC Guidance on Development of Local TSM Programs</p>	<p>Emission reductions in Baseline</p> <p>Fully implemented.</p> <p>MTC prepared report <i>Key Considerations for Developing Local Government TSM Programs</i> in December 1988. An update of this report was completed October 1990. Distributed report to cities, counties and Congestion Management Agencies in March 1991</p>	<p>VOC: 0.09</p> <p>NOX: 0.14</p>

<p>TCM 28</p> <p>Local Transportation Systems Management (TSM) Initiatives</p>	<p>Emission reductions in Baseline</p> <p>TCM 28 calls on MTC to support local TSM initiatives and to develop a Model Trip Reduction Ordinance for use by local jurisdictions. MTC prepared a model trip reduction ordinance in 1991. In 1995, the California legislature eliminated employee based trip reduction programs (SB 437). Some Bay Area jurisdictions have ordinances that encourage voluntary trip reduction efforts.</p> <p>The Air District's Trip Reduction Rule was adopted in December 1992. However, BAAQMD suspended implementation of Regulation 13, Rule 1 in October 1995.</p> <p>BAAQMD and some jurisdictions continue to encourage voluntary employer trip reduction efforts. In addition, a new group has been established called the Bay Area Clean Air Partnership, which plans to support and expand voluntary trip reduction efforts.</p>	
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APPENDIX E: FURTHER STUDY MEASURE DESCRIPTIONS

This Appendix includes brief descriptions of some possible control measures that are not appropriate for Plan commitments at this time, but merit further study. It is important to note that further study measures are not SIP commitments. These measures will be evaluated through an open, consultative process including all interested stakeholders. The evaluation of each measure could lead to various future actions, including: 1)

implementation of a program or adoption of a regulation prior to the 2004 SIP revision; 2) incorporation of a control measure in the 2004 SIP revision with a schedule for implementation by 2006; 3) incorporation of a further study measure in the 2004 SIP revision to provide additional time to resolve remaining issues; or 4) conclusion that the measure is not viable.

Further Study Measures

FS-1	Study Benefits of a Particulate Trap Retrofit Program
FS-2	Update High Occupancy Vehicle (HOV) Lane Master Plan
FS-3	Study Effects of High Speed Freeway Travel
FS-4	Parking Management Incentive Program
FS-5	Enhanced Housing Incentive / Station Access Program
FS-6	Further Smog Check Program Improvements
FS-7	Parking Cash Out Pilot Program
FS-8	Refinery Blowdown Systems
FS-9	Refinery Wastewater Systems
FS-10	Organic Liquid Storage Tanks
FS-11	Marine Tank Vessel Activities

FURTHER STUDY MEASURE 1 (FS-1)

Measure Name: **Study Benefits of a Particulate Trap Retrofit Program**

Description:

MTC together with the Bay Area transit operators will examine the potential to accelerate the application of particulate traps on diesel powered buses to achieve earlier compliance with state regulations. This analysis will consider the number of buses MTC believes can be repowered and retrofitted with traps given funding in the TIP, compared to the schedule required by CARB.

Schedule: MTC will complete the evaluation and public review by April, 2002.

FURTHER STUDY MEASURE 2 (FS-2)

Measure Name: **Update High Occupancy Vehicle (HOV) Lane Master Plan**

Description:

MTC will perform an update of the *HOV Lane Master Plan* including an analysis of:

- Existing and projected use of current HOV lanes
- Increased enforcement as a way to improve travel times for legitimate carpoolers
- Increasing the occupancy requirements of some 2+ lanes to 3+ in the most congested corridors

- Conversion of existing HOV lanes to bus only lanes and/or designation of any new carpool lanes as bus-only lanes.
- Utilization of certain freeway shoulders for peak-period express bus use
- Commercial vehicle buy-in to HOV lanes
- Appropriateness of HOV lanes for corridors that have considered congestion pricing or value pricing

Schedule: MTC will complete the evaluation and public review by December 2002

FURTHER STUDY MEASURE 3 (FS-3)

Measure Name: **Study Effects of High Speed Freeway Travel**

Description:

Using monitored freeway speed data and new EMFAC 2000 speed/emission relationships, MTC will estimate the emissions associated with travel over 55 mph and over 60 mph, and compare these to the total motor vehicle emissions inventory. If the emissions are significant, the feasibility of episodic enforcement of speed limits on high ozone days would be evaluated in terms of costs and other issues.

Schedule: MTC will complete the evaluation and public review by April, 2003.

FURTHER STUDY MEASURE 4 (FS-4)

Measure Name: **Implement Parking Management Incentive Program**

Description:

MTC will conduct a study to evaluate the feasibility of an incentive program for cities that lower parking requirements near transit stations and convert free public parking spaces to paid spaces. The study would review a sample of existing parking policies as they relate to new development approvals and would attempt to develop an order of magnitude estimate of parking spaces in the region that might be affected. The study would further consider programmatic approaches for creating incentives, such as modeled after the existing Housing Incentive Program which rewards jurisdictions with transportation funding based on the number of new residential units created near transit.

Schedule: MTC will complete the evaluation and public review by July, 2003.

FURTHER STUDY MEASURE 5 (FS-5)

Measure Name: **Enhanced Housing Incentive / Station Access Program**

Description:

MTC, ABAG, and the Air District will seek additional and compatible funding to provide incentives for new housing near transit and improved access to transit stations. Pooling of funds from a variety of sources may accelerate transit-oriented development and expand transit access options. Access considerations would include: electric station cars, car sharing, satellite transit lots, and electric bike use. Possible funding sources include: MTC's Transportation for Livable Communities, Air District Transportation Fund for Clean Air, CARB mobile source programs, State General Fund smart growth initiatives, and new regional funding from

increased vehicle registration surcharge. Legislation may be required. A target funding level of \$15 million per year would be considered.

Schedule: MTC, ABAG, and the Air District will complete the evaluation and public review by December, 2003.

FURTHER STUDY MEASURE 6 (FS-6)

Measure Name: **Further Smog Check Program Improvements**

Description:

The co-lead agencies, in cooperation with ARB and BAR, will evaluate potential improvements to the Smog Check Program in the Bay Area to identify new elements that are effective in reducing VOC emissions.

Schedule: The agencies will complete the evaluation and public review by December 2003.

FURTHER STUDY MEASURE 7 (FS-7)

Measure Name: **Parking Cash Out Pilot Program**

Description:

State law requires certain employers that provide subsidized employee parking to offer a cash allowance in lieu of a parking space. Such "parking cash out" programs can reduce motor vehicle use and emissions by promoting use of commute alternatives. In 1998, revisions to the federal tax code removed a significant impediment to implementation, but compliance with parking cash out requirements remains very limited. The Air District, in cooperation with MTC, ARB and major employers, would implement a parking cash out pilot program consisting of outreach to employers regarding parking cash out requirements, issues and opportunities, focusing on a set number of large public and private employers in heavily traveled corridors. The pilot program would help identify opportunities for broader implementation and potential emission reductions.

Schedule:

The Air District and MTC would begin the pilot program by July 2002 and complete the initial program evaluation by December 2003.

FURTHER STUDY MEASURE 8 (FS-8)

Measure Name: **Refinery Pressure Vessels, Blowdown Systems, and Flares**

Description:

The District, in cooperation with ARB and EPA, will examine the blowdown system for each of the Bay Area refineries to determine whether there is potential for significantly reducing emissions by reducing routine flaring and by venting more pressure relief valves (PRVs) to gas recovery systems, with flares used only for emergency events.

Refinery blowdown systems collect and recover liquid and gaseous discharges from process units. Typically, flares provide a backup safety device to combust gases that cannot be recovered. Pressure relief valves are another refinery safety mechanism. They are installed on refinery process units and serve to release overpressures that could threaten the integrity of process vessels. PRVs can be vented to the atmosphere,

through manifolds to an uncontrolled blowdown system, or to a blowdown system with a gas recovery system and flares. District regulations require that PRVs on new sources be vented to the refinery gas recovery system or to flares. District regulations also require such control for an existing PRV venting a second release at a single source within a five-year period. Beyond these requirements, it may be possible to reduce emissions from existing PRVs that vent to the atmosphere by venting them to gas recovery. The extent to which PRV releases and other blowdown system gases can be recovered depends upon the capacity of the refinery gas recovery system. To reduce flaring, a refinery may need to increase the capacity of its gas recovery system, particularly where additional PRVs are vented to the gas recovery system.

This study would, for each refinery, examine (1) volume and composition of gases sent to the blowdown system, (2) contribution of PRV emissions to these flows, (3) impacts on flows from venting additional PRVs to the blowdown system, (4) gas recovery system capacity, (5) flows to flares, and (6) flare efficiency. The study would ultimately attempt to determine the feasibility, cost, and safety of emission reductions that would come from reducing flows to the blowdown system and from increasing gas recovery capacity and flare efficiency.

Schedule:

The Air District will complete the study and public review by December 2003.

FURTHER STUDY MEASURE 9 (FS-9)

Measure Name: **Refinery Wastewater Systems**

Description:

The District, in cooperation with ARB and EPA, will examine the wastewater system for each of the Bay Area refineries to determine whether there are significant potential emission reductions from control of any remaining uncontrolled components of the wastewater system, or through other measures.

Most components of refinery wastewater systems are already controlled through compliance with District Regulation 8, Rule 8, District New Source Review requirements, and EPA's National Emission Standard for Benzene Waste Operations (40 CFR Part 61, Subpart FF). In 1998 and 1999, the District analyzed refinery wastewater systems and concluded that the entire wastewater system for each refinery should be analyzed and that it made little sense to focus further controls on specific wastewater system components. This was primarily because further control at one emission point in the system could have the effect of increasing emissions at other emission points. The wastewater system at each refinery is different, and control of remaining emissions will require detailed analysis of each individual system, with controls tailored to the specific system type.

This study would examine the wastewater system for each refinery to identify both means and costs for further VOC emission reductions from each wastewater system.

Schedule:

The Air District will complete the study and public review by December 2003.

FURTHER STUDY MEASURE 10 (FS-10)

Measure Name: **Organic Liquid Storage Tanks**

Description:

The District, in cooperation with ARB and EPA, will examine whether significant emission reductions would result from requiring controls on tanks storing lower vapor pressure liquids not currently subject to District Regulation 8, Rule 5, from requiring that external floating roof tanks be converted to internal floating roofs, and from more stringent tank cleaning standards.

Requiring controls for tanks storing lower vapor pressure liquids would require a means of accurately identifying lower vapor pressure liquids, as the current test method is not accurate below 0.5 psia, the current regulatory threshold. This study would examine the feasibility of various methods to accurately measure lower vapor pressure liquids and would determine how many Bay Area tanks contain lower vapor pressure liquids.

EPA's *Alternative Control Techniques Document: Volatile Organic Liquid Storage in Floating and Fixed Roof Tanks* (EPA 453/R-94-001, January 1994), states that internal and external floating roof tanks with good seals have control efficiencies of well over 90%, while properly operating vapor recovery system for tanks can achieve an effectiveness of about 95%. Though the EPA document and other studies indicate that there are no significant emissions benefits from choosing one of these controls over another, this study would examine whether Bay Area data and experience bear out this conclusion.

This study would ultimately attempt to determine whether retrofitting external floating roof tanks, controlling lower vapor pressure liquids, and more stringent tank cleaning standards would produce significant emission reductions and, if so, whether the reductions would be technically feasible and cost effective. This study would be conducted in conjunction with the implementation of control measure SS-12.

Schedule:

The Air District will complete the study and public review by December 2002.

FURTHER STUDY MEASURE 11 (FS-11)

Measure Name: **Marine Tank Vessel Activities**

Description:

The District, in cooperation with ARB and EPA, will examine whether there are any significant potential emission reductions that could come from the control of less volatile cargoes not currently subject to District Regulation 8, Rule 44 and from control of vessel purging.

BAAQMD Regulation 8, Rule 44 requires control for loading of specified cargoes (gasoline, gasoline blending stocks, aviation gas, JP-4 aviation fuel, and crude oil). The cargoes subject to the rule are the only cargoes loaded in significant quantities for which emission reductions are known to be significant (although JP-4 is no longer used by military aircraft and is no longer loaded). For example, EPA's AP-42 emission factor for uncontrolled gasoline loading is 75 lbs/1000 barrels, though the factor can be several times higher, depending upon loading and tank conditions. The only other liquids that appear to be loaded in the Bay Area in significant quantities are distillate oil and residual oil, according to U.S. Army Corps of Engineers waterborne commerce data. EPA emission factors for loading these materials are 0.2 lbs/1000 barrels for

distillate oil and 0.002 lbs/1000 barrels for residual oil. However, based on a test of vessel loading in the Los Angeles area, there is some uncertainty about the EPA emission factors.

Purging is the process of venting hydrocarbon vapors from a marine vessel tank by opening hatches or using a ship's inert gas generator to expel vapors. Gas freeing is the introduction of air into a tank, generally following purging and generally to allow personnel entry.

This further study measure would (1) identify types of organic liquids loaded in the Bay Area for which controls are not currently required, (2) determine appropriate emission factors for loading of these liquids, and (3) determine whether controls on loading of these liquids would produce significant emission reductions, and, if so, whether the reductions would be technically feasible and cost-effective. In addition, this measure would examine whether emission reductions would result from controlling marine vessel purging.

Schedule:

The Air District will complete the study and public review by December 2003.

APPENDIX F: TECHNICAL CORRECTION TO ATTAINMENT ASSESSMENT – Figure 6

This is a technical correction and explanation for one component in the Attainment Assessment: Figure 6, page 19, of the Proposed Final Ozone Attainment Plan, dated June 2001.

Figure 6 is an isopleth diagram that is one component of a multi-component Attainment Assessment, providing a "Weight of Evidence" showing of attainment, consistent with EPA recommendations for this Plan.

Isopleth diagrams are summaries of many photochemical model runs. The graphic format shows what Livermore's high ozone value will be for any combination of (regional) emission rates for VOC and NOx.

The original publication of Figure 6 indicated that additional emission reductions would be needed for attainment. It included text comments on pages 18 and 20, pointing out several shortcomings of the analysis, including: the short planning window, the definition of "attainment" by 2006, and the artificially high "background" ozone. The background ozone level is the most important and has the greatest effect on the results.

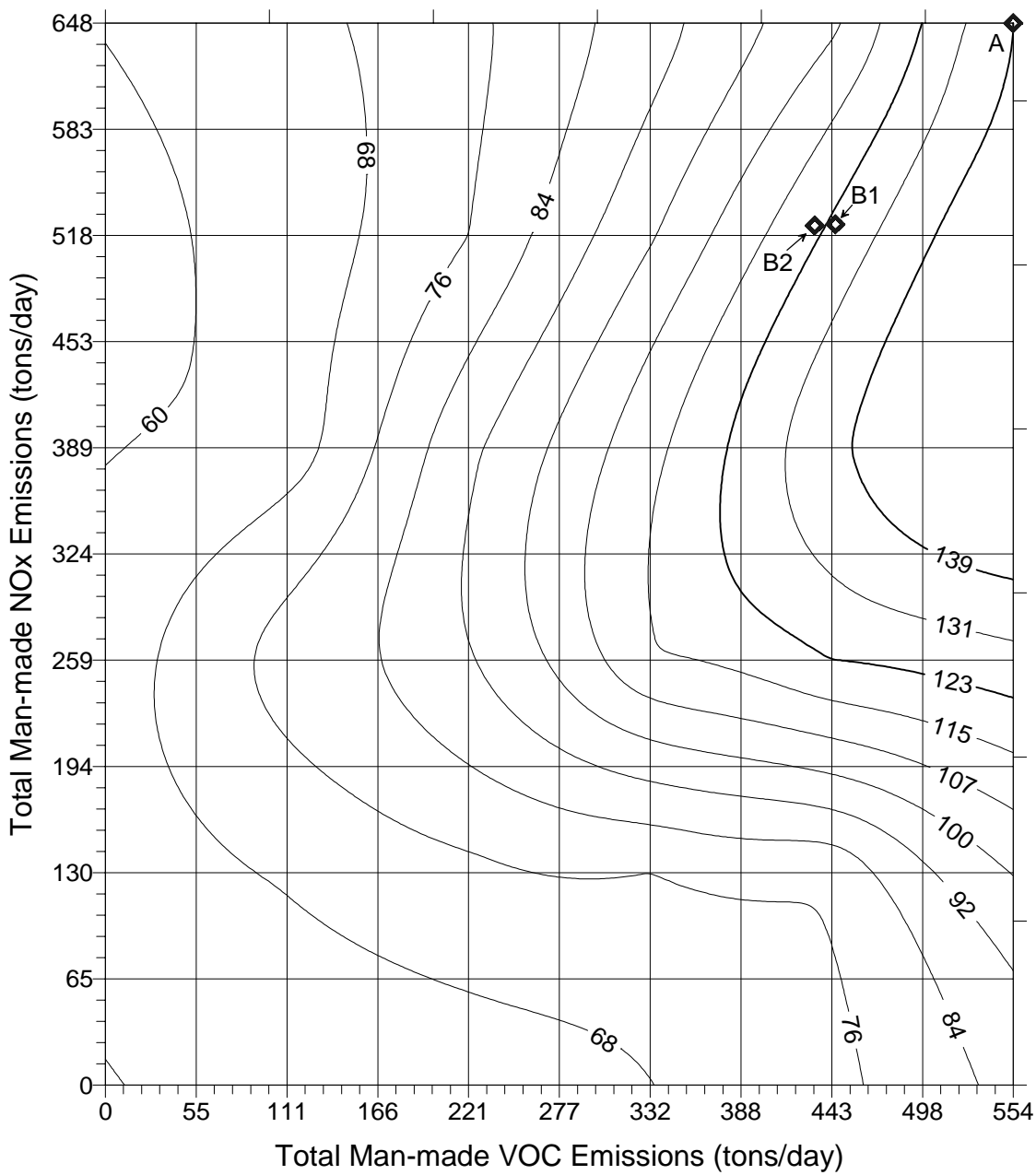
Basically, the original diagram showed that when all man-made emissions were reduced to zero, there would still be relatively high ozone--88 or 89 parts per billion. That is the number predicted by the isopleth line in the lower left corner of Figure 6. The lower left corner corresponds to zero NOx emissions and zero VOC emissions. But actual measurements of ozone in remote, unpopulated areas show that natural background ozone is only in the range of 40 to 60 parts per billion in the absence of traffic and industrial emissions.

The original Figure 6 value (in the lower left corner of the diagram) was too high because of modeling assumptions about initial and boundary conditions, and the graphics package used to plot the isopleth lines. This issue was mentioned in the Plan text on page 20, but was not quantified at the time because it did not seem critical to the overall weight of evidence conclusion of attainment.

This correction and explanation are provided now because some reviewers have focused on the original Figure 6 to the exclusion of all other elements in the Attainment Assessment. The correction consists of scaling the lower portions of the isopleth diagram such that the ozone prediction at zero emissions is 60 ppb--more consistent with observed values. The other isopleths are scaled proportionately, with diminishing corrections toward the upper right corner. The 139 ppb isopleth, starting point and design value remain unchanged.

The correction changes the conclusion of the Figure 6 analysis. After correction, it shows that the 2001 Plan would produce attainment of the national 1-hour ozone standard. An attainment design value of 121 ppb is indicated for the year 2006. This conclusion is consistent with the other components of the Attainment Assessment, and adds to the Weight of Evidence for attainment.

**FIGURE 6 -- CORRECTED FOR OZONE NATURAL BACKGROUND 7/12/01
2006 LIVERMORE OZONE SENSITIVITY USING 2000 BASE YEAR**



Isopleths of Livermore peak ozone concentrations (parts per billion) based on photochemical model sensitivity simulations. Point B1 represents the projected emissions for Year 2006 considering already adopted measures. Point B2 includes the effect of new control measures included in this Plan. The isopleth labeled 123 ppb represents a design value equivalent to attainment of the national 1-hour standard. The corresponding VOC emissions level is approximately 439 tons/day, given projected NOx emissions.