2004 AIR QUALITY MANAGEMENT PLAN FOR THE MONTEREY BAY REGION

Fourth Revision to the 1991 Air Quality Management Plan
for the Monterey Bay Region

Prepared by

Monterey Bay Unified Air Pollution Control District

September 2004

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EXECUTIVE SUMMARY

The Monterey Bay Unified Air Pollution Control District is one of 35 districts established to protect air quality in California. Its jurisdiction is the North Central Coast Air Basin (NCCAB), comprised of Monterey, Santa Cruz and San Benito counties. The Basin does not meet the State Ambient Air Quality Standards for ozone or inhalable particulate matter (PM_{10}).

The health based State ozone standard is exceeded when ozone levels exceed 0.09 parts per million during a one hour period. From 2000 to 2003 the State ozone standard was exceeded on 24 station days or 17 air basin days for a total of 36 hours. Air monitoring data for 2003 show that the District meets the criteria for a nonattainment-transitional area having had less than three exceedances of the State ozone standard at any one air monitoring station. While the classification of nonattainment-transitional is by operation of law, the Air Resources Board does not recognize the designation until it has validated the data.

The California Clean Air Act of 1988 required preparation of a 1991 plan showing how the State ozone standard would be met with subsequent updates every three years. This is the fourth update to the 1991 Air Quality Management Plan for the Monterey Bay Region (AQMP). Attainment of the PM_{10} standard is addressed in the "1998 Report on Attainment of the California Particulate Matter Standards in the Monterey Bay Region."

The 2004 AQMP includes:

- Current air quality data and analysis of air quality trends
- Revised emission inventory and emission forecasts
- Updated analysis of emission reductions needed to meet and maintain the State ozone standard
- Adoption of five stationary source control measures

The 2004 AQMP includes revisions to the base year emission inventories and 2005, 2010, 2015 and 2020 emission forecasts for volatile organic compounds and oxides of nitrogen (pollutants which form ozone). The most significant changes include updates to the on-road and off-road mobile source emission inventories.

The North Central Coast Air Basin remains on the borderline between attainment and nonattainment in part due to variable meteorological conditions occurring from year to year, transport of air pollution from the San Francisco Bay Area, and locally generated emissions. The photochemical model indicates that while the severity and extent of ozone exceedances are reduced in 2010 in comparison to 1990, some areas of the Basin may still not achieve the standard with current control measures.

Based on existing and projected air quality and requirements of the California Clean Air Act to adopt all feasible control measures, the 2004 AQMP includes adoption of the control measures for the following sources:

- Solvent Cleaning Operations
- Spray Booths - Misc. Coatings and Cleaning Solvents
- Degreasing Operations
- Adhesives and Sealants
- Natural Gas-Fired Fan-Type Central Furnaces and Residential Water Heaters.

The proposed control measures are defined as feasible by the Air Resources Board. Additionally, emissions from the first four proposed control measure categories are projected to increase by over 11% by 2020.

If the District is determined to be a nonattainment-transitional area by the ARB in early 2005, the proposed control measures will be returned to the Board for reconsideration as required by the California Clean Air Act.

1.0 INTRODUCTION

1.1 PLANNING AREA AND AIR BASIN DESCRIPTION

The North Central Coast Air Basin, comprised of Monterey, Santa Cruz, and San Benito counties, forms an area of more than 5,100 square miles with varied vegetation, climate and geography. The area includes portions of several mountain ranges: the Santa Lucia and Gabilan Ranges in Monterey and San Benito Counties, the southern portion of the Santa Cruz Mountains in Santa Cruz County, and the Diablo Range in the eastern half of San Benito County. The coastal terraces in the Santa Cruz area, the flat plains surrounding Watsonville, Salinas, and King City, and the southern Santa Clara Valley are sharply defined by the various mountain ranges.

The planning area consists of one of the smallest and one of the largest counties in the state. The air basin is home to approximately 738,700 people with 57 percent residing in Monterey County, 35 percent in Santa Cruz County, and 8 percent in San Benito County.[1] The Association of Monterey Bay Area Governments forecasts the area to grow to about 991,369 persons by 2030 (Table 1-1).

The dominant land use in the region is agriculture with approximately 1,626,000 agricultural acres or 437,000 farmed acres (pasture land excluded). About 88 percent of farmed agricultural land is in the Salinas Valley with 6 percent in San Benito County and 6 percent in Santa Cruz County. The gross agricultural crop value was $3.29 billion in Monterey County (2003), $239 million in San Benito County (2003) and $289 million in Santa Cruz County (2002) for a total of over $ 3.8 billion.[2]

Institutional land uses occupy significant portions of the land area within the region. Military land uses in Monterey County include Fort Hunter-Liggett, Camp Roberts, the Naval Postgraduate School, and the Presidio of Monterey. Other major institutional uses are the University of California at Santa Cruz (UCSC) and the Soledad Correctional Facility. Fort Ord, comprising almost 28,000 acres, was closed in 1993. The state University at Monterey Bay and UCSC have received over 2,000 acres of Fort Ord land for education and research uses.

The region has a significant amount of land in open space and recreation uses including several large State Parks, the Ventana Wilderness (164,503 acres), the Los Padres National Forest (304,035 acres), and the Pinnacles National Monument. Over 17,000 acres of Fort Ord have been dedicated to open space and recreational uses. The California Department of Parks and Recreation operates over 25 visitor facilities in the region.

In Monterey and Santa Cruz counties urbanized development occupies about three percent of the land area with approximately 65 percent of regional urban development in Monterey and Santa Cruz Counties extending around Monterey Bay on the coastal plain from the Cities of Santa Cruz to Carmel-by-the-Sea. Salinas is an exception, lying more than ten miles inland from Monterey Bay. Nearly three-quarters of the urban development is for residential purposes. Commercial land uses are concentrated in the major urban centers of the counties including Santa Cruz-Capitola, Monterey Peninsula, and Salinas. Tourism is also a major segment of the economic market in these areas.

Industrial activity includes oil production (San Ardo oil field), power generation

(Moss Landing), commercial fishing (Moss Landing), cement manufacturing (Davenport), quarrying activities (all three counties), agricultural processing in the Salinas and Watsonville areas, sand mining (Hollister, Marina, Scotts Valley and the North Coast of Santa Cruz County), food processors (Salinas, Watsonville and Santa Cruz) and electronic manufacturing firms (Scotts Valley, Santa Cruz, Watsonville and Salinas).

Approximately 97 percent of San Benito County is unincorporated land, with 90 percent being used as farmland, rangelands, forest, and public lands. The bulk of the county's population resides in the central region near the incorporated cities of Hollister and San Juan Bautista. Hollister serves as the major commercial center for the county.

Each county and city in the region has an adopted comprehensive general plan for its physical development. Each of the plans generally accommodates a certain amount of residential, commercial, industrial and institutional development.

1.2 AIR QUALITY DESIGNATIONS AND STATE AIR QUALITY PLANNING REQUIREMENTS

The air basin is a nonattainment area for the State Ambient Air Quality Standards for ozone and inhalable particulate matter (PM_{10}). The 1991 Air Quality Management Plan for the Monterey Bay Area (AQMP) was the first plan prepared in response to the California Clean Air Act of 1988 that established specific planning requirements to meet the ozone standard. The Act requires that the AQMP be updated every three years. This is the fourth update to the 1991 AQMP with the first three completed in 1994, 1997 and 2000, respectively. The AQMP addresses only attainment of the state ozone standard. Attainment of the PM_{10} standard is addressed in a separate report.

The California Clean Air Act also requires the District to prepare and submit a report to ARB summarizing progress in meeting the schedules for developing, adopting or implementing the air pollution control measures contained in the District's plans. The report is due by December 31 of each year and is included herein.

TABLE 1-1 POPULATION FORECASTS FOR NORTH CENTRAL COAST AIR BASIN[1]

Area	2000[2]	2005	2010	2020	2030
MONTEREY COUNTY					
Carmel	4,081	4,095	3,947	3,900	3,945
Del Rey Oaks	1,650	1,652	1,594	1,577	1,594
Gonzales	7,525	9,229	12,463	16,791	29,145
Greenfield	12,583	15,097	18,627	24,512	29,854
King City	11,094	12,885	15,484	19,381	23,360
Marina	19,163	23,172	30,567	34,362	35,357
Monterey	29,674	29,863	28,824	28,481	28,815
Pacific Grove	15,522	15,586	15,046	14,880	15,073
Salinas	143,776	146,687	165,141	184,434	213,063
Sand City	261	384	370	365	369
Seaside	33,097	34,221	34,888	34,855	35,148
Soledad	11,363	18,376	21,142	28,192	40,363
Soledad Prisons	11,271	11,271	11,271	11,271	11,271
Unincorporated	100,252	110,083	105,485	124,067	135,375
County Total	**401,312**	**432,600**	**464,847**	**527,069**	**602,731**
SANTA CRUZ COUNTY					
Capitola	10,033	10,869	10,978	11,104	11,136
Santa Cruz	54,593	56,953	57,768	59,924	63,987
Scotts Valley	11,385	13,182	13,667	14,062	14,275
Watsonville	44,265	52,716	56,779	65,473	70,418
Unincorporated	135,326	133,824	136,167	142,132	145,031
County Total	**255,602**	**267,544**	**275,396**	**292,695**	**304,847**
SAN BENITO COUNTY					
Hollister	34,413	38,280	44,423	53,485	59,703
San Juan Batista	1,549	2,032	2,905	3,593	4,315
Unincorporated	17,272	18,099	16,562	18,098	19,773
County Total	**53,234**	**58,411**	**63,890**	**75,176**	**83,791**
BASIN TOTAL	**710,148**	**758,598**	**804,333**	**894,940**	**991,369**

1 Association of Monterey Bay Area Governments, 2004
2 Census Data

REFERENCES

(1) California Department of Finance Population Estimates, January 2004.

(2) 2003 Crop Reports, Monterey and San Benito Counties. and 2002 Crop Report for Santa Cruz County

2.0 AMBIENT AIR QUALITY

2.1 AMBIENT AIR QUALITY STANDARDS, MEASUREMENTS, AND TRENDS

Both the federal and state Clean Air Acts identify pollutants of specific importance which are known as criteria pollutants. Ambient air quality standards are adopted by the Air Resources Board (ARB) and U.S. Environmental Protection Agency (EPA) to protect public health, vegetation, materials and visibility (Table 2-1). State and federal standards are updated periodically based on scientific studies and research on the effects of air pollution on health, vegetation and materials.

A new federal ozone standard for 8 hours was adopted in1997. Implementation of this standard was delayed until recently due to litigation. The federal 8 hour ozone standard will replace the federal 1-hour ozone standard in 2005. New federal and State standards for particulate matter 2.5 microns in diameter ($PM_{2.5}$) have been adopted, as well. Ambient air quality is currently being monitored for these new standards at the Salinas and Santa Cruz air monitoring stations. These standards are in addition to existing standards for particulate matter ten microns or less (PM_{10}).

Ozone, the primary constituent of smog, is formed in the atmosphere through complex chemical reactions involving volatile organic compounds (VOC) and nitrogen oxides (NO_x) in the presence of sunlight. The primary sources of VOC within the planning area are on- and off-road motor vehicles, cleaning and surface coatings, solvent evaporation, landfills, petroleum production and marketing, and prescribed burning. The primary sources of NO_x are on- and off-road motor vehicles, stationary source fuel combustion, and industrial processes.

PM_{10} and $PM_{2.5}$ are classified as primary or secondary depending on their origin. Primary particles are unchanged after being directly emitted, e.g., road dust. Secondary particulates are formed in the atmosphere largely by chemical reactions involving gases, e.g., sulfate from directly emitted sulfur oxides. Natural sources of particulates include sea spray, forest fires, volcanic debris, etc. Man-made sources include fuel combustion and industrial processes, industrial and non-industrial fugitive sources and transportation. Attainment of State PM_{10} standards is addressed in the District's 1998 Report on Attainment of the California Particulate Matter Standards in the Monterey Bay Region.

The District operates ten monitoring stations depicted in Figure 2-1. Air quality is also monitored by the National Park Service at the Pinnacles National Monument. There have been no violations of the Federal 1-hour ozone standard since 1990, and the District was designated a Federal Maintenance Area for ozone in March 1997. The District is an attainment area for the new federal 8-hour ozone standard. Table 2-2 summarizes exceedances of the State ozone standard from 1987 through 2003. Table 2-3 summarizes exceedances of the federal 8-hour ozone standard. Figure 2-2 depicts the number of days exceeding the State standard and the trend during the same period. Figure 2-3 compares exceedances of the State standard at population centers with those at the Pinnacles National Monument.

The ARB has classified violations of the State Ozone Ambient Air Quality Standard with respect to transport (Table 5-1). In 1994 and 1995 the State ozone standard was exceeded on 14 separate days. The ARB's analysis of the contribution of transported air pollution concluded that seven days were overwhelmed by transport of air pollution from upwind areas and four were due to significant transport from upwind areas. Analysis for one day was inconclusive, and two days were not analyzed because the exceedances were the result of unusual events beyond regulatory control.

Figure 2-1 Air Monitoring Station Map.

(Not include in the Website version of the AQMD.

For a copy of this map, contact Air District Planning Staff at (831) 647-9411)

TABLE 2-1
AMBIENT AIR QUALITY STANDARDS[a]

Pollutant	Averaging Time	California Standards[b]		National Standards[c]			
				Primary[d]		Secondary[e]	
		ppm	µg/m^3	ppm	µg/m^3	ppm	µg/m^3
Ozone	1 hour	0.09	180				
	8 hour			0.08		0.08	
Carbon Monoxide	8 hours	9.0	10,000	9.0	10,000	9.0	10,000
	1 hour	20.0	23,000	35.0	40,000	35.0	40,000
Nitrogen Dioxide	Annual			0.053	100	0.053	100
	1 hour	0.25	470				
Sulfur Dioxide[f]	Annual			0.03	80		
	24 hours	0.04	105	0.14	365		
	3 hours					0.5	1,300
	1 hour	0.25	655				
Respirable Particulate Matter (PM_{10}[g])	Annual		20		50		50
	24 hours		50		150		150
Fine Particulate Matter ($PM_{2.5}$[g])	Annual		12		15		15
	24 hours				65		65
Lead[g]	Calendar quarter				1.5		1.5
	30-day avg		1.5				
Sulfate[g]	24 hours		25				
Hydrogen Sulfide	1 hour	0.03	42				
Vinyl Chloride	24 hours	0.010	26				
Visibility Reducing Particles	8 hours (10 a.m.-6 p.m.)	In sufficient amounts to reduce prevailing visibility to <10 miles when relative humidity of <70% with equivalent instrument method					

[a] Standards first promulgated in ppm concentrations except where noted. Equivalent µg/m^3 concentrations based on reference temperature of 25°C and reference pressure of 760 mm of mercury.
[b] California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide, nitrogen dioxide, PM_{10}, and visibility reducing particles are values not to be exceeded.
[c] National standards, other than ozone and those based on annual averages, are not to be exceeded more than once a year.
[d] Designed to protect human health with an adequate margin of safety
[e] Designed to protect public welfare (i.e., prevent damage to vegetation, property, visibility)
[f] Federal standards first promulgated in µg/m^3.
[g] Standards promulgated in µg/m^3 only.

TABLE 2-2
EXCEEDANCES OF STATE OZONE AAQS IN NORTH CENTRAL COAST AIR BASIN
(1987-2003)

Year	Monitoring Station	Hours	Station Days
1987	Hollister	14	7
	Pinnacles	112	35
1988	Hollister	5	4
	Pinnacles	23	12
1989	Davenport	2	1
	Carmel Valley	7	3
	Hollister	2	1
	Pinnacles	15	7
1990	Davenport	1	1
	Hollister	7	3
	Pinnacles	22	9
1991	Santa Cruz	4	2
	Carmel Valley	2	1
	Davenport	2	1
	Hollister	2	1
	Pinnacles	23	9
1992	Hollister	1	1
	Pinnacles	15	9
1993	Carmel Valley	2	1
	Monterey	1	1
	Watsonville	2	1
	Scotts Valley	9	6
	Hollister	2	2
	Pinnacles	10	6
1994	Pinnacles	6	5
	Hollister	1	1
1995	Pinnacles	6	6
	Scotts Valley	1	1
	Hollister	1	1
1996	Pinnacles	39	14
	Scotts Valley	6	2
	Hollister	5	3
1997	Pinnacles	3	1

TABLE 2-2
EXCEEDANCES OF STATE OZONE AAQS IN NORTH CENTRAL COAST AIR BASIN
(1987-2003)

Year	Monitoring Station	Hours	Station Days
1998	Pinnacles	17	6
	Scotts Valley	1	1
	Hollister	8	5
1999	Pinnacles	4	2
	Santa Cruz	1	1
2000	Pinnacles	3	2
	Scotts Valley	1	1
	Monterey	1	1
2001	Pinnacles	3	2
	Hollister	1	1
2002	Pinnacles	15	7
	Hollister	4	4
2003	Pinnacles	4	2
	Scotts Valley	1	1

Note: Total O_3 Monitoring Stations: 1986-5; 1987-7; 1988 to 91-6; 1992 to 95-9; 1996 to 97-10; 98 to 03-8.

Table 2-3
EXCEEDANCES OF FEDERAL 8-HOUR OZONE AAQS IN THE NORTH CENTRAL COAST AIR BASIN
1997 - 2003

Year	Monitoring Station	Station Days
1997	Pinnacles	1
1998	Pinnacles	5
	Hollister	1
1999	Pinnacles	1
2000		0
2001	Pinnacles	2
2002	Pinnacles	5
2003	Pinnacles	2

Source: Monterey Bay Unified Air Pollution Control District and Air Resources Board

Figure 2-2

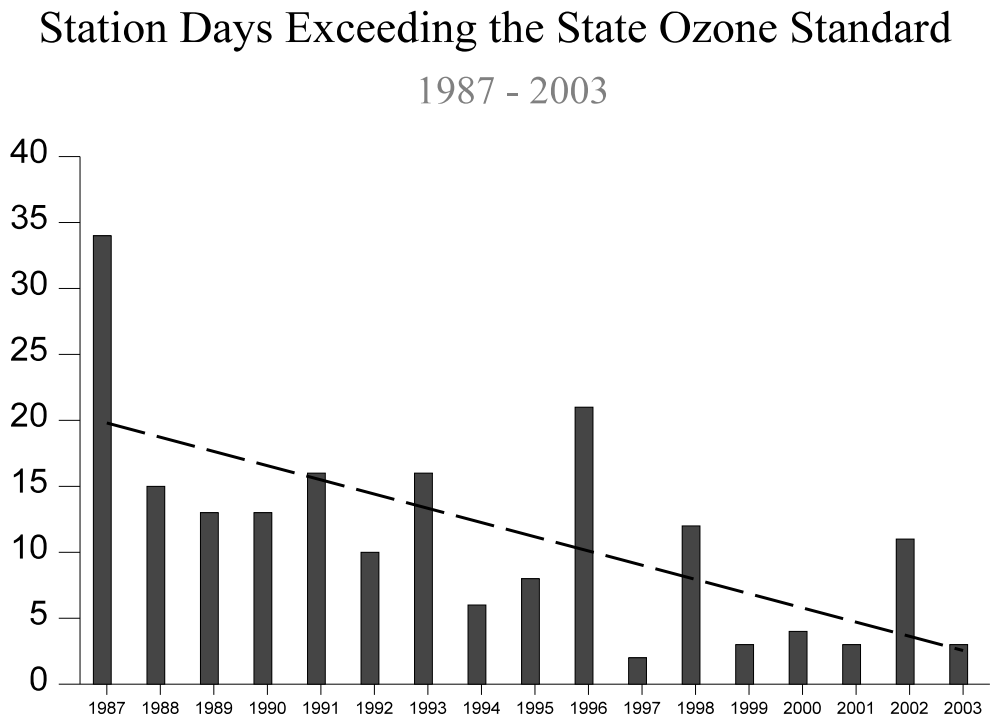
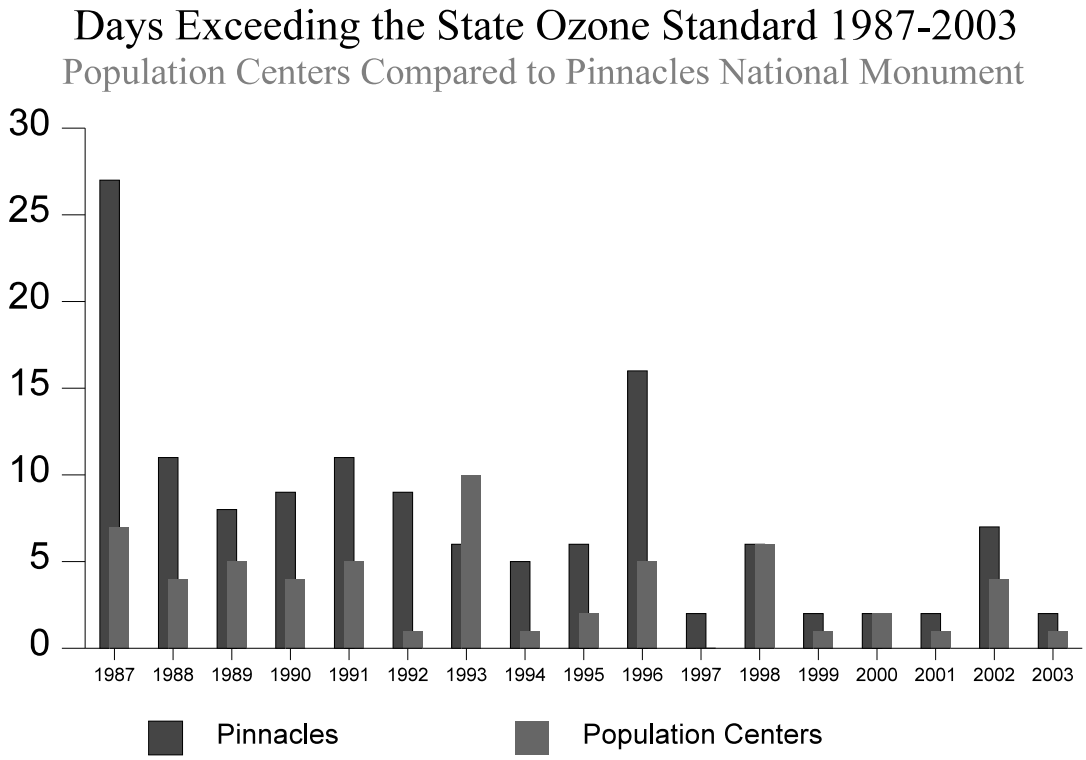


Figure 2-3



2.2 AIR QUALITY INDICATORS

The California Clean Air Act (CCAA) requires the ARB to evaluate and identify air quality indicators that can be used to by districts to assess their progress toward attainment of the State standards [HSC section 39607(f)]. An indicator is a way of summarizing measured air quality data so as to represent certain aspects of air quality in a specific area. Progress is assessed triennially. The assessment is to address (1) the peak concentrations in the peak "hot spot" subarea, (2) the population-weighted average of the total exposure, and (3) the area-weighted average of the total exposure (ARB Resolution 90-96, November 8, 1990).

This section presents the trends analysis for the air quality indicators (1) through (3). The trends extend back to 1987 which is the initial reference year for gauging progress in achieving the standard.

Peak Concentration or "Hot Spot" Indicators

The "hot spot" indicator is assessed in terms of what is called the Expected Peak Day Concentration or EPDC. The EPDC is calculated by ARB based on ambient data from each site in the air basin. The EPDC is the calculated peak one hour concentration, in parts per million (ppm), that is statistically expected to occur only once per year. The calculation procedure uses air monitoring data from each site during a consecutive three-year period. Three years of data are used to provide a more stable indicator than would be produced by just one year of data, since air quality trends can be highly affected by year to year variations caused by the weather. Only data from official monitoring stations meeting strict quality assurance criteria adopted by the ARB are used as Data For Record in making these determinations.

The EPDC "hot spot" indicator is the most important single indicator because it is used by ARB to designate areas in relation to the ambient air quality standard. EPDCs are updated annually, with the most recent EPDC indicators for the year 2002, based on data from 2000 to 2002. The ARB recommends that districts use the 3-year EPDC indicator for trends analysis since this is the key statistic used by the ARB in determining an area's attainment status.

The occurrence of measured violations of the standard will cause an area to be designated as nonattainment for the standard. However, not all recorded levels of ozone which exceed the standard are considered violations of the standard. Based on the criteria developed by ARB, exceedances that are higher than the station specific EPDC are not considered violations but rather infrequent extreme concentration events that do not have regulatory significance. For stations such as Pinnacles and Hollister, which currently have EPDCs above the standard, violations are considered as measured values that are above the standard but below the EPDC. For instance, at Pinnacles on August 26, 2002, a peak ozone hour of 0.098 ppm was recorded. Since this was above the standard but below the EPDC, this would be considered a violation. On July 10, 2002, a peak value of 0.115 ppm was recorded at that same station. Since this was above the current EPDC of 0.104 ppm, this event would be considered an exceedance, but not a violation. Additionally, exceedances which are known to have been caused by rouge events, such as stratospheric ozone intrusion or forest fires, are excluded from regulatory consideration.

In contrast to Pinnacles and Hollister, all other stations in the NCCAB network have EPDC's within the standard. Therefore, these sites can only have exceedances, but not violations. For instance, on June 14, 2000 Scotts Valley recorded a peak ozone level of 0.096 ppm. Since the EPDC for Scotts Valley is within the standard, this would only be considered an exceedance and would not be considered a violation in making regulatory designations.

A goal of the planning process is for all EPDCs in the District's network to be within the standard, because it is at that point that the NCCAB will likely become an attainment area for the

state standard. The current EPDCs for all District stations, and whether or not these are within the standard, are summarized in Table 2-4.

TABLE 2-4 - CURRENT[(1)] EPDCs IN THE NCCAB

Station	EPDC (ppm)	Within Standard [2)]
Pinnacles	**0.104**	**No**
Hollister	**0.097**	**No**
Scotts Valley	0.087	Yes
Carmel Valley	0.081	Yes
King City	0.081	Yes
Watsonville	0.076	Yes
Monterey	0.074	Yes
Santa Cruz	0.074	Yes
Salinas	0.067	Yes
Davenport	0.061	Yes

(1) Based on Data For Record for the years 2000-2002.
(2) The California standard for ozone is 0.095 ppm for a 1-hour average.

Table 2-4 also illustrates a well defined difference between the coastal and inland sites, whereby the inland sites tend to have higher EPDCs. This is because coastal areas typically benefit from cool coastal sea breezes, while the inland sites, which are further removed from marine influence, tend to experience pollution build-up from local and transported emissions.

Pinnacles National Monument

Pinnacles National Monument is the NCCAB's peak hot spot indicator station, and the NCCAB's attainment status is closely linked to conditions monitored at that site. The air quality situation at this remote and elevated site is rather complicated. ARB has determined that ozone conditions at Pinnacles are highly influenced by smog transported from a number of regional sources including the San Francisco Bay Area, the North Central Coast and the San Joaquin air basins. As shown in Figure 2-3, Pinnacles is the NCCAB's dominant exceedance site, with over two thirds of all NCCAB exceedances occurring at this site since monitoring began in 1987.

The trend for the Pinnacles EPDC indicator is shown in Figure 2-4. Overall, there was a 29% improvement in the Pinnacles EPDC indicator between 1987 and 2002, with the indicator decreasing from 0.146 to 0.104 ppm. This trend can actually be divided into two distinct sub-trends. During the early years improvement was rather dramatic with nearly three quarters of the overall improvement occurring during the first four years 1987 to 1990. This corresponded to a period of relatively rapid decreases in emissions of ozone precursors from regional sources. However, between 1995 and 2002, as new emission reductions from mobile and stationary sources became relatively smaller, the improvement became much flatter at only 2%. In fact, the indicator actually increased somewhat between 2001 and 2002 due to an unusually high number of exceedances that occurred that year, most likely a result of unusual ozone producing weather

in 2002 rather than a short-term increase in emissions. That deviation from the overall trend was short lived as exceedances were again low in 2003, although the actual EPDC value is not yet available.

Despite the reduced rate of progress during the late 90's, the overall improvement has been sufficient to reduce the average number of exceedances at Pinnacles to about three per year over the last five years. This is in contrast to earlier years when it was common to experience five to ten or more exceedances per year at that site. The year-to-year variation can be partially attributed to natural weather variations which can obscure the improvement trend due to regional emission reductions. Despite these variations, Figure 2-4 indicates that ozone levels at Pinnacles have shown overall progress in approaching the standard. Also, as shown in Figure 2-3, with only two exceedances recorded at Pinnacles in 2003, the NCCAB should qualify for a nonattainment transitional designation, which is a regulatory indicator of progress. Once the EPDC for Pinnacles dips below the standard at 0.095 ppm, the NCCAB will likely become an attainment area for the state ozone standard.

Hollister

The NCCAB's second highest "hot spot" location is Hollister, where the EPDC remains slightly above the standard at 0.097 ppm. This station is located in a populated area and ozone levels tend to be consistently lower than at Pinnacles. Hollister typically has zero to two exceedances days per year.

The 1987-2002 EPDC trend for Hollister is shown in Figure 2-5. Although starting off in 1987 at a lower level than Pinnacles, the overall 1987-2002 improvement in the EPDC for Hollister (13%) has been flatter than Pinnacles. Similar to Pinnacles, most of the improvement occurred in the first four years of the trend, with the trend being relatively flat during the late 1990's to present as the indicator slowly inches toward the standard. Although the current EPDC for Hollister remains slightly above the standard, Hollister will likely achieve the standard before Pinnacles.

Other Stations

While the trend's analysis tends to focus on the "hot spot" stations which remain above the standard, most stations in the NCCAB are within the standard and have been for some time. As shown in Table 2-4, eight of the ten monitoring sites in the NCCAB have EPDCs that are within the standard, only Pinnacles and Hollister are above the standard.

Figure 2-6 illustrates the EPDC trend for Salinas, the NCCAB's most populated urban center. The EPDC indicator for this population center is well within the standard and actually has one of the lowest indicators for any site in the air basin.

Other stations of interest are Scotts Valley and Carmel Valley, which are illustrated in Figures 2-8 and 2-9, respectively. Both of these charts depict sites in populated areas that once violated the standard but now have EPDC values well within the standard. However, Scotts Valley is the NCCAB's third highest exceedance site, and every few years Scotts Valley may still record an exceedance of the standard, although these do not occur frequently enough to cause the 3-year average EPDC to violate the standard. Scotts Valley had exceedances in 1998, 2000 and 2003. Carmel Valley hasn't had an exceedance since 1993.

The trend for Santa Cruz is illustrated in Figure 2-10. This is also an example of a population site which once violated the standard but now has an EPDC well within the standard. Santa Cruz has had only one exceedance in the last ten years which appeared to be a result of the Kirk complex wildfires in 1999.

In addition to assessing the longer term trends, ARB recommends that districts evaluate changes in the EPDC indicator for the most recent three years of data. It should be noted that in making these types of short-term assessments, even the stable EPDC indicator can be affected by naturally occurring year to year variations. At the key designation site Pinnacles, the EPDC remained flat between 2000 and 2002 at 0.104 ppm, largely due to the unusual numbers of exceedances in 2002. However, at Hollister a 7% improvement occurred as the indicator decreased from 0.103 ppm to 0.097 between 2000 and 2002. At Scotts Valley, the EPDC indicator also showed some improvement as it decreased from 0.089 to 0.087 ppm between 2000 and 2002.

Population and Area Exposure Indicators

Unlike the peak "hot spot" indicator which tracks progress at individual monitoring locations, the ARB's exposure indicators consolidate information into two cumulative annual exposure values for the entire air basin, one for population and one for area-wide exposure. These exposure indicators are based on the population and area within each census tract in the District and the tract's proximity to air monitoring stations recording ambient ozone levels above the standard. All recorded hours above the standard are considered and, unlike the EPDC, exceedance hours due to unusual events are not excluded. The indicators are updated annually to reflect the latest air monitoring data and also every ten years to reflect the latest census.

Although there is no standard for these indicators, they do provide a useful measure of progress toward achieving the standard. The population and area indicator trends are shown in Figures 2-7 and 2-8, respectively. Both figures indicate significant overall progress in reducing ozone exposure.

The population exposure indicator shown in Figure 2-7 is based on the number of hours each year that the population in certain census tracts was exposed to ozone levels above the state standard. These exposure values are allocated to population on the basis of the distance of individual tracks to District air monitoring stations recording ozone levels above the State standard, as well as the number of hours where ozone at those locations was estimated as being above the standard. The population weighted exposure indicators are in ppm-hours above the standard per person. The population indicator is sensitive to the location where exceedances occur and would likely be higher if Pinnacles were located in a populated area.

Figure 2-7 shows an overall downward trend for population exposure despite increasing population and annual variations caused by the weather. This suggests that emission controls have been able to offset growth, resulting in a net improvement in the air quality indicator.

The area exposure value is similar to the population exposure indicator except that it is based on the area within each census tract rather than the population in each tract. The area weighted exposure indicators are in ppm-hours above the standard per square kilometer and are shown in Figure 2-8. The area indicator shows slightly better improvement than the population indicator, because unlike population which has been increasing, the area within the census tracts remains fairly constant.

The population and area weighted indicators are based on a single year of monitoring data (as opposed to three used for the EPDC) and illustrate the strong natural variation that can occur year to year. For instance, the relatively poor air quality for 1996 and 1998 are shown as spikes on Figures 2-10 and 2-11 while the relatively clean 1997 (El Nino) and 1999 years have very low values. The increase shown in the indicators for 2002 was due to a poor year in 2002, when eight air basin exceedance days were recorded. The indicators should drop again for 2003, as only three exceedance days were recorded.

Again, because of these up and down variations, the NCCAB will likely fluctuate above and below the standard until regional emissions decrease to the point that the reduction in emissions fully override population growth and natural variation induced by the weather.

1989 to 1999 Nitrate and Ozone Trends at Pinnacles

Some pollutants share common precursors, such as ozone and nitrates which share the common precursor NO_x. Like ozone, nitrates are formed from precursors as polluted air travels downwind from urban and industrial source regions. The nitrate end product is in a class of fine particulates called secondary aerosols since they are not emitted directly but occur as a result of this conversion process. For locations far downwind of the source areas, such as Pinnacles, progress due to NO_x controls should be reflected both in terms of ozone and nitrate reductions.

Because of Pinnacles National Monument status as a federally protected Class I Area for visibility, special measurements of visibility impairing particluates have been monitored at that location by the National Park Service since the 1980s. This monitoring program, called the Interagency Monitoring of Protected Visual Environments or IMPROVE, includes long term measurements of nitrates. Thus, the long term data base of both ozone and nitrate at this site provides a unique opportunity to assess whether or not there is any relationship between these two indicators.

Since ozone tends to be highest during the summer and nitrates highest during the winter, highest concentrations for each constituent do not occur at the same time. Since NO_x is controlled year round and not just during the summer, the benefits of NO_x reductions should also be present during both the summer and the winter.

Peak nitrate and ozone levels monitored between 1989 and 1998 are summarized in Figure 2-12. It should be noted that the nitrate figures represent annual values while the ozone numbers represent the three year weighted EPDC which tends to smooth out annual variation. However, these short term averaging differences don't affect the long term trend comparison shown in Figure 2-12.

The figure suggests a general correlation between the nitrate and ozone trends as overall, the 1989-1999 trend analysis indicates that both have been declining. The decline in peak nitrates has been larger than the decline in peak ozone. This is consistent with modeling results which suggest that decreases in ozone precursors tend to be larger than the corresponding improvement in ozone. Similar to ozone, there are year to year variations in the nitrate decline, probably related to prevailing weather conditions during each year. For instance, nitrates decreased during the 1997 El Nino year, a year when there was only one exceedance of the state ozone standard at Pinnacles.

Since both ambient nitrates and ozone have shown an overall decrease since 1989, this suggests that regional strategies to reduce NO_x as an ozone precursor are having a beneficial affect on both ozone and secondary nitrates at the Pinnacles. The reduction in nitrates at the Pinnacles is similar to what has been observed at the San Gorgonio Wilderness Area IMPROVE site located downwind of the South Coast Air Basin, which is a major urban NO_x source region that has also reduced its NO_x emissions over the last decade.

FIGURE 2-4

PINNACLES NM PEAK OZONE TREND 1987-2002

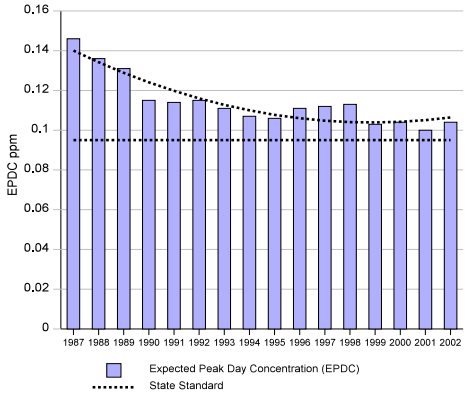


FIGURE 2-5

HOLLISTER PEAK OZONE TREND 1987-2002

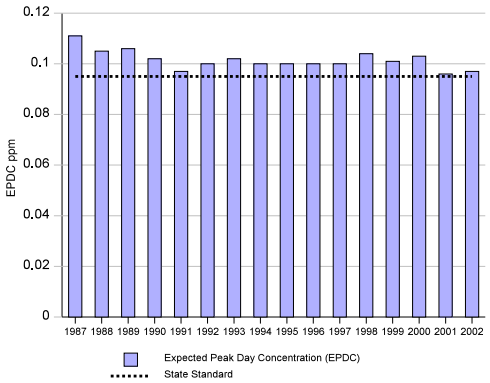


FIGURE 2-6

SALINAS PEAK OZONE TREND 1987-2002

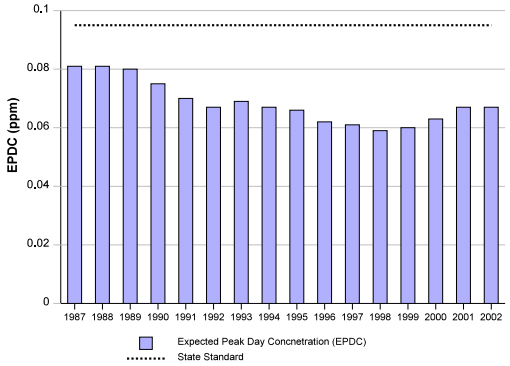


FIGURE 2-7

SCOTTS VALLEY PEAK OZONE TREND 1987-2002

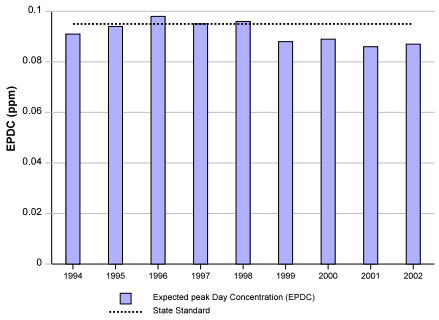


FIGURE 2-8

CARMEL VALLEY PEAK OZONE TREND 1987-2002

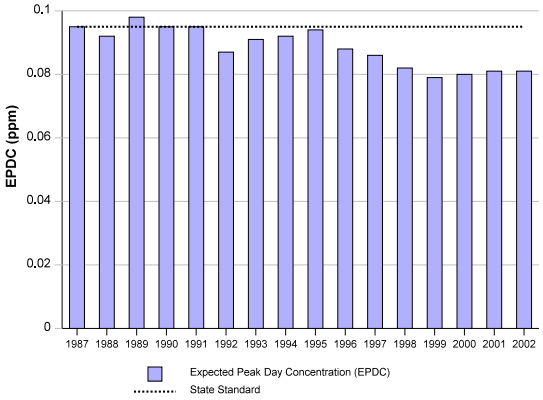


FIGURE 2-9

SANTA CRUZ PEAK OZONE TREND 1987-2002

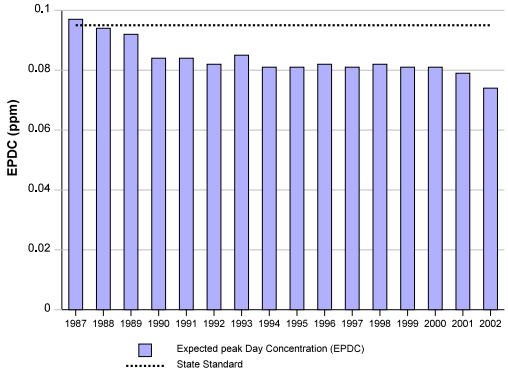


FIGURE 2-10

NCCAB POPULATION WEIGHTED INDICATOR

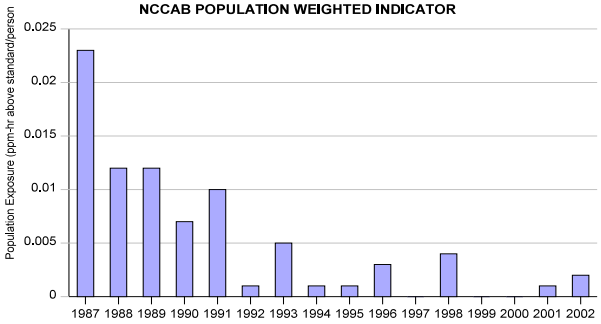


FIGURE 2-11

NCCAB AREA WEIGHTED INDICATOR

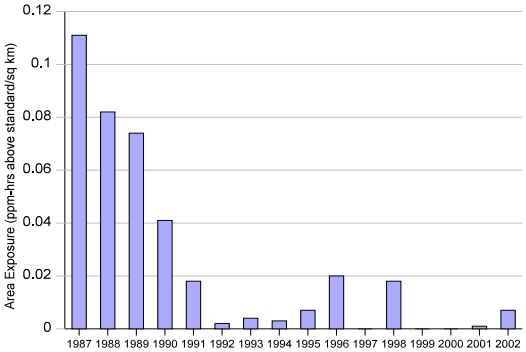
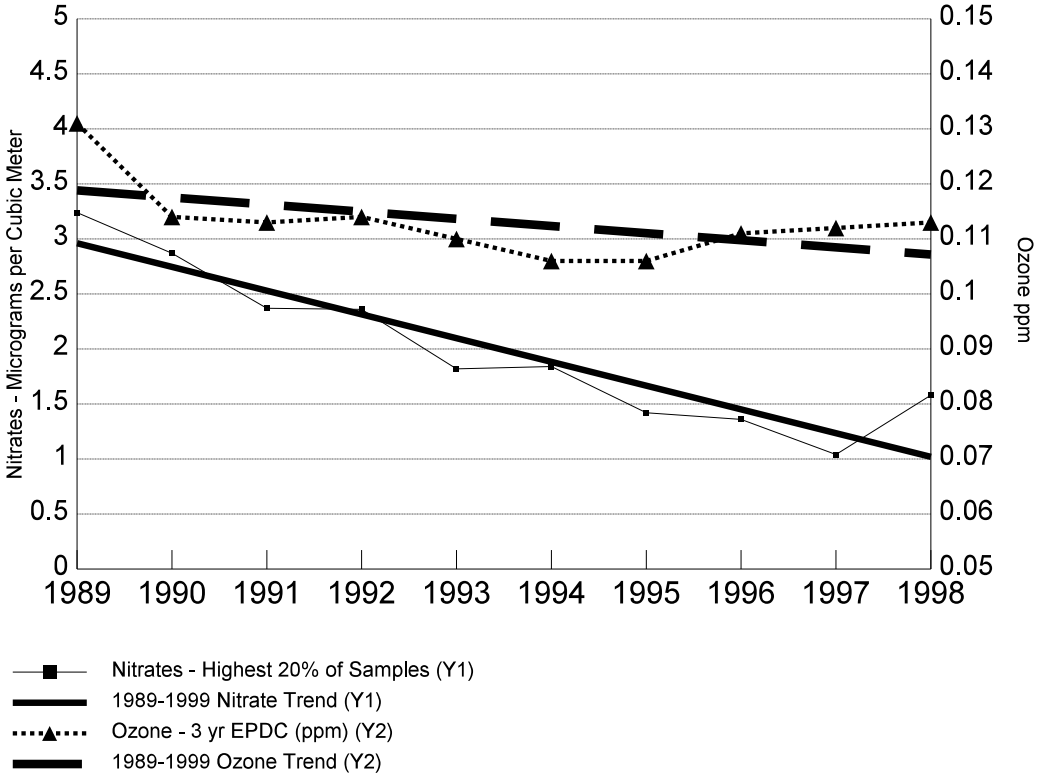


FIGURE 2-12

PINNACLES NITRATE VERSUS OZONE TRENDS



3.0 HEALTH AND ENVIRONMENTAL EFFECTS OF GROUND-LEVEL OZONE

3.1 INTRODUCTION

The following information is based on EPA's Fact Sheets published July 17, 1997 and the Ozone Staff Paper and the Ozone Criteria Document prepared for EPA's update to the federal ozone standard.

3.2 HEALTH EFFECTS

When inhaled, ozone can impair normal functioning of the lungs in healthy people, as well as those with respiratory problems.

When inhaled, even at very low levels, ozone can:

- cause chest pain and coughing;
- may also worsen asthma, bronchitis, and emphysema, as evidenced by studies showing increases in hospital admissions and emergency room visits for respiratory causes;
- cause acute respiratory problems;
- cause significant temporary decreases in lung capacity of 15 to over 20 percent in some healthy adults;
- cause inflammation of lung tissue;
- lead to hospital admissions and emergency room visits [10 to 20 percent of all summertime respiratory-related hospital visits in the northeastern U.S. are associated with ozone pollution]; and
- impair the body's immune system defenses, making people more susceptible to respiratory illnesses, including bronchitis and pneumonia.

Children are most at risk from exposure to ozone:

- The average adult breathes 13,000 liters of air per day. Children breathe in 50 percent more air per pound of of body weight than adults.
- Because children's respiratory systems are still developing, they are more susceptible than adults to environmental threats.
- Ground-level ozone is a summertime problem. Children are outside playing and exercising during the summer months at summer camps, playgrounds, neighborhood parks and in backyards.

Asthmatics and Asthmatic Children:

- Ozone can aggravate asthma, causing more asthma attacks, increased use of medication, more medical treatment and more visits to hospital emergency clinics.

- Asthma is a growing threat to children and adults. Children make up 25 percent of the population and comprise 40 percent of the asthma cases.

- Fourteen Americans die every day from asthma, a rate three times greater than just 20 years ago.

- For asthmatics having an attack, the pathways of the lungs become so narrow that breathing becomes akin to sucking a thick milk shake through a straw.

Healthy Adults:

- Moderately exercising healthy adults can experience 15 to over 20 percent reductions in lung function from exposure to low levels of ozone over several hours.

- Damage to lung tissue may be caused by repeated exposures to ozone -- something like repeated sunburns of the lungs -- and this could result in a reduced quality of life as people age. Results of animal studies indicate that repeated exposure to high levels of ozone for several months or more can produce permanent structural damage in the lungs.

- Among those most at risk to ozone are people who are outdoors and moderately exercising during the summer months. This includes construction workers and other outdoor workers.

3.3 THE CHILDREN'S HEALTH STUDY

The Children's Health Study, which began in 1992, is a large, long-term, study of the health effects of children's chronic exposures to southern California air pollution. About 5,500 children in twelve communities have been enrolled in the study; two-thirds of them were enrolled as fourth-graders. Data on the children's health, their exposures to air pollution, and many factors that affect their responses to air pollution are gathered annually until they graduate from high school. The twelve communities in the study were chosen because they have different patterns of high and low levels of these four pollutants:

- Ozone
- Nitrogen dioxide
- Acid vapor
- Particulate matter that is breathed deep into the lungs

Concentrations of the four pollutants have been continuously measured in each community throughout the study and for brief periods in schools and some homes. In addition, each child's lung function is tested every spring. Annual questionnaires ask about the children's respiratory symptoms and diseases, such as chronic cough and asthma; level of physical activity; time spent outdoors; and many other factors known to influence children's responses to air pollution, such as parental smoking and mold and pets in the household.

Major Results of the Study**:**

- Children living in high ozone communities who actively participate in several sports, are more likely to develop asthma than children in these communities not participating in sports.

- Children living in communities with higher concentrations of nitrogen dioxide, particulate matter, and acid vapor have lungs that develop and grow more slowly and are less able to move air through them. This decreased lung development may have permanent adverse effects in adulthood.

- Children who moved away from study communities had increased lung development if the new communities had lower particulate pollution, and had decreased lung development if the new communities had higher particulate pollution.

- Days with higher ozone concentrations resulted in significantly higher school absences due to respiratory illness.

- Children with asthma who are exposed to higher concentrations of particles are much more likely to develop bronchitis.

3.4 ENVIRONMENTAL EFFECTS

Ozone has the following effects on vegetation:

- Ground-level ozone interferes with the ability of plants to produce and store food (e.g., starches), so that growth, reproduction and overall plant health are compromised.

- By weakening sensitive vegetation, ozone makes plants more susceptible to disease, pests, and environmental stresses.

- Ground-level ozone has been shown to reduce agricultural yields for many crops (e.g., soybeans, kidney beans, wheat, cotton) as well as damaging the quality of some crops, reducing their market value.

- The effects of ground-level ozone on long-lived species such as trees are believed to add up over many years so that whole forests or ecosystems can be affected. For example, ozone can adversely impact ecological functions such as water movement, mineral nutrient cycling, and habitats for various animal and plant species, and the type of trees that make up a forest may change from those that are sensitive to ozone to more tolerant varieties.

- Ground-level ozone can kill or damage leaves so that they fall off the plants too soon or become spotted or brown. These effects can significantly decrease the natural beauty of an area, such as in national parks and recreation areas.

- One of the key components of ozone, nitrogen oxides, contributes to fish kills and algae blooms in sensitive waterways, such as the Chesapeake Bay.

REFERENCES

1. Health and Environmental Effects of Ground-Level Ozone, Fact Sheet, United Stated Environmental Protection Agency, Office of Air & Radiation and Office of Air Quality Planning & Standards, July 17, 1997.

II. Fact Sheet, The Children's Health Study, Air Resources Board, February 2002.

4.0 EMISSION INVENTORY AND FORECASTS

4.1 INTRODUCTION

An emission inventory is an estimate of ozone precursor pollutants (VOC and NO_x) emitted into the air by man-made sources over the entire air basin on a day during the ozone season (May through October). Since ambient ozone levels can be lowered by reducing the precursor emissions that form ozone, the emission inventory, and the trends it indicates, is a tool that can be used to assess progress the region is making toward attaining the California ambient air quality standard for ozone. The reductions are the result of State, local and federal regulations which are adopted for the purpose of reducing ozone precursor emissions.

The emission inventory is divided into three major categories. These are stationary, area and mobile source groupings. Stationary sources include typically large facilities such as power plants or cement plants, while area-wide sources include an aggregate of individually smaller sources, which when grouped together have significant emissions such as gasoline stations or consumer products. Mobile sources consist of the numerous cars and trucks that travel the streets and highways of the NCCAB, as well as other mobile sources such as off-road agricultural and construction equipment, trains and aircraft.

Within each of the three primary categories are a number of major subcategories which can be further broken down into hundreds of smaller subcategories. The emission inventory tables (Tables 4-1 and 4-2) present estimated emissions to the level of the major subcategories. Appendix A presents the inventory to a more detailed level.

Emission inventories and inventory estimation methods are continuously updated to provide more accurate estimates and to better reflect current trends. These changes, along with the need to periodically reassess progress toward achieving the standard, are primary reasons for periodically updating the AQMP. In the sections that follow, the current inventory is discussed, as well as significant changes to the emission estimates or the activity data that are used to develop those estimates.

4.2 EMISSION INVENTORY TREND

The overall emission inventory and forecasts are presented in Tables 4-1 and 4-2. The inventory series includes the historical years 1990, 2000, and 2003, which can be used to gauge progress already made toward attaining the standard. Forecasts for the years 2005, 2010, 2015, and 2020 can be used as a basis for evaluating future progress in attaining and/or maintaining the ozone standard.

As shown in the tables, the overall inventory has declined since 1990 and is forecast to continue to decline through the year 2020. This decrease corresponds to the general improvement in ambient ozone levels in the NCCAB described in the air quality section. The decreases are most pronounced for the oxides of nitrogen, while decreases in VOC's are not as rapid. The photochemical modeling project undertaken by the District in the 1990's indicated that areas along the transport corridor, including Pinnacles National Monument, are most

sensitive to regional reductions in the oxides of nitrogen. The reduction in NO_x should be beneficial in reducing ozone at the locations where ozone is highest.

The major categories of the emission inventory, as well as the forecasts for the year 2020, are illustrated in Figures 4-1 to 4-4. The figures show that emissions from motor vehicles represent a significant but declining fraction of both the VOC and NO_x inventories. On the other hand, solvent evaporation and fuel combustion represent a significant and increasing fraction of the VOC and NO_x inventories, respectively.

The overall trend for the VOC and NO_x emission inventories, which were presented in the tables, is graphically illustrated in Figure 4-5. The figure shows the overall decline in the emission of both ozone precursors. The decrease is most pronounced for NO_x, which is forecast to be at half the 1990 levels by the year 2015.

4.3 POPULATION TRENDS AND EMISSIONS

Regional population and population growth are important factors affecting the quantity of emissions emitted in the area. Figure 4-6 illustrates the regional growth in population between 1990 and 2020 compared to the combined emission inventory for ozone precursors. The figure indicates declining emissions despite increasing population. Between 1990 and 2020, population is expected to increase about 44%, while the combined inventory decreases by about 50%.

The NCCAB's regional Metropolitan Planning Organization, the Association of Monterey Bay Area Governments (AMBAG), periodically updates the population forecasts to reflect the most recent economic and population growth data. The 2004 forecasts are presented in Table 1-1. Figure 4-7 compares the population forecasts used in the 2000 AQMP with the 2004 forecasts. As shown in the figure, although both forecast show increasing population, the growth rate for the revised forecasts is somewhat lower than the growth rate for the prior figures. This is because the revised AMBAG figures in part represent "constrained forecasts" where limitations to growth due to such factors as the availability of water, wastewater treatment and local growth policies are taken into account.

Transportation activity from the cars and trucks traveling on the region's various highways and arterial roads tends to increase with population. An important factor affecting emissions from on-road motor vehicles is the amount of miles driven by all the vehicles in the area each day, or Vehicle Miles Traveled (VMT). Figure 4-8 illustrates the regional population forecasts with daily VMT estimated by AMBAG's regional transportation model. As shown in the figure, VMT is expected to grow more rapidly than population. This is a typical pattern seen throughout California.

4.4 EMISSIONS FROM MOBILE SOURCES

Emission estimates for mobile sources are developed by the ARB using two estimation models; the EMFAC model for on-road motor vehicles and OFFROAD for most other mobile sources.

On-Road Motor Vehicle Emissions - EMFAC Series

Estimates for emissions from all on-road motor vehicles are developed by the ARB's emission model called EMFAC. The EMFAC model estimates emissions from a wide variety of on-road motor vehicle types ranging from light duty passenger autos to heavy duty urban buses. This is a complex model which takes into account the composition and age of the vehicle fleet, adopted controls for tail-pipe emissions and input from regional travel models related to VMT and the number of trips. The current generation of this model is called EMFAC2002, and the version used in this plan is EMFAC2002 Version 2.2.

Estimates for emissions from on-road motor vehicles from EMFAC2002 for 1990-2020 are shown in Figure 4-9. The figure shows a significant decline in emissions from on-road sources. Both VOC and NO_x diminish from being a dominant category in 1990 to being a relatively small part of the inventory by 2020. The decreases in emissions from on-road motor vehicles is a major contributor to the overall improvement in regional ozone levels over the last decade. Details of motor vehicle emission estimates by vehicle class, year and county, as developed by EMFAC2002 for this AQMP, are provided in Appendix A.

Figure 4-9 also compares emission estimates for EMFAC2002 to the prior version, EMFAC 2000, which was used in the 2000 AQMP. As can be seen, current estimates are somewhat lower for VOCs while the forecasts for NO_x are slightly higher for 2005 and 2010. It should be noted that these lower estimates represent differences in the emission estimates, not real emission reductions. These changes are primarily due to updates to the EMFAC model including new VMT data, revised evaporative emissions and revised emissions associated with the statewide vehicle Inspection and Maintenance program (I&M Smog Check). Revisions to the I&M program estimates contributed to significantly higher estimates for NO_x, but not VOCs.

Figure 4-10 further illustrates an important aspect of the trend in emissions from on-road motor vehicles. It shows that despite increased travel in the form of VMT, emissions of ozone precursors from motor vehicles are declining.

On-Road Motor Vehicle Activity - AMBAG Travel Data

As previously mentioned, motor vehicle activity data are an important factor affecting the emission estimates developed by the EMFAC model. Input values for the activity parameters, such as VMT, are developed by AMBAG. Local travel data are preferable because they tend to more completely reflect the local travel network than the statewide network available to CALTRANS.

Starting with the 2000 AQMP, emission estimates from the EMFAC model have been based on the AMBAG travel model. Prior plans relied on travel data developed by CALTRANS. Figure 4-11 compares motor vehicle activity data in the form of VMT used in the 1997, 2000 and 2004 AQMP's. As shown in the figure, there is a stepwise increase in estimated VMT starting with the introduction of local travel data in the 2000 plan. VMT activity forecasts for the current plan are slightly lower than the previous, which in itself tends to produce lower emission forecasts. However, as mentioned in the prior section, there are a number of other factors affecting the forecasts which were updated in EMFAC2002, so the effect of the changes to this single parameter is not completely evident in the emission forecasts.

Other Mobile Sources - OFFROAD

Emission estimates from a large spectrum of generally diesel powered off-road equipment are developed by the ARB's emission model called OFFROAD. Similar to the on-road model, OFFROAD estimates average seasonal daily emissions for each county in the state and also develops forecasts based on anticipated growth and controls within each equipment category. The sources generally involve heavy duty diesel powered engines that are used in various equipment such as agricultural tractors, pumps and sprayers, as well as construction and mining equipment, commercial and industrial equipment, airport ground support equipment, transportable refrigeration units and various other equipment using compression ignited diesel engines. Since OFFROAD focuses on diesel sources, NO_x emissions are most significant.

As shown in Table 4-2 under Mobile Sources, NO_x emissions from these sources are projected to decline. This is due to the introduction of cleaner fuels and the use of improved control technologies. The largest reduction occurs in the Farm Equipment category.

4.5 AREA-WIDE SOURCES

As shown in Tables 4-1 and 4-2, forecasted area-wide emissions are expected to increase, particularly for VOCs. This is primarily due to expected increases in prescribed burning by State, federal, and private land managers who utilize prescribed burning for purposes of habitat management, wild fire prevention, range improvement and forest management. These increases were previously accommodated in the 2000 AQMP based on a survey of major burners in the NCCAB. Consistent with land management goals at both the State and federal level, the survey found that at the local level, there are plans to substantially increase prescribed burning in the future. However, funding continues to be a constraint to the planned increases.

Since the burning of vegetation produces emissions of both VOC's and NO_x, emission increases for both ozone precursors were estimated from this survey. Although the estimates are included on the ozone planning inventory we do not expect them to affect our ozone attainment status because, consistent with Title 17 requirements, prescribed burning will not be permitted on high ozone days. Further, as a mitigation in the District's Smoke Management Program, the District coordinates burning activities during the ozone season to keep ozone precursor emissions (i.e. Daily Emissions Allocation provision) within the estimates of the AQMP. In addition, due to the large scale meteorological conditions that accompany high ozone days, most high ozone days are declared No Burn Days. Consequently, high ozone days and days when prescribed

burning is being conducted in the NCCAB are generally not concurrent events.

Since the 2000 AQMP, a new category has been added to the area-wide sources as Livestock Husbandry. This rather large no growth VOC category is to accommodate animal digestive processes.

4.6 STATIONARY SOURCES

As shown in Tables 4-1 and 4-2, emissions from stationary sources are forecast to increase for both VOC and NO_x. For VOCs, the increase is driven primarily by the Coatings & Process Solvents subcategory, while for NO_x, the increase is driven primarily by increased natural gas combustion in the Manufacturing & Industrial sector. The influence of these single large subcategories on the growth of the overall stationary source inventory is illustrated in Figure 4-12.

Since these are both large categories and growth is substantial, these categories become candidates for future control measures, as described in the All Feasible Measures section of the AQMP.

4.7 EFFECT OF DISTRICT RULES ON EMISSIONS

The District has adopted a number of rules affecting both stationary and area-wide sources of emissions for the purpose of achieving the State and federal AAQS for ozone. These rules are summarized in Table 4-3.

The emission reductions associated with each of these rules depends to a large degree on the size of the emission category affected by the rule. Examples of two of the rules having a relatively large impact are Rule 431, which is a NO_x reduction measure for electric utility boilers, and Rule 425, which is a measure affecting VOC's from the use of cutback asphalt. The impact of each of these rules on the emission trend is shown in Figure 4-13. It should be noted that the nominal levels of NO_x shown for 2003 is not only due to controls, but also inactivity of the electric generators at the Moss Landing Power Plant due to low power demand. Normally, those units operate at a much higher level than in 2003.

TABLE 4-1 EMISSION INVENTORY & FORECASTS FOR VOLATILE ORGANIC COMPOUNDS FOR NORTH CENTRAL COAST AIR BASIN

Ozone Seasonal Planning Inventory (Tons/Day)

VOC SOURCE CATEGORY	1990	2000	2003	2005	2010	2015	2020
STATIONARY SOURCES:							
Fuel Combustion							
Electric Utilities	0.55	0.54	0.62	1.19	1.20	1.20	1.20
Cogeneration	0.69	0.29	0.30	0.30	0.30	0.31	0.32
Oil and Gas Production	0.13	0.03	0.03	0.03	0.03	0.03	0.03
Manufacturing and Industrial	0.08	0.06	0.07	0.07	0.07	0.08	0.08
Food and Agricultural Processing	0.13	0.15	0.15	0.15	0.15	0.15	0.16
Service and Commercial	0.05	0.45	0.47	0.49	0.53	0.59	0.64
Other	0.00	0.01	0.01	0.01	0.01	0.01	0.01
TOTAL	1.63	1.53	1.64	2.24	2.30	2.37	2.44
Waste Disposal							
Landfills	2.47	2.50	2.67	2.78	3.04	3.29	3.52
TOTAL	2.47	2.50	2.67	2.78	3.04	3.29	3.52
Cleaning & Surface Coatings							
Laundering	0.31	0.17	0.18	0.18	0.19	0.20	0.22
Degreasing	2.20	1.25	1.23	1.22	1.24	1.30	1.35
Coatings & Process Solvents	4.54	5.44	6.50	7.35	9.06	10.59	11.84
Printing	0.29	0.22	0.23	0.24	0.26	0.29	0.31
Adhesives & Sealants	0.92	0.64	0.60	0.58	0.52	0.47	0.43
Other	0.01	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	8.27	7.72	8.74	9.57	11.28	12.85	14.15
Petro Production & Marketing							
Oil and Gas Production	1.48	0.70	0.73	0.76	0.78	0.77	0.76
Petroleum Marketing	3.00	1.66	1.61	1.61	1.63	1.73	1.85
Other	0.40	0.16	0.22	0.24	0.25	0.25	0.26
TOTAL	4.88	2.52	2.56	2.61	2.66	2.76	2.86
Industrial Processes							
Chemical	0.00	0.19	0.19	0.19	0.19	0.19	0.19
Food and Agriculture	0.43	0.42	0.44	0.46	0.49	0.53	0.57
Mineral Processes	0.05	0.03	0.04	0.08	0.09	0.09	0.09
Electronics	0.00	0.04	0.05	0.06	0.08	0.09	0.10
Other	0.02	0.02	0.03	0.04	0.05	0.06	0.07
TOTAL	0.50	0.70	0.75	0.83	0.90	0.97	1.03
Use of Banked Emissions							
TOTAL	0.10	0.10	0.10	0.10	0.10	0.10	0.10
TOTAL STATIONARY	**17.85**	**15.07**	**16.46**	**18.13**	**20.28**	**22.33**	**24.10**
VOC SOURCE CATEGORY	**1990**	**2000**	**2003**	**2005**	**2010**	**2015**	**2020**

AREA-WIDE SOURCES:							
Solvent Evaporation							
Consumer Products	6.70	5.47	5.16	4.94	5.21	5.48	5.76
Architectural Coatings	2.79	3.02	2.70	2.58	2.62	2.68	2.76
Pesticides (Non-Methyl Bromide)	1.73	2.64	2.57	2.57	2.57	2.57	2.56
Asphalt Paving/Roofing	6.88	3.01	3.10	3.13	3.18	3.26	3.32
TOTAL	18.11	14.14	13.54	13.22	13.59	13.99	14.40
Miscellaneous Processes							
Residential Fuel Combustion	0.41	0.38	0.37	0.37	0.37	0.37	0.37
Livestock Husbandry	3.34	3.43	3.43	3.43	3.43	3.43	3.43
Structural & Auto Fires	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Prescribed Burns	5.51	7.99	9.63	11.55	13.05	13.05	13.06
Cooking	0.11	0.11	0.11	0.12	0.13	0.14	0.15
TOTAL	9.37	11.91	13.56	15.48	16.99	17.00	17.02
TOTAL AREA-WIDE	**27.48**	**26.05**	**27.10**	**28.70**	**30.57**	**30.99**	**31.42**
MOBILE SOURCES:							
On Road Motor Vehicles	54.59	26.14	21.64	19.00	13.33	9.54	7.36
Aircraft	0.64	0.88	0.94	1.00	1.08	1.21	1.32
Trains	0.14	0.18	0.19	0.19	0.17	0.17	0.17
Ships & Commercial Boats	0.14	0.12	0.12	0.12	0.12	0.11	0.11
Recreational Boats	4.35	5.79	5.01	4.41	2.98	2.03	1.63
Off-Road Recreational Vehicles	0.61	0.34	0.25	0.18	0.19	0.20	0.21
Off-Road Equipment	5.55	4.07	3.39	2.86	2.19	1.92	1.69
Farm Equipment	1.31	1.08	1.02	0.93	0.73	0.53	0.39
Fuel Storage - Other Mobile	1.63	1.74	1.17	0.57	0.48	0.50	0.51
TOTAL MOBILE SOURCES	**68.95**	**40.35**	**33.73**	**29.26**	**21.29**	**16.20**	**13.40**
VOC TOTAL ALL SOURCES	**114.27**	**81.48**	**77.29**	**76.09**	**72.14**	**69.51**	**68.91**
Summary Level VOC.wpd (5/17/04)							

TABLE 4-2 EMISSION INVENTORY & FORECASTS FOR OXIDES OF NITROGEN FOR THE NORTH CENTRAL COAST AIR BASIN
Ozone Seasonal Planning Inventory (Tons/Day)

NOx SOURCE CATEGORY	1990	2000	2003	2005	2010	2015	2020
STATIONARY SOURCES:							
Fuel Combustion							
Electric Utilities	16.33	9.88	0.97	2.71	2.74	2.74	2.74
Cogeneration	0.71	0.47	0.48	0.49	0.50	0.51	0.52
Oil and Gas Production	2.52	0.31	0.33	0.36	0.38	0.38	0.38
Manufacturing and Industrial	12.35	10.87	11.80	12.38	13.30	14.49	15.29
Food and Agricultural Processing	1.19	1.00	0.99	0.98	0.89	0.77	0.63
Service and Commercial	0.53	0.67	0.69	0.70	0.72	0.74	0.75
Other	0.05	0.06	0.06	0.07	0.07	0.08	0.09
TOTAL	33.68	23.25	15.31	17.68	18.59	19.72	20.40
Waste Disposal							
Landfills	0.00	0.03	0.03	0.04	0.04	0.04	0.05
TOTAL	0.00	0.03	0.03	0.04	0.04	0.04	0.05
Petroleum Production & Marketing							
Oil and Gas Production	0.07	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	0.07	0.00	0.00	0.00	0.00	0.00	0.00
Industrial Processes							
Mineral Processes	3.25	3.14	3.23	3.38	3.73	4.08	4.37
Other	0.00	0.03	0.04	0.06	0.07	0.09	0.11
TOTAL	3.25	3.17	3.27	3.43	3.80	4.17	4.47
Use of Banked Emissions							
TOTAL	0.10	0.10	0.10	0.10	0.10	0.10	0.10
TOTAL STATIONARY	**37.11**	**26.55**	**18.72**	**21.25**	**22.53**	**24.04**	**25.02**
AREA-WIDE SOURCES:							
Miscellaneous Processes							
Residential Fuel Combustion	0.93	0.93	0.93	0.93	0.94	0.95	0.96
Prescribed Burns	1.39	2.31	2.62	3.12	3.42	3.42	3.40
TOTAL AREA-WIDE	**2.32**	**3.24**	**3.54**	**4.05**	**4.36**	**4.37**	**4.38**
MOBILE SOURCES:							
On Road Motor Vehicles	70.06	48.83	44.41	40.48	30.02	20.31	14.32
Aircraft	0.41	0.44	0.49	0.52	0.57	0.62	0.67
Trains	4.40	5.56	4.82	4.12	3.54	3.61	3.58
Ships & Commercial Boats	0.62	0.57	0.56	0.55	0.55	0.54	0.52
Recreational Boats	0.51	0.66	0.87	1.07	1.12	1.02	0.95
NOx SOURCE CATEGORY (Cont.)	**1990**	**2000**	**2003**	**2005**	**2010**	**2015**	**2020**
Off-Road Recreational Vehicles	0.04	0.04	0.05	0.05	0.05	0.05	0.06

Off-Road Equipment	9.19	6.34	5.89	5.58	4.36	3.30	2.82
Farm Equipment	10.51	7.83	7.09	6.64	5.37	4.09	3.26
TOTAL MOBILE SOURCES	**95.74**	**70.27**	**64.17**	**59.00**	**45.59**	**33.54**	**26.17**
TOTAL ALL SOURCES	**135.17**	**100.06**	**86.44**	**84.30**	**72.47**	**61.95**	**55.58**
Summary Level NOx.wpd (5/17/04)							

TABLE 4-3 ADOPTED DISTRICT RULES LIMITING EMISSIONS OF OZONE PRECURSOR GASES

Rule	Title	VOC	NO_x
404	Sulfur Compounds and Nitrogen Oxides		x
416	Organic Solvents	x	
417	Storage of Organic Liquids	x	
418	Transfer of Gasoline into Stationary Storage Containers	x	
419	Bulk Gasoline Plants and Terminals	x	
429	Effluent Oil Water Separators	x	
423	New Source Performance Standards	x	x
425	Use of Cutback Asphalt	x	
426	Architectural Coatings	x	
427	Steam Drive Crude Oil Production Wells	x	
429	Application of Nonarchitectural Coatings	x	
431	Emissions from Electric Utility Boilers	x	x
433	Organic Solvent Cleaning	x	
434	Coating of Metal Parts and Products	x	
36	Title V: General Prohibitory Rule	x	x
437	Municipal Solid Waste Landfills	x	
438	Open Outdoor Fires	x	x
1002	Transfer of Gasoline into Vehicle Fuel Tanks	x	

Figure 4-1 2005 Emission Inventory
Volatile Organic Compounds (VOC)

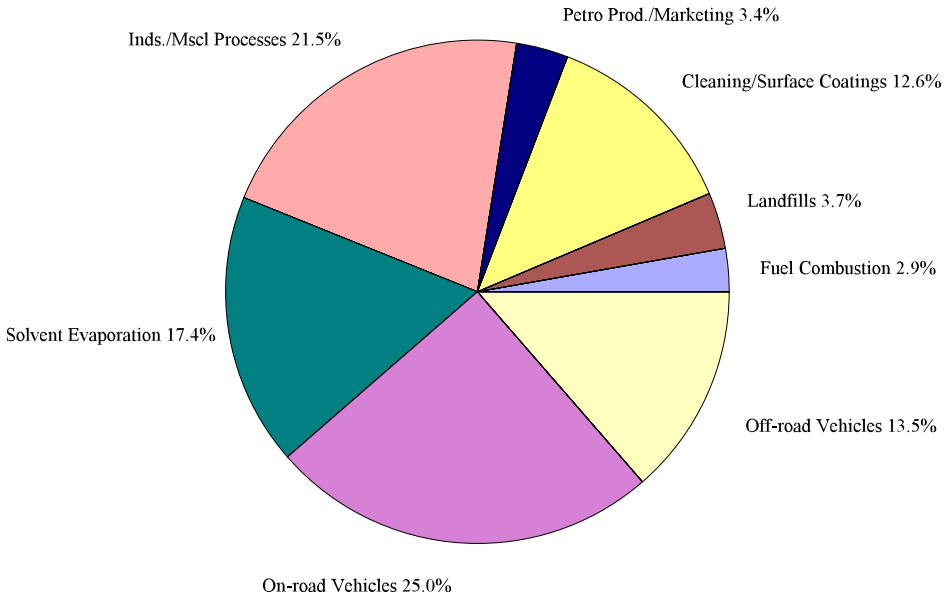


Figure 4-2 2020 Emission Inventory
Volatile Organic Compounds (VOC)

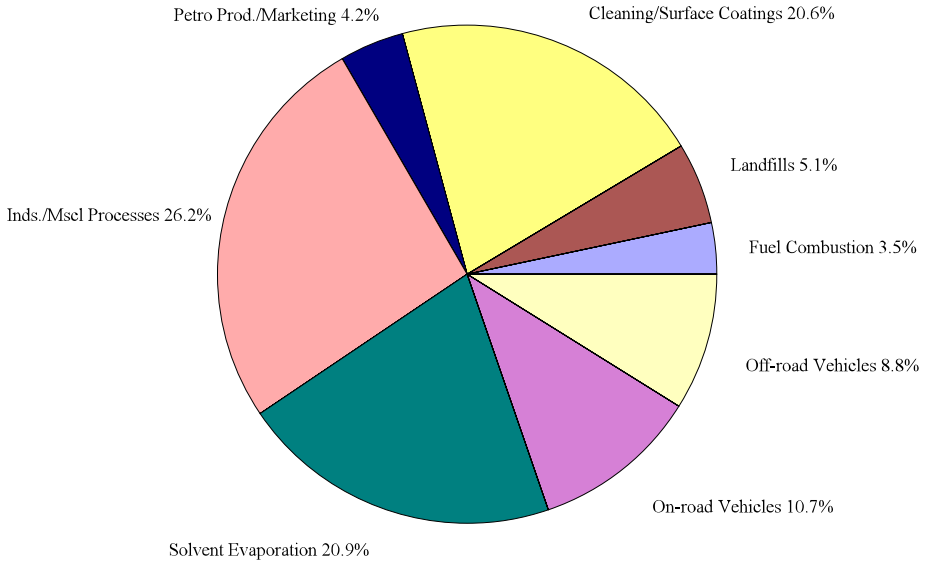


Figure 4-3 2005 Emission Inventory

Oxides of Nitrogen (NOx)

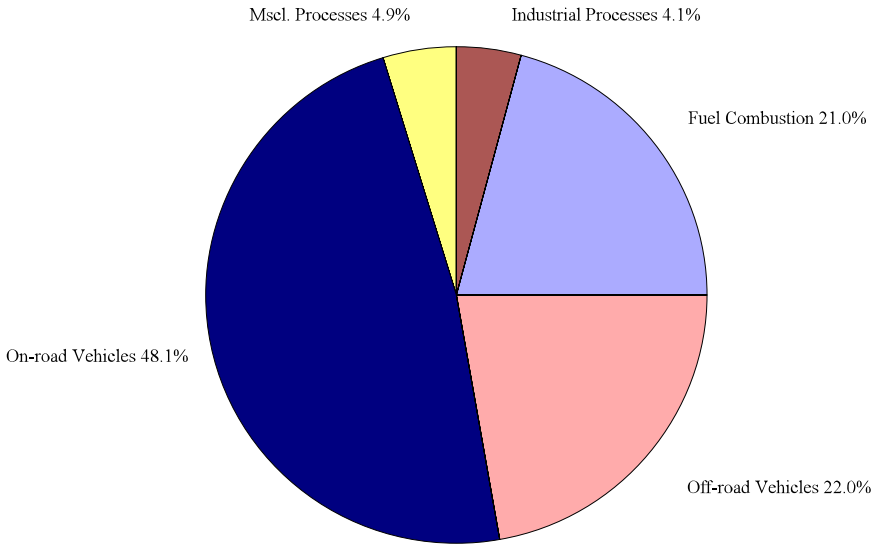


Figure 4-4 2020 Emission Inventory

Oxides of Nitrogen (NOx)

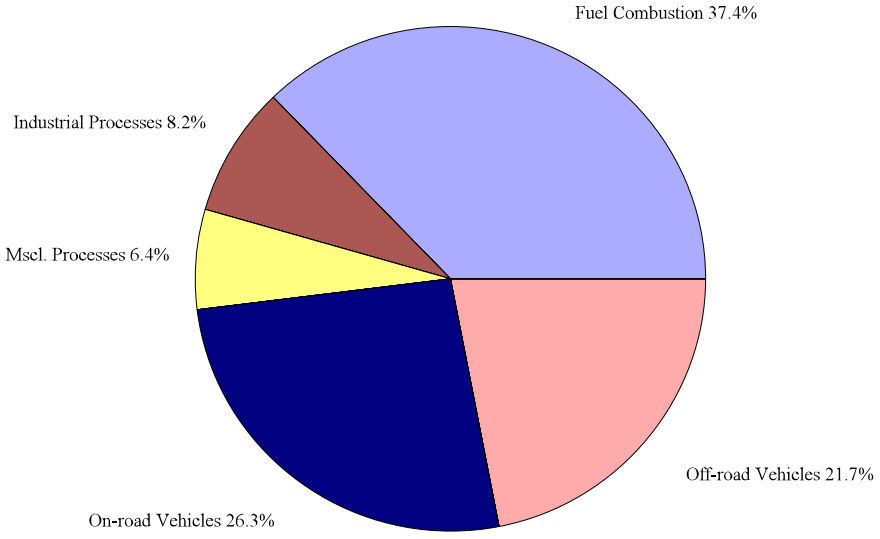
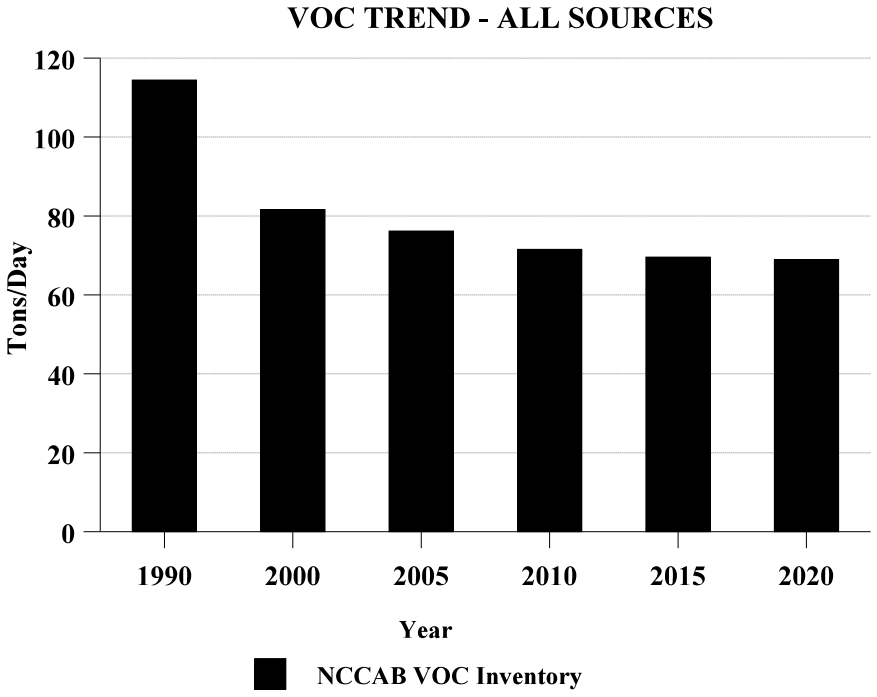


Figure 4-5

NCCAB VOC AND NO_x EMISSION INVENTORY TREND 1990-2020



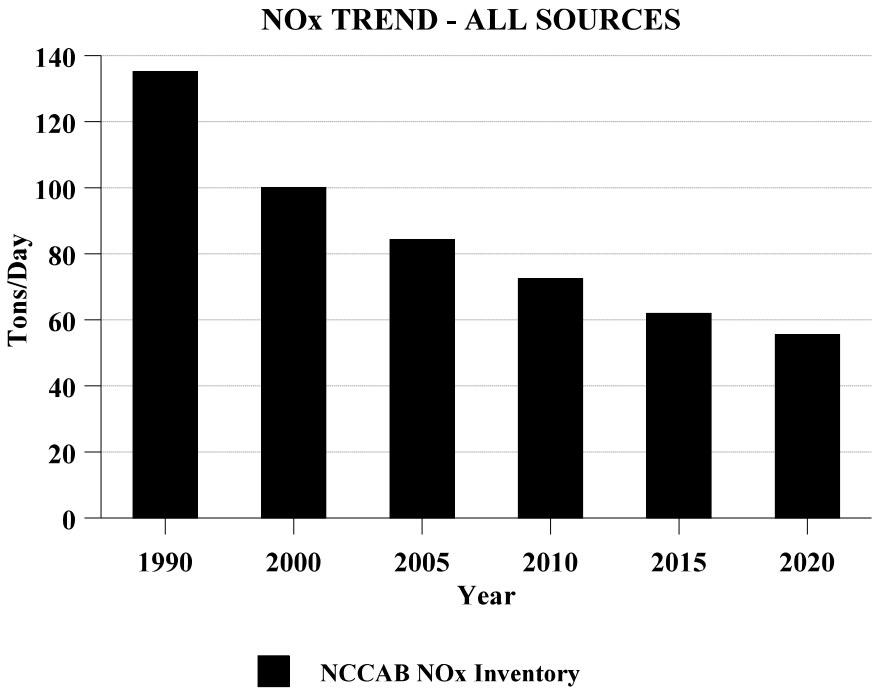


Figure 4-6
NCCAB EMISSION AND POPULATION TRENDS

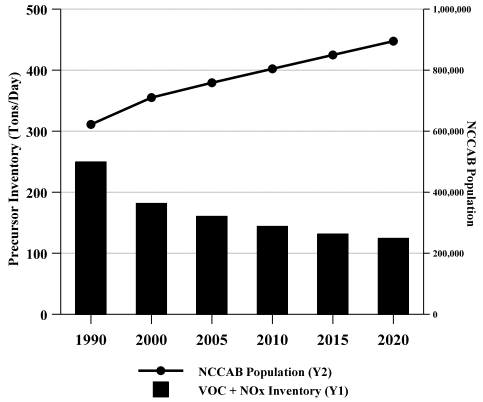


Figure 4-7
COMPARISON OF POPULATION FORECASTS USED FOR 2004 AND 2000 AQMPs

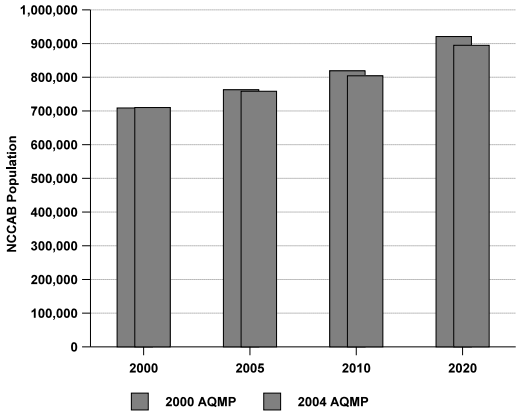


Figure 4-8
NCCAB VMT VS. POPULATION GROWTH

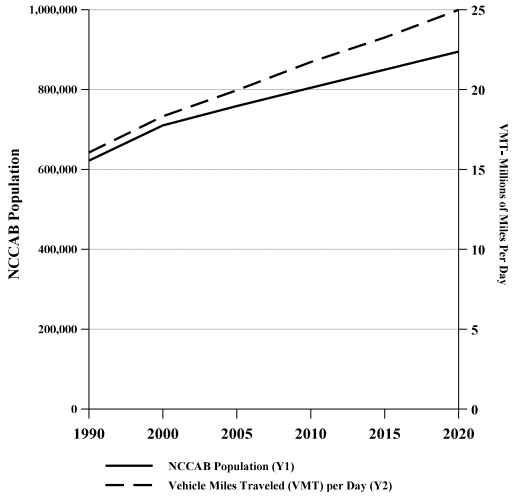


Figure 4-9
COMPARISON OF EMFAC 2002 TO EMFAC 2000
Emission Estimates for On-Road Motor Vehicles

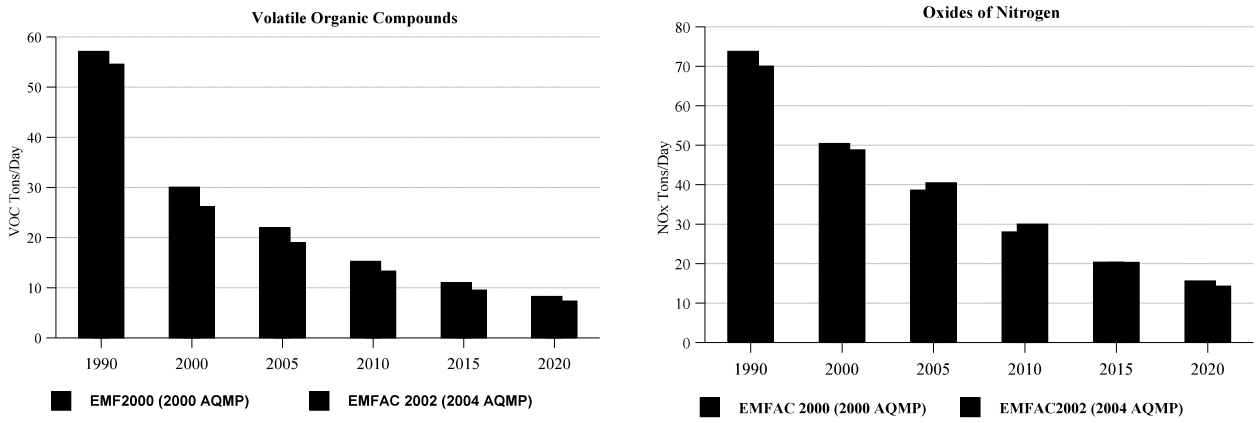


Figure 4-10
COMPARISON OF MOTOR VEHICLE EMISSIONS WITH VMT

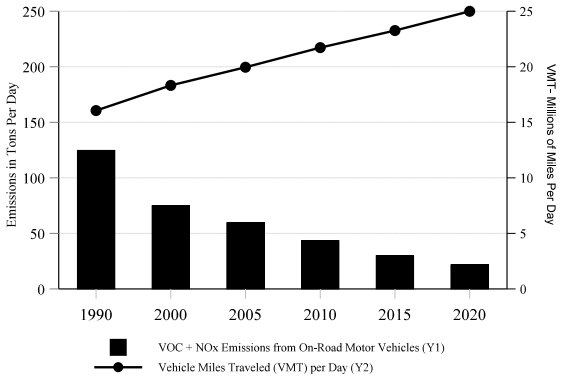


Figure 4-11
COMPARISON OF NCCAB VMT ACTIVITY DATA

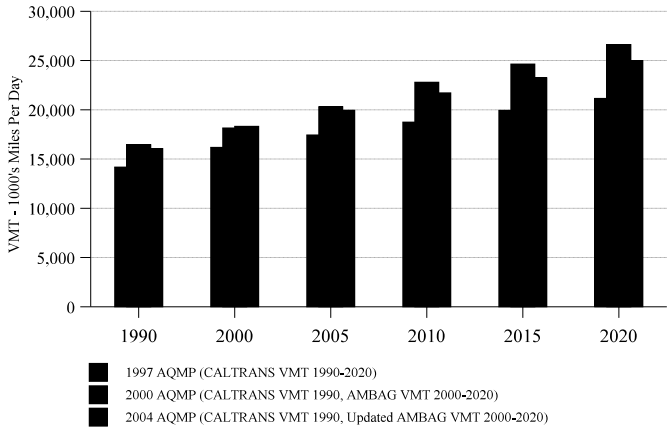
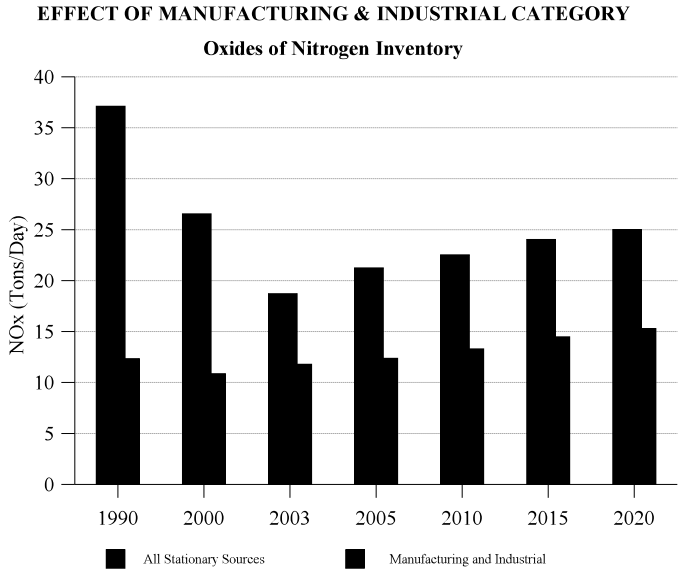


Figure 4-12

EFFECT OF HIGH GROWTH CATEGORIES ON STATIONARY SOURCE EMISSIONS



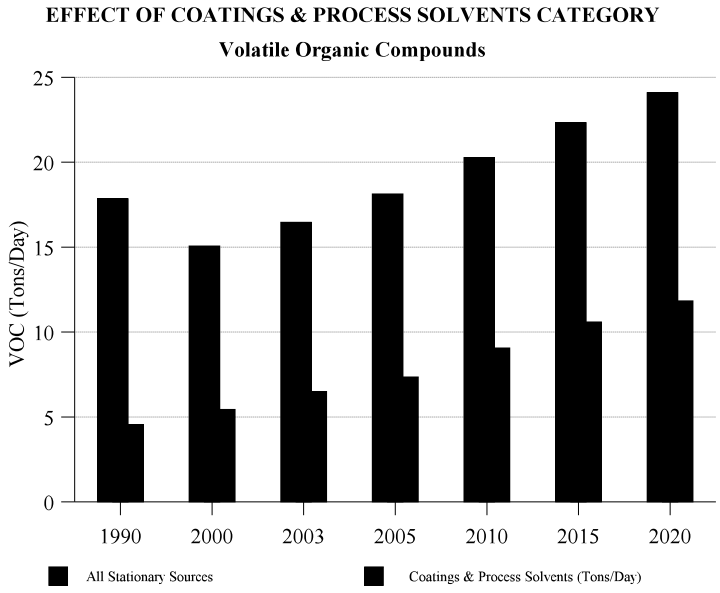
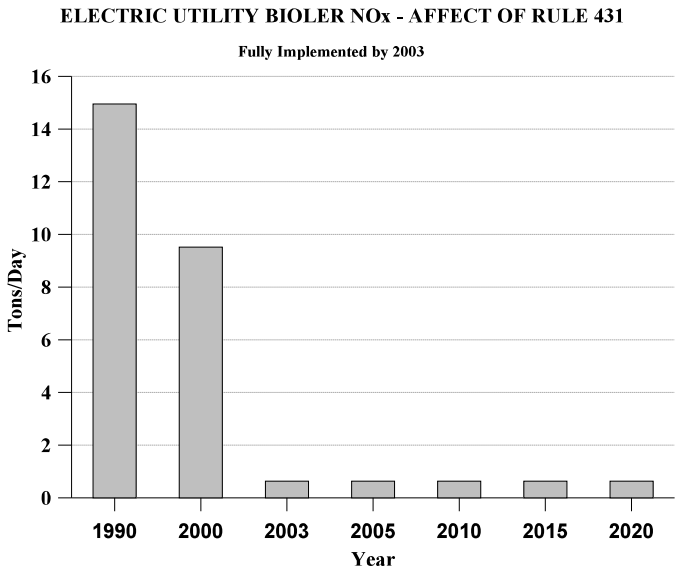
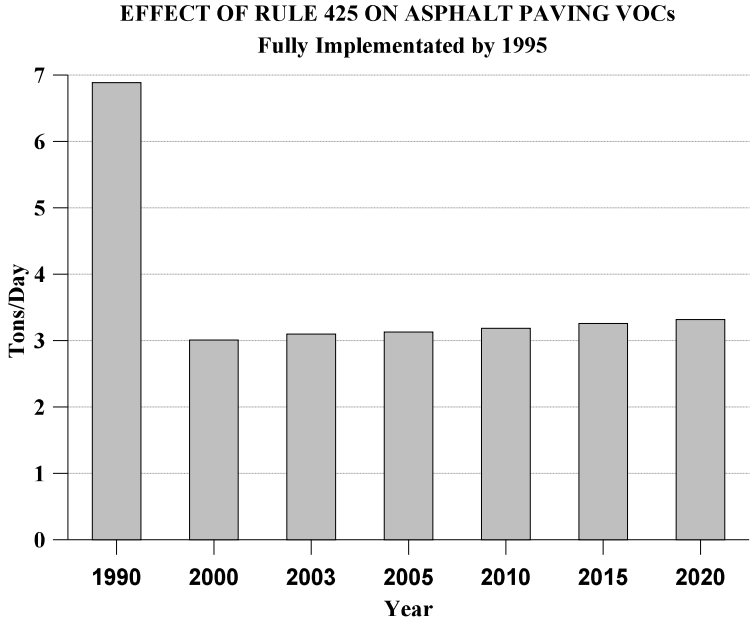


Figure 4-13

EFFECT OF DISTRICT RULES 431 AND 425





5.0 ACHIEVING AND MAINTAINING THE STATE OZONE STANDARD

5.1 INTRODUCTION

The basic strategy for improving air quality is to reduce emissions of those air pollutants which cause violations of ambient air quality standards. Because ozone is a regional pollutant, emissions affecting the entire North Central Coast Air Basin (NCCAB) are considered.

There are several approaches for determining the level of emission reductions needed to meet ozone standards. The first is to use a specific percentage of emission reductions over a given time frame until the standard is met. This approach is established in the California Clean Air Act, which requires a 5% annual reduction until the standard is met. It requires adoption of all feasible measures if the 5% annual reduction cannot be achieved. A second approach involves achieving the emission reductions associated with the area's specific ozone design value, which is based on an actual monitored violation where local emissions played a significant role in the event. Another approach uses photochemical modeling. This allows for evaluation of a number of regional emission reduction scenarios. The results of these tests can provide districts with insights into the unique conditions, such as inter-basin transport, which impact air quality in their areas. However, since model results can be uncertain and the models themselves require a considerable investment of time and resources to develop, this approach is optional.

The following sections describe the emission reduction strategies applicable to the NCCAB, the influence of transport on achieving the standard, as well as insights gained from the District's photochemical modeling project.

5.2 EMISSION REDUCTION REQUIREMENTS FOR NONATTAINMENT AREAS

Section 40914 of the California Clean Air Act states:

(a) Each district plan shall be designed to achieve a reduction in districtwide emissions of 5 percent or more per year for each nonattainment pollutant or its precursors, averaged every consecutive three-year period, unless an alternative measure of progress is approved pursuant to Section 39607.

(b) A district may use an alternative emission reduction strategy which achieves less than an average of 5 percent per year reduction in districtwide emissions if the district demonstrates to the state board, and the state board concurs in, either of the following:

> (1) that the alternative emission reduction strategy is equal to or more effective than the districtwide emission reductions in improving air quality.
>
> (2) That despite the inclusion of every feasible measure in the plan, and an expeditious adoption schedule, the district is unable to achieve at least a 5 percent annual reduction in districtwide emissions.

(c) For purposes of this section and Section 41503.1, reductions in emissions shall be calculated with respect to the actual level of emissions which exist in each district during 1990, as determined by the state board. All reductions in emissions occurring after December 31, 1990, including, but not limited to, reductions in emissions resulting from measures adopted prior to December 31, 1990, shall be included in this calculation. (Amended by Stats. 1996, Ch. 777. Sec.5.)

5.3 OZONE DESIGN VALUE STRATEGY

The ARB provided guidance to the District in 1994 regarding the level of emission reductions needed to achieve the State ozone standard based on an ozone design value. An ozone design value is defined as the highest recorded violation during the three year period evaluated, excluding the days on which an exceptional event, extreme concentration event, or overwhelming transport from an upwind area occurred. Based on the "Second Triennial Review of the Assessment of the Impacts of Transported Pollutants on Ozone Concentrations in California" prepared by the ARB, the District's design value is 0.10 ppm.

The ARB's 1994 guidance estimated that a 20 percent reduction in 1987 (base year) VOC and NO_x emissions was needed to meet the ozone standard based on a design value of 0.10 ppm. This reduction was addressed in the 1997 AQMP which showed that a 20 percent reduction from the 1987 emission inventory was 19.6 and 20.3 tons per day of VOC and NO_x, respectively. The actual reductions achieved were 36 percent and 26 percent for VOCs and NO_x, respectively. Although the emission reduction targets were met, air monitoring data for the NCCAB continued to indicate that the area had not achieved the standard.

In 2000, with the focus no longer on the ozone design value strategy, the ARB stated that since the NCCAB did not attain the State ozone standard by 1997, that the "feasible measure" criterion is applicable to the District. In a letter dated December 8, 2000, the ARB Executive Officer stated that for districts that have not achieved a five percent annual reduction of nonattainment pollutants or their precursors, they are to implement every feasible measure on an expeditious schedule. The letter further recommended adoption of the ARB's Suggested Control Measure (SCM) for Architectural Coatings. In 2002, the District adopted the SCM for architectural coatings. In this current plan, additional control measures, as described in Chapter 8, are adopted to address the all feasible measures criterion.

5.4 ARB TRANSPORT ASSESSMENTS

Transport from urban areas upwind of the NCCAB can have a significant effect on our strategy to achieve the standard. As required by Section 39610 of the CCAA, the ARB is to periodically assess the impact of emissions from upwind air basins on violations in the downwind areas. In this regulatory process, the ARB formally determines which areas are legally declared as upwind air basins which cause or contribute to violations in downwind air basins. The resulting upwind/downwind relationships are referred to as "transport couples". Upwind air basins have regulatory responsibilities to mitigate emissions sufficient for the downwind areas to achieve the standard.

The most significant transport couple affecting the NCCAB is the upwind relationship of the San Francisco Bay Area Air Basin (SFBAAB). This is referred to as the SFBAAB to NCCAB transport couple. This couple was initially identified in the first transport assessments in 1990 and has been reaffirmed in subsequent assessments, including the ARB's most recent transport review in 2001.

Transport contributions are described as overwhelming, significant, inconsequential or inconclusive. Transport is deemed as inconsequential if upwind emissions are not transported at all or did not appear to contribute significantly to the violation of the standard in the downwind area. A transport contribution is deemed significant if the upwind emissions contributed measurably to violations of the ozone standard in the downwind area on any single day. A transport contribution is overwhelming if emissions from the upwind area independently caused a violation of the State ozone standard in the downwind area on any single day. Transport is considered inconclusive when there are insufficient data to

determine the degree of transported air pollution.

Based on these contribution categories, transport from the SFBAAB has a strong influence on our attainment status. The transport assessments for 1994 and 1995 summarized in Table 5-1 indicate that 50 percent of NCCAB exceedances are the result of overwhelming transport from the SFBAAB, meaning that the exceedance would have occurred even with no emission contribution from the NCCAB. Thirty percent of the exceedances are classified as significant meaning that emissions from both the upwind and local area contributed measurably to exceedances of the standard. The remaining exceedances are classified as extreme concentration events or inconclusive.

Since the ARB transport assessments indicate that emissions from both the SFBAAB and NCCAB contribute to violations, continuing emission reductions in both areas will likely be necessary to achieve the standard.

5.5 FINDINGS FROM PHOTOCHEMICAL MODELING PROJECT

Because the issues of transport and assessing progress toward achieving the standard are important, the District contracted with researchers at the BAAQMD to use their regional photochemical model to address these two complex issues. The findings from this multi-year project [2)] are summarized below.

Transport Modeling

A primary objective of the project was to assess the influence of transported versus local emissions on the air quality of the NCCAB. This was undertaken using a modeling technique called “emission masking.” In an emission masking scenario, the base case episode is rerun in the model with emissions of ozone forming pollutants from specific air basins being significantly reduced. The corresponding change in ozone throughout the NCCAB for each reduction scenario is then determined by the model.

Using a regional base case episode that occurred in August 1990, the BAAQMD measured the ozone response of the Urban Airshed Model (UAM-V) to reductions in emission inventories from the San Francisco Bay Area Air Basin (SFBAAB), the San Joaquin Valley Air Basin (SJVAB) and the NCCAB to assess the influence of transport on the NCCAB.

Three anthropogenic (pollution originating from human activities) emission masking scenarios were run for each air basin. These included: (1) 50% reduction of the VOC inventory only, (2) 50% reduction of the NO_x inventory only, and (3) 50% reduction of both the VOC and NO_x inventories. Three emission masking scenarios were developed for each air basin and a total of nine scenarios were run.

The following summarizes the major findings of the emission masking scenarios that were run for each of the three air basins in terms of impacts on the NCCAB. In this discussion, the terms "NO_x sensitive” and “VOC sensitive” areas are used. NO_x sensitive areas of the NCCAB are areas where ozone formation was limited by the availability of NO_x and VOC sensitive areas are areas of the NCCAB where ozone formation was limited by the availability of VOCs. NO_x sensitive areas tend to benefit the most from NO_x emission reductions, while VOC sensitive areas benefit most from VOC reductions.

SFBAAB Impacts on NCCAB:

- Areas of the NCCAB where ozone tended to be highest were impacted by both NO_x and VOC emissions transported from the SFBAAB. For some areas, the contribution

was sufficient to cause ozone to exceed the standard.

- Ozone at the Pinnacles National Monument was significantly impacted by SFBAAB NO_x emissions.

- SFBAAB VOC reductions were effective at reducing ozone in the northern portion of the NCCAB by about 5-10 ppb on 5 August when ozone was highest. This reduction was sufficient to eliminate the August 5th 100 ppb exceedances that occurred at Hollister.

- Hollister had different sensitivity responses on August 5th versus August 6th. This suggests Hollister may be in a transition zone between SFBAAB VOC sensitivity and SFBAAB NO_x sensitivity.

- On August 5th, highest ozone occurred in northern San Benito County. At the locations where ozone was highest, SFBAAB NO_x reductions were less effective than SFBAAB VOC reductions. This may be because the air transported from the SFBAAB has an urban VOC sensitive precursor mix. However, other locations, downwind of the VOC sensitive regions, such as the area south of Hollister and extending south to the Pinnacles, did benefit from SFBAAB NO_x reductions.

- SFBAAB NO_x reductions produce a significant reduction (up to 10 ppb) in ozone in areas of elevated terrain in Santa Cruz County. SFBAAB NO_x reductions also produce a lessor but more wide-spread ozone reduction over a larger portion of the NCCAB.

- The combined SFBAAB VOC and NO_x reductions significantly reduced ozone in most of San Benito County.

Local NCCAB Impacts:

- Air laden with NCCAB precursors appeared to be primarily "NO_x sensitive," meaning that ozone formation due to local emissions was more limited by the availability of NO_x as opposed to the availability of VOCs.

- NCCAB NO_x contributed significantly to local ozone levels. NCCAB NO_x emission reductions reduced ozone values throughout Monterey County and in areas where ozone was simulated to be high, suggesting that there may be episodes where NCCAB NO_x controls would be effective at reducing ozone.

- Pinnacles, King City and San Ardo were all sensitive to NCCAB NO_x . Since these locations are in the downwind corridor of the Moss Landing Power Plant, this supports the large NO_x reductions required by District Rule 431.

- The transport impacted the Pinnacles site was sensitive to NO_x reductions from both the SFBAAB and the NCCAB. However, the 50% SFBAAB NO_x reduction scenario reduced simulated ozone more than the corresponding scenario for the NCCAB, suggesting that NO_x from the SFBAAB may have a greater impact on ozone levels at Pinnacles than NO_x from the NCCAB.

SJVAB Impacts on NCCAB:

- SJVAB NO_x reductions produced some reductions in simulated ozone in the eastern

portion of the NCCAB. This suggests that there may be conditions under which SJVAB NO_x reductions have some benefit in the NCCAB.

- SJVAB VOC reductions had no measurable effect on the NCCAB in this modeling exercise.

Episodic Patterns

The BAAQMD statistically evaluated the spatial pattern of ozone in Northern California during periods when high ozone levels were recorded in the NCCAB. The cluster analysis, which was based on the years 1990-1995, revealed three distinct patterns when ozone was high in the NCCAB. These were Cluster A (70% of NCCAB exceedances), Cluster B (21% of NCCAB exceedances) and Cluster C (only 9%).

The most common exceedance pattern (Cluster A) is when the Pinnacles produces a singularly high ozone reading in comparison to other stations in both the NCCAB and SFBAAB. The majority of all NCCAB exceedance days fell into Cluster A and 95% of those exceedances occurred at the Pinnacles National Monument. A probable cause of the anomalously high readings at Pinnacles is delayed transport aloft to this high elevation site. Often, such as on 8/1/95 the date of our last federal 1-hour exceedance at Pinnacles, previous day ozone had been vented from the SFBAAB resulting in lower values in the upwind source region and higher values downwind.

Year 2010 Projection

The projected change in NCCAB ozone from 1990 to 2010 was investigated by simulating the August 3 to 6, 1990 episode using an estimated year 2010 emission inventory. In 2010, the domain-total anthropogenic VOC inventory was 54% of the 1990 VOC inventory and 50% of the NO_x inventory. Thus, the overall inventory of ozone precursors in Central California in 2010 is estimated to be roughly half of what it was in 1990.

The results of this simulation are shown in Figure 5-3 which indicates:

- That while the severity and extent of ozone exceedances are reduced compared 1990, some areas of the NCCAB may still not achieve the standard with current control measures in place. Additional controls in both the NCCAB and SFBAAB may be needed to avoid future exceedances, especially under adverse meteorological conditions. This is especially important for the NCCAB, which tends to be very close to the attainment threshold, and year to year variations in weather can be an important factor in determining whether or not air quality meets the standard.

- The modeled 1990 SFBAAB to NCCAB transport corridor can clearly be seen in Figure 5-1. This is the region of high ozone extending from the central SFBA through San Benito County, including Pinnacles National Monument, and then into southern Monterey County. Although reduced in 2010, the transport corridor is still evident in the 2010 simulation, especially in the areas of highest ozone. Thus, while the severity of transport should be reduced in the future due to regional controls on emission sources, it will likely continue to influence air quality in the NCCAB at least through the year 2010.

- The areas within the NCCAB exceeding the state ozone standard is reduced.

- The areas of the NCCAB remaining in excess of the standard, primarily northeastern San Benito County, are areas that the transport assessments indicated are impacted by emissions from the SFBAAB, the SJVAB as well as local NCCAB emissions.

Based on the modeled 2010 nonattainment prediction, additional controls on ozone precursors in both the NCCAB and the SFBAAB, may be needed for the NCCAB to achieve the state standard.

The "Bay Area-North Central Coast Photochemical Modeling Investigation of Ozone Formation and Transport, Final Report", December 2000 is available upon request.

5.6 MEETING AND MAINTAINING THE STATE OZONE STANDARD

Preliminary air monitoring data for 2003 show that the District meets the criteria for a nonattainment-transitional area having had less than three exceedances of the State ozone standard at any one air monitoring station. While the classification of nonattainment-transitional is by operation of law, the Air Resources Board does not recognize the designation until it has validated the data. Additionally, ARB reviews preliminary air monitoring data for the current ozone season to determine if the area has not had more than one exceedance at any one monitoring station prior to designating an area nonattainment-transitional.

The nonattainment-transitional classification is consistent with the downward trend of ozone exceedances during the last 16 years, as described in Chapter 2. However, the nonattainment-transitional designation is an unstable air quality classification since it is only based on one year of data and is therefore sensitive to meteorological conditions that can vary year to year. Ambient ozone levels are typically nonlinear. Trends are not only affected by emissions, they are also significantly affected by the prevailing weather pattern during a particular ozone season. For example, the number of ozone violations in 1996 was the highest since 1987, while 1997 readings were the lowest in 11 years. 1996 exceedances were strongly affected by emissions from the Bay Area due to unusually hot conditions inland and generally cooler temperatures immediately along the coast which tend to activate the transport mechanism. Weakened inversions and better dispersion associated with the El Nino resulted in only one exceedance in 1997. In 1998 there were 12 exceedances, largely the result of the presence of an unusually strong high pressure ridge over the west coast during the ozone season.

Additionally, following three relatively “clean” years in 1999, 2000 and 2002 where there were no more than two exceedances at any one station, in 2002 there were at total of eleven exceedances recorded, including seven at Pinnacles and four at Hollister. In 2003, there was once again no more than two exceedances recorded at any one station. Due to these up and down variations, which are largely attributable to variations in year to year weather conditions, the District will probably remain on the borderline between attainment and non-attainment for the next several years.

As shown in Chapter 2, Table 2-4, the specific stations which remain above the standard are Pinnacles National Monument and Hollister. The ARB transport assessments indicate that these sites are impacted by significant to overwhelming transport. Thus, in order to achieve the standard at these remaining nonattainment sites, emission reductions in the NCCAB alone may not be sufficient for the area to achieve the standard. Emission reductions in the NCCAB will need to be coupled with regional emission reductions in the

upwind air basins as well.

Control strategies in the upwind areas are outlined in the plans for each region. The current 2000 Clean Air Plan for the Bay Area Air Quality Management District (BAAQMD) includes a minimum evaluation of emission reductions needed to meet the State ozone standard and address transport to downwind areas, deferring analysis to a future date when photochemical modeling results from the Central California Ozone Study (CCOS) should be available. The BAAQMD is currently developing its 2004 ozone attainment strategy, which will combine planning requirements for achieving the State and federal ozone standards. Photochemical modeling results from CCOS, as well as the BAAQMD's own modeling effort, are to be used to develop this plan. As with prior BAAQMD plans, the District will review this plan, particularly regarding the plan's adequacy in mitigating transport. The District will evaluate control measures necessary for reducing local emissions as well.

TABLE 5-1 TRANSPORT FINDINGS REGARDING STATE OZONE EXCEEDANCE DAYS NCCAB (1994-95)

Date	Location	Max Ozone Conc. (ppm)	Assessment*
6/9/94	Hollister	0.101	O - SF(1)
6/24/94	Pinnacles	0.96	S-SF; S-NCCAB
6/28/94	Pinnacles	0.95	S-SF; S-NCCAB
7/7/94	Pinnacles	0.97	O-SF
8/11/94	Pinnacles	0.95	S-SF; S-NCCAB
8/12/94	Pinnacles	0.95	O-SF
6/23/95	Pinnacles	0.95	O-SF(1)
7/14/95	Scotts Valley	0.97	O-SF
7/15/95	Hollister	0.97	O-SF(1)
8/1/95	Pinnacles	0.138	No assessment(2)
8/2/95	Pinnacles	0.11	No assessment(3)
8/12/95	Pinnacles	0.97	O-SF(1)
8/21/95	Pinnacles	0.102	Inconclusive
9/18/95	Pinnacles	0.96	S-SF; S-NCCAB(1)

*I=Inconsequential; S=Significant; O=Overwhelming
(1) Unknown contribution from the San Joaquin Valley Air Basin
(2) Ozone concentration greater than the Expected Peak Day Concentration (EPDC) (The EPDC is a statistical calculation for the concentration expected to occur only once per year per site)
(3) The EPDCs used in determining the need for assessments were based on 1992-94 data and was 0.10 ppm for the Pinnacles. EPDCs based on 1993-95 data were available for this report but not timely enough for performing assessment analyses. Therefore, while the most recent EPDC for Pinnacles is 0.11 ppm, the decision for "no assessment" was made on the previous 0.10 ppm EPDC.

Source: "Second Triennial Review of the Assessment of the Impacts of Transported Pollutants on Ozone Concentrations in California", ARB, October 1996.

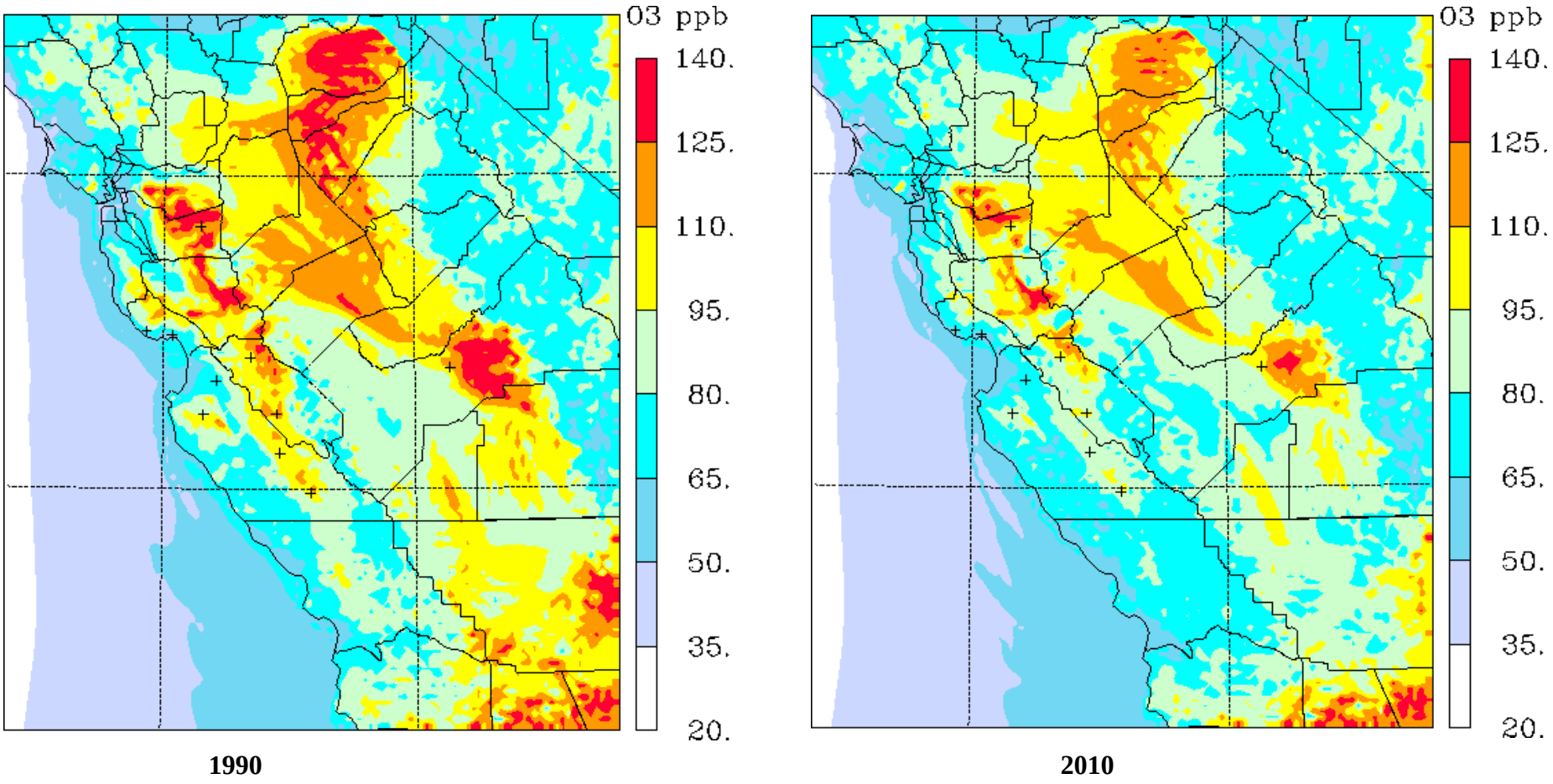


Figure 5-1 Comparison of photochemical modeling results for 1990 and 2010. The image on the left represents maximum ground-level hourly ozone concentrations (ppb) for an actual regional episode that occurred on August 5-6, 1990. Results on the right are maximum concentrations for the same episodic conditions, only with emission projections for the future year 2010. The "+" on the figures represents sites where ambient ozone monitoring was conducted in 1990.

6.0 CONTROL MEASURES

6.1 INTRODUCTION

The California Clean Air Act requires that districts achieve reductions in districtwide emissions of 5 percent or more per year averaged every consecutive three-year period. If districts are unable to achieve the 5 percent annual reduction, their plans are to include every feasible control measure. (H&S 40914). MBUAPCD has not achieved an annual 5 percent emission reduction and is thus required to adopt all feasible control measures until the standard is achieved.

Feasible control measures are defined as "air pollution control measures, including but not limited to emissions standards and limitations, applicable to all air pollution source categories under a district's authority that are based on the maximum degree of reductions achievable for emissions of ozone precursors, taking into account technological, social, environmental, energy and economic factors, including cost-effectiveness." (Code of Regulations, Title 17). This section addresses feasible control measures and includes adoption those for adoption, those to be retained from the 2000 AQMP as contingency control measures and those for deletion. If the District is determined to be a nonattainment transitional area by the ARB in early 2005, the proposed control measures will be returned to the Board for reconsideration as required by the California Clean Air Act.

6.2 ADOPTED CONTROL MEASURES

The following control measures are adopted based on a screening level analysis which considered their emission reduction potential and cost effectiveness (See Table 6-1). Rules will be refined and developed according to the District's rule development procedures which provide for 60 to 90 day review by ARB and EPA, six to eight week public review period, workshops, legal notices 30 days prior to public hearings, and public hearings before the District Advisory Committee and District Board. Rules would be implemented within six to 24 months of rule adoption.

Solvent Cleaning Operations: This control measure would reduce VOC emissions by the establishment of a 25 gram/liter VOC limit on general cleaning applications, cleaning of ink application equipment, and polyster resin application equipment.

Applicable APCD Rule:	None
Required Board Action:	Rule Adoption
Estimated Control Efficiency:	75%
	2005 2010
Affected Emissions: (tpd)	1.93 2.30
Cost Effectiveness:	$3,500 savings to $13,500 cost per ton reduced
Schedule:	October 2005

Spray Booths - Misc. Coating and Cleanup Solvents: This control measure would require the reduction of VOC emissions from miscellaneous coating and cleanup solvents at spray booth operations, which are not affected by other coating regulations. Control requirements include: 1) reformulated low-VOC or waterbased coatings and cleanup solvents, 2) alternative operating/cleaning methods, 3) improved transfer efficiencies, and 4) add-on control equipment, using vapor collection with thermal destruction, carbon adsorption, or condensation systems.

Applicable District Rule:	None
Required Board Action:	Rule Adoption
Estimated Control Efficiency:	40% overall

	2005	2010
Affected Emissions: (tpd)	6.64	8.30
Cost Effectiveness:	$2,500 to $17,500 per ton reduced	
Schedule:	October 2005	

Degreasing Operations: This control measure would reduce VOC emissions from degreasing operations by the establishment of a 50 gram/liter VOC limit on the cleaning solution. As an alternative, an airtight/airless cleaning system could be used in lieu of complying with the 50 gram/liter VOC limit.

Applicable APCD Rule:	433 - Organic Solvent Cleaning
Required Board Action:	Rule Revisions
Estimated Control Efficiency:	75%

	2005	2010
Affected Emissions: (tpd)	1.01	0.99
Cost Effectiveness:	$3,500 savings to $13,500 per ton reduced	
Schedule:	October 2005	

Adhesives and Sealants: This control measure would reduce VOC emissions from the use of adhesives/sealants and cleanup solvents by requiring low-volatile organic compounds (VOC) adhesives/sealants and clean-up solvents and improved adhesive transfer efficiency. As an alternative, add-on emission control equipment (carbon adsorption or incineration systems) could be used.

Applicable APCD Rule:	None
Required Board Action:	Rule Adoption
Estimated Control Efficiency:	50%

	2005	2010
Affected Emissions: (tpd)	0.58	0.52
Cost Effectiveness:	$1,000 savings to $3,000 cost per ton reduced	
Schedule:	October 2005	

Natural Gas-Fired Fan-Type Central Furnaces and Residential Water Heaters: This control measure would reduce NO_x emissions by establishing a limit of 40 nanograms/joule (55 ppm (@ 3% O_2) for new and replacement installations.

Applicable APCD Rule:	None
Required Board Action:	Rule Adoption
Estimated Control Efficiency:	30%

	2005	2010
Affected Emissions: (tpd)	0.69	0.71
Cost Effectiveness:	$0 to $13,500 per ton reduced	
Schedule:	July 2005	

6.3 CONTINGENCY CONTROL MEASURES

Each district plan is also required to contain contingency measures to be implemented upon a finding by the ARB that the district is failing to achieve interim goals or maintain adequate progress toward attainment (H&S 40915). Most of the following contingency control measures were recommended for adoption in the 1991 Air Quality Management Plan (AQMP). In 1994 these rules were moved to Contingency Control Measures since ARB indicated that no further emission reductions were needed to meet requirements of the California Clean Air Act. These measures were carried over to the 1997 and 2000 AQMPs. New control measures have been added based on their feasibility. The selection of specific rules for adoption in the event the ARB found that the district was making inadequate progress would depend on an assessment of their cost effectiveness and the emission reductions needed to address a shortfall.

Automobile Refinishing: This measure would reduce VOC emissions and affect refinishing of motor vehicles and other mobile equipment using lacquers, enamels, and other coatings sprayed in paint booths or in the open. This measure would require high transfer efficiency equipment, lower solvent coatings, or add-on air pollution control equipment to achieve up to 60% emission control from surface preparation, priming, top coating, and equipment cleaning operations. Methods of add-on control include installing totally enclosed paint spray booths equipped with incinerator or carbon adsorption control systems.

Applicable APCD Rule:	None	
Required Board Action:	Rule Adoption	
Estimated Control Efficiency:	60%	
	2005	2010
Affected Emissions: (tpd)	0.27	0.28
Cost Effectiveness:	$2,500 to $12,500 per ton reduced	

Boilers, Steam Generators and Process Heaters: This control measure would reduce NO_x emissions from boilers, steam generators, and process heaters (with a rated heat input of 2 million Btu's per hour and greater) used in industrial, institutional, and commercial operations by requiring such devices to comply with a 30 parts per million NO_x emission limit (at 3 percent oxygen) for gaseous fuels and a 40 parts per million NO_x emission limit (at 3 percent oxygen) for liquid fuels. This measure does not apply to: a) electric utility boilers that are used exclusively to produce electricity for sale; and b) waste-heat recovery boilers that are used to recover heat from the exhaust of combustion turbines.

Applicable APCD Rule:	None	
Required Board Action:	Rule Adoption	
Estimated Control Efficiency:	40%	
	2005	2010
Affected Emissions: (tpd)	0.37	0.39
Cost Effectiveness:	$5,500 to $13,500 per ton reduced	

Fiberglass Fabrication/Polyester Resin Use: This control measure would reduce VOC emissions from fiberglass operations by specifying monomer resin content limits and requiring use of vapor suppressants, high transfer techniques, and low-VOC cleanup solvents.

Applicable APCD Rule:	None	
Required Board Action:	Rule Adoption	
Estimated Control Efficiency:	40%	
	2005	2010
Affected Emissions: (tpd)	0.13	0.13
Cost Effectiveness:	$4,000 to $15,000 per ton reduced	

Fixed and Floating Roof Petroleum Storage Tanks: This control measure would require a tight-fitting secondary seal on most floating-roof storage tanks. A tight-fitting secondary seal, such as the RFI Weatherguard, exerts a pressure of 30 pounds per square inch (psi) on the wall of the tank. This control measure would also revise District Rule 417 by lowering the vapor pressure exemption level to 0.5 psi, so that more storage tanks would be required to install vapor recovery control systems.

Applicable District Rule:	Rule 417	
Required Board Action:	Rule Revision	
Estimated Control Efficiency:	75%	
	2005	2010
Affected Emissions: (tpd)	0.24	0.24
Cost Effectiveness:	$15,000 to $50,000 per ton reduced	

Fugitive Emissions from Petroleum Production: This control measure would reduce fugitive VOC emissions from valves, fittings, pumps, compressors, pressure relief devices, stuffing boxes, diaphragms, hatches, sightglasses, meters, and other components at oil and gas production fields/processing facilities and pipeline transfer stations. This measure would establish leak limits and requirements for inspection/maintenance programs.

Applicable District Rule:	None	
Required Board Action:	Rule Adoption	
Estimated Control Efficiency:	35%	
	2005	2010
Affected Emissions: (tpd)	0.24	0.25
Cost Effectiveness:	$15,000 to $50,000 per ton reduced	

Graphic Arts Printing and Coating Operations: This control measure would reduce emissions from graphic arts operations by establishing solvent content limits for inks, fountain solutions, and clean-up solvents. Types of firms in this category include newspaper, periodical and book publishers, greeting card companies, and companies that print on paperboard containers and boxes. The control measure would apply to printing operations emitting 60 pounds or more of VOC per month.

Applicable APCD Rule:	None	
Required Board Action:	Rule Adoption	
Estimated Control Efficiency:	20%	
	2005	2010
Affected Emissions: (tpd)	0.24	0.26
Cost Effectiveness	$1,000 savings to $15,000 per ton reduced	

Marine Coatings: This control measure would require the use of lower volatile organic compound content for high volatile solvent content coatings currently in use. Also, this measure would establish equipment and operating procedures to minimize the evaporation of solvents used for cleaning spray equipment and for surface preparation.

Applicable APCD Rule:	None	
Required Board Action:	Rule Adoption	
Estimated Control Efficiency:	20%	
	2005	2010
Affected Emissions: (tpd)	0.05	0.05
Cost Effectiveness:	$2,500 to $12,500 per ton reduced	

Petroleum Dry Cleaners: Several cleaning agents are used in the cleaning industry. The most common are perchloroethylene and Stoddard solutions. Perchloroethylene is not considered as a

reactive compound in the formation of ozone. This control measure would require operators of dry cleaning facilities which use Stoddard, a petroleum-based solvent, to control VOC emissions by at least 90 percent by use of activated carbon absorption or other appropriate means. This measure would also include operating requirements to control fugitive VOC Emissions.

Applicable District Rule:	None
Required Board Action: Rule	Adoption
Estimated Control Efficiency:	90%
	2005 2010
Affected Emissions: (tpd)	0.18 0.19
Cost Effectiveness:	$2,500 to $12,500 per ton reduced

Stationary Internal Combustion Engines: This control measure would reduce NO_x emissions from gas-fired stationary internal combustion engines rated at 50 or more horsepower by requiring the following:

1) NO_x emissions from a rich-burn engine shall not exceed 50 parts per million, as corrected to 15% oxygen, or shall be reduced by 90%.
2) NO_x emissions from a lean-burn engine shall not exceed 115 parts per million, as corrected to 15% oxygen, or shall be reduced by 80%.
3) Whenever an internal combustion engine is replaced, the replacement power unit must be an electric motor, if feasible.

Applicable APCD Rule:	None
Required Board Action:	Rule Adoption
Estimated Control Efficiency:	25%
	2005 2010
Affected Emissions: (tpd)	0.16 0.18
Cost Effectiveness:	$5,000 to $25,000 per ton reduced

Wood Products Coatings: This control measure would reduce VOC emissions from wood coating operations by requiring the use of low-VOC coatings, more efficient application techniques, and the use of low-VOC cleanup solvents. As an alternative, add-on emission control equipment, such as carbon adsorption or incineration systems, could be used.

Applicable District Rule:	None
Required Board Action:	Rule Adoption
Estimated Control Efficiency:	60%
	2005 2010
Affected Emissions: (tpd)	0.25 0.27
Cost Effectiveness:	$2,500 to $20,000 per ton reduced

Commercial Charbroiling: This control measure would reduce VOC and PM_{10} emissions from chain-driven charbroilers through the use of flameless catalytic oxidizers.

Applicable APCD Rule:	None
Required Board Action:	Rule Adoption
Estimated Control Efficiency:	90%
	2005 2010
Affected Emissions: (tpd)	0.12 0.13
Cost Effectiveness:	$7,500 to $20,000 per ton reduced

Food Product Manufacturing & Processing Operations: This control measure would reduce VOC emissions from the use of solvents in food manufacturing by establishing a VOC limit of 120 grams/liter for general process solvents and 200 grams/liter for sterilization solvents. As an

alternative, add-on emission control equipment (carbon adsorption and incineration systems) could be used.

Applicable APCD Rule:	None	
Required Board Action:	Rule Adoption	
Estimated Control Efficiency:	75%	
	2005	2010
Affected Emissions: (tpd)	0.02	0.02

Large Water Heaters and Small Boilers: This control measure would reduce NO_x emissions by establishing limits for new and replacement installations of 55 ppm (@ 3% O_2) for units greater than 75,000 Btu/Hr to 400,000 Btu/Hr and 30 ppm (@ 3% O_2) for units greater than 400,000 Btu/Hr.

Applicable APCD Rule:	None	
Required Board Action:	Rule Adoption	
Estimated Control Efficiency:	35%	
	2005	2010
Affected Emissions: (tpd)	0.13	0.13
Cost Effectiveness:	$5,500 to $13,500 per ton reduced	

Lime Kilns: This control measure would reduce NO_x emissions from lime kilns by establishing the following limits: 0.10 lbs NO_x/MMBtu for gaseous fuel, 0.12 lbs NO_x/MMBtu for distillate oil fuel, and 0.20 lbs NO_x/MMBtu for residual oil fuel.

Applicable APCD Rule:	None	
Required Board Action:	Rule Adoption	
Estimated Control Efficiency:	30%	
	2005	2010
Affected Emissions: (tpd)	0.16	0.16
Cost Effectiveness:	Greater than $30,000 per ton reduced	

Metal Parts and Products: This control measure would reduce VOC emissions from the coating of metal parts and products by limiting the VOC content of the coatings. As an alternative, add-on emission control equipment (carbon adsorption and incineration systems) could be used.

Applicable APCD	Rule: 434 - Coating of Metal Parts and Products	
Required Board Action:	Rule Revision	
Estimated Control Efficiency:	30%	
	2005	2010
	0.12	0.14
Cost Effectiveness:	$5,000 to $20,000 per ton reduced	

Semiconductor Manufacturing Operations: This control measure would reduce organic solvent emissions from semiconductor manufacturing operations by requiring: 1) exhaust emission controls (carbon adsorption, thermal or catalytic incineration) on photoresist lines, which have an emission control efficiency of at least 90%, 2) the use of low-VOC/vapor pressure cleanup solvents, and 3) cleaning station sinks with covers and minimum freeboard ratios of 1.

Applicable APCD Rule:	None
Required Board Action:	Rule Adoption
Estimated Control Efficiency:	50%
Affected Emissions:	2005 2010
	0.06 0.06
Cost Effectiveness:	$2,500 to $25,000 per ton reduced

6.4 CONTINGENCY CONTROL MEASURES DELETED

The following control measures were included in previous plans and are deleted because there are no sources within the air basin, the emissions are nominal or the sources are already regulated.

Aeration of Contaminated Soil and Removal of Underground Storage Tanks: This control measure would reduce VOC emissions from the aeration of contaminated soil and the removal of underground storage tanks by the establishment of requirements that limit aeration.

Applicable APCD Rule:	None
Required Board Action:	Rule Adoption
Estimated Control Efficiency:	20%
	2007 2010
Affected Emissions: (tpd)	0.0 0.0

Disposal of Organic Wastes/Hazardous Waste Minimization: This measure would apply to the generation, storage, transfer, treatment or disposal of volatile organic wastes. It would prohibit mixing wastes in such a manner that would render the waste unsuitable for recycling or recovery, require the waste to be stored in covered containers, and require submerged filling or bottom loading during transfer operations. It would prohibit ponding or land spreading of wastes containing greater than 1% VOC as defined by a vapor pressure or distillation test. It also requires facilities generating more than 2000 kilograms/month to have a District approved volatile organic waste control plan. This measure does not apply to household hazardous wastes.

This measure would encourage recycling and recovery of waste solvents, thus minimizing quantities disposed of in Class I dump sites. Class I sites would have to pretreat wastes with greater than 1% volatile organic wastes before the waste could be disposed of in ponds or by other land disposal methods.

Applicable APCD Rule:	None
Required Board Action:	Rule Adoption
Estimated Control Efficiency:	Unknown
Affected Emissions:	Unknown
Cost Effectiveness:	$1,000 to $7,500 per ton reduced

Dry Cleaning - Synthetic Solvent: This control measure requires operators of dry cleaning facilities which use synthetic solvents (e.g., perchloroelthylene or CFC-113) to install control equipment such as carbon adsorbers or refrigerated condensers, which can reduce VOC emissions by at least 90%. Also, dry-to-dry units are required for a new installation or replacement of a washer or dryer using synthetic solvents. This measure includes (1) 90% emission reduction control requirements for drying tumblers and cabinets and a 100 ppm emission limit, (2) specific outlet air temperature limits on the refrigerated condenser, and (3) a number of housekeeping, operating, and record keeping requirements. ***Perchloroethylene is not considered a VOC and CFC-113 is banned as an ODC.***

Applicable APCD Rule:	None	
Required Board Action:	Rule Adoption	
Estimated Control Efficiency:	60%	
	2007	2010
Affected Emissions: (tpd)	0.0	0.0

Landfill Gas Collection Systems: This control measure requires installation of gas collection systems at all new landfills and at existing (active or inactive) landfills with 500,000 tons or more of refuse in place and specifies performance standards and testing requirements for minimizing reactive organic gas emissions. Surface integrity testing would be performed by walking over the entire surface of the landfill using a portable detector to demonstrate that concentrations of total organics as methane do not exceed 500 parts per million. The control device used to destroy or process the collected gases must meet a non-methane organic compound destruction/treatment efficiency requirement of 98 percent, as well as emission limits on nitrogen oxides and carbon monoxide.

There are 35 landfills within the District, and 8 of these would probably be affected by this control measure. Of these 8 landfills, 7 have gas collection systems in operation. ***Systems have been installed and operational at 7 of the 8 landfills which would be subject to this regulation. Emissions from the one uncontrolled landfill are minimal due to quantity of waste in place.***

Applicable APCD Rule:	None	
Required Board Action:	Rule Adoption	
Estimated Control Efficiency:	54%	
	2005	2010
Affected Emissions: (tpd)	2.78	3.03

Petroleum Production and Separation: This control measure reduces VOC emissions from the production and separation of crude oil and gas by establishing emission control requirements for produced gas. Emissions from produced gas would be controlled by at least 90 percent using a vapor recovery system, a flare, or other equivalent control technology.

Applicable District Rule:	Rule 427 which applies only to Steam Enhanced Operations	
Required Board Action:	Rule Revision or New Rule Adoption	
Estimated Control Efficiency:	90%	
	2005	2010
Affected Emissions: (tpd)	0.0	0.0

Petroleum Sumps, Wastewater Separators and Well Cellars: This control measure would control organic compound emissions from sumps, wastewater separators and well cellars used in oil production. Control requirements include: 1) the prohibition of primary sumps, 2) the covering of secondary or tertiary sumps, and 3) the prohibition of storing oil in well cellars, except during well maintenance.

Within the District there are five tertiary production sumps which receive a stream of produced water from separation processes, as well as possible intermittent or emergency streams, and which have a small amount of crude oil present. The crude oil is classified as heavy oil which has less than 30 degrees API gravity. Total sump surface area is about 25,000 square feet.

Applicable District Rule:	None
Required Board Action:	Rule Adoption
Estimated Control Efficiency:	70%
	2005 2010
Affected Emissions: (tpd)	0.0 0.0
Cost Effectiveness:	$15,000 to $50,000 per ton reduced

Plastic Coatings: This control measure would reduce VOC emissions from plastic parts/products coating operations by requiring the use of low-VOC coatings, more efficient application techniques, and the use of low-VOC cleanup solvents. Add-on emission control devices such as thermal and catalytic incineration units or carbon adsorption units could also be used.

Applicable District Rule:	None
Required Board Action:	Rule Adoption
Estimated Control Efficiency:	50% overall
Affected Emissions:	2005 2010
	0.01 0.01
Cost Effectiveness:	$2,500 to $20,000 per ton reduced

Table 6-1 FEASIBLE CONTROL MEASURES - EMISSION REDUCTIONS AND COST EFFECTIVENESS

Feasible Control Measure	Emission Reduction Potential 2005 Tons per Day		Cost Effectiveness
	VOC	NO_x	
Spray Booths	2.6		$2,500 to $17,500
Solvent Clean Operations	1.5		$3,500 savings to $13,500
Degreasing Operations	0.75		$3,500 savings to $13,500
Adhesives & Sealants	0.29		$1,000 savings to $3,000
Natural Gas-Fired Fan-Type Central Furnaces and Residential Water Heaters		0.21	$0 to $13,500
Fixed & Floating Roof Petroleum Storage Tanks	0.18		$15,000 to $50,000
Petroleum Dry Cleaners	0.16		$2,500 to $12,500
Automobile Refinishing	0.16		$2,500 to $12,500
Wood Products Coatings	0.15		$2,500 to $20,000
Wood Products Coatings	0.15		$2,500 to $20,000
Commercial Charbroiling	0.11		$7,500 to $20,000
Boilers, Steam Generators & Process Heaters		0.11	$5,500 to $13,500
Fugitive Emissions from Petroleum Production	0.09		$15,000 to $50,000
Fiberglass, Fabrication/Polyester Resin Use	0.05		$4,000 to $15,000
Graphic Arts Printing & Coating Operations	0.05		$1,000 savings to $15,000
Large Water Heaters & Small Boilers		0.05	$5,500 to $23,500
Lime Kilns		0.05	>$30,000
Stationary Internal Combustion Engines		0.04	$5,000 to $25,000
Metal Parts and Products	0.03		$5,000 to $20,000
Semiconductor Manufacturing Operations	0.03		$2,500 to $25,000
Marine Coatings	0.01		$2,500 to $12,500

7.0 TRANSPORTATION CONTROL MEASURES

7.1 BACKGROUND

The California Clean Air Act requires plans for moderate nonattainment areas to include "Reasonably available transportation control measures sufficient to substantially reduce the rate of increase in passenger vehicle trips and miles traveled per trip if the district contains an urbanized area with a population of 50,000 or more (H&S Code, §40918[3]". The 1991 and 1994 AQMPs relied on implementation of Trip Reduction Ordinances (TROs) to meet the requirement. Since mandatory TROs were subsequently prohibited by State legislation, the 1997 and 2000 AQMPs included a revised list of Transportation Control Measures (TCMs).

The 2004 AQMP carries forward the TCMs adopted in the 2000 AQMP with updated information on TCM programs. Updated emission and travel reduction estimates are not provided but will be included in the 2006 AQMP.

7.2 DESCRIPTION OF ADOPTED TCMS

Improved Public Transit Service (new service and operations/increased ridership): This TCM includes increased capacity on existing routes, new routes proposed by public transit operators, and increased ridership on existing routes.

Transit service in San Benito County provides opportunities for increased ridership on the existing fixed route County Express service in Hollister by servicing school trips. Monterey-Salinas Transit (MST) and Santa Cruz Metropolitan Transit District (SCMTD) provide bus connections to Caltrain service in Gilroy and San Jose, respectively. MST is in the third year of grant funding to provide connecting bus service but has found ridership dropping, probably due to the economic downturn of Silicon Valley and the widening of US 101 through Coyote Valley. MST is considering the operation of a bus connector service to San Jose in cooperation with Caltrans and AMTRAK. This would be similar to the program operated by SCMTD which runs the AMTRAK Highway 17 service as part of its Highway 17 Express service. SCMTD has seen its ridership increase roughly 30% in just a few months by providing service seven days a week and with higher frequency. Both operators are cautiously optimistic about increased ridership on this specialty service.

Areawide Transportation Demand Management (Expanded Outreach): Areawide Transportation Demand Management includes expanded rideshare programs in Monterey and Santa Cruz counties, bicycle education programs, and expanded Transportation Management Association (TMA) activity.

The three projects included in this TCM are AMBAG/Commute Alternatives' expanded employer outreach, SCCRTC/Commute Solutions' vanpool subsidy program, and Pajaro Valley TMA's Commuter Club and Going Places/Making Choices program. Current ridershare programs in Monterey, San Benito, and Santa Cruz counties provide: assistance to individuals, voluntary employer trip reduction programs and TMAs; encourage the creation of new employer trip reduction programs and TMAs; provide computerized, on-line carpool matchlists; and promote carpooling, vanpooling, transit use, bicycling, and walking to the general public.

Commute Alternatives' expanded employer outreach provides additional services of increased employer outreach services to the business community, particularly for various special events and promotions. Commute Solutions vanpool subsidy program offers the following subsidies: a start-up one of $50 for the first month of vanpool operation; one to subsidize empty vanpool seats; $1,000 driver/coordinator incentive; and a critical condition one to temporarily bridge finances for vanpools in danger of folding. The Commuter Club is sponsored by the Pajaro

Valley TMA and provides discounts to local retail establishments to commuters who pledge to use commute alternatives one day per week. The Pajaro Valley TMA also is implementing a two-year program, funded by the Monterey Bay Unified Air Pollution Control District, under which it educates Santa Cruz County high school students about transportation alternatives.

Bicycle education programs are currently being conducted in Monterey and Santa Cruz Counties, particularly an on-going effort by the Santa Cruz County based Community Traffic Safety Coalition. These programs are safety oriented, focusing on reducing injuries to bicyclists.

Transportation Management Associations (TMA) operate in Santa Cruz and Watsonville. Both Santa Cruz County TMAs offer services to member employers such as trip reduction outreach, Guaranteed Ride Home programs, and special event promotions. These TMAs sponsor a discount bus pass program and are active in the twice yearly Bike to Work special events.

Signal Synchronization: Projects in this TCM include traffic signals synchronized at two or more intersections. Signal synchronization is included as a TCM because it improves traffic flow, reducing stop and go traffic and its associated emissions. Signal synchronization projects from the draft *FY 2004/05 to FY 2006/07 Metropolitan Transportation Improvement Program* (MTIP) are listed immediately below.

Monterey	FremontSt/ Del Monte Ave. Signal Upgrades	$296,000
Salinas	Laurel Drive - Davis Road Signal Interconnect	47,000
Salinas	Sanborn-Terven Signal Interconnect`	48,000
TOTAL		**$391,000**

New and Improved Bicycle Facilities: This TCM includes projects in Monterey, San Benito, and Santa Cruz Counties that improve bicycle facilities. Projects include Class I, II, and III bicycle paths, bicycle storage such as lockers and racks, and other facilities to encourage bicycling as a transportation mode. Bicycle facility projects programmed in the draft *FY 2004/05 through FY 2006/07 Metropolitan Transportation Improvement Program* are listed below.

Lead Agency	Description	Total Project Costs
CalTrans	Hwy 1/Harkins Slough Rd Interchange - includes bike lanes	$14,519,000
Hollister	Widen Shoulder: Sunnyslope Rd.- post Class II bike signs	310,000
Marina	Crescent Ave. Bike Lanes & Sidewalk	702,000
Salinas	Rossi St. Improvements - includes resigning for bike lanes	623,000
Santa Cruz	San Lorenzo River Bike/Ped. Bridge near Hwy 1	1,612,000
	Broadway-Brommer Bike Path	3,432,000
	Beach St. Bike Path	551,000
	West Cliff Dr. Path Widening	207,000
Scotts Valley	Green Hills Rd. Bike/Pedestrian Facilities	969,000
Seaside	Broadway Ave. Operation Improvements - includes bike	500,000
Watsonville	Walker St. Improvements - includes bike lanes	600,000
	Harkins Slough Road Reconstruction - includes new bike	980,000
	Green Valley Rd. Rehabilitation - includes Class II	955,000
San Benito	Class II Bike Lane - San Juan Hwy	445,000
Monterey Co.	Harkins/Hatton/Spreckels Blvd. Bike Path	601,000
	Carmel Valley Road Bike Path	143,000
	Pajaro Middle School Safe Routes to School	482,000
	Castroville-Elkhorn Bike Path	2,428,000
	Spreckels Blvd/Portola Dr. Bike Path	3,885,000
	Moss Landing Harbor District Coastal Trail, Phase 1 & 2	746,000
San Benito Co.	Southside Road Bike Lane	324,000
Santa Cruz Co.	Graham Hill Road Safety Improvements - includes bike	2,531,000
	Calabasas Rd. St. Improvements - includes bike lanes	1,507,000
	Bike/Ped. Path along East Cliff Dr.	820,000
	Brook Knoll Elementary Safe Routes to School	113,000
	Amesti Road Safe Routes to School	231,000
	State Park Dr. Improvements - includes multimodal	900,000
	Community Traffic Safety Coalition	40,000
	TOTAL	$41,156,000

Alternative Fuels: The alternative fuels TCM includes the conversion of gasoline-powered vehicles to alternative fuels, replacement of gasoline-powered vehicles with new alternative fuel vehicles, increasing the infrastructure needed to successfully operate alternative fuel fleets, and new applications of electric powered vehicles. By far the most common alternative fuel in use in the region is Compressed Natural Gas (CNG), although local agency fleet vehicles increasingly are using hybrid gas/electric vehicles now commercially available.

Past local CNG activity focused on conversion of gasoline-powered vehicles and fleet vehicle replacement. Replacement of diesel-powered transit buses with CNG buses is the largest conversion previously programmed. Although the draft *FY 2004/05 to FY 2006/07 Metropolitan Transportation Improvement Program* includes only one SCMTD project programmed under alternative fuel vehicles, many local agencies are replacing their fleet with them. CNG-powered vehicles continue to be funded, such as school buses, street sweepers, refuse trucks, and parking control vehicles. Additionally, fueling infrastructure is an important component of CNG usage and becomes more of a priority as CNG fleets grow.

One new alternative fuel project is programmed in the draft *FY 2004/05 through FY 2006/07 Metropolitan Transportation Improvement Program* (MTIP). Projects funded with *FY 2004* AB2766 and Moyer grants are also listed below.

LEAN AGENCY	DESCRIPTION	TOTAL COST
SCMTD	2 CNG Transit buses (MTIP)	$920,000
Monterey Penn. SD	CNG School Bus (portion-AB2766)	133,000
Monterey Penn. SC	CNG Fueling Station (AB2766)	168,000
San Benito HSD	2 Neighborhood Electric Vehicles (AB2766)	19,376
UCSC	CNG Fueling Station (portion-AB2766)	350,000
Total		**$1,590,376**

Park and Ride Lots: Park and Ride lots provide a supporting role to transit, bicycling, and ridesharing TCMs. Although the draft *FY 2004/05 to FY 2006/07 Metropolitan Transportation Improvement Program* does not include any specific park and ride lot development in its three-year time frame, the development of new lots is also based on shared use agreements where an existing parking lot for an other specified use is used during its traditional non-peak usage for park and ride purposes.

Livable Communities: Due to Livable Communities emphasis on alternative transportation and resultant emission reductions, it is included as a TCM. Livable communities is a term borrowed from the U. S. Department of Transportation's Livable Community Initiative. A broad definition of livable communities includes policies and projects that reduce auto dependency by promoting pedestrian, transit, and bicycle scaled development.

AMBAG adopted five policies in June 1995 as part of the *Livable Community Initiative for the Monterey Bay Region.* The five policies are:

- Promote mixed, complementary land uses;
- Promote transit-supportive density and zoning for new development where scheduled transit service exists and transit funds are available to support that density and zoning in the future;
- Provide pedestrian/bike circulation and access;
- Provide transit access; and

- Promote pedestrian friendly design.

These policies complement the recommended mitigation measures in MBUAPCD's *CEQA Air Quality Guidelines*. Three examples of MBUAPCD's recommended mitigation measures include: orient building entrances towards transit facilities, provide bicycle paths within major subdivisions that link to an external network, and provide preferential parking spaces for carpools. These measures are designed to reduce air quality impacts of new development.

The livable communities TCM supports and enhances other TCMs such as improved public transit, areawide Transportation Demand Management, and improved bicycle facilities. Many of the projects listed under these TCMs are equally appropriate in the livable communities TCM. Projects listed in the draft *FY 2004/05 through FY 2006/07 MTIP* that are appropriate to the livable communities TCM and that are not listed under other TCMs include:

LEAD AGENCY	DESCRIPTION	PROJECT COST
AMBAG	Monterey Bay Sanctuary Scenic Trail	$36,000
MST	Marina Transit Station	10,862,000
MST	Salinas Transit Center–Beautification & Safety Improvements	261,000
Salinas	Intermodal Transportation Center	1,250,000
Santa Cruz	Santa Cruz Multimodal Station	3,986,000
SCCRTC	Monterey Bay Sanctuary Scenic Trail	208,000
SCCRTC	Santa Cruz Branch Rail Line ROW Environ Review	378,000
SCCRTC	Santa Cruz Branch Rail Line ROW Acquisition	20,500,000
SCMTD	Pacific Center Update/Redesign	1,000,000
TAMC	Monterey Bay Sanctuary Scenic Trail	208,000
TAMC	Monterey Bay Multimodal Station Improvements	4,042,000

Selected Intelligent Transportation Systems:. The California Alliance for Advanced Transportation Systems defines Intelligent Transportation Systems (ITS) as "advanced sensor, computer, electronics, and communications technologies, applied in an integrated manner to the transportation system through consensus management strategies by regional agencies, to increase safety and mobility." This TCM does not apply to capacity increasing projects.

Different components of ITS include: 1) Advanced Traveler Information Systems (ATIS) which provides travelers with current "real-time" information to make informed travel choices; 2) Advanced Traffic Management/Emergency Management Systems (ATMS/EMS) which facilitates freeway and surface arterial operations to manage travel corridors and emergency situations; 3) Advanced Public Transportation Systems (APTS) which improves mobility for transit riders and transit operations for system managers; 4) Commercial Vehicle Operations (CVO) which enhances commercial goods delivery through improved management capabilities, communications and vehicle operations; 5) Electronic Payment (EP) which allows for electronic payment of transportation services; and 6) Advanced Vehicle Control and Safety Systems (AVCS) which automates vehicle safety and control for safe and improved travel.

ITS is included as a TCM in the Monterey Bay region, in part, for the following reasons: 1) it improves traffic flow, reducing stop and go traffic and its associated pollution emissions (through services like Freeway Service Patrol); 2) it decreases the incidence of crashes and resultant stop-and-go traffic (through projects like Changeable Message Signs, Highway Advisory Radio and Service Authority for Freeway Emergencies); 3) it includes transit related enhancements (through things like SMART Cards and demand responsive services); and 4) it promotes integrated traveler information to make informed traveling choices (through things like information kiosks). Given the range and combination of different projects, plus the current inability to gather sufficient data to analyze these various options, this TCM was not quantified.

Projects being implemented include the SAFE/ Freeway Service Patrols, signal pre-emption on Lighthouse Ave in the City of Monterey, and an MST automated communication system. Freeway Service Patrols are currently in operation in both Monterey and Santa Cruz Counties, while each county has also implemented a SAFE program, providing emergency "call boxes" for stranded motorists.

Traffic Calming: Traffic Calming is defined by the Institute of Transportation Engineers (ITE) as "the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users." Traffic Calming is a TCM with aspects of the TCM subsumed into the Improved Public Transit and Areawide Transportation Demand Management TCMs. Many of its techniques and principles can be included in the Livable Communities TCM. Studies have shown traffic calming reduces air pollution emissions by 10 to 50 percent. Projects that reduce vehicle stops and starts provide the greatest air quality benefits.

Traffic Calming includes, but is not necessarily limited to: 1) reducing the speed limit; 2) changing the road design to force traffic to travel at a slower, more even pace; 3) changing the psychological feel of the street; 4) increasing incentives to use public transit; 5) discouraging use of private motor vehicles; 6) optimizing the number of people using each car; 7) encouraging people to organize their own travel more efficiently; 8) optimizing choices for travel; 9) improved equity for non-motorized travel; and 10) creating strong, viable, compact local communities. Examples of specific Traffic Calming measures include: roundabouts; traffic circles; irregular or textured surfaces; median barriers; lane narrowing; reduced corner radii; street closure and limited street access; raised intersections; gateway treatments; and speed humps.

7.4 DMV MOTOR VEHICLE EMISSIONS REDUCTION GRANT PROGRAM (AB2766)

The on-going AB2766 grant program was established by MBUAPCD in 1992, funded by a $4.00 fee paid during annual vehicle registration. AB2766 grants made with these fee revenues have averaged $1,378,000 annually toward projects to reduce motor vehicles emissions and implement TCMs. Since 1993, the District has made 312 grants totaling over $17 million, of which 30% were for bike facilities,19% for alternative fuel projects,12% for trip reduction programs, 9% for transit, 6% for vanpools, 3% for park and ride projects, 2% for rail projects, 2% for signal coordination, and 3% for miscellaneous emissions reducing projects. It is estimated that projects funded since 1997 will reduce emissions by approximately 453 tons of VOC, 916 tons of NO_x and 321 tons of PM_{10} over the life of the projects.

7.5 REDUCTIONS IN THE RATE OF INCREASE OF PASSENGER VEHICLE TRIPS AND MILES TRAVELED

The estimates of vehicle miles travelled and trips made in 1990 are 16,452,000 and 3,097,328, respectively. For 2005, forecasts are 20,315,000 and 3,755,516, respectively for an increase of 3,863,000 and 658,188, respectively. Based on estimates from the 2000 AQMP, TCMs would reduce VMT by 74,459 (2%) and Trips by 16,171 (3%).

REFERENCES

1. Kreiger, Art, "Traffic Calming on a Low Budget: A Cast Study, " Tech Transfer, No. 59, Fall 1997, p. 10.

2. Monheim, H., "Traffic Calming in North Rhine Westfalia," in HASS-KLAU, C. (Erd.), New Life for City Centres, London, Anglo-German Foundation.

8.0 IMPLEMENTATION OF THE AIR QUALITY MANAGEMENT PLAN FOR THE MONTEREY BAY REGION

8.1 BACKGROUND

The California Clean Air Act requires the District to prepare and submit a report to the Air Resources Board (ARB) summarizing its progress in meeting the schedules for developing, adopting, or implementing the air pollution control measures contained in the District's plan to meet State requirements. The report is due December 31 of each year [H&SC section 40924(a)].

The ARB has provided guidance regarding the contents and approach of Annual Reports (Guidance for Annual and Triennial Progress Reports Under the California Clean Air Act, Air Resources Board, August, 1993). The ARB suggests the following subjects be addressed:

- Summary of rule activity from 1987 through the end of the report year.
- A table summarizing the planned adoption and implementation years versus actual adoption and implementation years.
- Where measures are pending, a more detail description of planned workshop activity and the projected adoption date.
- Activity in transportation control measures (TCM) and indirect source review implementation.
- Explanation of any significant deviations from the original plan schedule for adoption and implementation.

8.2 2000 AIR QUALITY MANAGEMENT PLAN FOR THE MONTEREY BAY REGION

The 1991 Air Quality Management Plan for the Monterey Bay Region (AQMP) was approved by ARB in accordance with requirements of the California Clean Air Act. The plan was updated in 1994 to reflect new information and data including a change to the ozone design value which is the pollutant concentration used for planning purposes. The design value for the 1991 AQMP was 0.11 ppm based on air monitoring data from 1987 through 1989. Using later data (1990 through 1992), the ARB revised the value downward to 0.10 ppm of ozone. Based on ARB guidance, a design value of 0.10 ppm ozone translated to a 20% reduction in emissions of volative organic compounds (VOC) and oxides of nitrogen (NO_x) from the 1987 base year inventory in order to attain the ozone standard.

The 1994 AQMP included revised emission inventories and forecasts for VOC and NO_x. A 20 percent emission reduction from the 1987 year emission inventory was 20.79 tons per day of VOC and 19.20 tons per day of NO_x. Based on adopted controls, these targets were exceeded by 6.65 tons per day of VOC and 3.13 tons per day of NO_x by 1997, the projected year of attaining the State ozone standard. No additional controls beyond those adopted prior to the 1994 AQMP were needed to achieve the 20 percent emission reduction target.

The 20 percent emission reduction was addressed in the 1997 AQMP which showed that a 20 percent reduction from the 1987 emission inventory was 19.6 and 20.3 tons per day of VOC and NO_x, respectively. The actual reductions achieved were 36 percent and 26

percent of VOC and NO_x, respectively. No additional controls beyond those adopted prior to the 1994 AQMP were needed to achieve the 20 percent emission reduction target.

The 2000 AQMP addressed attainment of the ozone standard using data from the District's photochemical model which showed that the standard may not be attained until after 2010. The 2000 plan included the Architectural Coatings SCM, the Carl Moyer Memorial Air Quality Standards Attainment Program, and Enhanced Enforcement of Rule 1002, Transfer of Gasoline into Vehicle Fuel Tanks.

8.3 SUMMARY OF RULE ACTIVITY FROM 1987 THROUGH THE END OF THE REPORT YEAR

The following rules were adopted to address both State and federal ozone planning commitments in the 1991 and 2000 AQMPs:

Revised Rule 207, Review of New or Modified Sources
Rule 426, Architectural Coatings
Rule 431, Emissions from Utility Power Boilers
Rule 430, Leather Finishing
Rule 433, Solvent Cleaning (Degreasing)
Rule 434, Metal Parts and Products

8.4 SUMMARY OF PLANNED ADOPTION, IMPLEMENTATION AND RULE EFFECTIVENESS VERSUS ACTUAL ADOPTION, IMPLEMENTATION AND RULE EFFECTIVENESS

The following summarizes planned versus actual adoption, implementation and rule effectiveness for control measures in the 1991 and 2000 Air Quality Management Plan for the Monterey Bay Region.

- Adoption of revised Rule 207, Review of New or Modified Sources, occurred April 21, 1993, within a few months of the planning target.

- Implementation of Rule 431, Emissions from Utility Power Boilers has produced the largest emission reductions of any District rule and has played a major role in reducing the overall NO_x inventory. Rule 431differs from the adopted control measure which projected emission reductions of 14.8 tons per day of NO_x in 1997 and 16.5 tons per day of NO_x in 2000. The first revision to Rule 431 was adopted in September 1993. A subsequent revision was adopted in August 1995 which included an AQMP derived emissions cap which assures that the 1994 AQMP mass based emission target for electric utility boilers will be achieved. The rule projected a reduction of 8.08 tons per day of NO_x emissions by 1997. In 2000 the rule produced an estimated reduction of 8.65 tons per day. By 2005, the fully implemented rule is expected to produce NO_x reductions of 16.4 tons per day.

- Rule 430, Leather Finishing, was fully implemented by January 1, 1996. The rule applied to only one source within the District. A proposed control measure in the 1982, 1989 and 1991 AQMPs estimated VOC emissions of 1.2 tons per day for this source. The source began reducing emissions in 1990 in anticipation of the rule which was adopted in 1994. In 1995 the VOC emission reduction was 0.70 tons per day. In 1999, emission reductions were estimated at 1.13 tons per day. However, the facility closed operations in 2001, and Rule 430 no longer applies to any facility operating in the District.

- Implementation of Rule 433, Solvent Cleaning (Degreasing), began in 1995 which is the same time frame anticipated in the 1991 AQMP. The 1991 AQMP included an estimate of 0.70 tons per day of VOC in contrast to 0.37 tons per day achieved for 2000. The revised estimate is based on more recent inventory data which reflect lower emissions for this category which resulted from the largest facilities affected by the rule either closing or changing their operations.

- Implementation of Rule 434, Metal Parts and Products, began in 1995 which is the same time frame as anticipated in the 1991 AQMP. The 1991 AQMP included an estimated reduction of 0.11 tons per day of VOC in 2000. However, the actual emission reduction for 2000 is estimated to be only 0.07 tons per day because two of the larger facilities affected by this rule either closed or changed their operations.

- Implementation of revised Rule 426, Architectural Coatings began January 1, 2003. Revisions to Rule 426 are estimated to reduce VOC emissions by 0.48 tons per day in 2005.

- The Carl Moyer Program has been implemented within the District since 1998. Over $1.5 million in District and State funds have been allocated to the program. Grant agreement have been signed for 59 engine projects through 2003 with 88 eligible active applications. Annual emission reductions of NO_x are estimated at 44.9 tons.

- Enhanced Enforcement of Rule 1002, Transfer of Gasoline into Vehicle Fuel Tanks, began in 2000.

8.5 WHERE MEASURES ARE PENDING, A MORE DETAILED DESCRIPTION OF PROJECTED WORKSHOP AND ADOPTION DATES

The 21 control measures adopted in the 1991 AQMP were included as contingency control measures in the 1994 and 1997 AQMPs. Most of these control measures are continued forward in the 2000 AQMP. These measures would be implemented upon a finding by the ARB that the District is failing to achieve interim goals or maintain adequate progress toward attainment. Any regulations necessary to implement the contingency measures are required to be adopted by the District Board within 180 days following the ARB's determination of inadequate progress.

8.6 EXPLANATION OF ANY SIGNIFICANT DEVIATIONS FROM THE ORIGINAL PLAN SCHEDULE FOR ADOPTION AND IMPLEMENTATION

All rules in the 1991 and 2000 AQMP were adopted without significant deviations from the original plan schedule.

8.7 ACTIVITY IN TRANSPORTATION CONTROL MEASURES (TCM) AND INDIRECT SOURCE REVIEW IMPLEMENTATION

Transportation Control Measures

Transportation Control Measures (TCMs) were updated in the 1997 AQMP and carried forward to the 2000 AQMP, to account for changes in legislation and local programs. The following addresses implementation of those TCMs.

Improved Public Transit Service

This TCM assumed increased ridership on the Hollister to Gilroy Caltrain shuttle and modest annual growth in transit ridership for both Monterey-Salinas Transit (MST) and the Santa Cruz Metropolitan Transit District (SCMTD) based on each operator's Short Range Transit Plan.

In the 2000 AQMP, it was reported that ridership had increased on the Council of San Benito County Governments' service into Gilroy to ride the train; this trend continued to 2002. In 2002-2003, ridership leveled off and has dropped since 2003. San Benito County Express staff attributes the decline to the loss of jobs in the Silicon Valley high-tech industry within the last several years.

At the time of the last AQMP update, MST in Monterey County was on the second year of a significant ridership increase based on implementation of its Comprehensive Operations Analysis (COA). The COA was focused on providing additional service on core routes and serving lower demand areas with demand-responsive service. Although projected to increase 4% the first year followed by annual average increases of 1.57 percent through 2005, ridership actually increased 21% in its first two years of operation (FYs 2000 and 2001). It remained static in FY 2002 and has been decreasing since. However, in FY 2004, ridership will still remain approximately 17% higher than that first FY 1999 comparison year.

In the 2000 AQMP it was reported that the first two years of evaluation (FYs 1999 and 2000) yielded SCMTD an average annual increase of 1.6 percent (excluding the Highwy 17 Express service) versus the original assumed 1.9 percent annual average. Since FY 2000, SCMTD has not increased its annual ridership; between FY 2000 and FY 2003, it experienced a 3.1% decrease in ridership.

Areawide Transportation Demand Management (Expanded Outreach)

This TCM included rideshare program activities beyond baseline programs. Analyzed for their cumulative rideshare benefits were: expanded rideshare programs in Monterey and Santa Cruz counties, bicycle education programs, expanded Transportation Management Activity (TMA), video conferencing, and vanpooling outside the rideshare programs.

Under the expanded rideshare programs and bicycle education subcategories, AMBAG's Commute Alternatives program, serving Monterey County, expanded outreach to major employers first with AB 2766 grant funding received from the District, then with various other grants provided through the District (Salinas Commuter Club, vanpool, electric bicycle, school pool). Although funding for those programs has now ceased, Commute Alternatives, again providing baseline rideshare services, currently has access to recently-updated employer based data for its outreach efforts. Employer-based data were garnered from each of the aforementioned grants and will be used for future outreach/promotional efforts. In addition, the three-county on-line database is a collaborative source of outreach among the three Central Coast counties.

Commute Solutions is completing the second phase of implementing its Vanpool Subsidy Program using AB 2766 monies. Under this grant program, SCCRTC's Commute Solutions provides the following vanpool subsidies: a) $50 per rider for the first month; b) an empty seat subsidy; c) $1,000 driver/coordinator incentive program; and d) the critical condition subsidy through which the SCCRTC can intervene to reduce the cost of the vanpool lease if it's in danger of folding. Currently, 13 vanpools are operational. In the upcoming year, Commute Solutions, as part of its baseline program, expects to promote a public outreach plan for the Highway 1/17 Merge Lanes Project and plans to update its website to make it more accessible.

The SCCRTC also hosted a Don't Drive One In Five promotional campaign aimed at encouraging motorists not to drive one day of the week. Funded with Congestion Mitigation and Air Quality (CMAQ) Improvement Program monies, the campaign ran two years prior to the Commissioners electing not to continue the program into FY 2004/05.

In addition to the two counties' programs above, MBUAPCD has committed promotional funding assistance with two large annual promotional events (Rideshare Week and Clean Air Month) over the past six years. Also, annually, during the month of May in Monterey County, and bi-annually during October and May in Santa Cruz County, Bike to Work promotions are held for a one-week period to promote the use of bicycling for transportation.

First implemented in the region by the Santa Cruz Area TMA, Commuter Club activity continued in Watsonville during this last three-year period under the auspices of the Pajaro Valley TMA. The Commuter Club program provides discounts from local retail establishments to commuters who pledge to use commute alternatives one day per week. The Pajaro Valley TMA supplemented its outreach efforts with AB 2766 this past year with the "Going Places, Making Choices" county-wide, high school student educational campaign promoting alternative transportation modes; this program will continue through FY 2004/05.

Although not active in the Commuter Club program the last several years, the Santa Cruz Area TMA joins the Pajaro Valley TMA in offering a Guaranteed Ride Home Program to their members' employees and a discount bus pass program (named "Just Hop on the Bus, Gus" within the Pajaro Valley TMA). The Ecology Action E-Bike subsidy program is also promoted through the Santa Cruz Area TMA, whereby e-bike purchasers can receive up to $375 off the purchase of an electric bicycle.

Finally, MBUAPCD provided AB 2766 funding to establish a teleconferencing center for the County of Monterey's Probation Office. AB2766 funds have also been used for vanpool programs for cities, universities and regional transportation agencies.

Signal Synchronization

This TCM includes traffic signals synchronized at two or more intersections to facilitate traffic flow and reduce stop-and-go traffic. These projects are funded by State and federal sources such as Regional Surface Transportation Program (RSTP) and Congestion Mitigation and Air Quality (CMAQ) program as well as District AB2766 funds. Over the last three years, projects have been sporadically implemented through the jurisdictional sponsors.

New and Improved Bicycle Facilities

Sixty-eight projects from the FY 1996/97 to FY 1998/99 Metropolitan Transportation Improvement Program (MTIP) and draft 1999 Metropolitan Transportation Plan were analyzed for their cumulative contribution to emission reductions. Projects included Class I, II, and III bicycle paths, bicycle storage such as lockers and racks, trail lighting and other facilities to encourage bicycling. Progress has been made in the implementation of these projects although implementation of several of the larger bicycle facilities has been delayed (e.g. Broadway-Brommer Bike Path, West Cliff Drive Bike Path, Castroville-Elkhorn Bike Path, Carmel Valley Road Bike Path, etc.) due to environmental and/or funding constraints. Twenty-eight bicycle projects, inclusive of adding bike lanes and signing to some roadway widening projects, are included in the draft FY 2004/05 to FY 2006/07 MTIP.

Alternative Fuels

The Alternative Fuels TCM included replacement of gasoline-powered vehicles with new alternative fuel vehicles, increasing the infrastructure needed to successfully operate alternative fuel fleets, and new applications of electric powered vehicles. Of the 17 projects analyzed from the FY 1996/97 to FY 1998/99 Metropolitan Transportation Improvement Program (MTIP) and draft 1999 Metropolitan Transportation Plan for their air quality benefits, 16 projects were Compressed Natural Gas (CNG) related.

A list of Alternative Fuels projects funded in whole or in part with AB2766 funds since 1997 follows:

LEAD AGENCY	PROJECT	PROJECT COST
Aromas-San Juan SD	3 CNG School Bus	$ 172,377
Monterey Co. Sup. Schools	CNG Vehicles	65,000
Salinas School District	3 CNG School Buses	365,000
City of Santa Cruz	CNG Parking Control	171,400
City of Watsonville	CNG Street Sweeper	42.000
Monterey Pen. SD	CNG School Bus	124,000
SCMTD	CNG Staff Vehicle and Employee Van	36,165
City of Santa Cruz	CNG Van	35,428
Monterey County Off./Edu.	2 CNG School Buses	165,000
SBHSD	CNG School Bus	140,000
Santa Cruz Co. Gen. Ser.	2 CNG Commuter Vans	99,300
UCSC	2 CNG/Gas Dual Fuel Commuter Vans	207,000
MST	3 CNG Job Access Shuttle Vans	243,500
Santa Cruz Public Library	CNG Delivery Van	25,925
Santa Cruz Co. - Sheriff	CNG Courthouse Van	35,000
SCMTD	8 CNG Buses (includes $265,000 Moyer funds and $48,831 AB2766 funds)	2,448,535
City of Santa Cruz	2 Electric Bicycles	8,640
Santa Cruze Co. - Sheriff	2 Electric Bicycles	4,320
City of Hollister	2 Electric Police Bikes	5,722
City of Pacific Grove	Business Electric Vehicle Program	9,600
City of Sand City	Electric Shuttle	77,887
Santa Cruz Port District	1 Electric Bike	2,000
Santa Cruz Co. - PW	Electric Bicycle Incentive Program	553,000
Santa Cruz Port District	2 Electric Utility Vehicles	35,000
Santa Cruz Public Library	Solar Bookmobile	9,707
Cabrillo College	2 NEV for Police Use	16l,795
City of Santa Cruz	Neighborhood Electric Vehicle Subsidy	259,670
Santa Cruz County	Electric Bicycle Incentive	31,098
Monterey Penn. College	CNG Fueling Equip. Training Course	135,000
SCMTD	CNG Refueling Facility	1,380,000
Santa Cruz Co.	Ocean St. CNG Refueling Facility	556,780
Monterey Co. Supp. Serv.	Salinas CNG Station Capacity Increase	59,000
City of Monterey	Mini-lub System	27,000

MST	Prel. Design of CNG Fueling Facilities	1,000,000
SCMTD	CNG Fueling Facility Design and Const. and fueling station	2,554,270
UCSC	CNG Fueling Station	283,000
Council of San Ben. Co. Gov'ts.	Backup CNG Fueling Facility	84,000
Total		**$11,613,119**

Livable Communities

Although included as a TCM in the 2000 AQMP, emission reductions for this TCM were not quantified. The Livable Communities TCM is broadly defined to include policies and projects that reduce automobile dependency by promoting pedestrian, transit, and bicycle oriented development. Awareness of Livable Communities principles has increased in the region the last three years as part of the planning process and through various workshops/training sessions offered. In the last several years, AMBAG has hosted several livable communities workshops under its Community Planning Forum series, while various jurisdictions/entities have played host to Walkable Communities professionals and their corresponding one-day workshops, many times with the co-sponsorship of the Surface Transportation Policy Project.

Selected Intelligent Transportation Systems

As another TCM included in the 2000 AQMP without accompanying emissions reductions, the goal of Selected Intelligent Transportation Systems (ITS) technologies is to integrate advances in electronics/communications technologies into the transportation planning and project implementation process to achieve safety and mobility rewards. In 2000, the Central Coast Region ITS Strategic Deployment Plan, as funded by Caltrans, was completed under AMBAG guidance. The five-county study laid out a plan of action for ITS technologies in the region; study participants were encouraged enough in their joint venture to call for the continuation of the study's Steering Committee as the ITS Coordinating Group, meeting approximately quarterly. With group endorsement, AMBAG submitted a grant application to hire a Central Coast ITS Coordinator, a consulting firm available to the partners in their ITS implementation quest.

Faced with recently adopted National ITS Architecture standards to which all regions are required to respond, the Central Coast ITS Coordinating Group received FHWA Partnership Planning funding this past year for the Central Coast ITS Coordinator. The preliminary Scope of Work includes not only the availability of the consultant to develop and/or refine ITS promotional materials and offer implementation assistance, but also to develop the Central Coast's architecture to national standards and to develop the subsequent architecture implementation and maintenance plans required. The grant will be conducted over the next 18-month to 2-year period.

Traffic Calming

Traffic calming measures include changing street designs and posted speeds; encouraging methods to reduce vehicle trips and optimizing choices for travel; and creating strong, viable, compact local communities. The Traffic Calming TCM did not include emission reductions. Several jurisdictions in the Monterey Bay region remain interested in traffic calming applications and continue to research and implement various physical improvements to lessen the impact of traffic on residential neighborhoods. As an example, in a recent grant application, the City of Pacific Grove proposed to study the physical alteration of the roadway serving a key retail/commercial district to make the area more walkable and safe.

AB2766 DMV Motor Vehicle Emissions Reduction Grant Program

Since 1991 when the DMV Motor Vehicle Emission Reduction Grant Program (AB2766) was established, the District has granted over $16 million for emission reducing projects including TCMS with 29% for bike facilities, 17% for alternative fuel projects, 12% for trip reduction programs, 7% for vanpools, 8% for transit, 4% for park and ride projects, 2% for rail projects, 2% for signalization, and 4% for miscellaneous projects.

Indirect Source Review Implementation

The District continues its program of addressing indirect source emissions through the California Environmental Quality Act review process. District staff reviews and comments on all Environmental Impact Reports (EIRs) and Statements (EISs) and Negative Declarations (NDs) and responds to all Notices of Preparation (NOPs) prepared for projects within the region. The District also reviews environmental documents for major projects in southern Santa Clara Valley. The District commented on 137 NOPs , 150 EIRs/EISs and 592 NDs between 1998 and 2003. The District also amended its guidelines for preparing air quality analyses in 2000 and June 2004 to incorporate updated data and revise its significance thresholds for VOC and NO_x.

8.8 2003 AMBIENT AIR QUALITY DATA AND ATTAINMENT OF THE STATE OZONE STANDARD

Air monitoring data for 2003 shows that the District meets the criteria for a nonattainment-transitional area having had less than three exceedances of the State ozone standard at any one air monitoring stations.

APPENDIX A - DETAILED EMISSION INVENTORY

(Available upon request)