2005 REPORT ON ATTAINMENT OF THE CALIFORNIA PARTICULATE MATTER STANDARDS IN THE MONTEREY BAY REGION

SENATE BILL 656 IMPLEMENTATION PLAN

December 1, 2005

Prepared by
Monterey Bay Unified Air Pollution Control District

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2005 REPORT ON ATTAINMENT OF THE CALIFORNIA PARTICULATE MATTER STANDARDS IN THE MONTEREY BAY REGION - IMPLEMENTATION OF SB 656

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EXECUTIVE SUMMARY

I. BACKGROUND

Statutory Requirements

The purpose of this plan is to fulfill the requirements of Senate Bill 656 (Sher), which was approved by the California Legislature in 2003 with the objective of reducing public exposure to particulate matter. The legislation requires the California Air Resources Board (ARB), in conjunction with local air pollution control districts, to adopt a list of the most readily available, feasible and cost-effective control measures that could be implemented by air pollution control districts to reduce ambient levels of particulate matter in their air basins.

The Implementation Plan would apply in the North Central Coast Air Basin (NCCAB), which includes Monterey, Santa Cruz and San Benito Counties. The location of the NCCAB is shown in Figure ES-1.

Public Involvement Process

As part of the SB 656 public involvement process, the District issued a draft plan dated May 11, 2005. The draft plan was presented to the District's Advisory Committee and Board of Directors in June and was made available to the public for review. Following direction from the Advisory Committee and Board, District staff met with and received guidance on the proposed measures in the draft plan from industry representatives including the Central Coast Agricultural Task Force as well as representatives from the cement and mineral processing industries. In addition, in August the District issued public notices for four public workshops, which were held in September 2005.

Summary of Plan Revisions

Based on stakeholder input received during this process, the District has issued this revised plan for implementing SB 656. Changes from the May 11th draft plan include:

- Simplified the agricultural Best Management Practices (BMPs) to focus on agricultural tilling and unpaved roads.
- Include the use of District grant incentive programs for implementing PM_{10} fugitive dust control measures as well as well as funding demonstration projects to determine the most effective ways of controlling fugitive dust for the various conditions of the NCCAB.
- The District does not intend to pursue use of vegetation wind/dust screens near agricultural fields as a fugitive dust control measure due to concerns voiced by agricultural stakeholders that these could provide habitat for pests and have an adverse impact on nearby crops if discretion is not used in selecting the specific species of plants used to create the screen.

- Modified the program description so that implementation of the plan would not conflict with regional water quality goals, water consumption or produce adverse impacts to the biota or crop quality.

- The Mineral Processing measure has been deleted as a contingency measure and added as a control measure (BMP /good housekeeping measure), which would become the basis for a District rule. The proposed rule would be subject to environmental review under CEQA prior to adoption by the District Board. The rule would establish minimum housekeeping requirements for all mineral processing operations, including cement manufacturing and quarries.

- The Cement Manufacturing measure was added as a contingency measure and would be implemented if the BMP/good housekeeping measure for Mineral Processing did not achieve intended results.

- Environmental review under the California Environmental Quality Act (CEQA) was added to the integrated planning process for particulate matter.

- Added implementation of the Air Toxics Control Measure (ATCM) for naturally occurring asbestos as a control measure.

- Added implementation of the ATCM for agricultural pumps as a control measure.

- Corrected several typographical and grammatical errors in the draft plan.

Health Effects of Particulate Pollution

Exposure to particulate pollution (particles less than 10 microns in diameter) is linked to a number of adverse health effects, including increased frequency and severity of asthma attacks, pneumonia, bronchitis, and even premature death in people with pre-existing cardiac or respiratory conditions. Those most sensitive to particulate pollution include infants, children, the elderly, and persons with heart and lung disease. These particles can pass through the nose and throat to reach deep into the lungs. Research suggests that the smallest particles may penetrate the lung walls. Some particles, such as diesel soot, are toxic.

Particulate Matter - "Coarse" and "Fine"

Particulate matter is not a single compound like other criteria pollutants such as ozone or carbon monoxide. Instead, it may consist of a variety of very small solid and liquid particles that are suspended in the air. Health concerns focus on particles smaller than 10 microns in size (PM_{10}), and the subset of fine particles smaller than 2.5 microns ($PM_{2.5}$). Particles with a size between 2.5 and 10 microns are often referred to as coarse particles while those less than 2.5 microns are referred to as fine particles.

Air Quality Standards and Monitored Air Quality for Particulate Matter

State and federal ambient air quality standards have been set for PM_{10} and $PM_{2.5}$. The NCCAB has achieved all federal standards for PM_{10} as well as the State and federal standards for $PM_{2.5}$. It is nonattainment for the State PM_{10} standard. The California ambient air quality

standard for PM_{10} is 50 micrograms per cubic meter ($\mu g/m^3$), averaged for 24-hours. Ambient PM_{10} data indicate that the NCCAB, like most areas of the state, is nonattainment area for the State PM_{10} standard. However, until 2003 when SB 656 was adopted, there was no requirement for districts to adopt control measures to make progress toward achieving the standard. The Monterey Bay Unified Air Pollution Control District (MBUAPCD), however, began developing reports addressing the State standard in the mid-1990s, prior to adoption of SB 656.

These earlier reports characterized conditions in the NCCAB by evaluating the area's air monitoring data, emissions inventory trends and the probable causes of monitored exceedances. In addition, starting in 1996 the District began having all exceedance filters chemically analyzed by a laboratory. This provided the District with considerable insight into the composition and likely causes of the exceedances, which was last reported in an extensive report issued in 1998.

This assessment is therefore also an update to the District's ongoing planning efforts to assess and report on the nature of PM_{10} in the NCCAB. SB 656 adds requirements for districts to not only assess the nature of the PM_{10} problem in their areas but also, based on the specific characteristics of PM_{10} in the air basin, to adopt implementation schedules for measures appropriate to those conditions, so progress can be made toward attainment of the California ambient air quality standard. The implementation schedule must include specific dates for final adoption, implementation, and sequencing of control measures.

Since the NCCAB has already achieved the State $PM_{2.5}$ standard, there are no specific requirements for $PM_{2.5}$. However, SB 656 encourages districts to adopt measures that reduce diesel exhaust, which is both a $PM_{2.5}$ pollutant and a toxic air contaminant.

II. CHARACTERIZATION OF PM_{10} IN THE NCCAB

Coastal Locations

In the NCCAB, highest particulate levels and most frequent violations occur in the coastal corridor. In this area, sea salt, in combination with fugitive dust from various geological and man-made sources, combines to exceed the standard. Nearly three quarters of all NCCAB exceedances occur at these coastal sites where sea salt is often the main factor causing the exceedance.

Without the sea salt burden, the majority of these exceedances would not have occurred. Occasionally, the sea salt component alone exceeds the standard. Exceedances along the coast are often driven by conditions in the natural marine environment, including high surf events and strong winds. However, at the highest site, Davenport in Santa Cruz County, the situation is further compounded by the presence of cement dust from a nearby cement plant.

Inland Locations

For non-coastal and inland stations, the frequency and severity of exceedances are considerably lower. In this area, chemical analysis of the exceedance filters suggests that wind blown fugitive dust, and occasionally smoke related particulates from wildland fires, cause ambient levels to exceed the standard. Particulate matter in the inland zone tends to be highest during the dry season when wind blown fugitives are highest.

Special studies indicate that areas of the NCCAB have elevated levels of naturally occurring asbestos. This is due to geological outcroppings of ultramafic (i.e., serpentine) rock in mountainous areas of the NCCAB, which can be spread throughout the watershed. In addition, chemical analysis of the filters also suggest levels of crystalline silica and beryllium near or above the Reference Exposure Levels established for these air contaminants by the Office of Environmental Health Hazard Assessment. These contaminants are commonly associated with the presence of fugitive dust.

Regional particulate air quality can also be significantly affected by wildfire events or when large prescribed burns occur near populated areas. These events are most common in the fall.

Contribution from Coarse versus Fine Particulate Matter

During most exceedances, influences from nearby local sources of fugitive dust tend to play a larger role than more distant regional sources. Regional secondary aerosols in the form of nitrates and sulfates are generally minor components of the particle mass of exceedance filters. Except for smoke related exceedances, fine particulates in the form of regional $PM_{2.5}$ tend to be less of a contributor to the exceedance mass than the coarse ($PM_{2.5}$ to PM_{10}) fraction.

Unusual Events and Natural Background

In many cases, the causes of exceedances are beyond District control because they are caused by naturally occurring factors, such as sea salt or fire-related events such as wildfires, or Superfund-related fires at Fort Ord. Exceedances caused by exceptional events such as wild fires, are normally excluded from the regulatory process used to determine an area's attainment status.

The ambient standard for PM_{10} is based on the amount of PM_{10} in the air, regardless of origin or composition. Consequently, the PM_{10} samples obtained through monitoring include PM_{10} from both human caused and naturally-occurring sources. Naturally occurring PM_{10} includes natural aerosols such as sea salt, fugitive dust from wind storms, volcanic dust, small amounts of nitrates and ammonia from decay of naturally occurring organic matter in the soil, as well as smoke from wildfires. Monitoring results representative of natural background levels of PM_{10} in the NCCAB are difficult to obtain because virtually all monitoring is conducted in areas already affected by human activities. However, monitoring results from a relatively undisturbed inland area of the NCCAB indicate that ambient background levels are quite variable, averaging about 25% of the standard and ranging from less than 10% up to about 40% of the standard, depending on the season. Along the coast, the situation is even more variable as natural background levels can exceed 100% of the standard due to the presence of sea salt.

Emission Inventory

The 2005 emission inventory for the NCCAB indicates that over 100 tons per day of PM_{10} is emitted from man-made sources on a typical day. The majority of this originates in the form of fugitive dust from paved and unpaved roads, agricultural tilling operations and disturbed unpaved surfaces. An assessment of the PM_{10} emission inventory trend over the period 2000-

2020 indicates that PM_{10} emissions are generally expected to increase. This is primarily due to anticipated increases in fugitive dust caused by increased vehicle travel on unpaved and paved roads. Although agricultural sources of PM_{10} are not expected to increase, they comprise a substantial portion of the inventory because they represent nearly 40% of the NCCAB's entire PM_{10} inventory.

III. PROPOSED CONTROL MEASURES AND IMPLEMENTATION SCHEDULE

Fugitive dust is identified as a major source of PM_{10} in the NCCAB. Consequently, the control measures presented in this Implementation Plan focus on reducing fugitive dust. In addition, as directed by the SB 656 legislation, priority is also given to reducing emissions of diesel exhaust, which has been identified as a toxic air contaminant by the ARB.

Many of the control measures do not represent major changes to existing programs. Because most exceedances in the NCCAB are caused by sea salt, which is beyond regulatory control and is not considered harmful to human health, and the few exceedances that remain where sea salt was not a major contributor are typically only about 5 to 10 $\mu g/m^3$ above the standard, conditions in the NCCAB do not require an aggressive set of new regulatory control measures beyond enhancing existing District programs that already include rules, permits, enforcement, incentive programs and environmental review of projects in accord with the California Environmental Quality Act (CEQA). Initial reductions of PM_{10} from the larger emission categories may be adequate to offset the expected overall growth in the NCCAB's PM_{10} emission inventory.

Consequentially, this effort focuses on enhancing existing programs, education, and incentive programs to reduce fugitive dust from a variety of sources. These are described in the following text and are also summarized in Table ES-I.

D-1 Unpaved Roads - Fugitive Dust Measure

The unpaved road dust measure involves Best Management Practices (BMPs) for reducing entrained road dust from unpaved roads, which is the largest single source of fugitive dust in the NCCAB. This includes fugitive dust disturbed and made airborne (i.e. entrained) by the aerodynamic wakes of vehicles traveling on unpaved roads. The unpaved road category includes city and county roads, State Parks, U.S. Forest Service, Bureau of Land Management, as well as agricultural roads. This single category represents approximately one quarter of all primary PM_{10} emissions in the NCCAB.

This BMP would be implemented primarily as a public awareness/educational effort. Implementation of this measure should also reduce dustfall on crops, homes, businesses and other property located near unpaved roads.

Specific BMPs to be considered under this measure include encouraging use of dust suppressants, including watering or gravel, applying non-toxic surfactants on unpaved roads and related equipment staging areas, recommending speed limits, limiting access to infrequently used unpaved roads or parking areas. In situations involving high volumes of traffic (> 100 vehicles per day), paving may be considered as a permanent measure on a case by case basis.

The District may also conduct demonstration projects to identify the most effective types of dust suppression for the varying conditions of the NCCAB. Because these measures would reduce emissions of PM_{10}, a nonattainment pollutant under state law, the District may use grant incentives to help fund implementation of these BMPs.

D-2 Unpaved Roads - Speed Limits

This measure is an extension or enhancement of the first measure (D-1) and would evaluate the impact of vehicle speed on unpaved roads in creating fugitive dust, visibility impairment, nuisance and dust deposition in areas along the roadway corridor. As with D-1, this measure would initially include an educational/public awareness effort. A regulatory component could be introduced at a later date if the awareness campaign does not produce the desired improvement. On unpaved roads where effective BMP dust suppression measures are not being applied, the District might recommend a voluntary 15 mph speed limit to mitigate the excessive emissions that occur at higher speeds. If a regulatory measure to limit vehicular speed becomes necessary, it would be proposed with required environmental review.

D-3 Agricultural Tilling/Land Planing

Agricultural tilling and land planing represent about 15% of the NCCAB's PM_{10} anthropogenic (man-made) emission inventory, and comprises the third highest category in the area. Agricultural tilling tends to occur during the dry season, when fugitive dust is highest. This measure would be an educational BMP, which would discourage tilling or land planing whenever the wind is greater than 25 mph.

This category is especially important for the many agricultural areas of the NCCAB where suburban land uses are often sited immediately downwind of agricultural fields. When fields are tilled, particularly under the windy conditions that prevail in the Salinas Valley during the dry season, this can become a problem. Development along this agricultural/urban interface is expected to increase in the future, so the impacts would require greater mitigation. In addition, particulate emissions from fields disturbed under windy conditions could also affect adjacent agricultural fields and visibility on nearby roadways.

D-4 Sea Salt Exemption

According to the ARB, sea salt has no demonstrated health effects or corresponding planning requirements. Consequently, the District would request that ARB exempt the portion of the PM_{10} sample represented by sea salt. Based on 2001-2003 data, exempting the portion of the sample mass represented by sea salt would eliminate about two thirds of NCCAB violations and would result in designation values for the coastal sites that are more representative of PM_{10} levels that are relevant from a health perspective. While an exemption would represent a policy change rather than a change to air quality, it might allow the NCCAB to achieve the California PM_{10} standard, which it might otherwise never do since sea salt alone can exceed the standard.

D-5a Mineral Processing

A review of the emissions inventory for the mineral processing category, as well as the

increasing number of quarry project proposals, indicates that quarry operations will be increasing. With larger quarry operations and increasing population, impacts on the public will likely increase. The objective of this measure would be the development of a consistent set of fugitive dust control mitigation measures for all proposed projects, to reduce PM emissions below thresholds of significance (82 lbs/day).

The measure would develop a set of "good housekeeping" measures for control of fugitive dust from mineral processing operations, which includes quarries and cement manufacturing facilities. The final product would be a recommended integration of relevant District rules and CEQA-related fugitive dust control measures applicable to these facilities into a single enforceable rule, which would be subject to applicable environmental review in accord with CEQA.

General provisions considered under the Mineral Processing measure could include watering roads frequently enough to suppress fugitive dust, paving unpaved roads when appropriate, applying water or non-toxic binders to exposed disturbed surfaces in unpaved areas vehicle speed limits in dusty or unpaved areas, restricting vehicle access to inactive unpaved areas, curtailing active excavation whenever high winds carry dust offsite, covering trucks hauling loose dust emitting raw materials, wheel washing when appropriate, planting ground cover on disturbed surfaces after grading or excavation, covering storage piles, limiting track-out distances, control and cleanup of spills in bulk loading areas, minimizing fall distances to storage piles, preventing carry-back underneath conveyors, upgrading dust collectors where inadequate or under performing, planting windbreaks consisting of trees and/or shrubs around the perimeter of the operation. If near agricultural fields, the type of windscreen used should not provide a habitat for pests, implementing ARB's Air Toxics Control Measure (ATCM) for naturally occurring asbestos (NOA) for operations in areas impacted by elevated levels of NOA, and establishing a working group to refine industry-specific fugitive dust control measures.

The general "good housekeeping" provisions developed under the Mineral Processing measure would also apply to fugitive dust from cement manufacturing operations.

D-5b Cement Manufacturing (Contingency Measure)

This contingency measure specific to cement production would be implemented if the general provisions of the Mineral Processing measure were not adequate to reduce PM_{10} from sources at cement plants. This would result in development of a rule which would apply to any cement production facility operating in the area and when proposed would be subject to applicable environmental review in accord with CEQA. The future rule would require continual implementation of good housekeeping practices to reduce fugitive dust and would suggest additional tools for maintaining these practices.

In addition to the general provisions established in the Mineral Processing measure, additional provisions that could be considered for cement manufacturing measure include establishing a procedure for reporting and documenting repairs made on dust control equipment, instituting a street cleaning program using a street sweeper/collector truck, preferably one which meets the requirements of SCAQMD Rule 1186 (80% PM_{10} collection efficiency), re-evaluation of the adequacy and reliability of dust collectors, constructing a dome over raw materials areas,

maintaining and operating an automatic street sprinkler system, quickly repairing breaches in building enclosures used as containment chambers for dust, reducing emissions inside buildings used as containment chambers for dust, such as a finish mill and a clinker storage shed, maintaining walls around the base of a clinker storage shed, adding video cams to problematic areas for fugitive dust (i.e. bulk loading, coal mill, active raw materials piles), for quicker response to fugitive dust situations, scheduling excavation in Cement Kiln Dust (CKD) area during periods of light wind (< 15 mph), using CKD as a cover for unpaved access roads which are watered to maintain a solid surface, removing accumulated materials in any laterite loading area, replacing worn or missing curtains in loading areas, and establishing a working group to refine plant-specific fugitive dust control measures.

Implementation of this contingency measure should encourage diligence in maintaining good housekeeping practices at any cement manufacturing facility, additional tools for enforcement to deal with noncompliance issues and complaint response, as well as decreased PM_{10} in areas adjacent to any cement plant.

D-6 Integrate District Programs into Reducing PM10 in the NCCAB

A number of District programs and rules share a common goal with the SB 656 Implementation Plan in terms of reducing PM_{10} emissions. The objective of the integrated approach would be to reduce PM and its associated precursors through these related planning processes. Particular attention would be given to reducing toxic diesel exhaust, which ARB estimates accounts for 70% of the airborne cancer risk from all air toxics in California. The implementation of this integrated approach would be reflected in revisions to the guidance used by the District in prioritizing efforts to reduce toxic diesel exhaust and development of control measures to reduce precursors to PM_{10} in the next update to AQMP.

Programs involved in this integrated approach are described below:

- D-6a Air Quality Management Plan - Since both NO_x and VOC's are common precursors to ozone as well as PM, the District's Air Quality Management Plan (AQMP) for ozone would consider the impacts associated with implementation of the ozone plan as part of the effort to reduce regional PM. Higher priority would be considered to AQMP measures that reduce NO_x which would produce minor benefits in reducing the nitrate component of ambient PM.

- D-6b Smoke Management Program - Ground-level smoke from large fires can cause exceedances of the PM_{10} standards. The objective of the District's Smoke Management Program (SMP) is to minimize ground-level concentrations of smoke from planned burn operations. Further development of the District's SMP could give particular attention to mitigating smoke impacts from projects near populated areas, such as Fort Ord and adjusting the program with the ARB to reflect the differences between the coastal and inland areas of the air basin. By increasing the number of inland burn days, fewer burns would likely occur on any one day, thus reducing the regional smoke burden. The District would also encourage improved methods of smoke management by working with the area's Fire Safe Councils. Any revisions to the SMP would be subject to environmental review.

- D-6c CEQA Air Quality Review - The District's CEQA Air Quality Guidelines, which guide District review of projects in the NCCAB that are subject to CEQA, include many project-level mitigation measures to reduce PM10 and diesel exhaust during the construction and operational phases of the project. The District's CEQA Air Quality Guidelines would be revised to reflect the demonstrated impacts of PM and the effectiveness of specific mitigation measures. The revision to the District's CEQA Air Quality Guidelines would be subject to environmental review as required by CEQA.

- D-6d Naturally Occurring Asbestos (NOA) - Fugitive dust in areas of the NCCAB are known to have elevated levels of naturally occurring asbestos. The District would implement the site-specific fugitive dust mitigation plans outlined in ARB's ATCM for NOA. This should have the dual benefit of reducing both airborne asbestos, as well as fugitive dust.

- D-6e District Moyer Grant Program - The District's grant incentive programs that reduce PM from diesel exhaust would contribute to the overall effort to reduce PM. The additional $2 per vehicle DMV surcharge authorized under AB 923 provides funding for replacement of diesel engines in school buses and other vehicles in the District. The District also administers the State-funded Carl Moyer Program, which provides incentives for cleaner engine projects that reduce diesel PM.

- D-6f Department of Motor Vehicle (DMV) Registration Program (AB 2766) - Because the NCCAB is a nonattainment area for PM_{10}, the District intends to use part of the DMV renewal fees collected under AB 2766 (HSC Section 44223) to fund demonstration projects to identify effective means of reducing PM_{10} in the NCCAB, as well as incentive and educational programs which reduce PM_{10} caused by motor vehicles.

D-7 Air Toxic Control Measure (ATCM) for Agricultural Irrigation Pumps

The ARB is expected to adopt an ATCM to reduce emissions of toxic diesel exhaust from agricultural pumps in 2006. The District would implement this ATCM and offer grant incentives from the Carl Moyer Program to help fund PM reductions, if allowed by State guidelines. When evaluating grant requests, PM reductions would be given the weighting factor of 20 compared to other pollutants, consistent with the District goal to reduce toxic diesel risk. This would be consistent with District goals to reduce toxic diesel risk and is also consistent with the SB 656 legislation.

IV. ADOPTION AND IMPLEMENTATION OF ADDITIONAL CONTINGENCY CONTROL MEASURES

If the Implementation Plan does not promote sufficient progress toward achieving the State's PM_{10} standard, the District would recommend contingency measures, in addition to Measure D-5b for Cement Manufacturing. These would be based on cost effectiveness, technological feasibility, emission reduction potential, public acceptability, and enforceability. Specific controls on particular sources or source types might be adopted in the future, should specific source to receptor relationships become evident. These contingency measures and controls would be subject to environmental review before adoption and implementation. The candidate contingency control measures are presented in Appendix E.

V. IMPLEMENTATION SCHEDULE AND ENVIRONMENTAL REVIEW UNDER THE CALIFORNIA ENVIRONMENTAL QUALITY ACT

SB 656 specifies that the implementation schedule for the measures should be adopted by district boards by July 31, 2005, following at least one public workshop. However, since the District considers this to be a discretionary action and hence a project under the California Environmental Quality Act (CEQA), the District will be undertaking necessary environmental review for this activity. The time frame required for CEQA review renders the July 31, 2005 adoption date infeasible. In addition, in order to provide more opportunity for public input, the District held four public workshops rather than one.

Environmental review under CEQA began on November 22, 2005 with circulation of an Initial Study and Negative Declaration. The Implementation Plan is scheduled for presentation to the Advisory Committee on December 1 and the Board on December 14, 2005.

The District intends to adopt the schedule of PM_{10} control measures by December 2005. The measures, and any revisions to existing rules will be then be implemented by the District within two years of schedule adoption. The District's implementation schedule for the measures adopted under SB 656 is shown in Table ES-1.

The District will continue to work with stakeholder groups as the measures are developed into specific BMPs or rules. ARB staff is to report on the actions taken by the District to fulfill the requirements of SB 656 to their Board by January 1, 2009.

TABLE ES-1 IMPLEMENTATION SCHEDULE FOR SB 656 MEASURES

No.	Measure Description	Target Pollutant	Measure Type	Implementation Date*
D-1	**Unpaved Roads - Best Management Practices (BMPs)**	Fugitive Dust	Educational and Grants	December 2006
D-2	**Unpaved Roads - Speed Limit**	Fugitive Dust	Educational or Regulatory	December 2006
D-3	**Agricultural Tilling/Land Planing**	Fugitive Dust	Educational	December 2006
D-4	**Sea Salt Exemption**	None	Policy	March 2006
D-5a	**Mineral Processing**	Fugitive Dust	Regulatory	June 2007
D-5b	**Cement Manufacturing**	Fugitive Dust	Contingency Measure	To Be Determined
D-6	**Integrate District Programs**	- -	- -	Various
"-6a	- Air Quality Management Plan for Ozone	Secondary PM	Regulatory	June 2007
"-6b	- Smoke Management Program	Smoke	Regulatory	June 2007
"-6c	- Environmental Review under CEQA	Fugitive Dust	Regulatory	October 2006
"-6d	- ATCM for Naturally Occurring Asbestos	Fugitive Dust	Regulatory	June 2007
"-6e	- Expanded Moyer Program (AB 923)	Diesel Exhaust	Grants	June 2006
"-6f	- Depart. of Motor Vehicles Renewal Fees (AB2766)	PM_{10}	Educational and Grants	June 2006
D-7	**ATCM for Agricultural Irrigation Pumps**	Diesel Exhaust	Grants	June 2007

* Based on a Board adoption date of 12/14/2005.

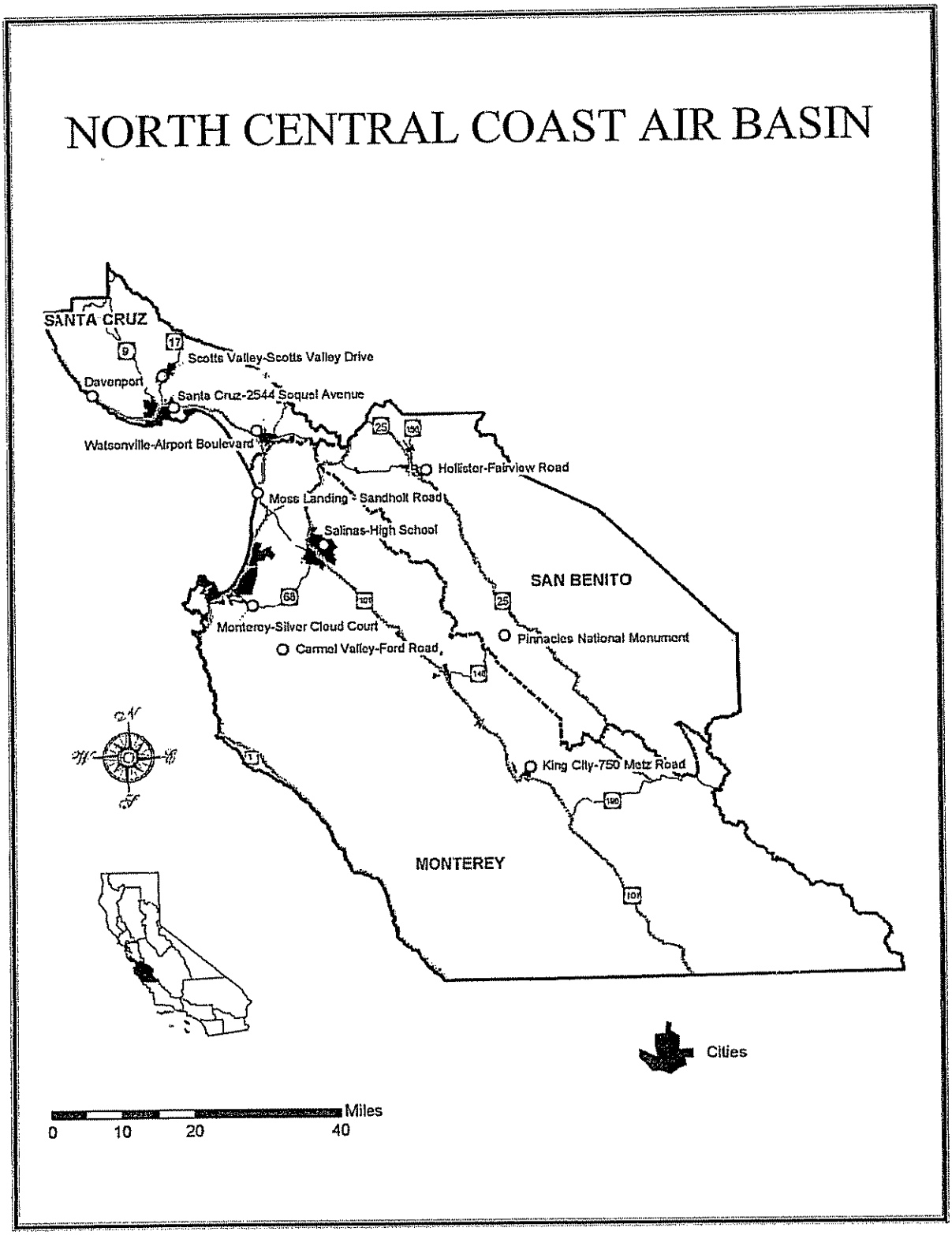


Figure ES-1 - Location of North Central Coast Air Basin.

1.0 BACKGROUND

1.1 INTRODUCTION

The State has ambient air quality standards for particulate matter 10 microns or less (PM_{10}) and 2.5 microns or less ($PM_{2.5}$). The State 24-hour Ambient Air Quality Standard PM_{10} is exceeded in the North Central Coast Air Basin (NCCAB) which is comprised of Monterey, San Benito and Santa Cruz counties. The annual state $PM_{2.5}$ standard is not exceeded. A 24-hour $PM_{2.5}$ standard is under consideration but has not been adopted by the Air Resources Board. The Federal PM standards are not violated in the NCCAB.

This report describes new State requirements for attaining PM_{10} and $PM_{2.5}$ standards and District PM_{10} regulations, analyzes ambient air quality for the Basin, describes the health effects and sources of PM_{10} and analyzes emission reductions needed to achieve the State PM_{10} standard.

1.2 SUMMARY OF CALIFORNIA PLANNING REQUIREMENTS UNDER SB 656

Although the State PM_{10} standard has been in existence since the 1980's until recently there have been no specific requirements in the California Health and Safety Code to consider measures to meet State Ambient Air Quality Standards for Particulate Matter. However, with the adoption of SB 656, that situation has changed.

In 2003, the Legislature enacted Senate Bill 656 (SB 656, Sher), codified as Health and Safety Code (H&SC) section 39614, to reduce public exposure to PM_{10} and $PM_{2.5}$. SB 656 requires Air Resources Board (ARB), in consultation with local air pollution control and air quality management districts (air districts), to develop and adopt, by January 1, 2005, a list of the most readily available, feasible, and cost-effective control measures that could be employed by ARB and the air districts to reduce PM_{10} and $PM_{2.5}$ (collectively referred to as PM). The goal is to make progress toward attainment of State and national PM_{10} and $PM_{2.5}$ standards.

By July 31, 2005, the bill requires the ARB and air districts to adopt implementation schedules for appropriate ARB and air district measures.

Finally, no later than January 1, 2009, the ARB must prepare a report describing actions taken to fulfill the requirements of the legislation as well as recommendations for further actions to assist in achieving the State PM standards. The bill requirements sunset on January 1, 2011, unless extended.

Air district implementation begins with an assessment of the nature and severity of the PM problem in each area. This is followed by an evaluation of the cost-effectiveness of a subset of measures appropriate to the specific needs of the area. Finally, an air district will select and prioritize a list of measures designed to most cost-effectively make progress towards attaining the PM standards.

Each air district will tailor its implementation schedule to its individual PM problem. For example, although most air districts do not meet the State PM_{10} standards, some are closer to attainment than others. In addition, the size (coarse versus fine) and chemical composition of

PM varies by region and season. In some areas, fugitive dust events may lead to high PM concentrations. In other areas, the major contributors may be the secondary formation of $PM_{2.5}$ caused by the reaction of precursor gases. Therefore, in adopting an implementation schedule, each air district will first characterize the major components of PM in its area to determine the most appropriate level and type of control approach.

H&SC section 39614 (d)(2) specifically requires each air district to prioritize measures that the air district is considering under the SB 656 program based on the effect individual control measures will have on public health, air quality, and emissions reductions and on cost-effectiveness. H&SC section 39614 (d)(1) provides that after the air district goes through the prioritization, the air district must adopt a prioritized implementation schedule for the most cost-effective measures (unless a statutory exception applies). Therefore, it is the air district's discretion to select, based on the magnitude and nature of its PM problem, a subset of measures to most cost-effectively address its specific PM problem.

Although the requirements of SB 656 include both PM_{10} and $PM_{2.5}$, this plan focuses on PM_{10} since the NCCAB has achieved all applicable standards for $PM_{2.5}$. A fact sheet summarizing the overall requirements of SB 656 is presented in Appendix A along with Sections 39614 and 40922 of Health and Safety Code which relate to SB 656.

The only PM_{10} plans completed in California to-date are those required in areas exceeding federal PM_{10} standards (e.g., San Joaquin Valley Unified Air Pollution Control District, South Coast AQMD, and Mojave Desert AQMD) and plans adopted by the Monterey District in 1995, 1996, and 1998.

1.3 EXISTING DISTRICT PM_{10} REGULATIONS

The following District Rules and Regulations address direct emissions of PM_{10} from new or modified stationary and area sources requiring District permits:

- **Rule 207, Review of New of Modified Sources** - Requires new sources to limit PM_{10} emissions to 82 lbs/day or less. Facilities which would not meet this threshold must include Best Available Control technology (BACT) and reduce emissions to zero through the use of offsets if the application of BACT does not reduce emissions to 82 lbs/day or less.

- **Rule 423, New Source Performance Standards** - Establishes source specific emission standards. The District has been delegated the responsibility for implementing these U.S. EPA standards which may vary from the Rule 207 threshold.

The following rules apply to permitted, nonpermitted, new and existing sources:

- **Rule 400, Visible Emissions** - Limits opacity for visual emissions to 20%.

- **Rule 402, Nuisances** - Prohibits a person from discharging quantities of air contaminants which cause "injury, detriment, nuisance or annoyance to any considerable number of persons or public or which endanger the comfort, repose, health or safety of any such person or the public or which cause or have a tendency to cause injury or damage to business or property."

- **Rule 403, Particulate Matter** - Sets emission limits for stationary sources of PM.

In addition, the following District rules limit emissions of PM_{10} precursors, including oxides of nitrogen, sulfur oxides and volatile organic compounds. As a result of chemical reactions in the atmosphere, these pollutants produce secondary PM_{10} including nitrates, sulfates and organic aerosols.

- Rule 404, Sulfur Compounds and Nitrogen Oxides.
- Rule 408, Incinerator Burning.
- Rule 412, Sulfur Content of Fuels.
- Rule 413, Removal of Sulfur Compounds.
- Rule 414, Reduction of Animal Matter.
- Rule 416, Organic Solvents.
- Rule 417, Storage of Organic Liquids.
- Rule 418, Transfer of Gasoline into Stationary Storage Containers.
- Rule 419, Bulk Gasoline Plants and Terminals.
- Rule 420, Effluent Oil Water Separators.
- Rule 423, New Source Performance Standards.
- Rule 424, National Emission Standards for Hazardous Air Pollutants.
- Rule 425, Use of Cutback Asphalt.
- Rule 426, Architectural Coatings.
- Rule 427, Steam Drive Crude Oil Production Wells.
- Rule 429, Application of Non-Architectural Coatings.
- Rule 431, Emissions from Electric Power Boilers.
- Rule 433, Organic Solvent Cleaning.
- Rule 434, Coating of Metal Parts and Products.
- Rule 437, Municipal Solid Waste Landfills.
- Rule 506, Burning of Rubber and Other Substances
- Rule 1000, Permit Guidelines and Requirements for Sources Emitting Toxic Air Contaminants.
- Rule 1001, Transfer of Gasoline into Vehicle Storage Tanks.
- Rule 1008, Air Toxic Control Measures.
- Rule 1009, Burning Of Treated Wood.

The complete book of District rules and regulations can be accessed on the web at http://www.arb.ca.gov/drdb/mbu/cur.htm.

1.4 DISTRICT SMOKE MANAGEMENT PROGRAM

In 2000, the California Air Resources Board (ARB) adopted amendments to Subchapter 2, Chapter 1, Division 3, Title 17 of the California Code of Regulations CCR). The amendments revised the *Agricultural Burning Guidelines* and renamed them the *Smoke Management Guidelines for Agricultural and Prescribed Burning* (Guidelines). The Guidelines establish requirements for local air districts to develop Smoke Management Programs (SMP) and to have them approved by ARB. SMPs are intend to address smoke impacts from burning activities conducted to: improve critical habitats for endangered and/or threatened species; manage watersheds; control invasive non-native plants; reduce hazardous fuel-loadings which elevate wildfire danger to residential areas; manage timber and forest resources; improve rangeland; and manage vegetation along the wildland-urban interface.

The District developed a SMP consistent with State Guidelines. It was approved by the ARB on February 13, 2003 under Executive Order G-00-60-020.

Under the new SMP, much of the District's existing program remained intact. Permitting for agricultural waste burning (e.g. , orchard and vineyard trimmings), household rubbish burning, and yard waste burning continued to be administered by local fire agencies. Permitting for larger types of burns continued to be administered by the District. These include burning of wood waste from developments; prescribed burning for rangeland improvement; forest management, and wildland vegetation management.

Significant new features included annual registration for prescribed burns, revised applications, Smoke Management Plans for specific large burns, smoke monitoring, test burns, daily burn authorizations, Smoke Action Guidelines, limitations on ozone precursor emission from prescribed burns with Air Pollution Control Officer discretion to approve prescribed burns that would exceed the emission budgets under specific circumstances, public notification, and rule revisions.

As a result of the SMP, the District combined many individual burn related rules into a single master rule for outdoor fires, which is District Rule 438 - Open Outdoor Fires. Rule 438 was adopted by the District Board on April, 16, 2003.

1.5 CALIFORNIA ENVIRONMENTAL QUALITY ACT

PM_{10} standards are also addressed through the California Environmental Quality Act (CEQA). District staff working with lead agencies assures that project specific PM_{10} analyses are complete and project emissions for both PM_{10} and its precursors are mitigated where applicable and feasible. The District has developed a list of suggested mitigation measures for PM_{10} as outlined in Table 8-2 of its CEQA Air Quality Guidelines, June 2004.

1.6 PLANNING AREA AND AIR BASIN DESCRIPTION

Santa Cruz, Monterey, and San Benito Counties form 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 759,000 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 from just over one-half million persons in 1980 to 991,369 persons in 2030 (Table 1-1).

The dominant land use in the region is agriculture with approximately 1,986,000 total agricultural acres or 362,000 farmed acres (pasture land excluded). About 82 percent of farmed agricultural land is in the Salinas Valley with 12 percent in San Benito and 6 percent in Santa Cruz County. The regional gross crop value for 1997 was $2.24 billion in Monterey County, $165 million in San Benito County and $240 million in Santa Cruz County for a total of over $2.3 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, the Naval Postgraduate School, and the Defense Language Institute. Other major institutional uses are the University of California at Santa Cruz, Monterey Bay State University, and the Soledad Correctional Facility.

The region has a significant amount of land in open space and recreation uses including several large State Parks, the Ventana Wilderness in the Los Padres National Forest, and the Pinnacles National Monument. Over 15,000 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 total 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. 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), electrical power generation (Moss Landing), commercial fishing (Moss Landing and Monterey), cement manufacturing (Davenport), quarrying activities (all three counties), sand mining (Hollister, Marina, Scotts Valley, and the North Coast of Santa Cruz County), food processing (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 occurs in the central region near the incorporated cities of Hollister and San Juan Bautista. Hollister serves as the major commercial center for the county.

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
Monterey 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
Santa Cruz 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
San Benito 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) Association of Monterey Bay Area Governments, 2004

(2) 1997 Crop Reports, Agricultural Commissioners, Counties of Monterey, San Benito, and Santa Cruz

2.0 CHARACTERIZATION OF AMBIENT PM_{10} IN THE NCCAB

Air district implementation of SB 656 begins with an assessment of the nature and severity of the PM problem in its area. Based on an assessment of the available data, the following sections characterize ambient PM_{10} in the NCCAB based on chemical composition, particle size distribution and probable factors contributing to exceedances of the California ambient PM_{10} standard at the locations where the higher PM levels are recorded.

2.1 AMBIENT AIR QUALITY STANDARDS FOR PARTICULATES

State and federal standards address inhalable particulates, which are particulate matter 10 microns or less (PM_{10}) in diameter. A micron is equal to a millionth of a meter and is too small to be seen by the unaided eye. In 1997 EPA adopted new standards for particulate matter 2.5 microns in diameter or less ($PM_{2.5}$) The existing standards for particulate matter 10 microns or less (PM_{10}) were retained with revisions to the method for calculating violations for the 24-hour standard. Figure 2-1 (courtesy of ARB) illustrates particles PM_{10} and $PM_{2.5}$ in size in comparison to a typical human hair.

Particulate matter is separated into two classes - fine and course particles. Fine particulates ($PM_{2.5}$) are generally derived from sources of combustion and form in the atmosphere largely by chemical reactions involving gases, e.g., nitrates from directly emitted oxides of nitrogen. Coarse particulate matter 10 microns in diameter to 2.5 microns tends to be directly emitted, e.g., road dust.

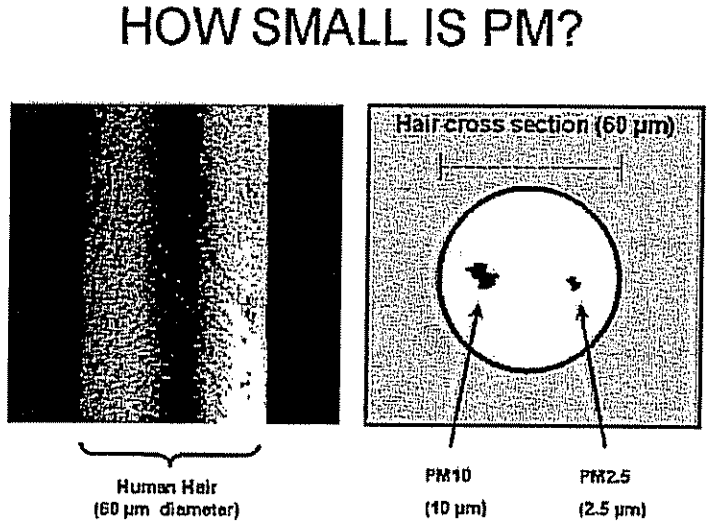


Figure 2-1 - PM_{10} and $PM_{2.5}$ compared to a human hair.

The National Ambient Air Quality Standards (NAAQS) are established to protect public health and welfare and, in general, consist of primary and secondary standards. Primary standards are to protect the public health, while secondary standards are intended to protect the public welfare, e.g., plants, crops, and materials. In terms of particulate matter, the primary and secondary standards are the same. Standards are set by the Administrator of the Environmental Protection Agency (U.S. EPA) who is advised by a seven member independent scientific review committee.

State Ambient Air Quality Standards are established "in consideration of the public health, safety, and welfare, including, but not limited to, health, illness, irritation to the senses, aesthetic value, interference with visibility, and the effects on the economy" (California Health and Safety Code, Sec. 39606[b]). A distinction is not made between standards to protect public health and welfare, i.e., primary and secondary standards. State standards are set by the California Air Resources Control Board (ARB).

State particulate matter standards are more stringent and protective of public health than federal standards. For example, the State 24-hour PM_{10} standard is 50 micrograms per cubic meter ($\mu g/m^{3)}$ compared to the corresponding federal standard at 150 $\mu g/m^3$. The 50 $\mu g/m^3$ State 24-hour PM_{10} standard is even more stringent than the federal 24-hour standard for $PM_{2.5}$, which is 65 $\mu g/m^3$. In 2003, the State adopted an annual standard for $PM_{2.5}$. The State annual standard for $PM_{2.5}$ is 12 $\mu g/m^3$, compared to the federal standard at 15 $\mu g/m^3$. The State also recently revised the annual PM_{10} standard downward from 20 $\mu g/m^3$ to 12 $\mu g/m^3$. The federal annual standard is much less protective of public health at 50 $\mu g/m^3$.

In addition to PM_{10} and $PM_{2.5}$, there are also separate ambient standards for other types of particulates and fine aerosols. These include sulfates, lead and visibility reducing particulates. Standards applicable to all particulate matter are shown on Table 2-1.

TABLE 2-1 AMBIENT AIR QUALITY STANDARDS FOR PARTICULATE MATTER

Particulate	Averaging Time	California Standards	Federal Standards	
			Primary [a]	Secondary [b]
PM_{10}	24 Hours	50 $\mu g/m^3$	150 $\mu g/m^3$	150 $\mu g/m^3$
	Annual [c]	20 $\mu g/m^3$	50 $\mu g/m^3$	50 $\mu g/m^3$
$PM_{2.5}$	24 Hours	-	65 $\mu g/m^3$	65 $\mu g/m^3$
	Annual [c]	12 $\mu g/m^3$	15 $\mu g/m^3$	15 $\mu g/m^3$
Lead	30 Days	1.5 $\mu g/m^3$	-	-
	Quarter	-	1.5 $\mu g/m^3$	1.5 $\mu g/m^3$
Sulfates	24 Hours	25 $\mu g/m^3$	-	-
Visibility Reducing Particulates	8 Hours	Extinction coefficient 0.23 per kilometer, visibility of 10 miles or more when relative humidity is less than 70%	-	-

[a] Designed to protect human health

[b] Designed to protect public welfare (i.e., to prevent damage to vegetation, property and visibility).

[c] Annual averages based on Arithmetic mean.

2.2 DESIGNATIONS STATUS IN RELATION TO PM STANDARDS

Designations are made by the State and EPA based on a standardized statistical evaluation of the Data for Record from all the official air monitoring stations in the area. There are several categories an area can be designated in terms of the ambient air quality standards. The area designation categories used by the State are described below.

- Attainment: a pollutant is designated attainment if the state standard for that pollutant was not violated at any site in the area during a three year period.
- Nonattainment: a pollutant is designated nonattainment if there was at least one violation of a State standard for that pollutant in the area.
- Unclassified: a pollutant is designated unclassified if the data are incomplete and do not support a designation of attainment or nonattainment.
- Nonattainment/Transitional: is a subcategory of the nonattainment designation. An area is designated nonattainment/transitional to signify that the area is close to attaining the standard for that pollutant.

Table 2-2 summarizes the current attainment status of the NCCAB in relation to the State and federal ambient air quality standards for particulate matter. Like most areas of the state, the NCCAB is designated as a nonattainment area for the State PM_{10} standard. The NCCAB is either attainment or unclassified for the other particulate standards. Designations can change if air quality changes, if the standards are revised or when new standards adopted.

Table 2-2 2004 DESIGNATIONS IN RELATION TO PM STANDARDS

Standard	California	Federal
PM_{10}	Nonattainment	Attainment
$PM_{2.5}$	Attainment*	Attainment
Lead	Attainment	Unclassified
Sulfates	Attainment	No Standard
Visibility	Unclassified	No Standard

- On January 20, 2005, the ARB designated the NCCAB an attainment area for the State PM2.5 standard, based on data gathered in 2001-2003

2.3 PM_{10} AIR MONITORING STATIONS

There are two types of air monitoring stations operated in the North Central Coast Air Basin: stations recording ambient data to compare to State and National Ambient Air Quality Standards and stations operated for other reasons. Typically, the latter are in place to monitor the impacts of larger emission facilities or are operated temporarily for permitting purposes or special studies.

The District's ambient air monitoring network includes stations in Salinas, Hollister, Carmel Valley, Santa Cruz, Monterey, Scotts Valley, Watsonville, Moss Landing, King City, and Davenport (Figure 2-2). PM_{10} is monitored at all sites but Scotts Valley and Monterey and is monitored on a six day cycle to coincide with EPA's nationwide schedule. The PM_{10} filters must be changed prior to each monitoring period which requires routine site visits by District staff. Monitoring equipment must also be certified by EPA.

In addition to the 6-day filter based sampling, the District is also establishing a monitoring network which use a new generation of instruments called Beta Attenuation Monitors (BAMs). The BAMs record particulate levels on an hourly basis every day of the week. These continuous samplers are advantageous in that they provide much more information on the time of day when particulates are highest and also on particulate levels for every day of the week. In addition, the data are available in real-time and can be accessed remotely which is very useful when particulate events are occurring. These will be operated at sites with higher populations, including Salinas, Santa Cruz and later Hollister.

PM_{10} and $PM_{2.5}$ monitoring has also been conducted since the late 1980's at Pinnacles National Monument at a station operated by the National Park Service. The monitoring is part of a national program known as the Interagency Monitoring of Protected Visual Environments (IMPROVE) which monitors visibility at National Parks. Originally, IMPROVE monitoring was conducted on Wednesdays and Saturdays, but in the late 1990's this was changed to a three day schedule to coincide with the EPA's national sampling schedule for particulates. The filters are routinely analyzed for individual constituents including nitrates and sulfates. The sampling devices are of unknown equivalency compared to EPA approved PM_{10} monitors.

A number of special studies have been conducted ranging from a few days to three years. In the 1990's PM_{10} was monitored at several source influenced facilities including a quarry location near Aromas and the Soledad Energy bio-mass power plant. Special monitoring has occurred in recent years at Moss Landing, Davenport, Fort Ord, Soledad, King City, San Lorenzo Valley, Felton, Harper Canyon, Graniterock Quarry, Quail Hollow Quarry, Hollister High School, and the Hollister Hills State Vehicular Recreation Area. District staff also conduct special monitoring in response to emergency events such as wildfires, the July 2003 tank fire at Moss Landing and the October 2003 fire at Fort Ord.

In response to new standards for $PM_{2.5}$, the MBUAPCD began routine $PM_{2.5}$ monitoring at the Salinas and Santa Cruz stations in 1999. Since fine particles also affect visibility, $PM_{2.5}$ will be used to address visibility requirements of the federal Clean Air Act at the Pinnacles National Monument and Ventana Wilderness, which are federal Class I protected areas. $PM_{2.5}$ has been monitored by the National Park Service at the Pinnacles National Monument as part of the IMPROVE program.

2.4 BACKGROUND LEVELS OF PM_{10}

It is not always feasible to establish a fixed value for background concentrations of PM_{10} due to natural sources. This is because the monitoring results themselves include a mixture of

PM_{10} from both naturally occurring sources and human activities and it is not always possible to distinguish origin. Background can vary sample to sample. Due to unique chemical signatures, occasionally, such as associated with cement processing, it is sometimes easier to distinguish the human contributed portion of the sample than the naturally occurring. For other cases, where an exceedance is driven by marine aerosols or wildfire smoke, the natural contribution is more evident. In either case, the ambient air quality standard applies to the mass of all PM_{10} in the air regardless of source.

Although fugitive dust can originate from both natural and human caused sources, excessive amounts of fugitive dust typically comes from soil surfaces disturbed by human activities, such as unpaved roads, exposed agricultural fields and construction sites.

Background can be expected to show large variation depending on location and season; during wet periods it can be expected to be very low at inland locations while along the coast it can be expected to be very high during large wave events or windy conditions along the coast. Background PM_{10} can be expected to consist of naturally occurring aerosols such as sea salt, fugitive dust from wind storms, volcanic dust, small amounts of nitrates and ammonia from decay of naturally occurring organic matter in the soil, as well as smoke from naturally caused wildfires such as the lightning ignited 1999 Kirk complex wildfires. It can be said, however, that at times background can exceed the standard as demonstrated by District measurements of sea salt at the coastal stations and smoke during the Kirk wildfire event.

Specific monitoring results representative of natural background levels of PM_{10} in the NCCAB are difficult to obtain since virtually all monitoring is conducted in areas already impacted by human activities. However, monitoring results are available from an ongoing year long pre-project monitoring program. These can provide insight into the general range of background values one might expect for an inland location. This is being conducted in a relatively undisturbed area of the Hollister Hills where naturally occurring PM_{10} should be the primary contributor to ambient levels. It should be noted that even at this relatively "clean" background location, which should be free from most human caused primary PM_{10}, regional secondary aerosols such as nitrates are likely still present. Consequently, these measures likely overestimate true natural background somewhat since they may still be influenced by anthropogenic PM_{10}. Nitrates are typically not a major component of the inland exceedance samples, ranging from about 1 to 3 $\mu g/m^3$.

During the Hollister Hills study, 24-hour PM_{10} levels have averaged about 8 to 15 $\mu g/m^3$ with the highest being around 20 $\mu g/m^3$. Highest values tended to occur during the dry season, while during the wet season, values have been at times less than 5 $\mu g/m^3$ and even as low as 2 $\mu g/m^3$ during rainy periods. Thus, ambient background levels at this inland location have averaged about 25% of the standard, ranging from less than 10% up to about 40% of the standard, depending on the season.

2.5 PM_{10} LEVELS FOR EACH STATION IN COMPARISON TO THE STANDARD

In order for the air basin to achieve the PM_{10} standard, data from all stations must demonstrate attainment of all aspects of the standard, including both the 24-hour and annual provisions. Thus, the air basin's fate is closely linked to conditions specific to each station, in

particular the stations with the highest readings. Statistical assessments for each station are updated annually and are based on the most recent three years of complete Data for Record from each site. Data effected by unusual or extreme events beyond regulatory control are generally excluded from the statistical assessments.

Data from the nine monitoring stations of the NCCAB's PM_{10} network indicate that PM_{10} conditions can vary widely across the air basin, with some stations within the standard and others not. In general, stations along the immediate coast have the highest readings, while stations further inland are generally much lower with several within the standard. Table 2-3 summarizes how each station stands in relation to the standard, and whether or not it is located in the immediate coastal zone (within 1,000' of the ocean) or further inland.

TABLE 2-3 STATION SPECIFIC MONITORING RESULTS COMPARED TO THE STATE STANDARD BASED ON 2001-2003 MONITORING DATA

		Monitored PM_{10} Concentration ($\mu g/m^3$)		Within Standard? [1]	
Station	**Zone**	**Peak 24-Hour** [2]	**Annual**	**24-hour**	**Annual**
Davenport	Coastal [3]	89	27.3	**No**	**No**
Moss Landing	Coastal	83	30.1	**No**	**No**
Salinas	Inland	67 [4]	18.6	**No**	Yes
King City	Inland	58	17.3	**No**	Yes
Watsonville	Inland	49	17.9	Yes	Yes
Hollister	Inland	49	16.4	Yes	Yes
Santa Cruz	Inland	39	16.9	Yes	Yes
Carmel Valley	Inland	38	12.8	Yes	Yes
Monterey [5]	Inland	38	13.3	Yes	Yes

Notes:

1. Failure to meet any part of the standard means the standard is not achieved. Stations failing to meet the standard are indicated in bold.
2. Peak 24-hour concentration based on the Expected Peak Daily Concentration (EPDC) calculated by ARB.
3. The coastal zone is the immediate corridor within 1,000' of the ocean, where marine influences are highest.
4. Salinas 2001-2003 peak 24-hour values impacted by the October 2003 Fort Ord fire event.
5. Monterey based on 1994-1996 data. Station deactivated in 1996 due to low monitored levels.

As shown by the table, four of the nine stations fail to achieve all or part of the PM_{10} standard, while five of the stations indicate values within the standard. Both coastal sites fail to meet either the 24 hour or annual part of the standard. The 24-hour criteria are clearly the most difficult part of the standard to achieve as all four stations violating the standard fail to meet the 24-hour component. Salinas and King City on the other hand fail to meet the 24-hour criteria but do meet the annual requirement. Partially attaining stations are still considered to be in violation of the standard since all aspects of the standard must be achieved.

2.6 MONTHLY EXCEEDANCE PATTERNS

Figure 2-3 a) presents the monthly distribution of exceedances in the air basin based on data from the years 1997 to 2004. This is a stable period for the monitoring network as there were no station changes. As can be seen from the chart, a distinct seasonal pattern is not evident. However, overall exceedance activity does tend to be higher in the spring and fall and lower during the summer and winter months. There are distinct geographic differences in when and where exceedances tend to occur.

Coastal Versus Inland Zones

In the b) and c) sub parts of Figure 2-3, monthly air basin exceedance totals are further disaggregated between those occurring in the coastal zone versus those occurring inland. The stations grouped in the coastal zone are Davenport and Moss Landing, while the inland grouping consists of the balance of the stations on the NCCAB's PM_{10} monitoring network. It should be noted that the air basin total shown in the figure is not necessarily the sum of the number of exceedances in the coastal zone plus the number of exceedances in the inland zone due to occasional days when concurrent exceedances occur in both zones.

The figure shows different exceedance patterns for the different zones with the overall air basin pattern being dominated by exceedances occurring in the coastal zone. Essentially all air basin exceedances from November through April were from the two coastal sites. The dry season September and October coastal peak is probably due to the increased role of fugitives in combination with sea salt to cause increased exceedances at Davenport and Moss Landing. During periods when PM_{10} is elevated at Davenport, fugitive emissions from cement processing, can further contribute to exceedances of the standard.

For the inland sites, exceedances were less frequent than along the coast and suggest the influence of dry season wind blown fugitive dust. Exceedances peak in the summer and fall with virtually none occurring during the wet season when moisture tends to hold fugitives down. In July, the inland total is actually higher than the coastal sites.

Effect of Sea Salt on Davenport and Moss Landing Exceedances

As shown in Figure 2-3 and 2-4, total NCCAB exceedances are dominated by the two coastal sites Davenport and Moss Landing, both of which are located within 1,000' of the ocean where marine influences are highest. Over 80% of all air basin exceedances occur at these sites alone, so it is important to gain insight into the causes of high values at these locations.

Chemical analysis of exceedance filters from these stations indicates that naturally occurring sea salt aerosols can be a significant contributor to the elevated readings at these sites. Sea salt aerosols can be created when strong winds blow over the ocean surface creating white caps that produce bubbles that burst and release aerosols to the atmosphere. Sea salt aerosols can also be produced during large wave events. Both of these mechanisms can create sea spray mists that persist along the immediate coast. This influence tends to diminish, but not entirely disappear, as the air mass progresses inland. At times, these naturally occurring sea salt aerosols

alone can exceed the State standard, which suggests that it might not be feasible for sites within the immediate coastal corridor to achieve the State standard. Figure 2-5 depicts a typical mist cloud of sea salt aerosols extending inland over the immediate coastline.

Figure 2-6 illustrates the impact sea salt has on the number of exceedances monitored along the coast based on the concentration of sea salt determined by the chemical analysis of 21 exceedance filters from Davenport and Moss Landing. As can be seen from the figure, sea salt has a tremendous effect on the number of exceedances and without the added burden of the sea salt concentration, nearly all 21 exceedances would not have occurred.

As a result of earlier PM_{10} plans where the impact of sea salt on coastal exceedances was initially identified, the District inquired to ARB as to the health effects of naturally occurring sea salt. In a letter dated October 9, 1997, ARB's Executive Officer indicated:

"From a health effects standpoint all small respirable particles are of concern, however, there are no health studies that show sea salt presents a health risk based on its chemical composition. In addition, while sea salt may contribute to PM_{10} violations, there are no planning or regulatory implications."

Although sea salt greatly increases the number of monitored exceedances, it apparently has no known health effects or planning implications. A copy of the ARB letter is presented in Appendix B.

Figure 2-7 shows the monthly distribution of exceedances at Davenport and Moss Landing for the years 1997-2004. The general distribution for these sites is similar, suggesting the importance of natural marine influences. On exceedance days with strong influence from marine aerosols (i.e. large wave events and/or strong ocean winds), both stations can record exceedances concurrently. However, exceedances are more frequent at the Davenport station, which is actually further removed from the ocean than the Moss Landing station. This suggests that other influences play a role at Davenport as well.

2.7 VARIATION IN MONTHLY AVERAGE PM_{10}

Monthly average PM_{10} concentrations for all stations are show in Figure 2-8 to 2-14, based on 2001 to 2003 data. The figures are sequenced by station in the general order of declining concentration. Monthly average concentrations diminish geographically from the coastal to inland sites, with the monthly averages for the inland sites only about half of that along the coast. As with exceedances, the monthly average concentrations do not depict a distinct seasonal cycle where one season is clearly higher or lower than the others. However, some months are generally higher while other months tend to be lower.

An interesting similarity is depicted in the series of charts. A similar overall monthly variation in PM_{10} appears across the network, despite representing a variety of local environments and concentration levels. Most stations show a general maximum during the May/June period followed by typically low values in July. Another general increase occurs in the October/November time frame. This similarity suggests that similar weather related factors likely

play an important role in these patterns. Most likely, these are driven by a combination of natural factors including wind speed, humidity, temperature and precipitation which can affect coarse fraction (2.5 to 10 microns) fugitive particulates including sea salt along the coast and wind blown dust in the inland areas.

2.8 YEAR TO YEAR VARIATION IN PM_{10}

Year to year changes in monitored levels of PM_{10} can demonstrate whether or not the levels have been increasing or decreasing over time at a particular location. These changes can indicate changes with the emission sources. However, it should be kept in mind that these variations can be influenced by a combination of factors including local emissions, year to year variations in weather conditions and sometimes unusual events, such as wildfires. The District has jurisdiction over many man-made local sources, but not natural conditions, which can also contribute significantly to monitored levels of PM_{10}.

The annual variation in peak 24-hour and annual average PM_{10} values for each station are shown in Figures 2-14 to 2-21 based on the long-term period of record available for each site. For most stations, the period covered extends from 1990 to 2003.

As shown back in Table 2-3, stations that currently exceed that State PM_{10} standard include Davenport, Moss Landing, Salinas and King City. The year to year trend, if any, was examined for these sites to see if any improvements were evident. For the highest site Davenport, Figure 2-14 indicates some overall improvement between about 1995 and 2000. However, the levels remained well above the standard and a increase is evident in recent years. For Moss Landing, the overall trend depicted in Figure 2-16 is nearly flat, which is consistent with a location where natural conditions have a major influence on PM_{10} levels. The very slight improvement shown on the chart may be due to the closure of the NRF industrial facility which emitted particulates in the form of dolomite, magnesia and magnesium hydroxide. For Salinas, Figure 2-17 shows slight overall improvement, and the site has achieved the annual component of the standard. It should be noted that the anomalous increase in peak PM_{10} shown for 2003 was affected by a series of exceedances that occurred during a prescribed burn that was conducted at Fort Ord in October 2003. Figure 2-18 shows no definitive improvement trend for King City. PM_{10} levels at this site were actually within both the 24-hour and annual components of the standard during the years1995 to 1998, but levels again increased above the standard after that point.

The non-coastal sites which are currently within the standard, include Watsonville, Hollister, Santa Cruz and Carmel Valley. The annual charts for those sites are shown in Figures 2-19 to 2-22, respectively. These show an interesting similar annual pattern with higher levels tending to occur in the 1993/94 period and a well defined low point around 1997/98, followed again by another general increase around 2000. These types of year to year variations are likely due to natural influences. For example, during the strong 1997 El Nino, there was only one exceedance recorded by the inland stations while 19 exceedances were recorded by the coastal sites. This is consistent with the stormy conditions that prevailed during that period which created many sea spray forming large wave events along the coast along with generally wet conditions which tends to suppress wind blown fugitives inland. Because of year to year variation, it is likely that some inland stations will continue to cycle above and below the standard.

2.9 CHEMICAL CHARACTERIZATION OF EXCEEDANCE SAMPLES

Unlike ozone or NO_2 monitoring which involves discrete constituents, the mass of any PM_{10} sample is comprised of a variety of particles of various sizes and composition. The make-up or profile of the particles that comprise the sample can reveal the source categories contributing to the gross particle mass of the sample. For instance, if the sample were made up mostly of larger soil related particles, one might suspect local sources such as primary wind blown fugitives or entrained road dust. However, if the sample is made up largely of nitrates, one might expect secondary aerosols from distant combustion related sources as being important to the sample. Since the PM_{10} measurements alone are not a direct indicator of source activities, elemental and particle sizing analysis of the filters is important to gain more insight as to how to best improve PM_{10} air quality.

The chemical composition of each exceedance sample is important because it can provide insight into the types of sources contributing to the exceedance. As a result of a key recommendation in the District's first PM_{10} plan, all PM_{10} filters associated with exceedances in the NCCAB are submitted to a laboratory for chemical analysis. This practice extends back to 1996. Twenty two of these earlier exceedances were individually analyzed and summarized in detail in the 1998 PM_{10} plan. This plan builds on the findings developed in the 1998 plan.

One of the objectives of the filter analysis is to identify the portion of the exceedance sample comprised of sea salt since most exceedances occur at coastal sites where the strong natural marine influences can significantly contribute to the exceedance. Generally, sea salt is one of the few constituents that can be readily identified on standard quartz filters. However, depending on the extent of the laboratory's analysis, other constituents can also be identified that provide information on other sources likely contributing to the exceedance mass.

Since the PM_{10} samples are collected automatically using a timer based instruments, the conditions on many exceedances days are not observed directly by District staff. Consequently, these must be reconstructed later using evidence including the filter analysis, comments from the station technicians, supporting measurements of air quality, marine and weather conditions on the day as well as inspector reports in response to community dust complaints.

Methods Overview

The PM_{10} samples are initially acquired at each network station on 8"x10" quartz micro-fiber filters, which are the long standing standard media for determining particulate levels in relation to the ambient air quality standards. Once the filters are received from the field, they are conditioned and weighed in the District's lab to determine the total PM_{10} mass concentration, which is then compared to the standard in order to identify those which exceed the standard. All filters that exceed the standard are then gathered and submitted to the chemical laboratory facilities at the South Coast Air Quality Management District in Southern California for analysis.

Once received at the lab, the samples are subjected to a number of analysis procedures. These includes Ion Chromatography (IC) which identifies the cations sodium, ammonium, potassium, magnesium and calcium as well the anions chloride, nitrates and sulfates. Organic, elemental and total carbon is identified using the Thermal/Optical Reflectance (TOR) technique.

A larger suite of elemental metals is then determined using Inductively Coupled Plasma/Mass Spectrometry (ICP/MS).

This allows for identification of a fairly broad range of PM_{10} constituents, including those related to sea salt, secondary aerosols, combustion sources including wood smoke and to some degree vehicle exhaust, markers for cement dust and various trace elements. However, since the standard filters used for determining PM_{10} mass concentration consist of a quartz-fiber based media, some constituents common to soil and the filter media cannot be identified. Consequently, the unidentified portion of exceedances that have high amounts of soil constituents tend to be higher than samples which have a large amount of sea salt. Typically, about three quarters of the sample mass can be identified for the coastal exceedances where sea salt tends to be a large part of the sample, while only about one quarter of the sample mass is typically identified for the inland exceedances where fugitive dust tends to be more predominate.

Coastal Sites

Available data related to exceedances at the coastal Davenport and Moss Landing stations were extensively evaluated in the 1998 PM_{10} plan. Based on a review of the latest exceedances those findings, particularly as they relate to Davenport where both natural and man made sources contribute to exceedances, are still relevant. Consequently, those findings are briefly recapped in the following sections, along with a summary of the latest information.

Davenport

In the 1998 plan, it was determined that Davenport had the highest exceedance rate of any District station, with well over half of all District exceedances occurring at that single site. Sea salt was identified as a major contributor as 6 of the 13 Davenport exceedances evaluated would not have occurred without the sea salt burden. The nearby cement plant also appeared to be a contributor as well as at least 2 of the 13 exceedances evaluated would not have occurred without the cement dust burden. Exceedances occasionally coincided with complaints from Davenport residents about cement dust deposition. Other sources, such as fugitive dust from nearby roads and agricultural activities, also appeared to contribute to ambient particulate levels.

Davenport Site Description

The air monitoring station is located about 12 miles NW of the city of Santa Cruz. It is situated on an elevated coastal plain at an elevation of 110' above mean sea level. in the Old Town section of Davenport. It is adjacent to the school yard for Pacific Elementary School. The station is immediately surrounded by the school, houses and paved residential roadways. The air quality at the monitoring site is representative of PM_{10} levels to which residents are exposed.

The RMC Lonestar cement plant is located about 1,000' from the air monitoring station. The plant occupies the WNW to NNW sectors relative to the air monitoring station. Bulk cement loading facilities and ground level storage piles are located within 1,500' of the air monitoring station. Other activities related to the cement plant include raw materials handling, clinker and cement kiln dust storage, finished cement handling, materials staging and travel on paved and

unpaved roads. The main stack, which does not appear to be a significant contributor to ground level PM_{10}, is approximately 1,500' NW of the air monitoring station

Other local sources of PM_{10} include traffic on State Highway 1 located about 500' west of the site which, at 7,200 vehicles per day, can be a source of entrained road dust. Agricultural fields are located north and south of Davenport. These can also serve as significant sources of PM_{10} due to tilling operations, wind blown fugitives from exposed fields and outdoor burning activities.

Prevailing winds in the area are from the W to NW with gusts often exceeding 16 mph, a common threshold for suspending fugitive dust.

Although the air monitoring station is located on an elevated coastal terrace within 1000' of the Pacific, substantial 100'+ coastal cliffs rise immediately along the coastline. These cliffs can serve as partial barriers to sea mist laden marine air which tends to reduce the concentration of sea salt in the ambient atmosphere as compared to other near coast locations such as Moss Landing, which is not protected by the coastal cliffs. In both cases however, naturally occurring marine aerosols are a major source of particulates in the area.

Davenport Exceedance Evaluations

As shown previously in Table 2-3, data for Davenport violate both the 24-hour and annual aspects of the California standard and its designation criteria are the highest of any station on the network. Based on 2001 to 2003 data (the current window for designations), the calculated 24-hour average Expected Peak Day Concentration (EPDC) for Davenport is 89 $\mu g/m^3$ vs. the standard at 50 $\mu g/m^3$. In addition to violating the 24-hour standard, Table 2-3 also indicates that Davenport violates the annual criteria of the standard as well.

The estimated number of violations of the 24-hour standard at Davenport is also very high. As shown in Figure 2-4, when adjusted for the one in six day sampling cycle, Davenport experiences about 30 violations of the 24-hour standard each year and is a principal contributor to the total number of violations recorded in the air basin each year.

In order to gain insight into the causes of these violations, the chemical composition of samples exceeding the standard was examined. Based on the chemical analysis results, the average composition of 14 exceedance filters acquired at Davenport between 2001 and 2004 is presented in Figure 2-23. The average mass concentration of these exceedances was about 65 $\mu g/m^3$ and sea salt, averaging about 31 $\mu g/m^3$, represented nearly half the entire mass of the sample and over 60% of the State standard.

As was found in the 1998 plan, the sea salt burden clearly provides an elevated background at this site making it easier for the contribution due to other particulates to exceed the standard. In one of the fourteen Davenport exceedances (12/16/02) summarized in the figure, the sea salt burden alone exceeded the standard. It is significant to note that without the sea salt burden, only about one of the 14 exceedances evaluated would have occurred. If normalized to the 2.6 years period of record and the 6 day sampling schedule, the 14 monitored exceedances could translate to 30 or more sea salt driven exceedances per year at this site.

Magnesium, while not a significant portion of the samples, tends to be elevated at both coastal sites. This is likely due largely to the fact that magnesium is one of the minerals contained in sea salt. The chemical analysis results demonstrate that the magnesium concentration increases with the chloride ion, which suggests that increases in magnesium are largely linked to increases in the sea salt burden.

A continuing concern at Davenport is the contribution to PM_{10} from the nearby cement plant. As described in the 1998 plan, there are a number of low level fugitive dust sources at this facility which can contribute to exceedances. Historically, there have been a number of occasions when process dust from the cement plant has impacted the adjoining town of Davenport. Calcium is a good indicator for the presence of cement dust and this constituent is identified on the filters. It can also be a minor component of sea salt. As shown in Figure 2-23, the average calcium level at Davenport is about 3 $\mu g/m^3$. This is higher than the other coastal site Moss Landing where, despite the higher sea salt background, the calcium concentration is typically less than one.

It should be noted that cement dust incidents impacting the town of Davenport may occur which are not captured on the exceedance filters. There are several reasons for this. First, sampling is conducted once every 6 days so the majority of the days are not monitored. Also, there could be sampling days with elevated calcium which are not exceedances, so the filters would not be analyzed. Incidents could also occur where winds carry the plume away from the air monitoring station. In addition, much of the dustfall can be outside the 10 μ sampling range of the PM_{10} instrument. District investigations of dust complaints from Davenport residents often reveal evidence of area-wide deposition of cement process dust, particularly on cars. Deposition particulates are typically larger than 10 μ in diameter.

Figure 2-24 illustrates the chemical analysis of the filter for a 65 $\mu g/m^3$ exceedance that occurred on May 27, 2003, when the calcium indicator was clearly elevated. On this date, the District investigated two complaints from Davenport residents regarding excessive amounts cement dust emanating from the cement plant which impacted their neighborhoods and vehicles. The District confirmed this incident and issued a Notice of Noncompliance to the company for emitting excess process dust from the rail car bulk loading tank.

On this sample, elemental calcium was 5 $\mu g/m^3$, or about 10% of the standard. The actual contribution from cement dust during these events is likely higher than that indicated by the calcium indicator alone because cement dust consists of a number of other constituents which are not directly identified in the filter analysis. The figure also shows that the sea salt background continued to be a significant contributor to the exceedance.

Figure 2-25 illustrates the calcium concentrations for all the exceedance samples from 2001 to June 2004. An upward trend is clearly illustrated, particularly for the more recent exceedance samples. In the 1998 plan it was found that there are times when calcium is sporadically elevated, and these often coincided with emission events at the cement plant. The figure shows this pattern continuing. It's significant to note that during the more recent exceedances in 2004, calcium is continuously elevated. At least two and perhaps three of the eleven exceedances analyzed would not have occurred without the calcium burden. Most of these were marginal exceedances < 55 $\mu g/m^3$ when the calcium contribution alone placed the mass total above the standard. However,

when adjusted for the 2.6 years period covered and the 1 in 6 day sampling cycle, this could translate to about 5 to 7 excess exceedances per year attributable to the calcium burden.

The presence of carbon on the Davenport filters, while not unusually high, could be an indicator for background combustion sources. In particular the organic carbon fraction may be an indicator of motor vehicle activity, particularly on nearby Highway 1. These mobile sources would also tend to contribute to fugitive dust due to entrained road dust, which commonly occurs throughout the air basin.

Moss Landing

In the 1998 plan, it was determined that Moss Landing had the second highest exceedance rate of any District station, with about one third of all District exceedances occurring at that site. Naturally occurring sea salt was found to be the major contributor. All seven Moss Landing exceedances evaluated in that plan would not have occurred without the sea salt burden. There was also some evidence of a minor contribution from a local, now closed, industry. Past studies of particulate matter from this site suggest that fugitive dust in the form of geological materials and beach sand also contribute to particulate levels at this location.

Moss Landing Site Description

Moss Landing is located at the mid point of the Monterey Bay coastline about 18 miles SE of the city of Santa Cruz. The air monitoring station is located within the Moss Landing Harbor on a small north-south extension of beach dunes which forms the small protected bay that is the harbor. The monitoring site is located opposite to the intersection of Highway 1 and Dolan Road which separates Duke Energy's 2500 Megawatt Moss Landing Power Plant (MLPP) from the closed National Refractories and Minerals facility (NRF) which are both within a 1000' of the site. The elevation of the monitoring site is very close to sea level because there are no coastal cliffs at this location. Moss Landing is the District's newest PM_{10} monitoring site with PM_{10} monitoring being initiated in 1997.

The immediate vicinity of the site is largely surrounded by harbor waters which are within 50' of the station and occupy the NNE through E through SSW sectors around the site. The large expanse of water to the east can serve to suppress non-marine sources of land based PM_{10} for periods when the wind is off the land. In contrast, the site is largely open to the west to flow off the ocean and the adjoining sand dunes which can deliver various sea salt PM_{10} sized aerosols and wind blown sand fugitives to the site. This can serve to increase the marine influence under prevailing sea breeze conditions. In addition, there are various light traffic volume paved roads near the site as well as several unpaved parking areas, all of which can be a source of fugitives.

The now vacant NRF facility formerly manufactured and handled various magnesium containing products including dolomite, magnesia and magnesium hydroxide. The facility has been closed for a number of years.

The MLPP, while a significant source of NO_x, is not a significant source of primary PM_{10} because it is fired on natural gas. Any PM_{10} emissions from the 500' stacks were not likely captured by the nearby PM_{10} monitor which is very close to ground level.

Approximately 550 vessels can be accommodated by the harbor. Diesel emissions from marine vessels include PM_{10} which can contribute to carbonaceous PM_{10}.

Other local sources of PM_{10} include traffic on State Highway 1 (~50,000 vehicles per day) located about 600' east of the site and a large unpaved parking area west of Highway 1 opposite of Dolan Road. These can serve as a source of entrained road dust. Agricultural fields are located north and south of the MLPP and the former NRF industrial facility. These areas can also serve as sources of PM_{10} due to tilling operations, wind blown fugitives from exposed fields and outdoor burning activities.

Prevailing daytime winds in the area are marine influenced sea breeze winds from the SW to WNW with gusts often exceeding 16 mph, a common threshold for suspending fugitive dust. Nocturnal winds are much lighter and from the land, occasionally associated with drainage from the Salinas Valley.

A tide actuated pressure relief valve is located about 100' north of the monitor. This could contribute to the sea salt loading if the valve is released causing sea spray to be emitted. However, this would require relatively infrequent north wind conditions.

In contrast to the coastal Davenport station, which is about 1,000' from the ocean and has 100' cliffs between the ocean and the station, the Moss Landing station is within 300' of the ocean, and its elevation is very close to sea level. Consequently, the setting is somewhat more exposed to marine influences than Davenport.

Moss Landing Exceedance Evaluations

As shown back in Table 2-3, data for Moss Landing, like Davenport, also violate all aspects of the standard. Based on 2001 to 2003 data, the calculated 24-hour average Expected Peak Day Concentration (EPDC) for Moss Landing is the second highest in the area at 83 $\mu g/m^3$ vs. the standard at 50 $\mu g/m^3$. In addition to violating the 24-hour standard, Table 2-3 also indicates that Moss Landing violates the annual criteria of the standard as well, having the highest annual average of any station on the network.

The estimated number of violations of the 24-hour standard at Moss Landing is the second highest on the network. As shown in Figure 2-4, when adjusted for the one in six day sampling cycle, Moss Landing experiences about 23 violations of the 24-hour standard each year and, like Davenport, is a major contributor to the total number of violations recorded in the air basin each year.

In order to gain insight into the causes of these violations, the chemical composition of samples exceeding the standard was examined. Figure 2-26 illustrates the average composition of 7 exceedance filters acquired at Moss Landing between 2001 and 2004. This period is important because it includes the years 2001 to 2003 which is the current 3-year window used for designation purposes. The average mass concentration of these exceedances was 63 $\mu g/m^3$, which is slightly lower than Davenport, possibly because Moss Landing filters do not indicate excess calcium. However, the sea salt burden, averaging 35 ug/m3, was slightly higher than that of

Davenport and represented 70% of the State standard. In fact, on one of the individual samples (March 28, 2003), the sea salt burden alone at 53 $\mu g/m^3$ actually exceeded the State standard. It should be noted that without the sea salt burden, all seven exceedances compiled in Figure 2-17 would not have occurred. This is the same as was found in the 1998 PM_{10} Plan, where all the Moss Landing exceedances would not have occurred without the sea salt burden. The high sea salt burden is consistent with the open marine exposure of the site. Natural influences appear to be the dominant factor affecting PM_{10} levels at this site.

Although carbon does not represent a significant portion of Moss Landing exceedance samples, the composite shown in Figure 2-26 does reflect a slightly elevated value for elemental carbon. This may be due to diesel vessel activity in the harbor.

Entrained road dust from nearby Highway 1 and wind blown dust from the nearby sand dunes and agricultural fields are likely important secondary contributors to total PM_{10} at Moss Landing. However, these geological constituents are not analyzed directly and are likely contained in the unidentified portion of the sample. It's significant to note that without the sea salt burden, none of these other contributors appear in sufficient mass on any of the filters to create any of the seven Moss Landing exceedances.

Inland Sites

Exceedances from the inland stations are evaluated in greater detail in this plan because there are more years of exceedance data and more events to consider, which represent new information that was not available for the 1998 plan. The non-coastal stations which occasionally exceed the standard include Salinas and King City. Both of these are located in the Salinas Valley, where fugitive dust and wind often characterize the environment. The following section summarizes exceedances recorded between 1998 and 2004. Since exceedances can be relatively infrequent events at these sites some years, such as 2004, pass with no exceedances recorded.

Inland exceedances, since they tend to occur on warm days during the dry season, occasionally coincide with high ozone days in the air basin.

Salinas Site Description

The city of Salinas is the largest city in the NCCAB with a population of about 147,000 in 2005. The population is expected to grow to over 210,000 by 2030.

The Salinas station was located at two different sites for the period of exceedances evaluated. The first site, Salinas II, was at 1270 Natividad Rd and is where the station was located between 1975 and 2000. The PM_{10} monitor was located on the roof of a 2 story medical building on the property of the Natividad Medical Center and was often exposed to the afternoon sea breeze coming in from the ocean. The building was several hundred feet E of busy Natividad Rd, which extended SW to NE along the frontage of the large medical center site. In terms of exposure, for all directions from the SW through the W to the NE, the site was surrounded by the City of Salinas urban corridor. At the time, most of the urban development was in the SW sector from the site. Natividad Medical Center, and its expansion related construction project, occupied

the NE to E sector from the site. The Pacific Ocean is approximately 10 miles NW of the site. In between Salinas and the ocean is the coastal plain, largely occupied by agricultural land use.

In 2000, the Salinas station was moved from Natividad Road near the hospital to the Regional Occupational Program (ROP) school site operated by the Salinas Union High School District. The new site is approximately 3/4 of a mile directly E of the old site. The monitor is located on top of a trailer at a combined height of about 14' above ground level. Except for the school property and paved parking area W of the monitor, the overall area is surrounded by unpaved open fields. These are primarily agricultural fields which are no longer actively cultivated, although they are infrequently tilled as part of the ROP training activities. The 2003 annual Site Survey Report identifies these fields as being within 5 meters of the site in the E and S sectors. Slightly more distant fields are also present in the upwind sectors N and W of the site.

Salinas Exceedance Evaluations

As shown in Table 2-3, data for Salinas violates the 24-hour aspect of the standard, but not the annual. Based on 2001 to 2003 data, the calculated 24-hour average Expected Peak Day Concentration (EPDC) for Salinas is 67 $\mu g/m^3$ vs. the standard at 50 $\mu g/m^3$. Based on this current data, this is actually the second highest EPDC on the network. The usually high EPDC of 67 $\mu g/m^3$ is due in part to the fires at Fort Ord in October 2003. Normally, the EPDC for Salinas is less than 60 $\mu g/m^3$.

Although monitored exceedances are rare at Salinas, data for the site do not meet the standard. As shown in Figure 2-4, when adjusted for the one in six day sampling cycle, Salinas experiences about 4 violations of the 24-hour standard each year. However, unlike the coastal sites, Salinas is not a significant contributor to the total number of violations recorded in the air basin each year.

Figure 2-27 illustrates the average composition of the filters for the three exceedances that occurred at Salinas between 1997 and 2004. Monitored exceedances are infrequent at Salinas, occurring only once every two or three years. The PM_{10} mass concentration for the three samples was 54 $\mu g/m^3$, with the individual samples only ranging from 52 to 59 $\mu g/m^3$. All three exceedance days featured dry, warm weather conditions with occasionally gusting winds. One PM_{10} exceedance day (6/02/03) coincided with a high ozone day where Pinnacles exceeded the both the state 1-hour and federal 8-hour standards for ozone. The first two exceedances (10/25/97 & 10/20/98) occurred at the Salinas II site and the third (6/2/03)occurred at Salinas III.

It should be noted that the chemical analysis data in Figure 2-27 do not include the analysis of the exceedance filters for the samples affected by the October 2003 fire at Fort Ord or the Kirk Complex wildfires in 1999. These events are discussed later in this chapter.

The average distribution for Salinas shown in the figure is fairly typical of the inland stations, with the largest portion (over 70%) of the sample falling into the unidentified category. Since most fugitives cannot be identified on quartz filter media, a large unknown is often a signal suggesting a strong contribution from fugitive sources. The role of fugitive sources in these exceedances is further supported by technician comments regarding a long-term hospital

construction project occurring nearby where extensive grading was taking place during both exceedances at Salinas II. The station technician also observed field tilling operations occurring next to the air monitoring station during the exceedance at the Salinas III site.

A carbon analysis was available for only the more recent exceedance at Salinas III. Although carbon was not a major portion of the sample, the available data did indicate an elevated organic carbon fraction. This can be an indicator for gasoline combustion by motor vehicles. Aside from exhaust related carbon, which would appear in the fine $PM_{2.5}$ size range, motor vehicle activity on nearby roads can further contribute to coarse fraction fugitives from entrained road dust from paved and unpaved road surfaces. The Annual Site Survey identifies arterial traffic within 500 meters of the site at a volume of ~10,000 vehicles per day.

Only one PM_{10} exceedance sample (6/2/03) had a concurrent 24-hour $PM_{2.5}$ value. Although the 15.9 $\mu g/m^3$ sample was well about the Salinas average of about 9 $\mu g/m^3$, $PM_{2.5}$ still only represented about 30% of the PM_{10} sample mass. This indicates that the bulk of the sample (~70%) was comprised of coarse fraction particulate matter. This fraction is typically comprised of directly emitted geological materials including fugitive dust, as well as sea salt.

The analysis of the Salinas exceedance filters also demonstrates that Salinas, which is sometimes in a transition zone between coastal and inland influence, can occasionally be impacted by sea salt. For instance, on the 6/2/03 exceedance, what appeared to be aged sea salt comprised about a third of the sample. On that day both Davenport and Moss Landing also exceeded the standard and both stations had significant sea salt loadings. However, sea salt is normally a minor component of Salinas exceedance samples. Higher than normal sea salt related sulfates may also partially explain why $PM_{2.5}$ was somewhat elevated on the 6/2/03 exceedance.

In summary, monitored exceedances at Salinas can be characterized as infrequent, typically occurring on a warm dry season day, often with offshore flow and overall elevated levels of particulate matter in the Salinas Valley. The evaluation of each of the three Salinas exceedances suggest that wind blown fugitives appear to be primary contributors at both Salinas sites. At Salinas II, these were in the form of construction and entrained road dust. Tilling related fugitives appeared to be a primary contributor to the exceedance at the Salinas III site. It appears that at times, sea salt can impact Salinas. Since many Salinas exceedances are only marginally above the standard, secondary aerosols, while typically only representing 10% of the sample mass or less, can occasionally provide the margin above the standard that causes the sample to become an exceedance. Soil related OC was evident on the only exceedance with a carbon analysis.

Based on the nature of the exceedances as well as more recent direct measurement of $PM_{2.5}$, most of the PM_{10} exceedance mass would appear to be in the coarse fraction size range, which again is consistent with the presence of primary wind blown fugitive dust.

King City Site Description

The King City station is located at the King City Corporation Yard which is located on the grounds of the King City Municipal Airport, a small, limited use airport. The yard is a large open lot with a bare crushed stone surface which is used for storage and maintenance of trucks and other vehicles. Agricultural fields are located outside the airport boundaries and are located in the

upwind sector to the NW. The King City station, while part of the NCCAB ambient PM_{10} network, is actually owned and operated by industry as part of a permit condition. Consequently, since District technicians don't routinely visit the site, the identification of local activities that may affect individual samples is more limited than at District operated stations.

Although the King City station was originally established to monitor potential impacts from a nearby cogeneration plant, the station is typically not downwind of any emissions from the facility, and the station is mainly influenced by ambient conditions.

King City Exceedance Evaluations

As shown in Table 2-3, data for King City like the other inland site Salinas, only violates the 24-hour aspect of the standard, but not the annual. Based on 2001 to 2003 data, the calculated 24-hour average EPDC for King City is 58 $\mu g/m^3$ vs. the standard at 50 $\mu g/m^3$.

Although monitored exceedances are infrequent at King City, data for the site do not meet the standard. As shown in Figure 2-4, when adjusted for the one in six day sampling cycle, long term 1990 to 2004 data indicate that King City experiences about 2 ½ violations of the 24-hour standard each year. Similar to Salinas, King City is not a significant contributor to the total number of violations recorded in the air basin each year.

The average composition of the five exceedance filters recorded at King City between 1999 and 2004 is illustrated in Figure 2-28. The PM_{10} mass concentration for the five samples was 60 $\mu g/m^3$, with the individual samples ranging from 56 to 65 $\mu g/m^3$. Although infrequent (less than once per year), monitored exceedances at King City tend to occur more often and at slightly higher concentrations than Salinas. Although exceedance days at King City and Salinas do not tend to be concurrent, particulate levels can follow a similar pattern. On three of the five King City exceedance days evaluated, particulate levels were elevated at Salinas (85%+), although not exceeding the standard.

King City exceedances also tend to occur on successive weeks and then not recur again for several years. This suggests the possible influence of periodic local activities, such as grading or agricultural tilling. All King City exceedances were clustered during the same time of year, the May-July time frame, further suggesting some type of seasonal activity, with impacts maximized during the dry season.

In examining the meteorological conditions and chemical analysis results for each of the five exceedances, it is often not feasible to develop conclusive findings largely due to the large portion of the sample that typically cannot be chemically identified and the fact that the site is not operated by the air district so documentation of local activities is limited. However, King City exceedances do have some general attributes that can be characterized.

King City exceedances typically occur on warm windy days in the Salinas Valley, most often during the dry season months May through July. These are clearly conditions favorable for the generation of wind blown fugitive dust which could arise from a variety of sources. As shown in the figure, the chemical analysis results are characterized by a rather high (50 to 90%) portion of the sample that is left unidentified. This is actually typical of fugitive dust events because

many of the constituents of fugitive dust cannot be chemically identified on quartz filter media. The species that were identified, however, indicate that secondary aerosols in the form of nitrates and sulfates are typically low (~8%) and only minor contributors to exceedances. Interestingly, on one of the five exceedances (6/7/02), what appeared to be aged/transported sea salt represented nearly a quarter of the entire sample mass and was a significant contributor to the exceedance. On that date, both Moss Landing and Davenport did record sea salt laden exceedances. The Salinas site was also elevated on 6/7/02, although it did not exceed the standard so there were no chemical results available to see if significant sea salt reached that location.

Although District staff was not present on the exceedance days, it has been noted that onsite grading of a large unpaved area periodically occurs which involves the use of a wide grate. In addition, trucks driving over the unpaved surfaces of the maintenance yard could create large amounts of fugitive dust. These activities could create excessive local fugitive dust, which, if conducted on dry days which coincide with PM_{10} sampling dates would be collected on the filter. These local influences cause King City exceedances to, at times, be a singularity on the network which does not fit the overall regional pattern indicated by the other stations.

In summary, King City exceedances can be characterized as infrequent and occurring on warm, dry, summer days when a well developed sea breeze (20 to 25+ mph range), which tends to produce overall elevated levels of fugitive dust in the Salinas Valley. King City exceedance days tend to coincide with elevated particulate levels at the nearest site, Salinas. However, in two of the five exceedances, particulate levels at King City were singularly high while the rest of the monitoring network was low, which suggests that local influences can occasionally be strong. Wind blown fugitive dust from both non-agricultural as well as agricultural field sources were likely important contributors. Local fugitives from the onsite unpaved parking areas and onsite grating activities may further contribute to some samples. Nitrates and sulfates, while present, do not contribute substantially to the exceedance mass. King City exceedance days occasionally coincide with exceedance days at the coast and the chemical results do confirm an occasional sea salt influence.

Hollister Site Description

Exceedances are very rare at Hollister with only two non-wildfire exceedances being recorded over the past 10 years. Table 2-3 further indicates air quality criteria are within the standard. However, since Hollister's 24-hour designation value is near the standard and Hollister represents an area of growing population, it can be useful to evaluate data on the most recent exceedance.

The Hollister air monitoring station is located at a California Department of Forestry fire station along the eastern perimeter of the city of Hollister. The land parcel occupied by the fire station extends into agricultural fields which surround the site immediately to the north, east and south. The fields are used for range grazing by cattle rather than for the cultivation of crops. The agricultural parcel to the north actually encompasses directions all the way from WNW through N to the adjoining parcel to the E. As indicated in the annual Site Survey Report, these agricultural lands are within 10 meters of the station. Hollister suburban land use corridor extends to the west, across Fairview Road.

Hollister Exceedance Evaluation

The only exceedance to occur at Hollister between 2001 and 2004 occurred on September 19, 2002 with a concentration of 59 $\mu g/m^3$. This particular sampling day was actually a make-up sample for the normally scheduled day of September 17th. In looking back at the history of Hollister exceedances which extends back to 1986, this event, which is about 20% above the standard, is the highest on record, except for an exceedance that occurred in 1999, which was impacted by smoke from the Kirk Complex wildfires.

Since this was a "make-up" sample and the rest of the monitoring network did not operate that day, there are no network results available to assess the regional pattern. However, results for the closest sampling days on the 17th and 23rd, indicated regionally low particulate levels with most stations at half the standard or less. The following Hollister sample on the 23rd was also low at less than half the standard. This information would suggest the possibly of a local anomaly on the 19th. Ozone levels were low on the 17th both regionally and at Hollister.

In terms of weather conditions, this was the second day of a multi-day heat wave with temperatures at Hollister reaching 89 degrees. Daytime winds were from the W to NW with NW winds reaching peak speeds in the 15 to 20 mph range during the mid-afternoon. Winds were continuously from the W to NW for all hours between 8 am and 5 pm. Afternoon humidity dropped from the low 20%'s to the upper teens. During the pre-dawn and evening hours winds were light, generally from the E to SE directions. The predominance of daytime winds from the W to NW sector placed the monitor downwind of the large agricultural parcel to the N for all hours when conditions for fugitive dust generation were greatest.

The chemical analysis of the exceedance filter for this event is summarized in Figure 2-29. There are many aspects of the chemical signature on this filter that would suggest a fugitive wind blown dust event. The soil related species including silicon, aluminum and calcium were all elevated. Typically, these elements appear in soils in oxide form rather than as pure elements. Consequently, their actual contribution to the sample mass can be much higher than shown by the elemental indicator alone. The soil related trace metal beryllium was also high at 0.008 $\mu g/m^3$ and exceeded OEHHA's 0.007 $\mu g/m^3$ chronic REL for that trace substance.

Total carbon was high representing nearly 10% of the sample mass. This consisted exclusively of organic carbon (OC) coupled with virtually no elemental carbon (EC). As implied by ARB's PM speciation profile #417 for agricultural tilling dust, agricultural soil fugitives can be characterized by a high OC to EC ratio.

Secondary aerosols in the form of sulfates and nitrates were low on this sample and represented only about 5% of the sample mass. Sulfates and nitrates were not important contributors to this event.

A small amount of sodium was detected on the filter, but no virtually chloride. The sodium is probably soil related, possibly enhanced by aged sea salt where the chloride ion had been depleted during the long journey from the coast.

A fairly high portion of the sample remained unidentified. This is typical of chemical evaluations of quartz filters laden with fugitive dust. Although a large part of the sample was

unidentified, the specifies that were identified carry a fugitive dust signature and several other species such as nitrates, sulfates and even sea salt were confirmed as being minor contributors.

In summary, the Hollister exceedance appears to be due to fugitive wind blown dust from the open range lands which were immediately upwind of the station on a warm, dry, and windy late summer afternoon. Since this is a bit of an aberration in that exceedances don't always occur at this site during hot dry windy conditions, there may have been other undocumented activities occurring that could have further contributed to dust emissions. However, since District staff were not onsite that day, these activities cannot be identified.

Sulfates, Nitrates and Ammonium

The filter analysis provides information on sulfates, nitrates and ammonium, which are problematic pollutants in some areas of California. These aerosols mostly appear in the fine (< 2.5 μ) fraction of the particulate size spectrum. Sulfates and nitrates are known as secondary aerosols because they are not emitted directly but rather are formed by reactions in the atmosphere. Ammonia, on the other hand, is directly emitted and tends to combine in the atmosphere with sulfates and to a lessor degree nitrates to form ammonium sulfate or ammonium nitrate. The resulting ammonium ion produced by these reactions, is the constituent actually detected on the filters.

Sulfates originate from the combustion of sulfur containing fuels as well as certain natural processes. Nitrates are mostly derived from NO_x emissions resulting from the combustion of fossil fuels by both stationary and mobile sources as well as natural sources including soil. Nitrates can also be present in fertilizer. Nitrates can also interact with sea salt to produce acidic compounds. Ammonia can originate from man-made sources including fertilized lands, sewage disposal and can also be produced by animal waste and natural soils.

Chemical analyses of the exceedance samples from both the coastal and inland stations suggest that these aerosols are generally not significant contributors to the exceedances. The generally low concentrations of these fine fraction constituents suggests that the coarse fraction is a more significant player in causing exceedances. Nitrates typically comprise less than 5% of the sample mass of NCCAB exceedances. Sulfates typically comprise 5% or less of the sample mass of NCCAB inland site exceedances and 5 to 10% of the sample mass for exceedances at the coastal sites.

The analysis summaries shown in pie charts further demonstrate that sulfates, while not present in abundant quantity, are elevated at the coastal sites compared to those inland. This is likely due to the fact that sulfates tend to be part of the naturally occurring marine aerosols which again tend to increase when the sea salt burden is high. Sulfates likely enter the marine aerosol mix largely due to the action of marine phytoplankton which create dimethyl sulfide which is then converted to marine sulfates.

Sulfate levels at both Davenport and Moss Landing are very similar, averaging about 4.5 $\mu g/m^3$ which is typically less than 10% of the sample mass. The similar levels of sulfates at the two sites suggests that naturally occurring sulfates, and not coal burning in the cement plant kiln, are the major contributors to sulfates at Davenport.

Measured levels of sulfates from all samples were well within the California 24-hour sulfate standard, which is 25 $\mu g/m^3$.

In other areas of the State, such as the San Joaquin Valley, wintertime formation of nitrates is a significant contributor to high levels of particulate matter. The filter analysis data provide little evidence that nitrates are a significant contributor to exceedances in the NCCAB.

Nitrate concentrations on the exceedance samples are typically in the 1 to 3 $\mu g/m^3$ range and tend to be slightly higher at the inland sites, likely due to the greater influence of motor vehicles at these locations. Continuing controls on mobile and stationary sources of the oxides of nitrogen should be beneficial in keeping nitrates low.

The ammonium ion was non-detect (< 0.1 $\mu g/m^3$) on virtually all exceedance samples. This suggests that ammonia, as well as its attendant sources, are not significant contributors to NCCAB PM_{10} exceedances.

Data from both the coastal and inland stations suggest that secondary aerosols in the form of nitrates and sulfates are generally not a significant part of the exceedance samples. This is consistent with the finding that the coarse fraction is a more significant player in causing exceedances.

Trace Metals

All filters for exceedances between November 2001 and June 2004 were submitted to the South Coast lab for a rather extensive suite of analyses. This included a suite of toxic metals including arsenic, beryllium, cadmium, chromium, copper, lead, manganese, nickel, selenium, vanadium and zinc.

Except for beryllium, trace metals on all these filters were low and well below regulatory health thresholds. Beryllium levels were generally in the 0.002 to 0.009 $\mu g/m^3$ range and occasionally exceeded the 0.007 $\mu g/m^3$ California Office of Environmental Health Hazard Assessment (OEHHA) chronic Reference Exposure Level (REL) for this substance at various stations in both the coastal and inland areas.

It is not clear why beryllium might be regionally elevated, except that beryllium is a naturally occurring substance that is part of the earth's crust and can be emitted to the atmosphere as wind blown geological dust. Beryllium can also be emitted by man made activities including the burning of coal or fuel oil. Fuel oil burning sources are not significant in the air basin. Although coal is used to fuel the kiln at the Davenport cement plant, continuous gaseous measurements indicate the plume rarely if ever impacts the air monitoring station. In addition, beryllium concentrations as high as 0.009 $\mu g/m^3$ not only occur at Davenport but also occur at a number of other stations far removed from this potential source.

The beryllium levels detected on NCCAB exceedance filters appear to be another indicator for the presence of fugitive dust.

Crystalline Silica

Crystalline silica is a common constituent of soil, sand, granite and many other minerals. Quartz is the most common form of crystalline silica. Crystalline silica is commonly present in wind blown dust and sand. Respirable crystalline silica can penetrate the lungs where it can cause respiratory irritation and inflammation. Since these crystals are insoluble, they are not readily removed by the body. Over a long period of time, this can cause scaring and fibrous legions in the lungs leading to a disease known as silicosis. Workers breathing silica dust in abrasive sandblasting, quarrying and rock drilling occupations are most susceptible to silicosis.

Due to adverse health effects, in February of 2005 the OEHHA adopted a chronic REL for crystalline silica. The level of the chronic REL is 3.0 $\mu g/m^3$ and applies to long-term exposure over many years.

As with most areas, detailed air monitoring data representative of long-term exposure levels in the NCCAB in not available. However, for nine of the exceedance filters sent to the South Coast lab, an analysis of elemental silicon was developed for those 24-hour samples. These included exceedance filters from Davenport, Moss Landing, King City and Hollister. If all the elemental silicon detected on the filters originated as crystalline silica, the 24-hour average concentrations would range from about 0.2 to 3.4 $\mu g/m^3$, and averaging about 1.5 $\mu g/m^3$. Interestingly, based on this limited data, concentrations along the coast, where one might expect more windblown sand, weren't necessarily higher than inland, averaging about 1.0 $\mu g/m^3$, while the two inland filters averaged about 3.0 $\mu g/m^3$, which is comparable to the level of the REL for crystalline silica.

The highest 24-hour value, 3.4 $\mu g/m^3$, occurred at Hollister on September 19, 2002. This was a hot, dry, windy day conducive to wind blown fugitive dust. There was other evidence of crustal geological materials on the filter that day as aluminum and beryllium were also elevated.

Other special studies undertaken by the District where filters were analyzed for an extensive suite of chemicals include the 1988-1991 Davenport Study and the 1993/94 Moss Landing Air Monitoring Program. Silicon results from both of these studies suggest levels of crystalline silica near or above the chronic REL.

Based on the available information, it is possible that fugitive dust related crystalline silica may at times be elevated, which has also been seen in the monitoring results for other fugitive dust related constituents, including asbestos and beryllium.

Fire Impacted Events

Controlled and uncontrolled wildland fires, while often not under District jurisdiction, can have a significant impact on air quality. These events can persist for days and even weeks, which often requires that the District undertake special monitoring in support of issuing public health advisories. Two such events are briefly summarized below; the first was a wildfire that occurred in the Los Padres National Forest in the Fall of 1999, and the other was a fire at the former Fort Ord in October 2003 which was initially a controlled burn that quickly escaped and became a wildfire.

Kirk Complex

On September 8, 1999, dry lightning struck at multiple locations in a wilderness area of the Santa Lucia Mountains in sections of the Los Padres National Forest in Monterey County. The resulting strikes created several wildfires which became known as the Kirk Complex Fires which became one of the largest wildfires on record for the region, consuming over 85,000 acres and persisting for more than 45 days. The Kirk Complex is second only to the 177,000 acre Marble Cone Fire which occurred in the same area in the 1970's. Smoke from the long lasting Kirk fires, in combination with smoke from other wildfires around the state at the time, contributed to elevated particulate levels throughout the air basin as well as exceedances of the State PM_{10} standard and the issuance of smoke advisories for certain hardest hit locations.

One of the areas exceeding the standard during that event was Carmel Valley, located along the northern perimeter of the Los Padres National Forest. The results of the chemical analysis of an exceedance filter recorded on the District's air monitoring station in Carmel Valley are shown in Figure 2-30. As can be seen from the chart, carbon, a primary indicator for the presence of smoke was significantly elevated on this sample. Total carbon, which would mostly be present in the fine $PM_{2.5}$ size range, totaled 17 $\mu g/m^3$ and represented about 30% of the sample mass. Fine carbonaceous particulate matter can have adverse health impacts, especially on sensitive members of the public including asthmatics.

Fort Ord

Fires have occurred periodically over the many decades Fort Ord was an active Army base used for training. In many cases, these were wildfires ignited by the training exercises themselves and in some cases these were planned prescribed fires. Due to the complex meteorology, terrain and fuels at Fort Ord, coupled with its proximity to nearby urban areas, these often produced smoke impacts on the surrounding community.

The history of prescribed burns at Fort Ord demonstrates that the window of favorable burn conditions is often brief, lasting only a few hours or less, and very difficult to forecast in advance. In some cases, past burns were initiated under favorable conditions which quickly change. History further indicates that the planned fires can often be complicated by escapes, which lead to an uncontrolled burn.

Weather conditions at Fort Ord are in a transition zone between marine and land influences, and the transition from land to marine influences can occur rapidly. On dry clear season mornings, the light land breeze can often be replaced by the stronger daytime sea breeze, with its attendant marine inversion, in a matter of minutes. Smoke that had been rising vertically from fires ignited during the light land breeze can suddenly be held close to ground-level by the stronger winds and marine inversion, ultimately fumigating downwind communities E and SE of the site. Under offshore flow conditions, low level wind shear, where the wind speed increases rapidly within the first 1,000' of the surface, often occurs early in the day. Under these conditions, winds may appear to be light at the surface but stronger winds immediately several hundred feet above can shear off portions of the smoke column which can then impact nearby downwind communities to the W and SW. A favorable prescription must match the duration of the planned fire with the predictability and duration of the favorable conditions for smoke management.

One such major prescribed burn project, for ordnance removal, was planned for the Fall of 2003. Since the lands of the former Fort Ord are surrounded by suburban and urban development and fires in this challenging domain have historically been problematic, a network consisting of a number of special purpose monitoring stations were established at school sites and fire stations in the vicinity of the burn. In addition, all regular district monitoring stations in the vicinity were specially programmed to run during the event.

The burn project was originally planned to be a 500 acre controlled burn in the former training area of the former Army base. The objective was to remove surface vegetation so removal teams could remove dangerous unexploded ordnance that had accumulated during many decades of training exercises. Since the project is a federal CERCLA (Superfund) project, the District did not have permit authority.

Based on the prescribed weather conditions, it was decided to initiate the fire on the morning of October 24, 2003. Shortly after ignition, lower portions of the smoke plume began descending into the City of Seaside, fumigating the urban areas along a corridor immediately SW of the former training area. Later on in the day as smoke from the wind driven wildfire continued, the areas impacted gradually shifted to the areas S and later to the E of the fire. The fire eventually grew to 1,500 acres.

Seventeen offsite exceedances of the State 24-hour PM_{10} standard were recorded in nearby communities during the event, as well as one exceedance of the federal 24-hour standard for PM_{10}. The Salinas air monitoring station, which rarely records exceedances, recorded two exceedances of the State standard.

Figure 2-31 summarizes the chemical analysis results for one of the exceedances at Salinas, located about 10 miles NE of the burn site. The results show elevated smoke indicators, especially in the form of organic carbon. Total carbon on that sample was 8.1 $\mu g/m^3$ or about 15% of the sample mass. Even at that distant location, the smoke related constituents contributed to the exceedance. Impacts on PM_{10} concentrations were higher at the special stations located closer to the burn site. However, carbon results for those exceedance filters were not available at the time of this writing due to continuing problems with the instrument at the chemical lab.

Burning of maritime chaparral in the challenging burn environment of the former Fort Ord will continue into the future by both the Army, for ordinance removal and also by other agencies, as part of the Habitat Conservation Plan. Given the close proximity of urban areas to these projects and the challenging environment under which these burns will be conducted, these projects will remain a concern in terms of their potential impact on ambient air quality.

2.11 $PM_{2.5}$ CHARACTERIZATION

For regulatory purposes, PM is generally divided into two size categories: a coarse fraction ranging from 2.5 to 10 μ in diameter and a fine fraction ranging from 0 to 2.5 μ in diameter. The PM_{10} measurements obtained at District air monitoring stations cover the entire range 0 to 10 μ. Information on $PM_{2.5}$ levels is important because it tells what fraction of the PM_{10} size range is contributed by the fine size range. These fine particles are especially important because they

penetrate deeper into the lungs and can therefore have greater health effects. They also tend to contain the more toxic combustion related constituents as well as secondary aerosols including nitrates and sulfates.

The District began $PM_{2.5}$ monitoring in 1999 at two locations representative of population exposure, Salinas and Santa Cruz. Originally, $PM_{2.5}$ monitoring was conducted on a nationwide 3-day sampling schedule set by the EPA. However, due to the nominal levels of $PM_{2.5}$ found in the NCCAB, this was relaxed to a 6-day sampling schedule. The $PM_{2.5}$ sampling schedule is the same as that used for PM_{10}, so for each $PM_{2.5}$ sample there is a concurrent PM_{10} sample. The $PM_{2.5}$ samples are obtained using EPA approved reference method samplers, which collect the samples on filter media over a 24-hour period extending midnight to midnight. In addition to the 6-day filter-based sampling, the District has also been testing a new generation of instruments that record $PM_{2.5}$ levels on an hourly basis continuously every day of the week.

The concurrent measurements of PM_{10} and $PM_{2.5}$ are useful for assessing whether or not the bulk of the sample was from the coarse size range which typically involves directly emitted primary particles such as fugitive dust, or the fine fraction which includes secondary particulates formed in the atmosphere by chemical reactions. Control strategies can be quite different for the different size ranges; one range focuses on directly emitted large particles, while the other involves more complex interactions and sources.

Monthly average PM_{10} and $PM_{2.5}$ are illustrated for Salinas and Santa Cruz in Figures 2-32 and 2-33, respectively. As can be seen from the charts, $PM_{2.5}$ levels at both Salinas and Santa Cruz tend to be rather low and relatively constant compared to PM_{10}. PM_{10} on the other hand shows some variation at these sites with the higher values typically occurring during the dry season months May through June and also September through November.

The charts further indicate that increases in overall PM_{10} tend to be driven by the coarse rather than fine size range. This is consistent with the exceedance evaluations for the non-coastal sites which suggest that exceedances tend to be driven by the coarse fraction and often appear to be due to fugitive dust.

2.12 DATA FROM SPECIAL STUDIES

Special studies have been undertaken over the years in response to citizen complaints. The most comprehensive studies undertaken are the Moss Landing Air Monitoring Program (MAMP) and the RMC Lonestar Study. MAMP was jointly conducted by the Moss Landing Harbor District, Pacific Gas and Electric, National Refractories and Minerals and the District. PM_{10} was one of the pollutants monitored daily from June 1, 1993 to June 30, 1994 as part of this program. The State 24-hour PM_{10} standard was exceeded on 44 days at one or more monitoring sites. Eleven of these exceedances were attributed to the Malibu fire in the fall of 1993. An air monitoring study was undertaken by RMC Lonestar and the District in the Davenport area from 1988 to 1991. PM_{10} was monitored every six days at three sites: downtown Davenport and north and northeast of the RMC Lonestar facility. There were 32 days on which the State 24-hour PM_{10} standards was exceeded in 1988, 41 days in 1989, 40 days in 1990 and eight days in 1991.

Graniterock conducted continuous monitoring at three sites at their quarry in Aromas from June 1990 to September 1991 prior to the issuance of District permits. There were 21 days exceeding the State 24-hour PM_{10} standard in 1990 and one in 1991.

A month long PM_{10} monitoring program was conducted by the District in the San Lorenzo Valley in Santa Cruz County from December 1995 to May 1996 and November 1996 to May 1997 to determine the effects of residential wood burning on ambient air quality. Monitoring was conducted every six days. There was one recorded exceedance of the standard in December 1995 and one in December 1996.

Due to concerns regarding smoke from outdoor burning and fireplaces, a six month long study in Harper Canyon, Monterey County, was begun in November 1997. There were no recorded exceedances of the PM_{10} standard.

In response to community concerns about particulate emissions from an energy biomass plant in Soledad, the District conducted a four week investigation in late March and early April of 2002. PM_{10} monitoring was conducted at four sites in and around the city of Soledad. There were no exceedances of applicable ambient air quality standards for PM_{10}.

As part of the District's response to wildfire events, special realtime and in-field portable PM monitors are deployed. The information, especially that from the real-time monitors, is used to aid in the issuance of smoke advisories to those living in the affected areas. Examples of these special response efforts include the Kirk Complex wildfires in the Fall of 1999, the Plaskett Incident along the Big Sur coastline in July 2000, the Croy Wildfire in the Santa Cruz Mountains in September 2002, a fuel oil tank fire in Moss Landing in July 2003 and a wildfire at the former Fort Ord, also in July 2003. The District also conducted special monitoring during the Fort Ord fire in October 2003, which was previously described.

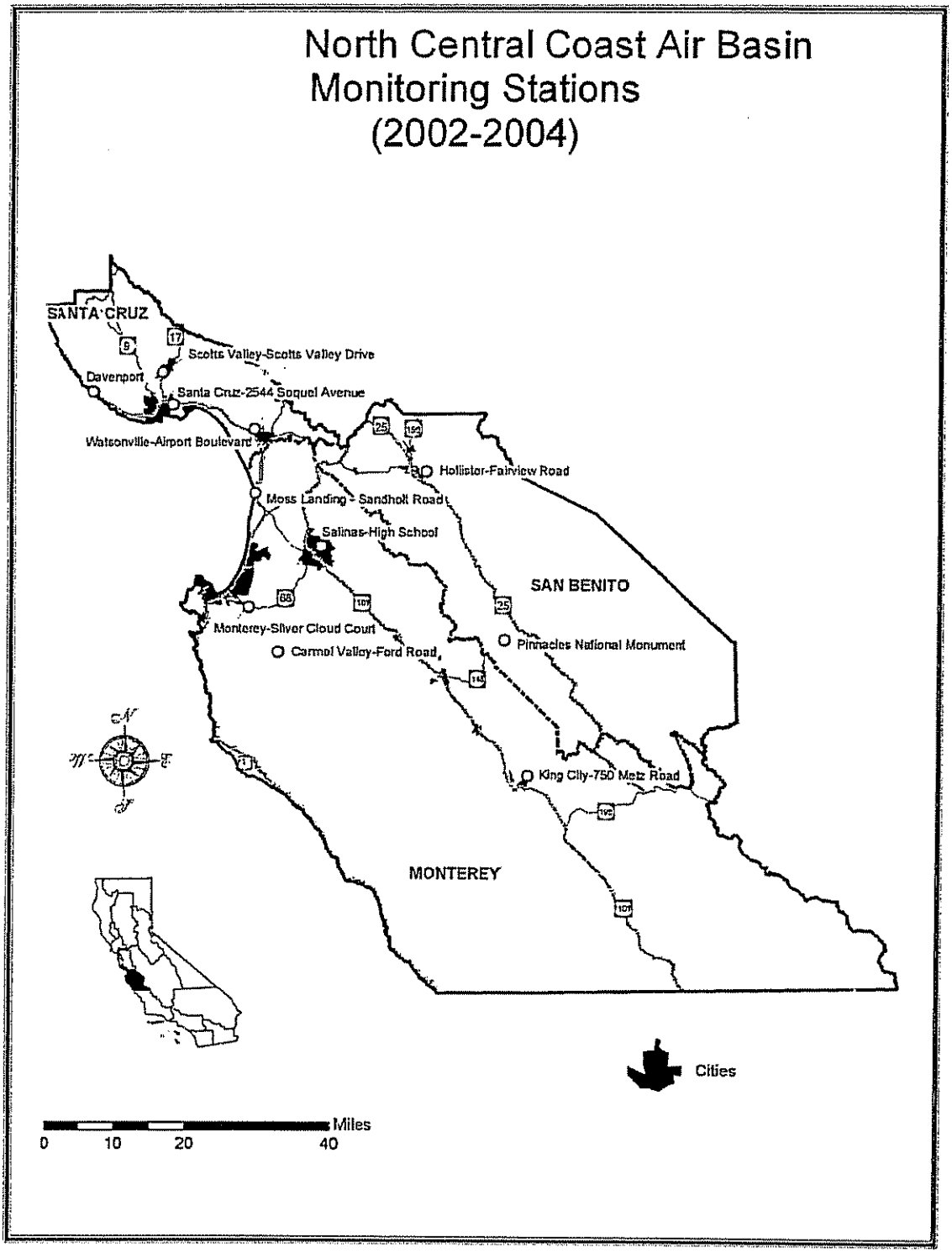


Figure 2-2 - NCCAB Air Monitoring Network (Map courtesy of CARB).

FIGURE 2-3 a) - MONTHLY AIR BASIN EXCEEDANCES

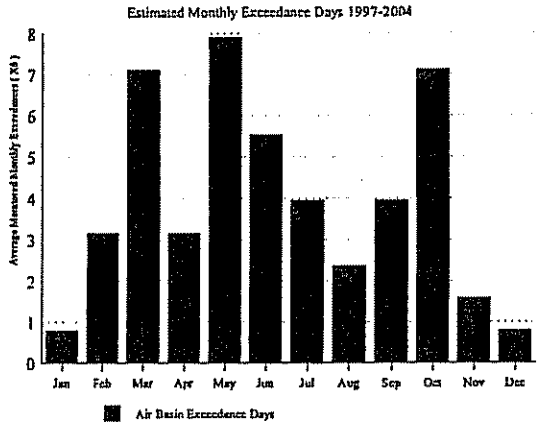


FIGURE 2-3 b) - MONTHLY COASTAL EXCEEDANCES

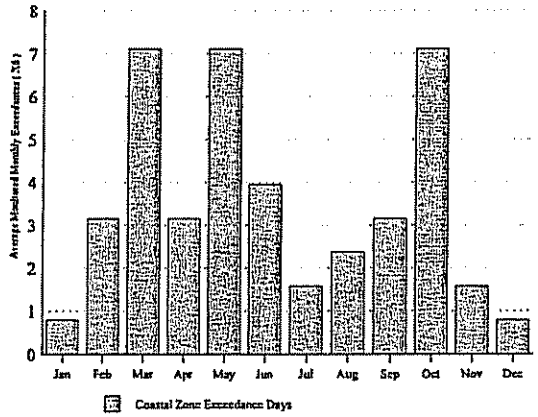


FIGURE 2-3 c) - MONTHLY INLAND EXCEEDANCES

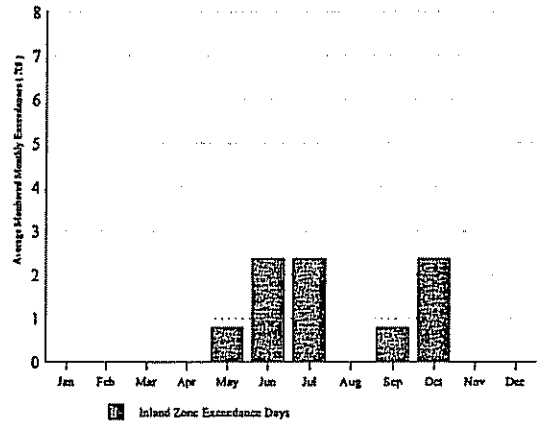


Figure 2-3 Distribution of monthly exceedances for the a) Air Basin, b) Coastal Zone and c) Inland Zone. Based on air monitoring data from 1997 to 2004. Exceedances represent estimated monthly exceedances where the monitored number of exceedances have been upwardly adjured to account for the 1 in 6 day sampling schedule.

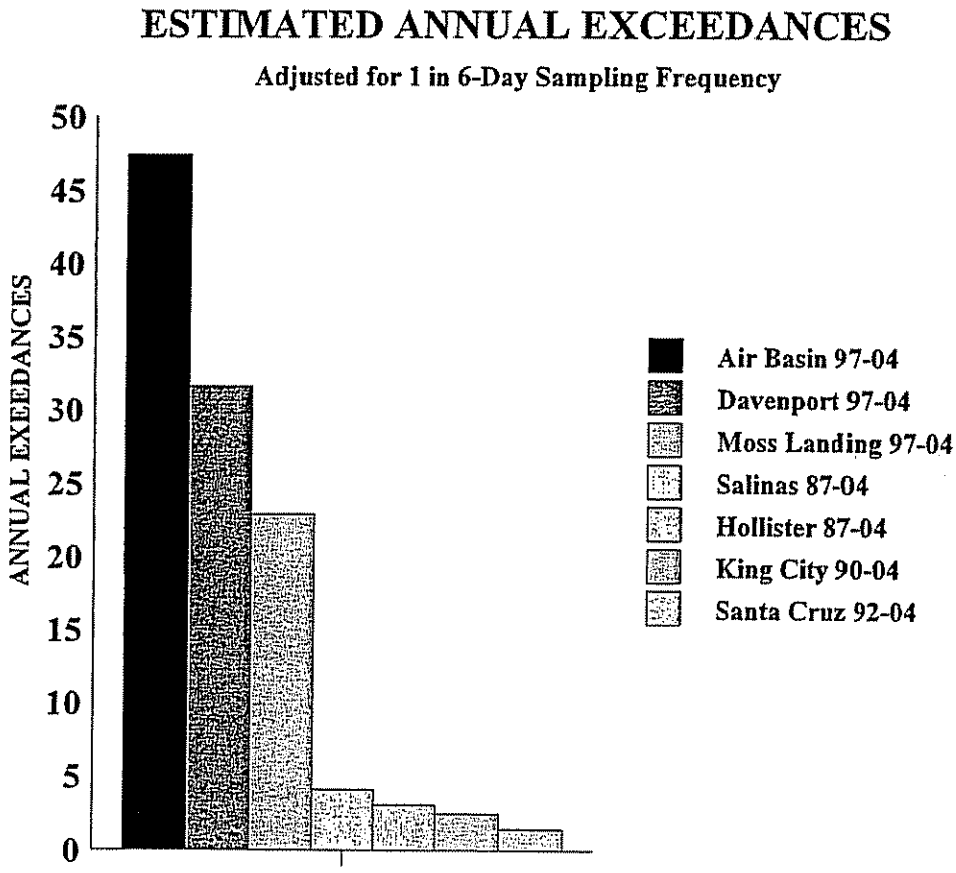


Figure 2-4 Distribution of annual exceedances for the air basin and by station. Exceedances represent estimated monthly exceedances where the monitored number of exceedances have been upwardly adjured to account for the 1 in 6 day sampling schedule.

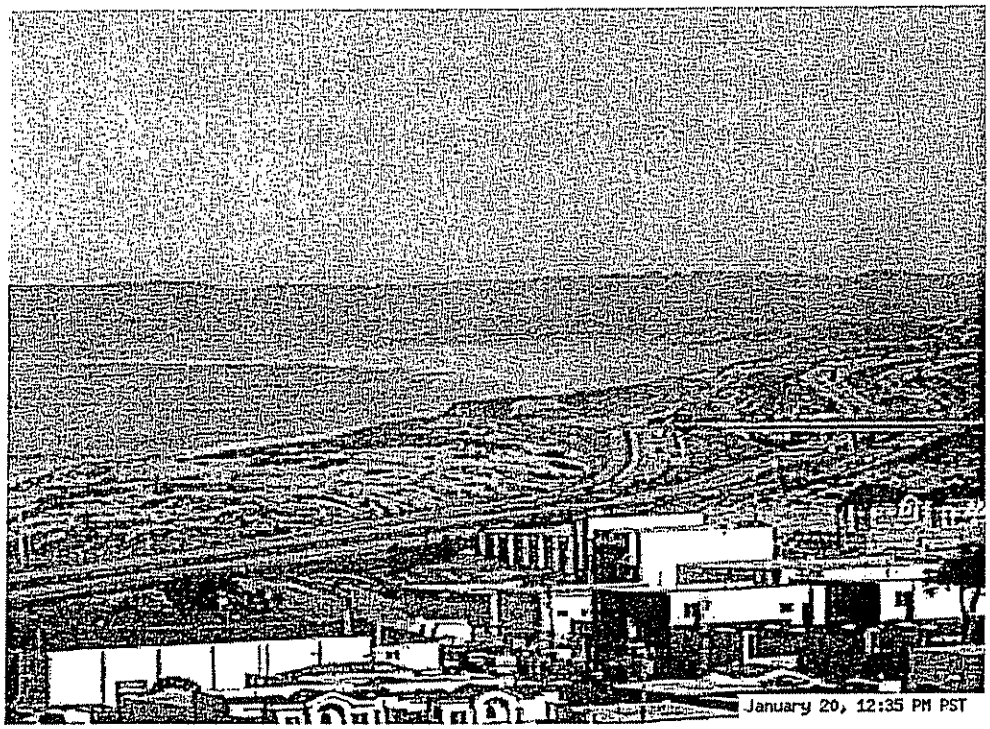


Figure 2-5 **Typical mist cloud of sea salt aerosols extending inland over the immediate coastline. Photo courtesy of KSBW Monterey web cam.**

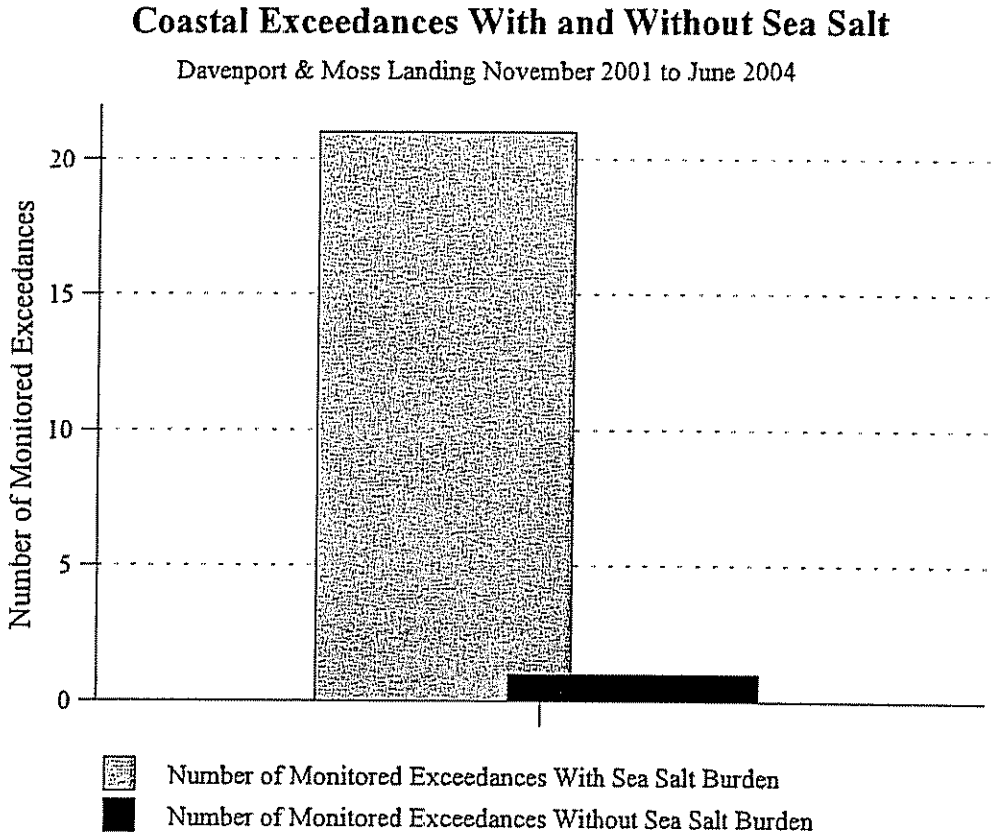


Figure 2-6 - Impact of sea salt on the number of exceedances monitored at the coastal sites.

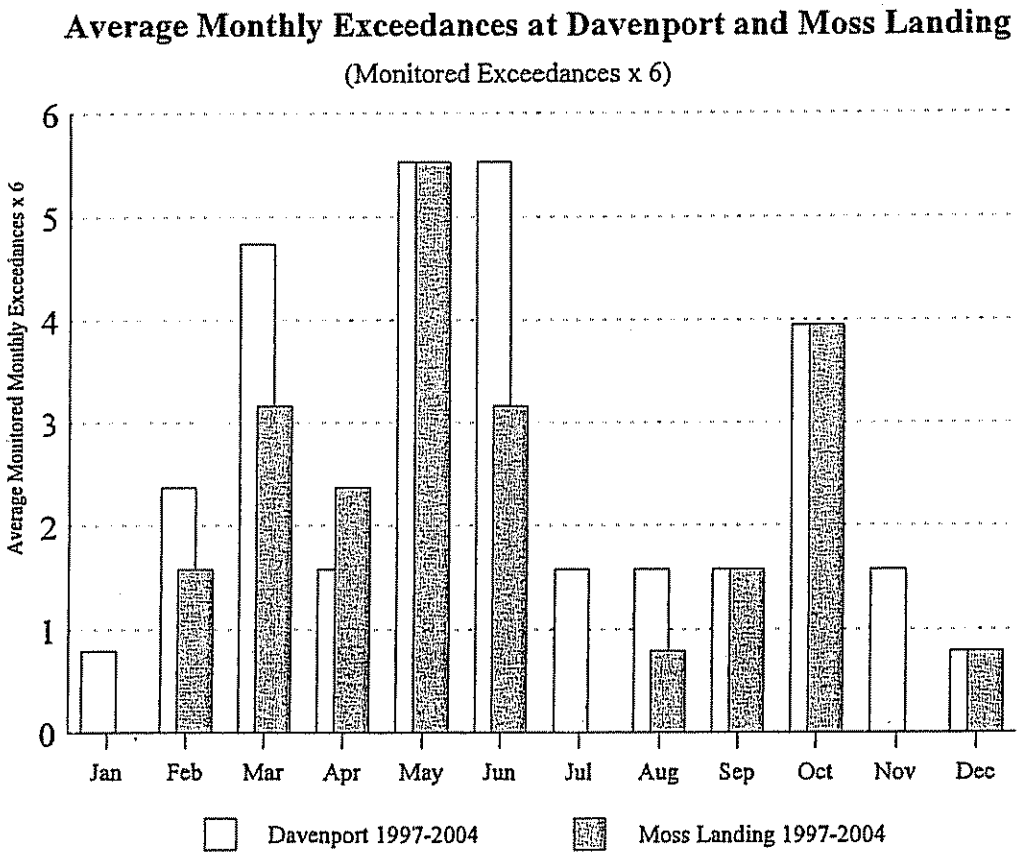


Figure 2-7 Comparison of exceedances at Davenport and Moss Landing.

FIGURE 2-8 - MONTHLY AVERAGE PM10 CONCENTRATION

Davenport 2001 - 2003

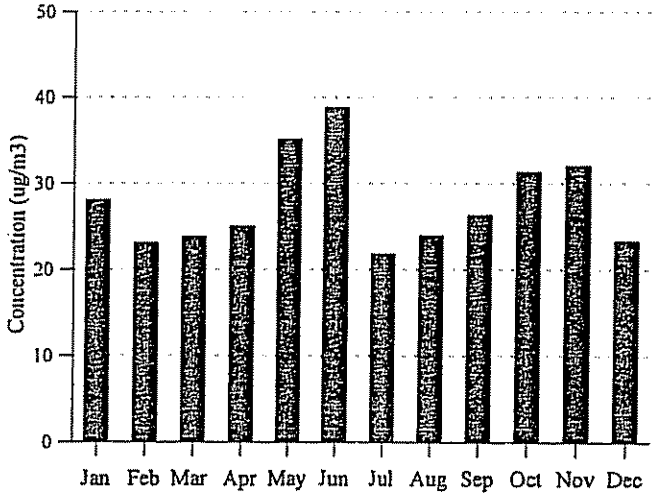


FIGURE 2-9 - MONTHLY AVERAGE PM10 CONCENTRATION

Moss Landing 2001 - 2003

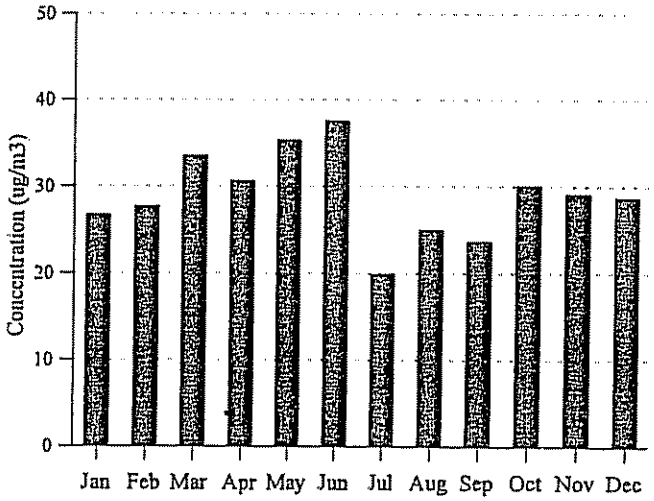


FIGURE 2-10 - MONTHLY AVERAGE PM10 CONCENTRATION

Salinas 2001 - 2003

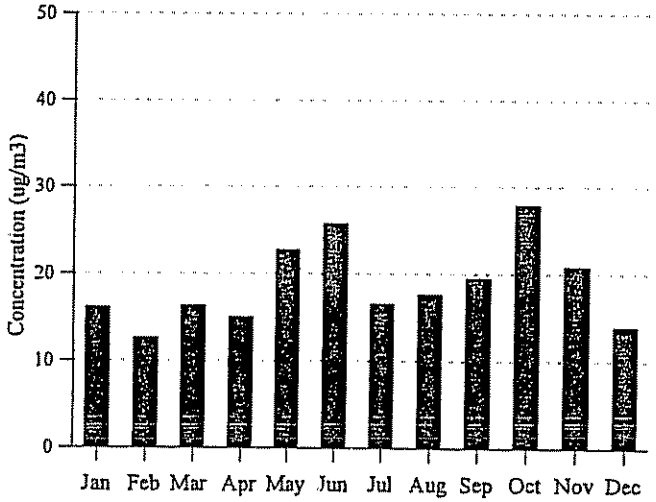


FIGURE 2-11 - MONTHLY AVERAGE PM10 CONCENTRATION

Watsonville 2001 - 2003

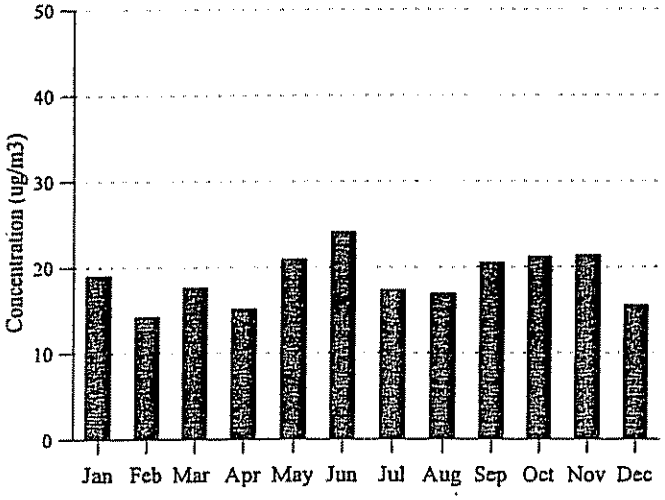


FIGURE 2-12 - MONTHLY AVERAGE PM10 CONCENTRATION

Hollister 2001 - 2003

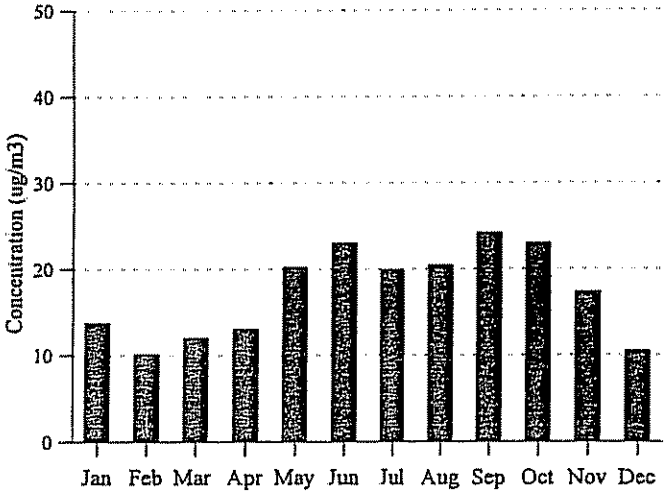


FIGURE 2-13 - MONTHLY AVERAGE PM10 CONCENTRATION

Santa Cruz 2001 - 2003

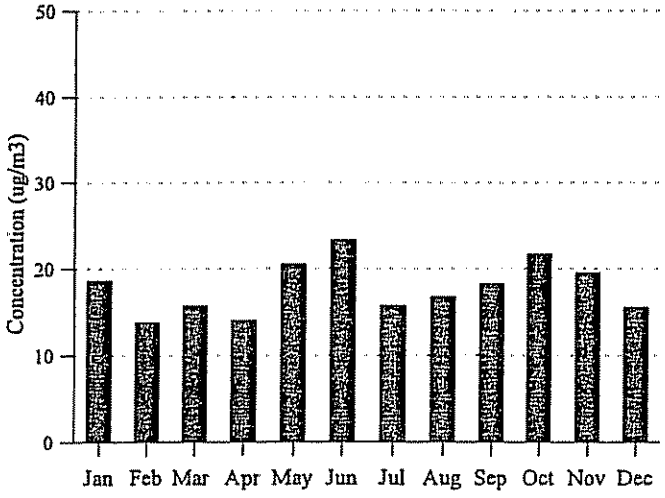


FIGURE 2-14 - MONTHLY AVERAGE PM10 CONCENTRATION

Carmel Valley 2001 - 2003

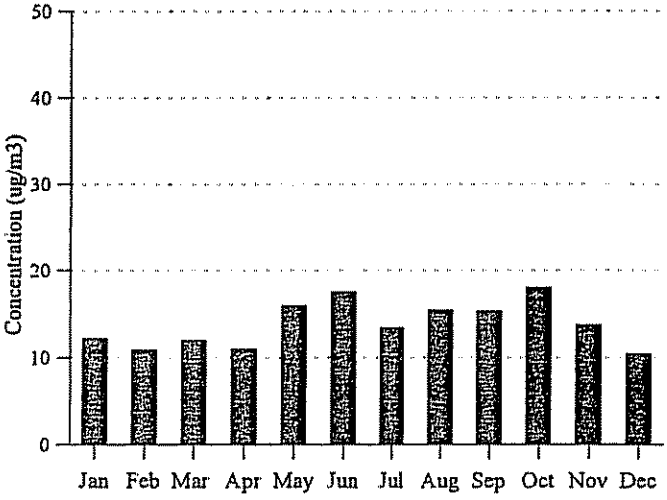


FIGURE 2-15 ANNUAL TREND COMPARED TO THE PM10 STANDARD

DAVENPORT 1993-2003

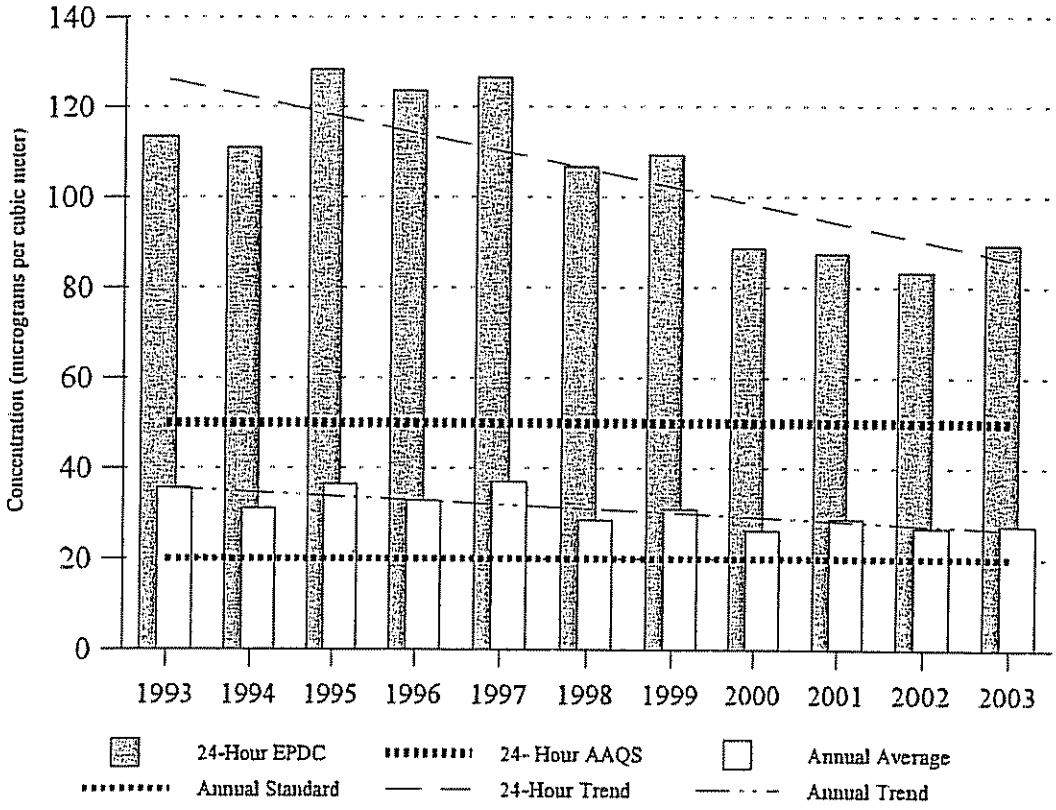


FIGURE 2-16 ANNUAL TREND COMPARED TO THE PM10 STANDARD

MOSS LANDING 1997-2003

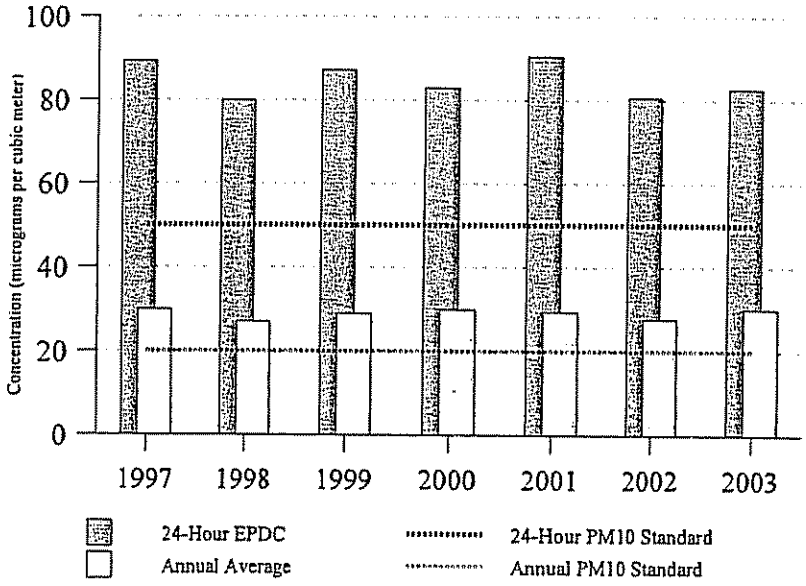


FIGURE 2-17 ANNUAL TREND COMPARED TO THE PM10 STANDARD

SALINAS 1990-2003

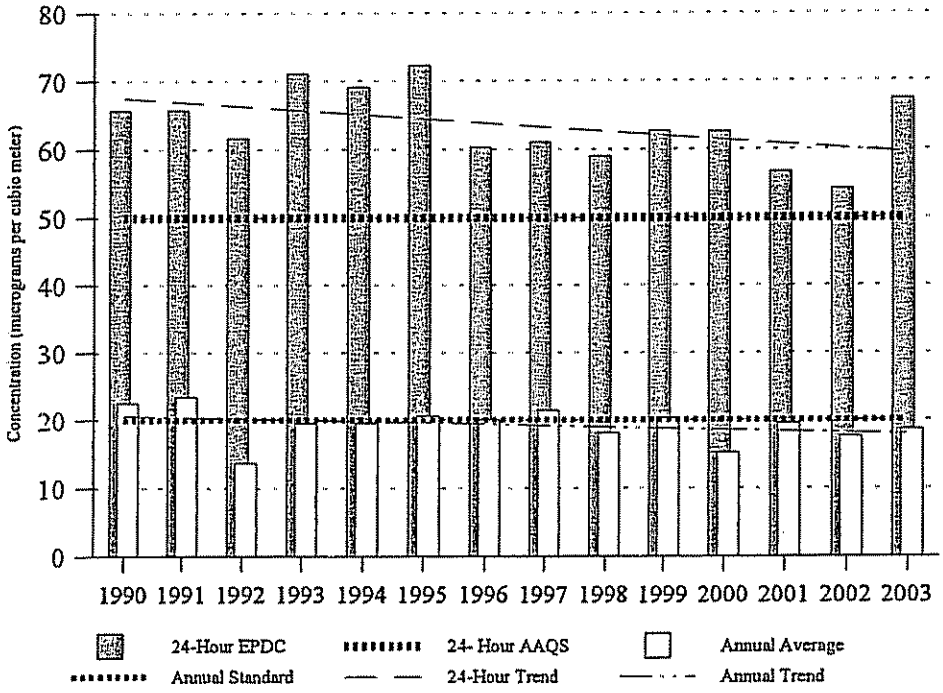


FIGURE 2-18 ANNUAL TREND COMPARED TO THE PM10 STANDARD

KING CITY 1991-2003

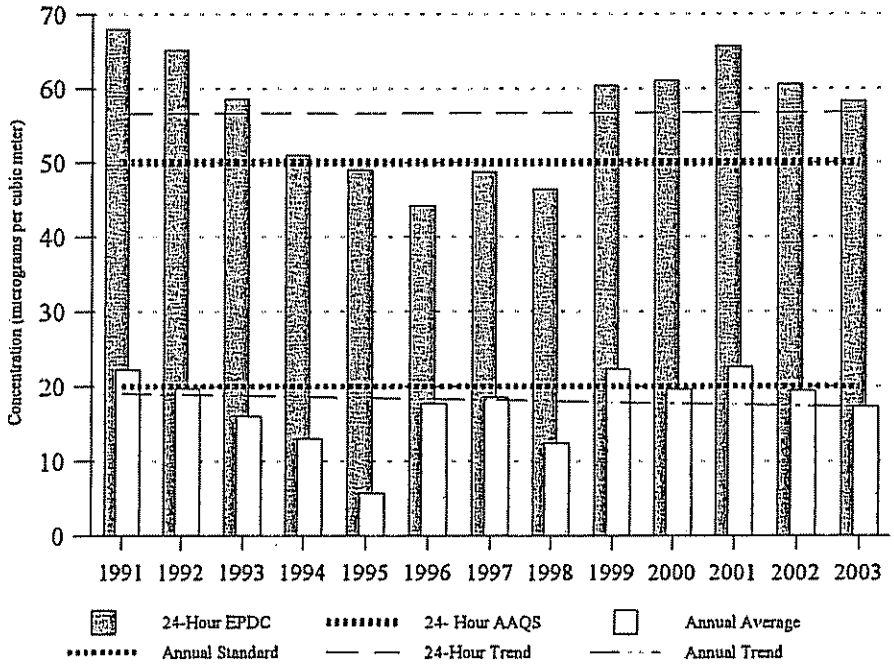


FIGURE 2-19 ANNUAL TREND COMPARED TO THE PM10 STANDARD

WATSONVILLE 1992-2003

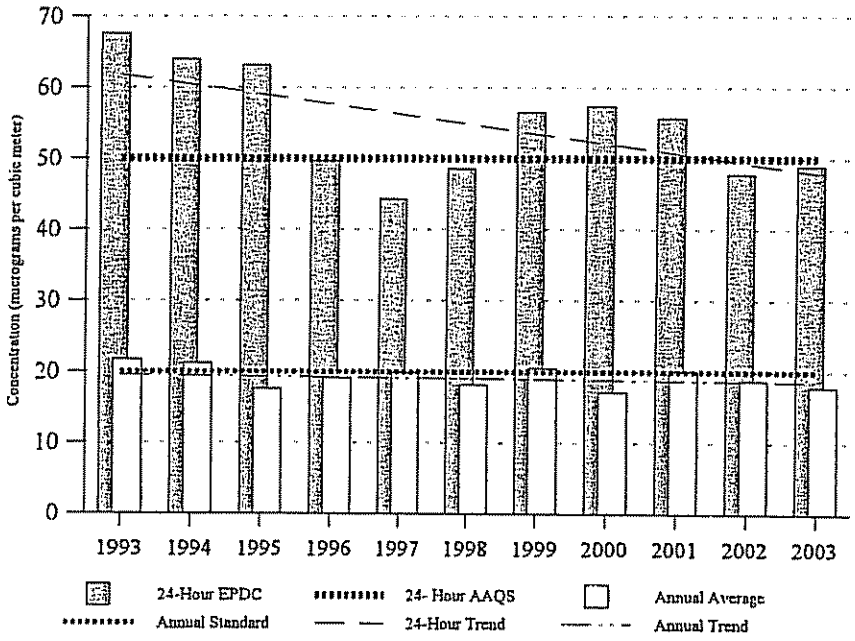


FIGURE 2-20 ANNUAL TREND COMPARD TO THE PM10 STANDARD

HOLISTER 1991-2003

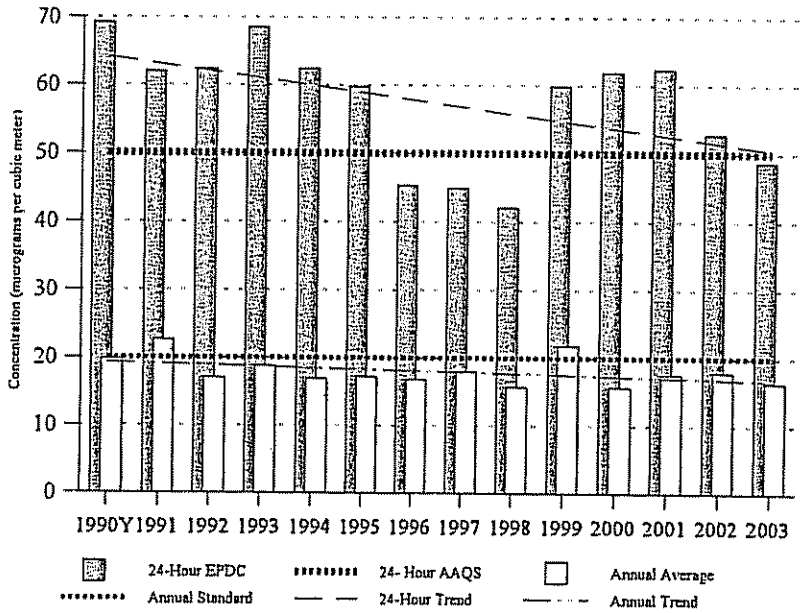


FIGURE 2-21 ANNUAL TREND COMPARED TO THE PM10 STANDARD

SANTA CRUZ 1990-2003

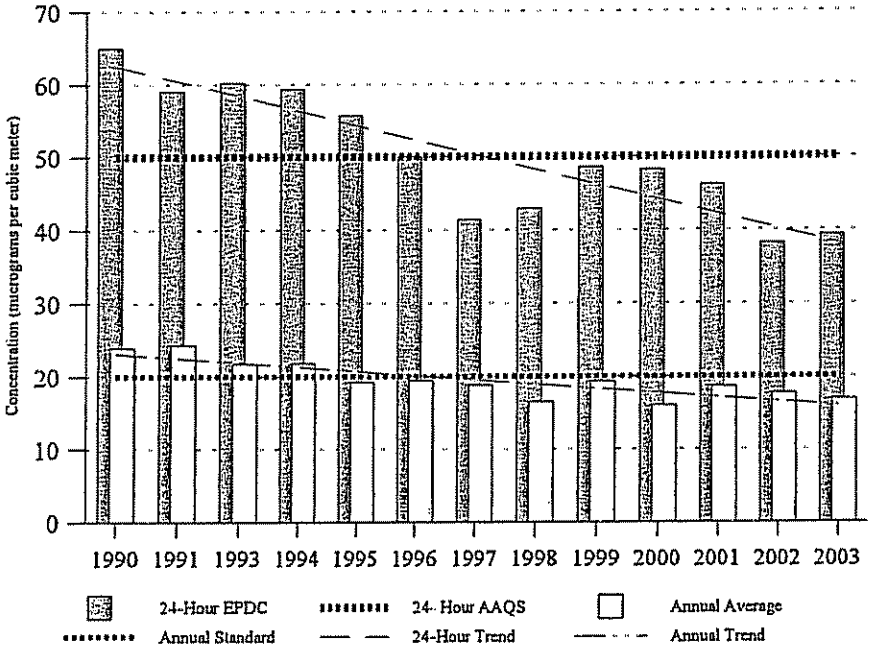


FIGURE 2-22 ANNUAL TREND COMPARED TO THE PM10 STANDARD

CARMEL VALLEY 1993-2003

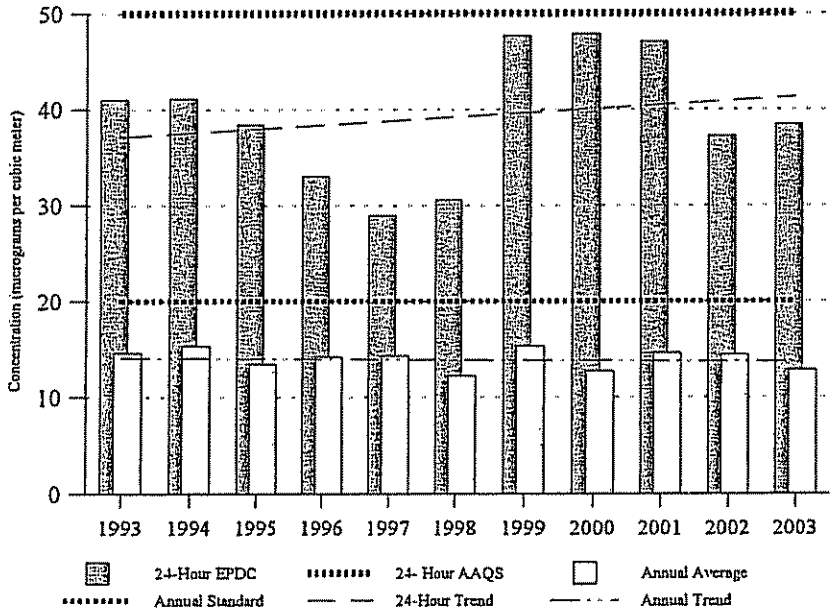


FIGURE 2-23 AVERAGE COMPOSITION OF 14 DAVENPORT EXCEEDANCES

Concentrations in Micrograms per Cubic Meter (Average PM10 65.2 ug/m3 2001-'04)

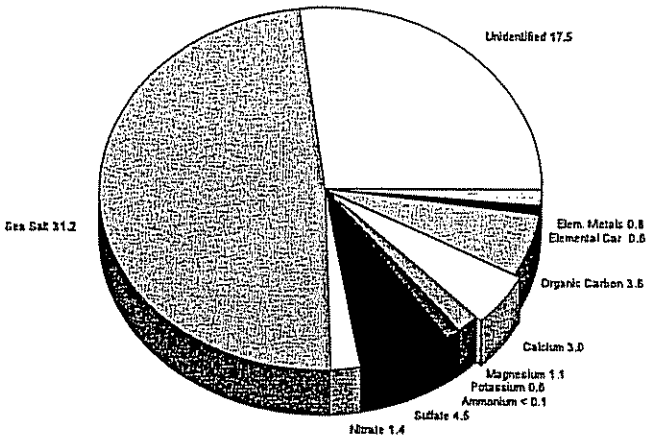


FIGURE 2-24 DAVENPORT CALCIUM IMPACTED EXCEEDANCE

May 27, 2003 PM10 Mass Concentration: 65 ug/m3

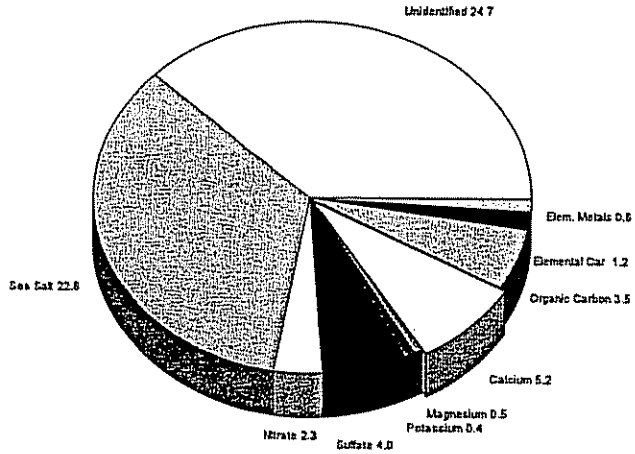


Figure 2-25 Trend in Davenport Calcium Indicator 2001-2004

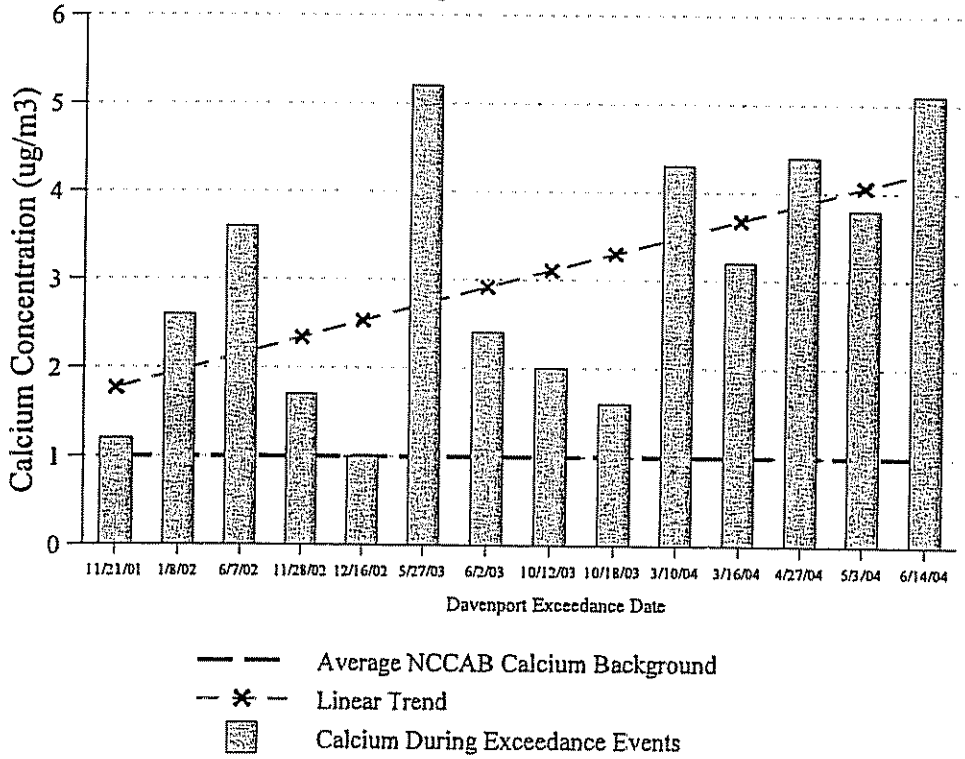


FIG. 2-26 AVERAGE COMPOSITION OF 7 MOSS LANDING EXCEEDANCES
Average PM10 Exceedance Concentration 2001-2004: 62.9 ug/m3

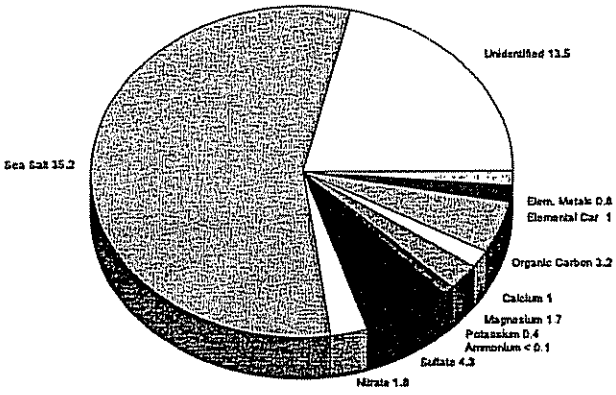


FIG. 2-27 AVERAGE COMPOSITION OF 3 SALINAS EXCEEDANCES
Average PM10 Exceedance Concentration 1997-2003: 54.2 ug/m3

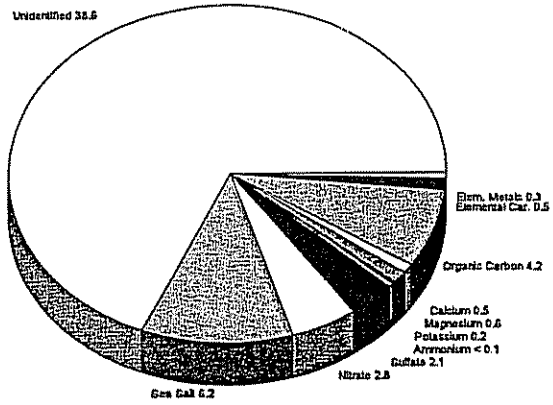


FIG. 2-28 AVERAGE COMPOSITION OF 5 KING CITY EXCEEDANCES
Average PM10 Exceedance Concentration 1999-2003: 59.8 ug/m3

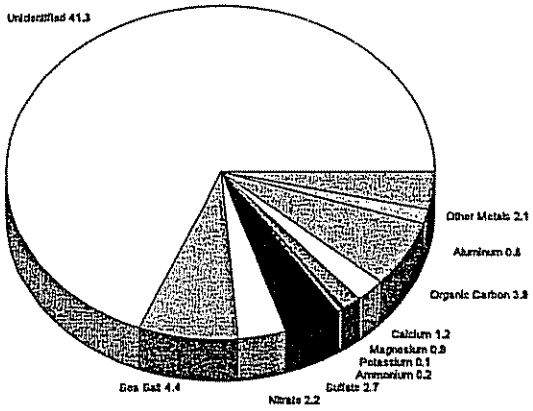


FIG 2-29 COMPOSITION OF HOLLISTER EXCEEDANCE - Sept. 19, 2002
PM10 Concentration : 59.0 ug/m3

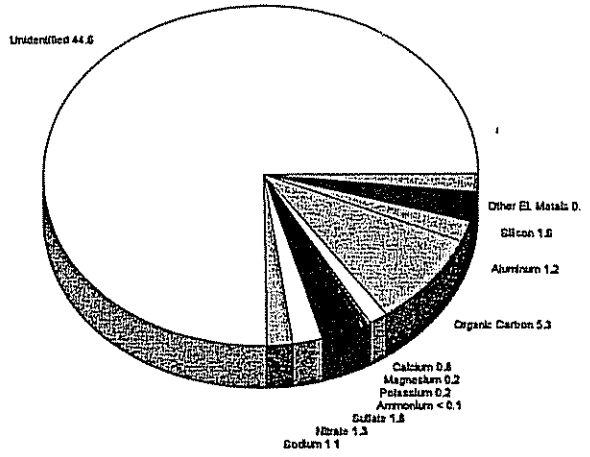


FIGURE 2-30 EXCEEDANCE IMPACTED BY KIRK COMPLEX WILDFIRES

9/27/1999 Carmel Valley: 56.5 Micrograms per Cubic Meter

(Concentrations in Micrograms per Cubic Meter)

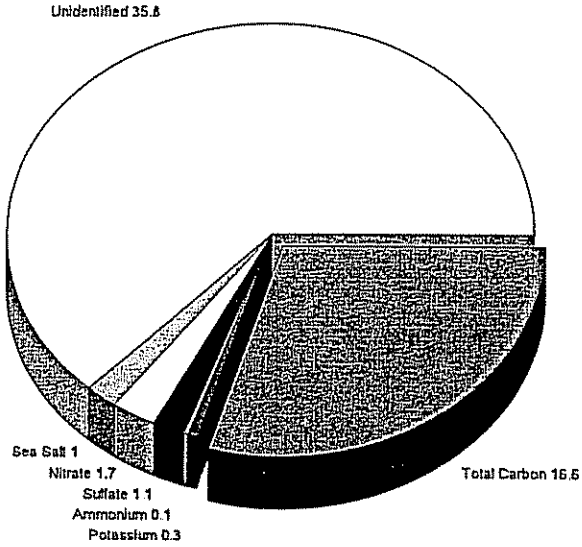
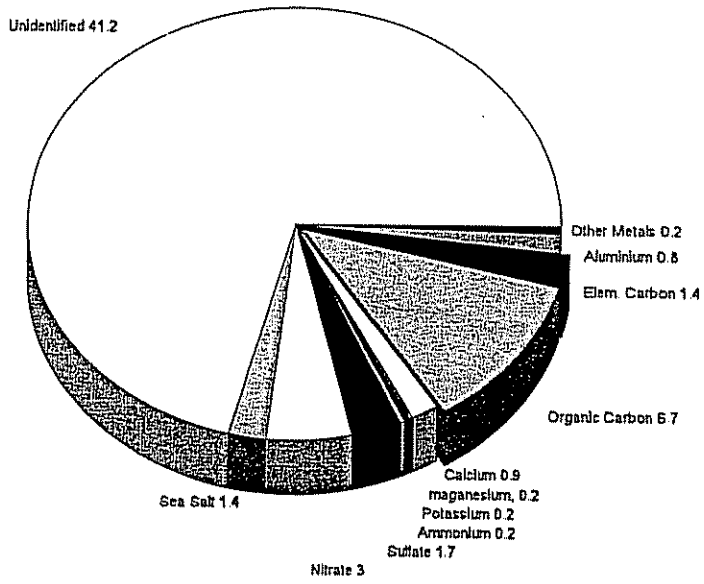
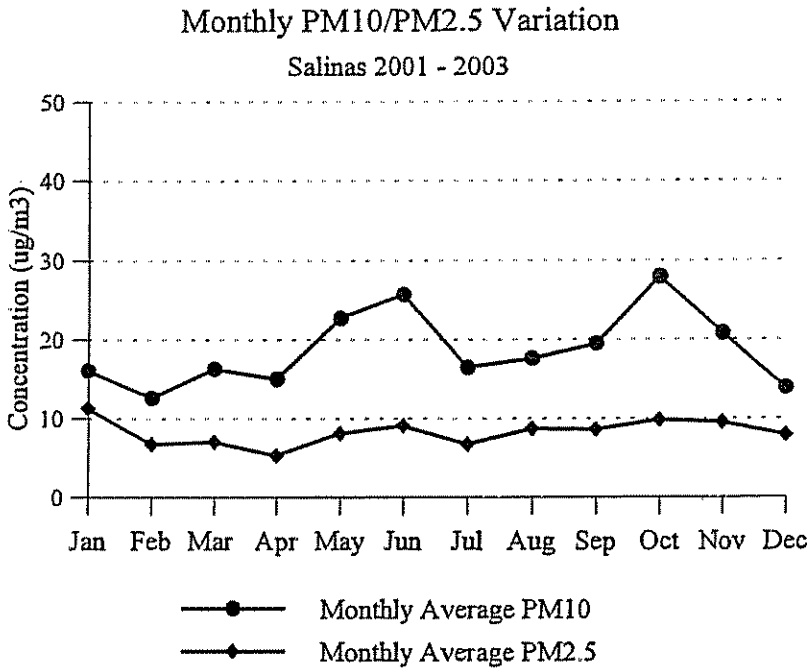


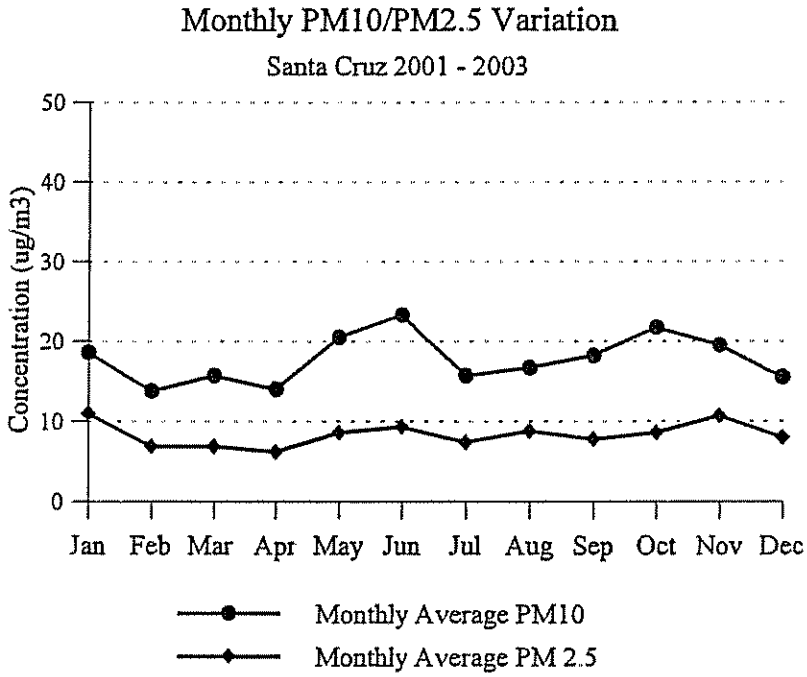
FIGURE 2-31 EXCEEDANCE IMPACTED BY FORT ORD OCTOBER 2003 FIRE

October 25/26, 2003 Salinas: 55.4 Micrograms per Cubic Meter

(Concentrations in Micrograms per Cubic Meter)




Monthly PM10/PM2.5 Variation
Salinas 2001 - 2003
Concentration (ug/m3)
50
40
30
20
10
0
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Monthly Average PM10
Monthly Average PM2.5


Monthly PM10/PM2.5 Variation
Santa Cruz 2001 - 2003
Concentration (ug/m3)
50
40
30
20
10
0
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Monthly Average PM10
Monthly Average PM 2.5

3.0 EFFECTS OF PARTICULATE MATTER ON HEALTH AND VISIBILITY

3.1 EFFECTS ON HEALTH

Particulate Matter

EPA based its 1997 decision to adopt new particulate matter standards on health information provided in the agency's Criteria Document for Particulate Matter (PM) and Staff Report. The Criteria Document concludes:

> "The evidence for PM-related effects from epidemiological studies is fairly strong, with most studies showing increases in mortality, hospital admissions, respiratory symptoms, and pulmonary function decrements associated with several PM indices. These epidemiological findings cannot be wholly attributed to inappropriate or incorrect statistical methods, misspecification of concentration-effect models, biases in study design or implementation, measurement errors in health endpoint, pollution exposure, weather or other variable, nor confounding of PM effects with other factors. While the results of the epidemiology studies should be interpreted cautiously, they nonetheless, provide ample reason to be concerned that there are detectable health effects attributable to PM at levels below the current NAAQS."

As discussed in the Criteria Document, key health effects categories associated with PM include:

- premature mortality
- aggravation of respiratory and cardiovascular disease as indicated by increased hospital admissions, emergency room visits, school absences, work loss day, and restricted activity
- changes in lung function and increased respiratory symptoms
- changes to lung tissues and structure and
- altered respiratory defense mechanisms.

According to EPA, the recent epidemiological information indicates that several subpopulations are apparently more sensitive to effects of community air pollution containing PM. Observed effects include decreases in pulmonary function reported in children and increased mortality reported in the elderly and individual with cardiopulmonary disease.

Particulate Matter and Size

The Criteria Document addresses health effects associated with PM_{10} and $PM_{2.5}$. The coarse fraction of PM_{10} (greater than 2.5 microns) is generally associated with primary particulates such as dust. The finer fraction (2.5 microns and less) is generally related to secondary aerosols such as sulfates and nitrates which are oxidized in the atmosphere from nitrogen oxides and sulfur dioxides. $PM_{2.5}$ is also directly emitted from combustion processes occurring in mobile and stationary sources.

EPA states:

"... Both fine and coarse fraction particles can deposit in the thoracic regions of the respiratory tract. However, based on atmospheric chemistry, exposure, and mechanistic considerations, the Criteria Document concludes it would be most appropriate to "consider fine and coarse mode particles as separate subclasses of pollutants" (U.S. EPA, 1996a, p. 13-94), and to measure them separately as a basis for planning effective control strategies.

Given the significant physical and chemical differences between the two subclasses of PM_{10} (U.S. EPA, 1996b, pp. V-69-78), it is reasonable to expect that differences may exist between fine and coarse fraction particles in both the nature of potential effects and the relative concentrations required to produce such effects. The Criteria Document highlights a number of specific components of PM that could be of concern to health, including components typically within the fine fraction (e.g., acid aerosols including sulfates, certain transition metals, diesel particles, and ultrafine particles), and other components typically within the coarse fraction (e.g., silica, resuspended dust, and bioaerosols). While components of both fractions can produce health effects, in general the fine fraction appears to contain more of the reactive substances potentially linked to the kinds of effects observed in the epidemiological studies. The fine fraction also contains by far the largest number of particles and a much larger aggregate surface area than the coarse fraction. The greater surface area of the fine fraction increases the potential for surface absorption of other potentially toxic components of PM (e.g., metals, acids, organic materials), and dissolution or absorption of pollutant gases and their subsequent deposition in the thoracic region.

"The Staff Paper presents the available quantitative and qualitative information on the effects of fine particles and its constituents (U.S. EPA, 1996b, pp. V-60-63). Because of the number of pertinent studies published since the last review, far more quantitative epidemiological data exist today for relating fine particles to mortality, morbidity, and lung function changes in sensitive subpopulations, in terms of both short- and long-term ambient concentrations, than was the case for PM_{10} at the conclusion of the last review. (The 1986 Staff Paper cited PM studies conducted in essentially three locations as a basis for the 24-hour standard, and four studies involving a total of 10 cities as a basis for the annual standard; none measured PM_{10} directly [EPA, 1986b]). Like the more numerous PM_{10} studies, the fine particle studies (e.g., studies using $PM_{2.5}$, sulfates) generally find statistically significant positive associations between fine particle concentrations and mortality and morbidity endpoints, with more than 20 studies conducted in a number of geographic locations throughout the world, including the U.S., Canada, and Europe. More specifically, daily mortality effects estimates reported for $PM_{2.5}$ fall within the range of approximately 3 to 6 percent increases in relative risk for a 25 $\mu g/m^3$ increase in 24-hour average $PM_{2.5}$ concentrations, for those cities with statistically significant positive associations (U.S. EPA, 1996b, Table V-12). This collection of studies shows qualitative coherence in the types of health effects associated with fine particle exposure including mortality, morbidity, symptoms, and changes in lung function (U.S. EPA, 1996b, Tables V-11 to V-13).

"By contrast, the current review finds much less direct epidemiological or toxicological evidence regarding the potential effects of coarse fraction particles at typical ambient concentrations. As discussed in the Staff Paper, community epidemiological studies directly comparing the effects of fine and coarse fraction

particles provide evidence that reported PM associations with mortality and decreased lung function in children are more likely associated with fine fraction particles (U.S. EPA, 1996b, pp. V-63-67). On the other hand, both past and current reviews of occupational and toxicological literature have found ample qualitative reasons for concern about higher-than-ambient concentrations of coarse fraction particles. At such elevated levels, coarse fraction particles are linked to short-term effects such as aggravation of asthma and increased upper respiratory illness, which are consistent with enhanced deposition of coarse fraction particles in the tracheobronchial region (U.S. EPA, 1996a, p. 13-51). Children may be particularly sensitive to such an effect, since they typically spend more time in outdoor activities, such that they may encounter higher exposures and doses of coarse fraction particles than other potentially sensitive populations.

"In addition, long-term deposition of insoluble coarse fraction particles in the alveolar region may have the potential for enhanced toxicity, in part because clearance from this region of the lung is significantly slower than from the tracheobronchial region. Limited qualitative support for this concern is found in autopsy studies of animals and humans exposed to various ambient crustal dusts at or slightly above ambient levels typical in the Southwest.

"Unlike the case for fine particles, the clearest community epidemiological evidence regarding coarse fraction particles finds such effects only in areas with numerous marked exceedances of the current PM_{10} standard (U.S. EPA, 1996a, p. 13-51). In this regard, it appears that the weight of the available evidence allowing direct comparisons between the two size fractions of PM_{10} suggests that ambient coarse fraction particles are either less potent or a poorer surrogate for community effects of air pollution than are fine fraction particles...

"The Staff Paper concludes, however, that continued use of PM_{10} as the *sole* indicator for the PM standards would not provide the most effective and efficient protection from the health effects of particulate matter (U.S. EPA, 1996b, pp. VII-4-11). The recent health effects evidence and the fundamental physical and chemical differences between fine and coarse fraction particles have prompted consideration of separate standards for the fine and coarse fractions of PM_{10}. In this regard, the Criteria Document concludes that fine and coarse fractions of PM_{10} should be considered separately (U.S. EPA, 1996a, p. 13-93). Taking into account such information, CASAC found sufficient scientific and technical bases to support establishment of separate standards relating to these two fractions of PM_{10}. Specifically, CASAC advised the Administrator that "there is a consensus that retaining an annual PM_{10} NAAQS . . . is reasonable at this time" and that there is "also a consensus that a new $PM_{2.5}$ NAAQS be established" (Wolff, 1996b).

"While it is difficult to distinguish the effects of either fine or coarse fraction particles from those of PM_{10}, comparisons between fine and coarse fraction particles presented in the Staff Paper suggest that fine particles are a better surrogate for those components of PM that are linked to mortality and morbidity effects at levels below the current standards (U.S. EPA, 1996b, P. VII-18). Moreover, a regulatory focus on fine particles would likely also result in controls on gaseous precursors of fine particles (e.g., SO_x, NO_x, VOC), which are all components of the complex mixture of air pollution that has most generally been associated with mortality and morbidity effects. The Staff Paper concludes that, in contrast to fine particles, coarse fraction particles are more clearly linked with certain morbidity effects at levels above those allowed by the current 24-hour standard."

3.2 HEALTH EFFECTS OF SEA SALT

As mentioned in Chapter 2, since sea salt represents a significant source of PM_{10} at coastal sites, the District requested ARB to identify the health effects of sea salt.

The following response was provided by the ARB Executive Officer:

"From a health effects standpoint all small respirable particles are of concern, however, there are no studies that show sea salt presents a health risk based on its chemical composition."

A full copy of the letter is presented in Appendix B.

3.3 VISIBILITY EFFECTS

Effects of reduced visibility include loss of aesthetic qualities and hindrance to aviation and military experimental work. Reduced visibility is the result of gases or particles suspended in the atmosphere. Fine particles (0.1 to 2 microns) are the primary contributors to reduced visual range. Particulate nitrates contribute significantly to reduced visibility. In the South Coast Air Basin, it has been estimated that approximately 35 percent of the visibility impairment may be caused by particulate nitrates.[2]

REFERENCES

(1) National Ambient Air Quality Standards for Particulate Matter: Proposed Decision, U.S. EPA, Federal Register, November 27, 1996.

(2) Motor Vehicle Contribution to PM_{10} in California, Air Resources Board, 1988.

4.0 PM_{10} EMISSION INVENTORY

4.1 BACKGROUND

Atmospheric particles originate from a variety of natural and human caused sources and posses a range of structural, chemical and physical properties. The mixture of particles present in the air at any one time may contain a variety of inorganic ions and elements, elemental carbon, organic material and soil related compounds. The organic fraction is especially complex with hundreds of organic compounds having been identified in atmospheric aerosols, e.g., nitrated organic compounds. Although the composition of particles emitted into the atmosphere is complex and variable, the ambient PM_{10} air quality standards, and consequently the emission inventory, are based on the basic mass of PM_{10} emitted to the atmosphere and not its composition.

Particles are classified as primary or secondary depending on their origin. Primary particles are unchanged after being directly emitted, e.g., wind-blown dust, sea salt, road dust, mechanically generated particles and combustion-generated particles such as smoke or soot. Aside from naturally occurring sea salt, fugitive dust is the major contributor to primary PM_{10} in the NCCAB. The directly emitted PM_{10} and $PM_{2.5}$ particulate constituents of motor vehicle exhaust are included in the primary emission inventory. This includes the PM_{10} mass of toxic diesel exhaust.

Secondary particulates and aerosols are among the smallest particulates in the atmosphere. Their diameters are generally smaller than a pinpoint and are often less than one micron. They can be either solid, liquid or a combination of both. Aerosols are generally not emitted directly but are formed over time and distance from the source as secondary and tertiary products due to chemical transformation, coagulation or interaction with other aerosols. Aerosols can be important because they affect ambient PM_{10} levels and can be transported over long distances. Some of the chemical ingredients involved in the formation of aerosols, such as NO_x and certain organic compounds, are also involved in the formation of photochemical smog. Nitrates can be formed as a secondary product of combustion emissions which originate from industrial facilities such as power plants or the tailpipes of cars and are then carried long distances by the wind.

The PM_{10} emission inventory is based on PM_{10} direclty emitted from human causaed processes and does not include secondary particles since there are no accepted modeling tools which allow the attribution of secondary sulfates, nitrates, and organics to the emitters of their precursors. Chemical analysis of the exceedance filters indicates that these secondary particles are not a major cause of exceedances in the NCCAB.

4.2 EMISSION INVENTORY DEVELOPMENT PROCESS

The emission inventory is a summary of estimated human caused PM_{10} emissions from primary sources of particulate matter in the area that contribute to PM_{10} air pollution. It is a first step in gaining insight into the sources of PM_{10} pollution that cause the NCCAB to be a nonattainment area for the State PM_{10} standard. By understanding the causes of high PM_{10}, using information derived from both the inventory and the filter analysis, control strategies can be developed with the objective of achieving the standard.

Emissions are grouped according to source types which are aggregated into three major categories. These are the stationary, area and mobile source categories. Stationary sources generally pertain to fairly large industrial facilities such as cement plants or large quarry operations. Area sources represent cumulative total emissions from a large number of individually small sources, such as construction projects or agricultural tilling operations. Mobile sources relate to emissions caused by a variety of on-road and off-road motor vehicles. Within each major category are a number of subcategories.

Development of the emission inventory for the entire air basin is a fairly involved process. The inventory is based on a number of factors unique to each county in the region. Briefly, these include the amount of unpaved and paved roads in the area, agricultural acreage, population, daily vehicle miles traveled (VMT), soil characteristics, the amount of prescribed burning in the area, projected construction activity, the nature of stationary sources in the area as well as a number of other factors. Past and future activity indicators are developed and projected into the future for each category. Emission factors are then assigned to the projected levels of activity for each category. From these projections, past, current and future levels of emissions, in tons per day, are estimated for each year in the inventory series. The daily emissions presented in this plan relate to a summer seasonal day, which is a season when man-made PM_{10} levels tends to be highest.

The emission estimates pertain to anthropogenic emissions rather than those caused by natural processes. For instance, wind blown fugitive dust originating from surfaces disturbed by human activities is included in the anthropogenic inventory. However, naturally occurring sea salt, the primary cause of many NCCAB exceedances, is not included in the inventory. Natural processes are not included on the inventory because they are beyond regulatory control.

Data used to produce the emission inventory are developed by ARB, the District as well as regional planning agencies such as the Association of Monterey Bay Area Governments. These data, as well as the associated emission factors, are constantly refined so emission inventories are periodically updated. The three county regional emission inventory should be regarded as a general indicator of sources contributing to PM_{10} levels in the air basin and not a definitive tool for explaining individual violations of the standard, which cause the area to become nonattainment. Since the analysis of specific exceedances indicate that they are often caused by nearby sources, the overall inventory may not be representative of source contribution during a specific exceedance event. For instance, an exceedance caused largely by the construction dust category, which only represents about 4% of the regional emission inventory, may not appear in the same proportion in the regional inventory as it does in the PM_{10} mass collected on the particular exceedance filter. However, the emission inventory does provide a useful resource for screening prospective sources contributing to exceedances as well as future trends related to the particular category of concern.

4.3 EMISSION INVENTORY AND FORECASTS

Table 4-1 summarizes the primary PM_{10} emission inventory and forecasts for the NCCAB for the years 1990 to 2020. A more detailed distribution of the emission inventory at the sub-category level is also presented in Appendix C. Please note that for 2000 to 2020 the inventories are in 5 year increments, while 1990 to 2000 is a 10 year increment.

The inventory indicates that fugitive dust is the major contributor to primary PM_{10} in the NCCAB. Combined fugitive dust sources comprise about three quarters of the 2005 emission inventory. Fugitive dust consists of geological material that is suspended into the atmosphere by wind and human activities such as motor vehicle travel on paved and

unpaved roads, construction and demolition of buildings and roads, wind erosion of disturbed surfaces and especially agricultural tilling. The major non-fugitive dust sources in the NCCAB, which make up the balance of the inventory, are fuel combustion sources related to industrial processes, waste burning (prescribed fire), and motor vehicle exhaust. PM_{10} emissions from waste burning represent about fifteen percent of the emission inventory, industrial sources about five percent, and motor vehicle exhaust emissions and tire wear only about three percent.

In preparation for the 1998 plan, and due to expected increases in prescribed burning as a means of habitat management by land management agencies, the District conducted a detailed survey of land managers involved with prescribed burning in our area to update the current as well as forecast year emission estimates. Updated information on projected levels of burning of various vegetation types was obtained by the survey. Updated emission factors were also applied based on the vegetation types that are most representative of the types burned in our area. The results produced significant increases in estimated emissions for the prescribed burn category, particularly for the emission forecasts since these reflected land manager's long term goals to increase the use of prescribed fire for implementation of their habitat management plans.

Figure 4-1 illustrates the inventory presented in Table 4-1. It shows the overall inventory trend for the years 1990 to 2020 as well as the trend for major categories affecting the overall trend. The figure shows the overall inventory growing from about 92 tons per day in 1990 to about 109 tons per day in 2020. Agricultural related fugitives, coupled with entrained road dust comprise about three quarters of the entire inventory. Emissions from entrained road dust are projected to exceed that from agricultural sources by 2015. Figure 4-1 further indicates that agricultural related fugitives provide a significant no growth baseline (about 38 tons per day) for the inventory, while much of the growth in emissions over that period is driven by increases in the entrained road dust categories and increased emissions from increasing usage of prescribed fire as a habitat management tool.

A slight decrease in emissions is shown in Figure 4-1 between 1990 and 2000. This nuance is due to the closure of several large facilities in the mineral processing category.

Compared to the emission inventory in the 1998 plan, the overall PM_{10} inventory for 2005 and 2010 is slightly lower than the forecasts developed for the 1998 plan for those same years. This is primarily due to revised population and VMT forecasts which are slightly lower. The revised lower forecasts have the effect of reducing estimated fugitive dust related to travel, especially for the unpaved road category. Revised PM_{10} emission estimates related to construction activity and fugitive wind blown dust from soil surfaces disturbed by human activities are also lower in this plan as compared to the 1998 plan.

Compared to current 2005 conditions, the forecasts for PM_{10} show increasing emissions, growing from about 102 tons per day in 2005 to about 109 tons per day in 2020, a seven percent increase. The increase is generally due to growth in motor vehicle activity, mineral processing, construction/demolition activities, and prescribed burning.

4.4 CATEGORY RANKINGS

Table 4-2 ranks the 37 inventory categories presented in Table 4-1 in terms of the top 20 contributors to the 2005 inventory. As can be seen, the number one category is fugitive dust in the form of entrained road dust from unpaved roads. This single most significant category represents nearly 25% of the entire 2005 inventory. This is followed by prescribed

fires, which represent about 17% of the inventory. However, unlike low-level fugitive dust, smoke from prescribed fires generally rises vertically into the atmosphere and is typically from operations conducted away from population so, with the exception of Fort Ord, these emissions generally have less impact on the public at ground-level than low level sources of fugitive dust. Closely following, the third highest contributor is fugitive dust from agricultural tilling which represents about 16 tons per day or 15% of the inventory. Seven of the top eight contributor categories represent fugitive dust sources. Together, these 7 fugitive dust categories represent over three quarters of the entire 2005 PM_{10} inventory.

4.5 AVERAGE DAILY AND EPISODIC DAILY EMISSIONS

The emission inventory represents average daily emission during a typical summer day. For inventory purposes, this spans the dry season months May through October. The generic daily averages are typically determined by taking the total amount of activity expected during the season and dividing by the number of days in the season. This is the standard approach for developing overall planning inventories, which must accommodate a large variety of source types into a single resource.

However, some categories in the inventory, such as those related to prescribed burning, are not uniform, as most of the activity occurs over a relatively few number of days during the season. Singular days when emissions for a particular category are usually high may be regarded as episodic days. Since the planning inventory presented in this plan is based on average conditions, it does not capture these spike or episodic conditions. These conditions are addressed through District Rules and Regulations which are intended to control potential episodes by limiting daily emissions and preventing high emission activities on days when pollution levels are already high in the air basin.

Episodic inventories, while not used in this type of planning document, are useful for modeling purposes where the objective is to model air quality impacts due to high emissions from a particular category or due to regional pollution transport or air stagnation.

4.6 TREND IN PM_{10} PRECURSOR EMISSIONS

As listed in Section 70200, Title 17 of the California Code of Regulations, both the oxides of nitrogen (NO_x) and reactive organic gases (ROG) are precursors to PM_{10}. They are also common precursors to ozone.

Figure 4-2 presents the NO_x and ROG emission inventories for 1990 to 2020 from the District's 2004 Air Quality Management Plan for ozone. As can be seen from the figure, emission of both NO_x and ROG are shown to decline throughout the entire 30 year period. The secondary PM_{10} products of these precursors include nitrates and certain organic species. Although compared to primary PM_{10}, these secondary species are generally minor contributors to exceedances in the NCCAB; this downward favorable trend should be beneficial in improving air quality for both ozone and PM_{10}.

4.7 TREND IN POPULATION AND EMISSIONS

Figure 4-3 compares the growth in population with the growth in PM_{10} emissions. The figure shows that, unlike the ozone planning inventory which is decreasing with increasing population due to aggressive controls on emissions, the PM_{10} inventory is generally growing with population. This is largely due to growth in vehicle travel which results in uncontrolled growth in the entrained road dust categories, from both unpaved and paved roads.

TABLE 4-1 NCCAB PM_{10} EMISSION INVENTORY AND FORECASTS 1990-2020

SOURCE CATEGORY	1990	2000	2005	2010	2015	2020
STATIONARY SOURCES:						
Fuel Combustion						
Electric Utilities	0.84	0.94	1.17	1.25	1.25	1.25
Cogeneration	0.04	0.02	0.03	0.03	0.03	0.03
Oil and Gas Production	0.68	0.03	0.03	0.03	0.03	0.03
Manufacturing and Industrial	0.40	0.44	0.50	0.55	0.60	0.64
Food and Agricultural Processing	0.07	0.08	0.07	0.07	0.06	0.05
Service and Commercial	0.05	0.05	0.06	0.06	0.06	0.06
Other	0.01	0.01	0.01	0.01	0.01	0.01
TOTAL FUEL COMBUSTION	2.10	1.57	1.88	2.00	2.04	2.07
Waste Disposal						
Landfills & Incinerators	0.00	0.01	0.01	0.01	0.01	0.01
TOTAL WASTE DISPOSAL	0.00	0.01	0.01	0.01	0.01	0.01
Petro Production						
Oil and Gas Production	0.04	0.00	0.00	0.00	0.00	0.00
Cooling Towers	0.00	0.00	0.00	0.01	0.01	0.01
TOTAL PETRO PRODUCTION	0.04	0.00	0.00	0.01	0.01	0.01
Industrial Processes						
Chemical	0.00	0.00	0.00	0.00	0.00	0.00
Food and Agriculture	0.26	0.16	0.16	0.16	0.16	0.16
Mineral Processes	6.11	2.32	2.69	2.92	3.15	3.35
Wood & Paper	0.00	0.04	0.04	0.04	0.04	0.05
Electronics	0.00	0.00	0.01	0.01	0.01	0.01
Other	0.01	0.06	0.07	0.08	0.09	0.10
TOTAL INDUSTRIAL PROCESSES	6.38	2.57	2.96	3.21	3.46	3.67
TOTAL STATIONARY	**8.51**	**4.16**	**4.85**	**5.22**	**5.51**	**5.75**
AREA-WIDE SOURCES:						
Miscellaneous Processes						
Residential Fuel Combustion	0.89	0.82	0.81	0.80	0.80	0.81
Agricultural Tilling	15.75	15.70	15.68	15.66	15.63	15.61
Harvest Operations	0.43	0.43	0.43	0.43	0.43	0.43
Cattle Feedlot Dust	0.04	0.03	0.03	0.03	0.03	0.03
Construction & Demolition	4.49	4.33	4.54	4.69	4.89	5.07
Fugitive Windblown Dust - Ag Lands	15.16	15.12	15.10	15.07	15.05	15.03
Fugitive Windblown Dust - Pastures	4.20	4.19	4.18	4.17	4.17	4.16
Entrained Road Dust - Farm Roads	2.59	2.58	2.58	2.57	2.57	2.57
Fugitive Windblown Dust - All Unpaved Rds	0.87	0.68	0.68	0.68	0.68	0.68
Structural & Auto Fires	0.01	0.01	0.02	0.02	0.02	0.02
Prescribed Burns	7.30	8.34	17.40	17.80	17.80	17.81
Commercial Charbroiling	0.32	0.32	0.36	0.38	0.41	0.44
TOTAL MISC PROCESSES	49.46	49.96	59.19	59.72	59.90	60.07
TOTAL AREA-WIDE	**49.46**	**49.96**	**59.19**	**59.72**	**59.90**	**60.07**
MOBILE SOURCES:						
On Road Motor Vehicles	1.72	1.23	1.25	1.24	1.23	1.26
Entrained Road Dust - Paved Roads	7.50	8.82	9.93	11.18	12.29	13.41
Entrained Road Dust - Unpaved Non-ag Rds	20.07	20.03	22.64	23.18	23.81	24.58
Aircraft	0.06	0.06	0.06	0.07	0.07	0.07
Trains	0.09	0.12	0.12	0.11	0.11	0.11
Ships & Commercial Boats	0.03	0.02	0.02	0.02	0.02	0.02
Recreational Boats	0.21	0.31	0.46	0.51	0.57	0.60
Off-Road Recreational Vehicles	0.00	0.00	0.00	0.00	0.00	0.00
Off-Road Equipment	0.70	0.48	0.43	0.37	0.31	0.26
Farm Equipment	0.75	0.51	0.44	0.37	0.28	0.22
TOTAL MOBILE SOURCES	**33.70**	**36.16**	**37.95**	**39.61**	**41.26**	**43.11**
TOTAL ALL SOURCES	**91.67**	**90.28**	**101.99**	**104.55**	**106.67**	**108.93**

TABLE 4-2 TOP 20 PM_{10} EMISSION INVENTORY CATEGORIES

Rank	Source Category	2005 Inventory	
		Tons/Day	% Inventory
1.	Entrained Road Dust - Unpaved Non-Ag Roads	22.64	22.2%
2.	Prescribed Burns	17.40	17.1%
3.	Agricultural Tilling	15.68	15.4%
4.	Fugitive Windblown Dust - Ag Lands	15.10	14.8%
5.	Entrained Road Dust - Paved Roads	9.93	9.7%
6.	Construction & Demolition (Dust)	4.54	4.5%
7.	Fugitive Windblown Dust - Pastures	4.18	4.1%
8.	Mineral Processes (Cement Manufacturing, Mining)	2.69	2.6%
9.	Entrained Road Dust - Farm Roads	2.58	2.5%
10.	On Road Motor Vehicles (Exhaust, Brake & Tire Wear)	1.25	1.2%
11.	Electric Utilities	1.17	1.1%
12.	Residential Fuel Combustion	0.81	0.8%
13.	Fugitive Windblown Dust - All Unpaved Roads	0.68	0.7%
14.	Manufacturing and Industrial	0.50	0.5%
15.	Recreational Boats	0.46	0.5%
16.	Farm Equipment (Primarily Diesel Exhaust)	0.44	0.4%
17.	Off-Road Equipment (Exhaust)	0.43	0.4%
18.	Harvest Operations	0.43	0.4%
19.	Wood & Paper	0.04	0.0%
20.	Commercial Charbroiling	0.36	0.4%
	2005 INVENTORY TOTAL FOR ALL SOURCES	101.99	99.3%

FIGURE 4-1 EMISSION INVENTORY TREND 1990-2020

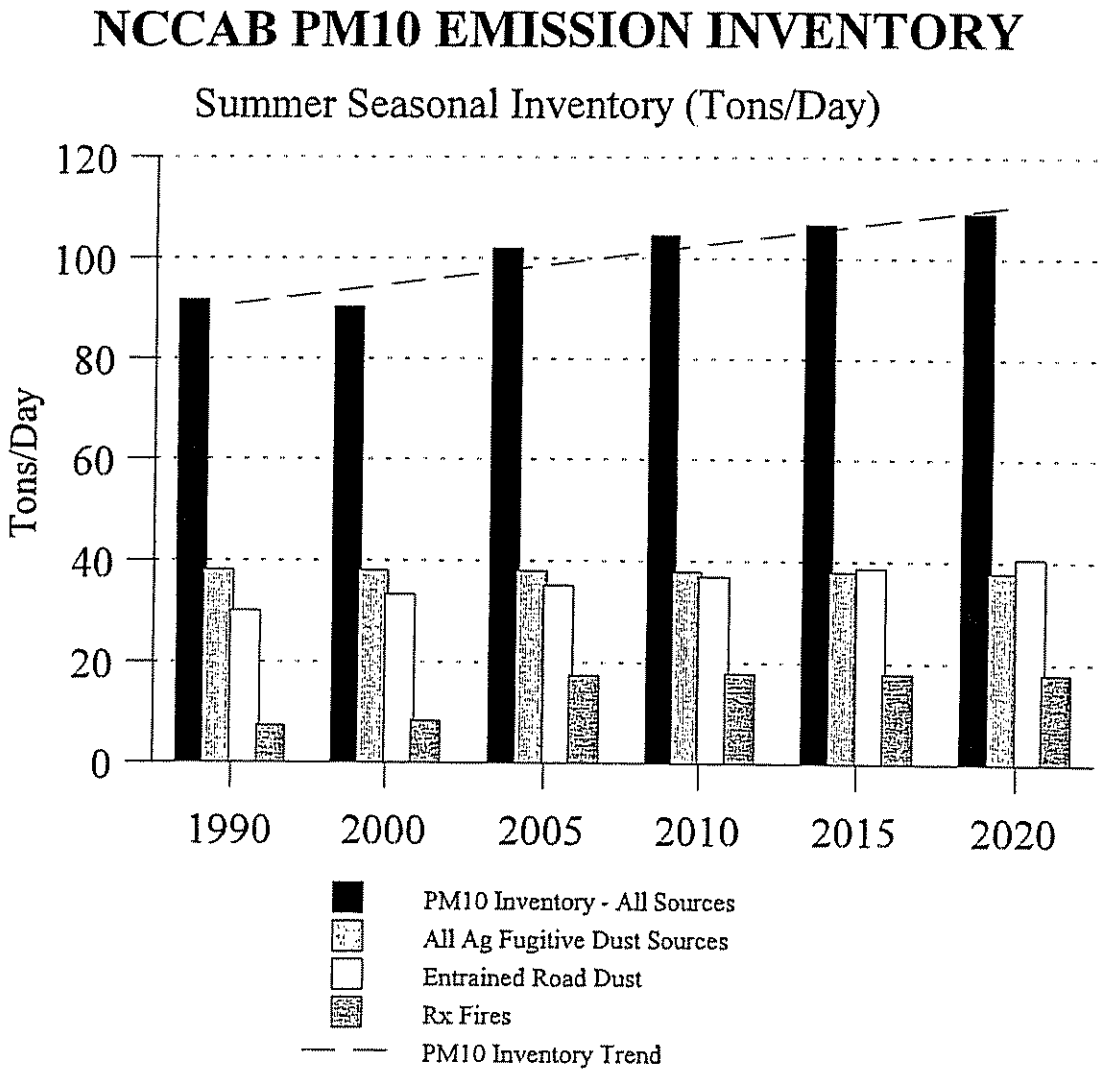
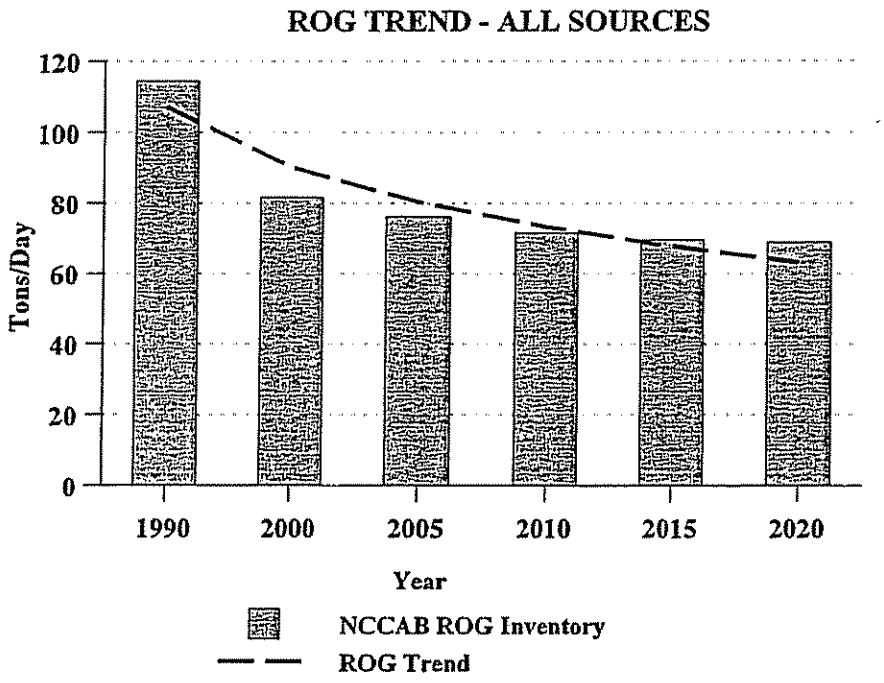


Figure 4-2

NCCAB ROG AND NO_x EMISSION INVENTORY TREND 1990-2020



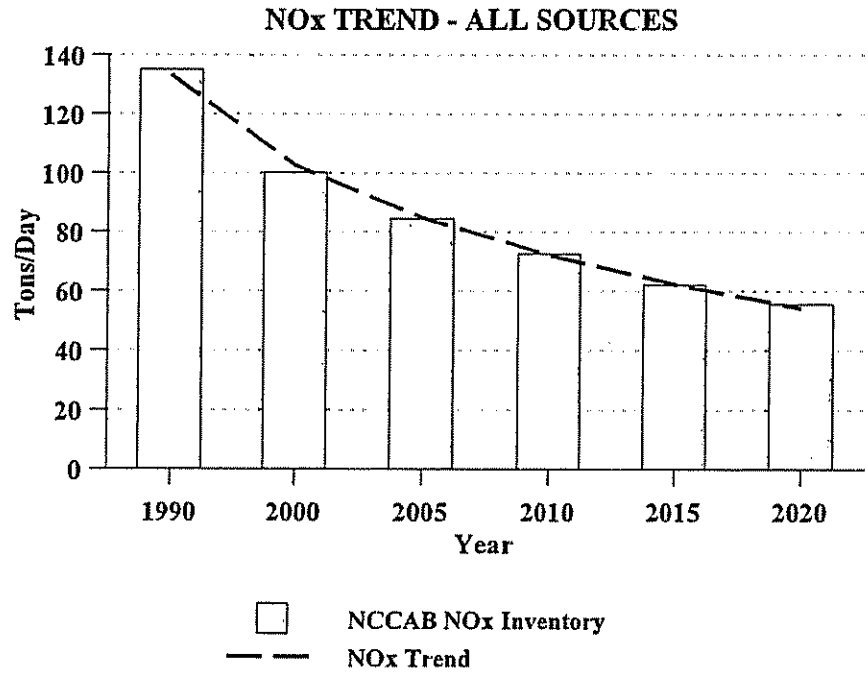
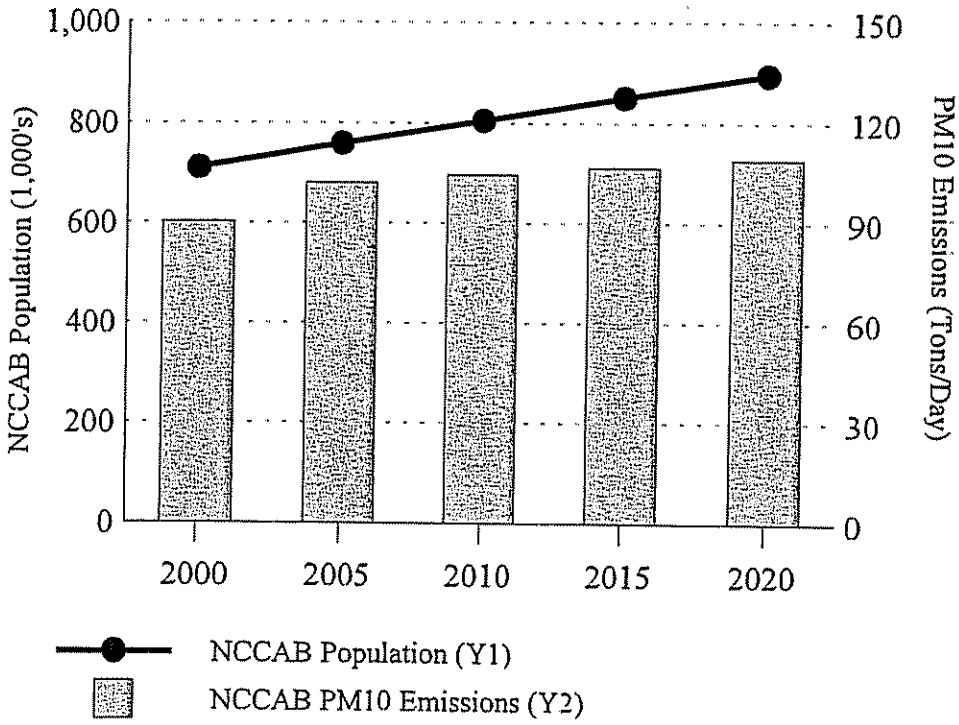


FIGURE 4-3 GROWTH IN POPULATION AND EMISSIONS

2000 - 2020



5.0 DISTRICT CONTROL MEASURES UNDER SB 656

5.1 CONTROL MEASURE REQUIREMENTS UNDER SB 656

SB 656 requires that districts review their air monitoring and emissions inventory data to determine the likely causes of violations of the State PM_{10} standard in their areas and then consider control measures that are both cost effective and feasible to reduce PM_{10}. This is to be based on a master list of existing control measures developed by other districts and the ARB. Districts are then to identify the most appropriate measures and establish an implementation schedule by July 31, 2005.

Districts are also given latitude to develop their own specific measures to address unique conditions in their particular area.

As discussed in Chapters 2 and 4, the District reviewed the area's air monitoring and emissions data and, based on the available evidence, has characterized sources that likely cause or contribute to monitored violations of the standard in the NCCAB.

As described in Chapter 2, the major cause of exceedances in the NCCAB is naturally occurring sea salt. Without the sea salt burden nearly three quarters of all NCCAB exceedances would not have occurred. The remaining exceedances are relatively infrequent and are typically only about 5 to 10 $\mu g/m^3$ above the standard. According to ARB (Appendix B), there are no planning requirements associated with sea salt. Consequently, conditions in the NCCAB do not justify an aggressive set of new control measures beyond existing District programs which include rules, permits, enforcement, incentive programs as well as CEQA Guideline practices.

For the smaller group of exceedances which remain where sea salt was not a major contributor, the causes were likely related to fugitive dust from a variety of sources. These include entrained road dust, especially from unpaved roads, wind blown dust from disturbed soil and unpaved surfaces, construction activities and agricultural sources, especially as they relate to agricultural tilling and exposed agricultural lands. Fugitive dust from cement manufacturing and handling, as well as smoke from wildland fires also contribute to exceedances of the standard at times.

The proposed activities involve control of fugitive dust, public education, administrative definitions, as well as continued enhancements to the District's Smoke Management and emission reduction incentive programs. In addition, the District also considered how controls under other regulatory programs may be beneficial in reducing regional PM_{10}. It was found that existing controls included in the District's Air Quality Management Plan for achieving the ozone standard would also be beneficial. The controls on NO_x should be most beneficial since they reduce a common precursor to both ozone and nitrates, which is generally a minor constituent found on exceedance filters.

In addition, ARB clean engine rules will also be beneficial, especially in reducing toxic diesel exhaust. However, these controls, while beneficial, do not pertain to the major causes of non-sea salt driven exceedances, which generally relate to fugitive dust.

Since the NCCAB has already achieved State and federal standards for $PM_{2.5}$, the SB 656 planning effort focuses on improving PM_{10} air quality. However, many of the measures considered, as well as statewide regulations for cleaner engines, will also be beneficial for maintaining the $PM_{2.5}$ standards.

5.2 PROPOSED CONTROL MEASURES

Fugitive dust is identified as a major source of PM_{10} in the NCCAB. Consequently, the control measures considered in this plan focus on reducing fugitive dust. In addition, as directed by the SB 656 legislation, priority is also given to reducing emissions of diesel exhaust, which has been identified as a toxic air contaminant by the ARB.

Many of the control measures do not represent major changes to existing programs. Because most exceedances in the NCCAB are caused by sea salt, which is beyond regulatory control and is not considered harmful to human health, and the few exceedances that remain where sea salt was not a major contributor are typically only about 5 to 10 $\mu g/m^3$ above the standard, conditions in the NCCAB do not require an aggressive set of new regulatory control measures beyond enhancing existing District programs that already include rules, permits, enforcement, incentive programs and environmental review of projects in accord with the California Environmental Quality Act (CEQA) Initial reductions of PM_{10} from the larger emission categories may be adequate to offset the expected overall growth in the NCCAB's PM_{10} emission inventory.

Consequentially, this effort focuses on:

- Enhancing existing programs,
- Education, and
- Incentive programs to reduce fugitive dust from a variety of sources.

The measures and activities are described in the following text and are also summarized in Table I.

D-1 Unpaved Roads - Fugitive Dust Measure

The unpaved road dust measure involves Best Management Practices (BMPs) for reducing entrained road dust from unpaved roads, which is the largest single source of fugitive dust in the NCCAB. This includes fugitive dust disturbed and made airborne (i.e entrained) by the aerodynamic wakes of vehicles traveling on unpaved roads. The unpaved road category includes city and county roads, State Parks, U.S. Forest Service, Bureau of Land Management, as well as agricultural roads. This single category represents approximately one quarter of all primary PM_{10} emissions in the NCCAB.

This BMP would be implemented primarily as a public awareness/educational effort. Implementation of this measure should also reduce dustfall on crops, homes, businesses and other property located near unpaved roads.

BMPs to be considered under this measure include:

- Encouraging use of dust suppressants, including watering or gravel.
- Applying non-toxic surfactants on unpaved roads and related equipment staging areas and unpaved parking lots.
- Recommending speed limits for vehicles traveling on unpaved roads.
- Limiting access to infrequently used unpaved roads or parking areas.

- Decreasing visible emissions at specific distances downwind of unpaved roads.
- In situations involving high volumes of traffic (> 100 vehicles per day), paving may be considered as a permanent measure on a case by case basis.

Paving as an option for implementing the unpaved road dust measure would be voluntary and would be undertaken on a case-by-case basis. As part of the description of this measure, paving would not be implemented where it might result in direct harm or mortality to individual species listed as threatened or endangered, or where it might have an adverse impact on vernal pools, drainage patterns, absorption rates, or runoff. It would also not be implemented in situations where excessive paving emissions would contribute to exceedances of the ambient air quality standards for ozone.

The BMPs for reducing fugitive dust from unpaved roads and equipment staging areas would focus on the use of non-toxic dust suppressants. Although only dust surfactants and soil binders described by manufacturers as non-toxic would be considered, they must also be acceptable to the Regional Water Quality Control Board and the Monterey Bay National Maine Sanctuary. They would also be field tested and monitored for impacts on the environment, including food safety and crop quality when used in an agricultural setting. In addition, water usage for dust suppression would be coordinated to avoid conflict with regional goals to reduce agricultural water usage.

The District also intends to conduct demonstration projects to identify the most effective types of dust suppression for the various conditions that occur in the NCCAB. Because these measures would reduce emissions of PM_{10}, a nonattainment pollutant under state law, the District may use grant incentives to help fund implementation of these BMPs.

D-2 Unpaved Roads - Speed Limits

This measure is an extension or enhancement of the first measure (D-1) and would evaluate the impact of vehicle speed on unpaved roads in creating fugitive dust, visibility impairment, nuisance and dust deposition in areas along the roadway corridor.

As with D-1, this measure would include an educational/public awareness effort to reduce emissions from travel on unpaved roads. A regulatory component would be introduced at a later date if the awareness campaign not produce the desired improvement, and would be subject to required environmental review.

On unpaved roads where effective BMP dust suppression measures are not being applied, the District might suggest a voluntary 15 mph speed limit to mitigate the excessive emissions that occur at higher speeds. If a regulatory measure to limit vehicular speed becomes necessary, it would be proposed with appropriate environmental review, as required under CEQA.

D-3 Agricultural Tilling/Land Planing

Agricultural tilling and land planing represent about 15% of the NCCAB's PM_{10} anthropogenic (man-made) emission inventory, and comprises the third highest category in the area. Agricultural tilling tends to occur during the dry season, when fugitive dust is highest. This measure would be an educational BMP, which would discourage tilling or land planing whenever the wind is greater than 25 mph.

This category is especially important for the many agricultural areas of the NCCAB where suburban land uses are often sited immediately downwind of agricultural fields. When fields are tilled, particularly under the windy conditions that prevail in the Salinas Valley during the dry season, this can become a problem. Development along this agricultural/urban interface

is expected to increase in the future, so the impacts would require greater mitigation. In addition, particulate emissions from fields disturbed under windy conditions could also affect adjacent agricultural fields and visibility on nearby roadways.

D-4 Sea Salt Exemption

According to the ARB, sea salt has no demonstrated health effects or corresponding planning requirements. Consequently, the District would request that ARB exempt the portion of the PM_{10} sample represented by sea salt. Based on 2001-2003 data, exempting the portion of the sample mass represented by sea salt would eliminate about two thirds of NCCAB violations and would result in designation values for the coastal sites that are more representative of PM_{10} levels that are relevant from a health perspective. While an exemption would represent a policy change rather than a change to air quality, it might allow the NCCAB to achieve the California PM_{10} standard, which it might otherwise never do since sea salt alone can exceed the standard.

D-5a Mineral Processing

A review of the emissions inventory for the mineral processing category, as well as the increasing number of quarry project proposals, indicates that quarry operations will be increasing. With larger quarry operations and increasing population, impacts on the public would likely increase. The objective of this measure would be the development of a consistent set of fugitive dust control mitigation measures for all proposed projects, to reduce PM emissions below thresholds of significance (82 lbs/day).

The measure would develop "good housekeeping" measures for control of fugitive dust from quarry operations. The final product would be a recommended integration of relevant District rules and CEQA-related fugitive dust control measures applicable to these facilities into a single enforceable rule, which would be subject to applicable environmental review in accord with CEQA.

General provisions considered under the Mineral Processing measure include:

- Water roads frequently enough to suppress fugitive dust.
- Pave unpaved roads when appropriate.
- Apply water or non-toxic binders to exposed disturbed surfaces in unpaved areas that are acceptable to the Regional Water Quality Control Board and the Monterey Bay National Marine Sanctuary.
- Reduce vehicle speeds in dusty or unpaved areas (15 mph maximum).
- Restrict vehicle access to inactive unpaved areas.
- Curtail active excavation whenever high winds carry dust offsite.
- Cover trucks hauling loose raw materials.
- When feasible and when not creating significant impacts, install wheel washers for vehicles leaving the facility.
- Plant ground cover on disturbed surfaces after grading or excavation.
- Cover storage piles.
- Sweep or wash down paved loading areas to limit track-out distance to less than 50'.
- Control spills in bulk loading areas and cleanup spills immediately.
- Minimize fall distances to storage piles.
- Prevent carry-back underneath conveyors.
- Upgrade dust collectors where inadequate or under performing.
- Plant windbreaks consisting of trees and/or shrubs around the perimeter of the operation. If near agricultural fields, the type of windscreen used should not provide a habitat for pests.
- Implement ARB's Air Toxics Control Measure (ATCM) for naturally occurring asbestos (NOA) for operations in areas impacted by elevated levels of NOA.
- Establish a working group to refine industry-specific fugitive dust control measures.

The general "good housekeeping" provisions developed under the Mineral Processing measure would also apply to fugitive dust from cement manufacturing operations.

D-5b Cement Manufacturing (Contingency Measure)

This contingency measure specific to cement production would be implemented if the general provisions of the Mineral Processing measure were not adequate to reduce PM_{10} from sources at cement plants. This would result in development of a rule which would apply to any cement production facility operating in the area and when proposed would be subject to applicable environmental review in accord with CEQA. The future rule would require continual implementation of good housekeeping practices to reduce fugitive dust and would suggest additional tools for maintaining these practices.

In addition to the general provisions established in the Mineral Processing measure, additional provisions that could be considered for cement manufacturing measure include:

- A procedure for reporting and documenting repairs made on dust control equipment.
- A street cleaning program using a street sweeper/collector truck, preferably one which meets the requirements of SCAQMD Rule 1186 (80% PM_{10} collection efficiency).
- Re-evaluation of the adequacy and reliability of dust collectors.
- Construct a dome over open raw materials areas.
- Maintain and operate an automatic street sprinkler system.
- Quickly repair breaches in building enclosures used as containment chambers for dust.
- Reduce emissions inside buildings used as containment chambers for dust, such as a finish mill and a clinker storage shed.
- Maintain walls around the base of a clinker storage shed.
- Add video cams to problematic areas for fugitive dust (i.e. bulk loading, coal mill, active raw materials piles), for quicker response to fugitive dust situations.
- Schedule excavation in Cement Kiln Dust (CKD) area during periods of light wind (< 15 mph).
- Use CKD as a cover for unpaved access roads which are watered to maintain a solid surface.
- Remove accumulated materials in any laterite loading area.
- Replace worn or missing curtains in loading areas.
- Establish a working group to refine the plant-specific fugitive dust control measures.

Implementation of this contingency measure should encourage diligence in maintaining good housekeeping practices at any cement manufacturing facility, additional tools for enforcement to deal with noncompliance issues and complaint response, as well as decreased PM_{10} in areas adjacent to any cement plant.

D-6 Integrate District Programs into Reducing PM10 in the NCCAB

A number of District programs and rules share a common goal with the SB 656 Implementation Plan. The objective of the integrated approach would be to reduce PM and its associated precursors through these related planning processes. Particular attention would be given to reducing toxic diesel exhaust, which ARB estimates accounts for 70% of the airborne cancer risk from all air toxics in California. The implementation of this integrated approach would be reflected in revisions to the guidance used by the District in prioritizing efforts to reduce toxic diesel exhaust and development of control measures to reduce precursors to PM_{10} in the next update to AQMP.

Programs involved in this integrated approach would include:

- District's Air Quality Management Plan (AQMP) for Ozone
- Smoke Management Program (SMP)

- Environmental Review under CEQA
- Air Toxics Control Measure (ATCM) for Naturally Occurring Asbestos (NOA)
- Expanded Moyer Program (AB 923)
- Department of Motor Vehicle (DMV) Registration Program (AB 2766)

D- 6a Air Quality Management Plan

Since both NO_x and VOC's are common precursors to ozone as well as PM, the District's Air Quality Management Plan (AQMP) for ozone would consider the impacts associated with implementation of the ozone plan as part of the effort to reduce regional PM. Higher priority would be considered to AQMP measures that reduce NO_x which would produce minor benefits in reducing the nitrate component of ambient PM.

D-6b Smoke Management Program

Ground-level smoke from large fires can cause exceedances of the PM_{10} standards. The objective of the District's Smoke Management Program (SMP) is to minimize ground-level concentrations of smoke from planned burn operations. Further development of the District's SMP could give particular attention to mitigating smoke impacts from projects near populated areas, such as Fort Ord and adjusting the program with the ARB to reflect the differences between the coastal and inland areas of the air basin. By increasing the number of inland burn days, fewer burns would likely occur on any one day, thus reducing the regional smoke burden. The District would also encourage improved methods of smoke management by working with the area's Fire Safe Councils. Any revisions to the SMP would be subject to environmental review.

D-6c CEQA Air Quality Review

The District's Guidelines for implementing the California Air Quality Act (CEQA) include many project level mitigation measures for reducing PM_{10}, as well as diesel exhaust during the construction and operational phases of a project. The CEQA review process would be revised to reflect the demonstrated PM impacts and effectiveness of mitigation measures, and would, itself, be subject to required environmental review.

D-6d Naturally Occurring Asbestos (NOA)

Fugitive dust in areas of the NCCAB are known to have elevated levels of naturally occurring asbestos. The District would implement the site-specific fugitive dust mitigation plans outlined in ARB's ATCM for NOA. This should have the dual benefit of reducing both airborne asbestos, as well as fugitive dust.

D-6e District Moyer Grant Program

The District's grant incentive programs that reduce PM from diesel exhaust would contribute to the overall effort to reduce PM. The additional $2 per vehicle DMV surcharge authorized under AB 923 provides funding for replacement of diesel engines in school buses and other vehicles in the District. The District also administers the State-funded Carl Moyer Program, which provides incentives for cleaner engine projects that reduce diesel PM.

D-6f Department of Motor Vehicle (DMV) Registration Program (AB 2766)

Because the NCCAB is a nonattainment area for PM_{10}, the District intends to use part of the DMV renewal fees collected under AB 2766 (HSC Section 44223) to fund demonstration projects to identify effective means of reducing PM_{10} in the NCCAB, as well as incentive and educational programs which reduce PM_{10} caused by motor vehicles.

D-7 Air Toxic Control Measure (ATCM) for Agricultural Irrigation Pumps

The ARB is expected to adopt an ATCM to reduce emissions of toxic diesel exhaust from agricultural pumps in 2006. The District would implement this ATCM and offer grant incentives from the Carl Moyer Program to help fund PM reductions, if allowed by State guidelines. When evaluating grant requests, PM reductions would be given the weighting factor of 20 compared to other pollutants, consistent with the District goal to reduce toxic diesel risk. This would be consistent with District goals to reduce toxic diesel risk and is also consistent with the SB 656 legislation.

5.3 ADOPTION AND IMPLEMENTATION OF ADDITIONAL CONTINGENCY CONTROL MEASURES

If the Implementation Plan does not promote sufficient progress toward achieving the State's PM_{10} standard, the District would recommend contingency measures, in addition to Measure D-5b for Cement Manufacturing. These would be based on cost effectiveness, technological feasibility, emission reduction potential, public acceptability, and enforceability. Specific controls on particular sources or source types might be adopted in the future, should specific source to receptor relationships become evident; and these contingency measures and controls would be subject to environmental review before adoption and implementation.

Based on conditions in the NCCAB, candidate contingency control measures were identified based on a review of ARB's master list of 103 suggested control measures (Appendix D). The master list consisted of a variety of measures developed by other districts, plus a list of statewide measures adopted by the ARB, generally involving mobile source exhaust emissions.

The District refined this large list to a smaller list of 13 contingency control measures, based on their estimated cost effectiveness, technological feasibility, emission reduction potential, public acceptability, and enforceability. These would be implemented should future monitoring and emissions inventory data indicate that the District is not making adequate progress toward achieving the standard, or if specific source to receptor relationships are determined indicating that specific control measures are needed for a particular source or source type. As with the basic list presented in Table 5-1, the contingency measures are geared primarily to reducing fugitive dust. Many of the measures represent duplication or enhancements to existing MBUAPCD programs including rules, the District's CEQA review process, as well as existing enforcement practices. The candidate contingency control measures are presented in Appendix E.

5.4 COST EFFECTIVENESS AND FEASIBILITY OF PROPOSED MEASURES

Estimates for cost effectiveness (CE), when applicable, are presented in Table 5-1. These are based on studies of similar measures in other areas. The preferred most cost effective measures are generally with CE figures of 1 to $15,000/ton PM reduced. It should be noted that many measures contain multiple provisions that could be applied under a variety of conditions. Consequently, a range of CE estimates are given rather than a single value. Since the CE ranges currently referenced in Table 5-1 are based on studies in other areas, figures specific to this area will be refined during the rule and program development process.

Since most measures have already been implemented in other areas, are similar to existing District programs or are educational or administrative in nature, they are all considered feasible. In order to increase acceptability of measures related to agriculture, these measures will focus on areas of common concern, such as where dust is bad for both air quality and crops.

5.5 IMPLEMENTATION SCHEDULE AND ENVIRONMENTAL REVIEW UNDER THE CALIFORNIA ENVIRONMENTAL QUALITY ACT

SB 656 specifies that the implementation schedule for the measures should be adopted by district boards by July 31, 2005, following at least one public workshop. However, since the District considers this to be a discretionary action and hence a project under the California Environmental Quality Act (CEQA), the District will be undertaking necessary environmental review for this activity. The time frame required for CEQA review renders the July 31, 2005 adoption date infeasible. In addition, in order to provide more opportunity for public input, the District held four public workshops rather than one.

Environmental review under CEQA began on November 22, 2005 with circulation of an Initial Study and Negative Declaration. The Implementation Plan is scheduled for presentation to the Advisory Committee on December 1 and the Board on December 14, 2005.

The District intends to adopt the schedule of PM_{10} control measures by December 2005. The measures, and any revisions to existing rules will be then be implemented by the District within two years of schedule adoption. The District's implementation schedule for the measures adopted under SB 656 is shown in Table 5-2.

The District will continue to work with stakeholder groups as the measures are developed into specific BMPs or rules. ARB staff is to report on the actions taken by the District to fulfill the requirements of SB 656 to their Board by January 1, 2009.

TABLE 5-1 DISTRICT ACTIONS UNDER SB 656 AND ESTIMATED COST EFFECTIVENESS

No.	Description	Target Pollutant	Emission Inventory [1]	Cost Effectiveness [2], [3]	Measure Type
D-1	**Unpaved Roads - Best Management Practices**	Fugitive Dust	25.22	1 to 15	Educational and Grants
D-2	**Unpaved Roads - Speed Limit**	Fugitive Dust	25.22	1 to 2	Educational or Regulatory
D-3	**Agricultural Tilling/Land Planing**	Fugitive Dust	15.68	5 to 15	Educational
D-4	**Sea Salt Exemption**	None	Not Applicable	Not Applicable	Policy
D-5a	**Mineral Processing**	Fugitive Dust	2.69	5 to 20+	Regulatory
D-5b	**Cement Manufacturing**	Fugitive Dust	0.51	5 to 20+	Contingency Measure
D-6	**Integrate District Programs**	--	--	--	--
"-6a	- Air Quality Management Plan for Ozone	Secondary PM	84.30 NO_x	Not Available [4]	Regulatory
"-6b	- Smoke Management Program [5]	Smoke	17.40	Not Applicable [6]	Regulatory
"-6c	- Environmental Review under CEQA	Fugitive Dust	Not Applicable	1 to 15	Regulatory
"-6d	- ATCM for Naturally Occurring Asbestos	Fugitive Dust	Not Available	1 to 20+	Regulatory
"-6e	- Expanded Moyer Program (AB 923)	Diesel Exhaust	2.07	5 to 30	Grants
"-6f	- Department of Motor Vehicles Renewal Fees (AB2766)	PM_{10}	35.83	1 to 20	Educational and Grants
D-7	**ATCM for Agricultural Irrigation Pumps**	Diesel Exhaust	0.44	5 to 30	Grants

Notes for Table 5-1:

1) 2005 PM_{10} emission inventory for each measure in tons per day.
2) Cost Effectiveness ($1,000/Ton of PM_{10} reduced).
3) Cost effectiveness figures will be refined during the rule development/program development stage.
4) The relationship between reductions in NO_x and the corresponding reduction in PM_{10} (nitrates) is not known at this time.
5) Work in kind cost for ongoing data analysis and possibly cost for additional temperature sounding data or a wind and temperature profiler in the inland area of the air basin.
6) Measure aimed at reducing ground-level concentrations of smoke related PM_{10}, not necessarily gross emissions.

TABLE 5-2 SB 656 IMPLEMENTATION SCHEDULE

Control Measure		Final Adoption of Control Measure	Implementation of Control Measure
D-1	**Unpaved Roads - BMPs**	December 14, 2005	December 2006
D-2	**Unpaved Roads - Speed Limit**	December 14, 2005	December 2006
D-3	**Agricultural Tilling/Land Planing**	December 14, 2005	December 2006
D-4	**Sea Salt Exemption**	December 14, 2005	March 2006
D-5a	**Mineral Processing**	December 14, 2005	June 2007
D-5b	**Cement Manufacturing**	December 14, 2005	To Be Determined
D-6	**Integrate District Programs**	December 14, 2005	Various
	- Air Quality Management Plan for Ozone	December 14, 2005	June 2007
	- Smoke Management Program	December 14, 2005	June 2007
	- Environmental Review under CEQA	December 14, 2005	October 2006
	- ATCM for Naturally Occurring Asbestos	December 14, 2005	June 2007
	- Expanded Moyer Program (AB 923)	December 14, 2005	June 2006
	- DMV Renewal Fees (AB 2766)	December 14, 2005	June 2006
D-7	**ATCM for Agricultural Irrigation Pumps**	December 14, 2005	June 2007

G:\Wp9\DOCS\2005 PM10 Plan\Text\Text Draft Final\December 1st Plan\Chapt 5 CM Text5.wpd

APPENDIX A

ARB SB 656 FACT SHEET

AND SB 656 TEXT FROM THE HEALTH AND SAFETY CODE

Fact Sheet

California Environmental Protection Agency
Air Resources Board

Reducing Particulate Matter in California – Implementation of Senate Bill 656

Background

- Reducing particulate matter (PM) air pollution is one of the California's highest public health priorities. PM consists of very small liquid and solid particles suspended in the air. Particles smaller than 10 microns in size are known as PM10, while the very smallest particles less than 2.5 microns in size are known as PM2.5.
- Exposure to PM is linked to increased frequency and severity of asthma attacks, pneumonia and bronchitis, and even premature death in people with pre-existing cardiac or respiratory disease. Infants and children, the elderly, and persons with heart and lung disease are most sensitive to the effects of PM.
- The ARB (Air Resources Board) and the U.S. Environmental Protection Agency have adopted health-based standards for PM10 and PM2.5. California's standards are the most health-protective in the nation, and are designed to provide additional protection for the most sensitive groups of people.
- Virtually the entire State exceeds the State PM10 standard, with most urban areas and several isolated sub-areas also exceeding the State PM2.5 standard. The San Joaquin Valley, the South Coast, and several desert areas also exceed the federal PM10 standard. Areas exceeding the federal PM2.5 standards include the San Joaquin Valley and the South Coast.
- The sources contributing to PM problems in different areas of the State are very diverse. In some areas, specific source types are a major part of the problem, ranging from windblown dust to residential wood combustion. In other areas of the State, particularly in urban areas, many different sources are significant, reflecting various urban activities ranging from paved road dust and wood burning, to motor vehicles, diesel engines and other combustion sources.

Requirements to Reduce PM

- In 2003, the Legislature passed Senate Bill 656 to reduce public exposure to PM10 and PM2.5. The legislation requires the ARB, in consultation with local air pollution control and air quality management districts (air districts), to adopt a list of the most readily available, feasible, and cost-effective control measures that could be implemented by air districts to reduce PM10 and PM2.5.
- The legislation establishes a process for achieving near-term reductions in PM throughout California ahead of federally required deadlines for PM2.5, and provides new direction on PM reductions in those areas not subject to federal requirements for PM. Measures adopted as part of SB656 will complement and support those required for federal PM2.5 attainment plans due in 2008, as well as for State ozone plans. This will ensure continuing focus on PM reduction and progress towards attaining California's more health protective standards.

- This list of air district control measures was adopted by the ARB on November 18, 2004. ARB also developed a list of state PM control measures for mobile and stationary sources, including measures planned for adoption as part of ARB's Diesel Risk Reduction Plan. The lists can be found at the following web site:

  http://www.arb.ca.gov/pm/pmmeasures/pmmeasures.htm

- Over 100 possible air district measures covering a broad spectrum of sources are listed. Sources categories include measures to address residential wood combustion and outdoor greenwaste burning; fugitive dust sources such as paved and unpaved roads and construction; combustion sources such as boilers, heaters, and charbroiling; solvents and coatings; product manufacturing; and spare-the-air and other air pollution reduction incentive programs.

Next Steps

- Air districts must now develop implementation schedules by July 31, 2005. The implementation schedules will identify a subset of measures from the list that are appropriate to the nature and severity of the PM problem in their area.
- Each air district will prioritize measures from the list based on the effect measures will have on public health, air quality, emission reductions, and cost-effectiveness. These local measures will build upon programs adopted by ARB as part of ongoing statewide efforts.
- Due to the special emphasis on reducing diesel PM exposure, ARB encourages air districts to take full advantage of programs to reduce diesel PM emissions, such as incentive funding to replace diesel engines, and enforcement of school bus and heavy-duty vehicle idling restrictions.
- As a starting point for selecting measures, suggested basic measures for different types of PM problems are presented in the attached table. However, air districts with more severe or specialized PM problems may also need to evaluate measures from the comprehensive list.
- To assist air districts, the ARB has also prepared a characterization of the nature of the PM problem in each area of the State. This document can be found at:

  http://www.arb.ca.gov/pm/pm.htm

- A general fact sheet on PM can also be found at:

  http://www.arb.ca.gov/research/aaqs/pm/pm.htm

How to Participate in the Process

- Over the next six months, air districts will be developing their implementation schedules that will include a listing of PM control measures proposed for adoption pursuant to this legislation. As part of this process, they must hold at least one public workshop, and adopt the implementation schedule at a public meeting. Public participation in this process is encouraged. Your local air district can be contacted for more information. A list of local air districts can be found at:

  http://www.arb.ca.gov/capcoa/roster.htm

If you have special accommodation or language needs, please contact the Air Resources Board Coordinator at (916) 323-4916. TTY/TDD/Speech-to-Speech users may dial 7-1-1 for the California Relay Service.

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Website: http://www.arb.ca.gov.

Proposed Set of Basic Air District Measures for Different Types of Particulate Matter Problems

PM Problem Type	Measures
Smoke from Wood-Burning Fireplaces and Heaters	▪ Establish a public awareness program; ▪ Set a voluntary curtailment during periods with predicted high PM levels (or update to mandatory); ▪ Require all woodstoves and fireplace inserts installed be U.S. EPA certified or equivalent; ▪ Limit number of wood-burning fireplaces and heaters in new developments; ▪ Replace non-certified units upon property sale; ▪ Control wood moisture content; ▪ Prohibit burning of materials not intended for use in wood-burning appliance.
Smoke from Non-Agricultural Burning	▪ Establish mandatory curtailment during periods with predicted high PM levels; ▪ Set performance standards for allowed burns.
Dust from: ▪ Construction	▪ Establish requirements for earthmoving, demolition, and grading operations (e.g., applying water or chemical stabilizers/dust suppressants).
▪ Paved Roads	▪ Establish requirements for new and modified public and private roads (e.g., paved shoulders, curbing, chemical suppressants); ▪ Establish requirements for sweeping existing roads.
▪ Unpaved Roads	▪ Set control requirements for unpaved roads (e.g., watering, graveling, applying suppressants, vegetating, paving, setting speed limits).
▪ Windy Conditions	▪ Establish requirements to suppress windblown dust from construction/earthmoving operations, disturbed areas, and bulk material storage piles (e.g., ceasing active operations, watering, applying chemical stabilizers).
▪ Agricultural Operations	▪ Set requirements for agricultural sources (e.g., treating unpaved roads, watering, and other dust-reducing measures).
Direct PM from Combustion Sources	▪ Set requirements for commercial charbroiling operations (e.g., emission control device).
Direct PM from Sources Not Covered under Any Other Specific Rule	▪ Set visible emission limits (e.g, opacity). ▪ Set PM emission limits from combustion sources.
Ammonium Nitrate (NOx measures)	Set NOx emission limits for: ▪ Boilers, steam generators, process heaters, turbines, and IC engines; ▪ Residential central furnaces and water heaters.
Ammonium Nitrate and Secondary Organic Aerosols (VOC measures)	▪ Set requirements for architectural coatings (e.g., limiting VOC content in coatings). ▪ Set VOC emission limits from solvent use (e.g., limiting VOC content of products used, through operation requirements).

HEALTH AND SAFETY CODE
Division 26 Air Resources

§ 39614. (Repealed January 1, 2011)Development of list of most readily available, feasible, and cost-effective proposed control measures

(a) For the purposes of this section, the following terms have the following meanings:

(1) "Cost-effective" or "cost-effectiveness" means either of the following, as applicable:

(A) For the state board, a determination using the standards, formulas, and criteria used by the state board to calculate cost-effectiveness for other regulations.

(B) For a district, a determination using the standards and process described in Section 40922.

(2) "Implementation schedule" means a schedule that specifies dates for final adoption, implementation, and sequencing of control measures pursuant to this section.

(3) "Measures" means any of the following:

(A) Emissions limits, control technologies, or performance standards designed to limit emissions for a source or source category.

(B) Examples of adopted state or local district regulations.

(C) Examples of programs.

(4) "PM 2.5" means particulate matter of 2.5 microns and smaller in size.

(5) "PM 10" means particulate matter of 10 microns and smaller in size.

(6) "Programs" means any state or local program that reduces either of the following:

(A) Smoke from agricultural or wood burning sources.

(B) Diesel emissions.

(b) On or before January 1, 2005, the state board, in consultation with the districts, and after at least one public workshop, shall develop and adopt at a public meeting a list of the most readily available, feasible, and cost-effective proposed control measures, based on rules, regulations, and programs existing in California as of January 1, 2004, that could be employed by the state board and the districts to reduce PM 2.5 and PM 10 and make progress toward attainment of state and federal PM 2.5 and PM 10 standards. The list shall include measures to reduce emissions from new and existing stationary, mobile, and area sources, and shall indicate whether those measures apply to new, modified, or existing sources. In developing the list, the state board shall take into account information it determines to be appropriate and relevant from emissions inventories, air monitoring data, and other scientific studies, including, but not limited to, information associated with compliance with the federal ambient air standards for particulate matter. The list shall include control measures for all of the following emission source categories:

(1) Stationary combustion sources.

(2) Woodstoves and fireplaces.

(3) Commercial grilling operations.

(4) Agricultural burning.

(5) Construction and grading operations.

(6) Diesel-powered engines used in stationary and mobile applications, including, but not limited to, control measures that do any of the following:

(A) Reduce heavy-duty vehicle idling.

(B) Require the use of ultra low-sulfur diesel fuel.

(C) Encourage, and require to the extent authorized by law, fleet turnover or the pull-ahead of new technology.

(D) Use public funds, including, but not limited to, Congestion Mitigation and Air Quality Improvement Program funds to upgrade, retrofit, or replace heavy-duty engines with less polluting alternatives.

(E) Promote increased purchase and use by government agencies of low-emission heavy-duty vehicles and equipment.

(c) The state board shall specify in the list adopted pursuant to subdivision (a) whether a proposed control measure is intended to reduce emissions of PM 2.5, PM 10, or both, and whether it is a proposed control measure for adoption by the state board or by a district. The state board and the districts shall adopt and implement only those control measures within their respective jurisdictions in accordance with applicable provisions of state law.

(d)(1) Not later than July 31, 2005, after at least one public workshop and a noticed public hearing, and in a manner otherwise in accordance with this section, the state board shall adopt an implementation schedule for the state measures on the list developed pursuant to subdivision (b) and each district shall adopt an implementation schedule for the most cost-effective local measures from the list for that district after prioritizing the measures based on the factors identified in subparagraph (A) of paragraph (2). The state board and each district, in carrying out the requirements of this section, shall adopt and implement control measures to reduce PM 2.5 and PM 10 from stationary, area, and mobile sources, and to make progress toward attainment of state and federal PM 2.5 and PM 10 standards.

(2) In developing an implementation schedule pursuant to this subdivision, the state board and each district shall do all of the following:

(A) Prioritize adoption and implementation of proposed control measures based on the effect individual control measures will have on public health, air quality, and emission reductions, and on the cost-effectiveness of each control measure.

(B) Strive to integrate the scheduling of control measures with the federal planning process for attainment of the federal ambient air quality standards for particulate matter in an efficient manner, to the extent that integration does not delay the adoption of control measures.

(3) An implementation schedule adopted by a district pursuant to this subdivision may not include a control measure that meets any of the following criteria:

(A) Is substantially similar to a control measure already adopted by the district, as determined by the district.

(B) Is substantially similar to a control measure scheduled for adoption by the district within two years of the adoption of the implementation schedule, as determined by the district.

(C) The district has determined there is a readily available, feasible, and cost-effective alternative control measure that will achieve an equivalent or greater emission reduction.

(D) Is intended to reduce emissions of a precursor to PM 2.5 or PM 10, if the district has adopted and implemented the measure or scheduled the measure for adoption within two years of the adoption of the implementation schedule as part of the district's ozone attainment plan pursuant to subdivision (a) or (b) of Section 40914.

(4) If a district determines that a readily available, feasible, and cost-effective alternative control measure exists as described in subparagraph (C) of paragraph (3), the district shall adopt that measure.

(e) Nothing in this section requires a district to adopt a control measure to further regulate emissions from any source that operates under, or requires a district to modify, either of the following programs:

(1) A market-based incentive program that complies with Section 39616.

(2) An interchangeable emission reduction credit program that is consistent with the methodology adopted by the state board pursuant to Section 39607.5.

(f) Nothing in this section is intended to alter or affect any of the following:

(1) The authority of the state board or a district to adopt a control measure for PM 2.5 and PM 10 pursuant to this division.

(2) The authority of the state board or a district over diesel-powered engines established pursuant to this division.

(3) The authority of a district to modify either of the programs described in paragraph (1) or (2) of subdivision (e).

(4) The authority of a district to adopt measures necessary to attain state or federal air quality standards.

(g) In identifying control measures for woodstoves and fireplaces pursuant to paragraph (2) of subdivision (b), the state board shall include a consideration of rules and regulations encouraging the use of wood fuel appliances that meet the standards established in Subpart AAA of Part 60 of Title 40 of the Code of Federal Regulations.

(h) In adopting the list and implementation schedule pursuant to this section, the state board is not subject to the rulemaking provisions of Chapter 3.5 (commencing with Section 11340) of Part 1 of Division 3 of Title 2 of the Government Code.

(i) Not later than January 1, 2009, the state board shall prepare a report, and make available to the public, on the actions taken by the state board and local districts to comply with this section. The report shall include, but is not limited to, all of the following:

(1) Adopted and proposed rules.

(2) Regulations and programs.

(3) Air quality and public health impacts of state and district actions taken pursuant to this section.

(4) Cost-effectiveness of rules, regulations, and programs implemented pursuant to this section.

(5) Recommendations for further actions to assist in achieving state air quality standards for particulate matter.

(j) This section shall remain in effect only until January 1, 2011, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2011, deletes or extends that date.

Added Stats 2003 ch 738 § 2 (SB 656).
Amended Stats 2004 ch 183 § 216 (AB 3082), repealed January 1, 2011.

ANNOTATIONS

Amendments:

2004 Amendment:
(1) Deleted "(CMAQ)" after "Congestion Mitigation and Air Quality Improvement Program" in subd (b)(6)(D); and (2) substituted "described in paragraph (1) or (2)" for "described in paragraphs (1) or (2)" in subd (f)(3).

Note:
Stats 2003 ch 738 provides:
SECTION 1. (a) The Legislature finds and declares all of the following:
(1) The body of scientific evidence demonstrating health effects related to particulate matter exposure has grown tremendously over the past 10 years, and presents a compelling public health case for reducing emissions and exposures.
(2) Both coarse and fine particulate matter (PM 10 and PM 2.5, respectively) are linked in scientific literature to a range of serious health impacts, including premature mortality, acute and chronic bronchitis, asthma attacks and emergency room visits, upper respiratory illnesses, and days with work loss.
(3) Exposure to particulate pollution is particularly dangerous for sensitive groups including, but not limited to, the elderly, individuals with asthma and other lung illnesses, infants, and children.
(4) Recent scientific literature on particulate matter demonstrates serious health impacts in infants and children including, but not limited to, mortality, reduced birth weight, premature birth, asthma exacerbation, and acute respiratory infections.
(5) The state board recently reviewed the particulate matter air quality standard pursuant to the Children's Environmental Health Protection Act (Chapter 731 of the Statutes of 1999) and based on that review, tightened the existing PM 10 annual standard and added a stringent new PM 2.5 annual standard.
(6) The state board has adopted a statewide risk reduction plan for reducing diesel particulate matter emissions by 2010, however it is necessary to ensure the prompt implementation of that plan and its particulate reduction goals.
(7) One component of particulate matter pollution, diesel particulate matter, has been identified as a toxic air contaminant by the state board based upon the cancer risk posed by public exposure to this pollutant. In order to be effective, control measures to reduce particulate pollution need to control not only diesel particulate and other directly emitted PM 10 and PM 2.5, but also control precursors that contribute to formation of particulate matter, including, but not limited to, oxides of nitrogen, sulfur oxide, reactive organic gases and ammonia.
(8) Data from the existing air monitoring network, emission inventory, and other scientific studies should be used to identify sources of particulate pollution and prioritize control measures for that pollution and its precursors.
(9) The United States Environmental Protection Agency has recently begun the process to implement the federal fine particulate standard and to designate area attainment status. However, attainment of the federal standards is at least a decade in the future and the federal standard is less stringent and protective of public health than the state particulate standard.
(b) The Legislature therefore declares that it is essential that the state board and the districts take readily available, feasible, and cost-effective measures to reduce the public's exposure to PM 2.5 and PM 10.
(c) It is the intent of the Legislature that the State Air Resources Control Board, and each air quality management district and air pollution control district in the state consider the impact of proposed control measures for PM 2.5 and PM 10 on other criteria pollutants when adopting the implementation schedule pursuant to Section 39614 of the Health and Safety Code.

§ 40922. Cost-effectiveness of control measures

(a) Each plan prepared pursuant to this chapter shall include an assessment of the cost effectiveness of available and proposed control measures and shall contain a list which ranks the control measures from the least cost-effective to the most cost-effective.

(b) In developing an adoption and implementation schedule for a specific control measure, the district shall consider the relative cost effectiveness of the measure, as determined under subdivision (a), as well as other factors including, but not limited to, technological feasibility, total emission reduction potential, the rate of reduction, public acceptability, and enforceability.

Added Stats 1988 ch 1568 § 11.

NOTES OF DECISIONS

A local air quality management district's amendment of an administrative regulation regarding the use of flat paint was subject to H & S C § 40922(b), which applied to the district's planning processes and the adoption of its management plan. However, plaintiff paint manufacturers never challenged the management plan that included an adoption and implementation schedule for the control measure at issue and, in any event, the district considered technological feasibility and public acceptability of the amended architectural coatings rule. Sherwin-Williams Co. v South Coast Air Quality Management Dist. (2001, 2nd Dist) 86 Cal App 4th 1258, 104 Cal Rptr 2d 288

APPENDIX B

ARB LETTER REGARDING THE HEALTH EFFECTS OF SEA SALT

Cal/EPA

California
Environmental
Protection
Agency

Air Resources Board

P.O. Box 2815
2020 L Street
Sacramento, CA
95812-2815

www.arb.ca.gov

'97 OCT 14 P3:39

October 9, 1997

Pete Wilson
Governor

Secretary for
Environmental
Protection

Mr. Douglas Quetin
Air Pollution Control Officer
Monterey Bay Unified Air Pollution Control District
24580 Silver Cloud Court
Monterey, California 93940-6536

Dear Mr. Quetin:

Thank you for your letter regarding the health effects of sea salt and its contribution to PM10 (particles less than 10 microns in diameter) levels at monitoring sites near the ocean. As your letter indicates, the PM10 air quality standard is defined on the basis of particle size and sea salt does contribute to PM10 in the ambient air. Wind sweeping along the ocean surface picks up ocean water to create a fine mist or fog which can ultimately find its way onto PM10 filters.

From a health effects standpoint all small respirable particles are of concern, however, there are no studies that show sea salt presents a health risk based on its chemical composition. In addition, while sea salt may contribute to PM10 violations, there are no air quality planning or regulatory implications. Sea salt is naturally occurring; there are no practical means of reducing exposure.

In terms of addressing PM10 violations, the District should focus on controllable PM10 sources. The California Clean Air Act provides flexibility in terms of addressing violations of the state PM10 standard -- attainment plans are not required. As a result, there is no planning or regulatory problem with simply acknowledging the contribution of sea salt to PM10 violations as part of the District's efforts to characterize the region's PM10 air quality.

We are happy to provide any technical assistance you may need to identify the contribution of sea salt to your district's PM10 levels. If you have any questions, please feel free to call your district liaison, Mr. Ron Nunes at (916) 323-8408.

Sincerely,

Michael P. Kenny
Executive Officer

bcc: D. Saito
R. Nunes
OAQTP Chron
LS Chron
District File
Reading file (2)
Assignment #1424
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APPENDIX C

NCCAB PM_{10} EMISSION INVENTORY

EIC LEVEL SUMMARY

NCCAB EMISSION INVENTORY
PM10 Emissions in Tons/Day
Summer Seasonal

EIC	EICSUM	EICSOU	EICMAT	1990	2000	2005	2010	2015	2020
010-005-0110-	010-ELECTRIC UTILITIE	005-BOILERS	0110-NATURAL GAS	0.493	0.4824	0.7245	0.7691	0.7691	0.7691
010-005-0254-	010-ELECTRIC UTILITIE	005-BOILERS	0254-WOOD/BARK WASTE	0.0245	0.0245	0.0245	0.0245	0.0245	0.0245
010-005-1530-	010-ELECTRIC UTILITIE	005-BOILERS	1530-RESIDUAL OIL - GRADE #6	0.3179	0.3572	0.3159	0.3473	0.3473	0.3473
010-040-0142-	010-ELECTRIC UTILITIE	040-I.C. RECIPROCATING EN	0142-LANDFILL GAS	0.0027	0.0109	0.0096	0.0106	0.0106	0.0106
010-045-0110-	010-ELECTRIC UTILITIE	045-I.C. TURBINE ENGINES	0110-NATURAL GAS	0	0.0646	0.0969	0.103	0.103	0.103
	010-ELECTRIC UTILITIES			**0.8381**	**0.9396**	**1.1714**	**1.2545**	**1.2545**	**1.2545**
020-005-0110	020-COGENERATION	005-BOILERS	0110-NATURAL GAS	0.003					
020-040-0012	020-COGENERATION	040-I.C. RECIPROCATING EN	0012-FUEL (UNSPECIFIED)	0.0038					
020-040-0110	020-COGENERATION	040-I.C. RECIPROCATING EN	0110-NATURAL GAS	0.0041	0	0	0	0	0
020-045-0110	020-COGENERATION	045-I.C. TURBINE ENGINES	0110-NATURAL GAS	0.0193	0.0112	0.0122	0.0123	0.0125	0.0123
020-995-0012	020-COGENERATION	995-OTHER	0012-FUEL (UNSPECIFIED)	0.0126	0.0137	0.0146	0.0151	0.0155	0.0158
	020-COGENERATION			**0.0428**	**0.0249**	**0.0268**	**0.0274**	**0.028**	**0.0281**
030-010-0110	030-OIL AND GAS PRO	010-PROCESS HEATERS	0110-NATURAL GAS	0.0003	0.0001	0.0001	0.0001	0.0001	0.0001
030-015-0110	030-OIL AND GAS PRO	015-STEAM GENERATORS	0110-NATURAL GAS	0.0135	0.0102	0.0119	0.0123	0.0127	0.0123
030-015-0130	030-OIL AND GAS PRO	015-STEAM GENERATORS	0130-PROCESS GAS	0.009	0.0063	0.0079	0.0086	0.0092	0.0092
030-015-1600	030-OIL AND GAS PRO	015-STEAM GENERATORS	1600-CRUDE OIL (UNSPECIFIED	0.646					
030-040-0100	030-OIL AND GAS PRO	040-I.C. RECIPROCATING EN	0100-GASEOUS FUEL (UNSPEC	0	0	0	0	0	0
030-040-0110	030-OIL AND GAS PRO	040-I.C. RECIPROCATING EN	0110-NATURAL GAS	0					
030-040-1200	030-OIL AND GAS PRO	040-I.C. RECIPROCATING EN	1200-DIESEL/DISTILLATE OIL (U	0.001	0	0.0001	0.0001	0.0001	0.0001
030-060-1210	030-OIL AND GAS PRO	060-DRILLING RIGS	1210-DIESEL (UNSPECIFIED)	0.0139	0.0094	0.0113	0.0119	0.0119	0.0119
	030-OIL AND GAS PRODUCTION (COMBUSTION)			**0.6837**	**0.026**	**0.0313**	**0.033**	**0.034**	**0.0336**
050-005-0110	050-MANUFACTURING	005-BOILERS	0110-NATURAL GAS	0.0024	0.0065	0.0073	0.0077	0.008	0.0082
050-010-0110	050-MANUFACTURING	010-PROCESS HEATERS	0110-NATURAL GAS	0.0011	0	0	0	0	0
050-010-0120	050-MANUFACTURING	010-PROCESS HEATERS	0120-LIQUIFIED PETROLEUM G	0	0.0007	0.0007	0.0008	0.0008	0.0007
050-010-1220	050-MANUFACTURING	010-PROCESS HEATERS	1220-DISTILLATE OIL (UNSPEC	0	0	0	0	0	0
050-040-1200	050-MANUFACTURING	040-I.C. RECIPROCATING EN	1200-DIESEL/DISTILLATE OIL (U	0.0046	0.0016	0.0017	0.0018	0.0019	0.002
050-070-0110	050-MANUFACTURING	070-IN-PROCESS FUEL	0110-NATURAL GAS	0	0	0	0	0	0
050-070-1220	050-MANUFACTURING	070-IN-PROCESS FUEL	1220-DISTILLATE OIL (UNSPEC	0					
050-070-1500	050-MANUFACTURING	070-IN-PROCESS FUEL	1500-RESIDUAL OIL (UNSPECIF	0	0	0	0	0	0
050-995-0110	050-MANUFACTURING	995-OTHER	0110-NATURAL GAS	0.3953	0.4306	0.4951	0.5381	0.5885	0.6265
050-995-1220	050-MANUFACTURING	995-OTHER	1220-DISTILLATE OIL (UNSPEC	0	0	0	0	0	0
050-995-1500	050-MANUFACTURING	995-OTHER	1500-RESIDUAL OIL (UNSPECIF	0	0	0	0	0	0
	050-MANUFACTURING AND INDUSTRIAL			**0.4034**	**0.4394**	**0.5048**	**0.5484**	**0.5992**	**0.6374**
052-005-0110	052-FOOD AND AGRIC	005-BOILERS	0110-NATURAL GAS	0.0089	0.0083	0.0079	0.0081	0.0084	0.0086
052-010-0110	052-FOOD AND AGRIC	010-PROCESS HEATERS	0110-NATURAL GAS	0.0015	0.0049	0.0049	0.005	0.0053	0.0055
052-042-1200	052-FOOD AND AGRIC	042-AG. IRRIGATION I.C. ENG	1200-DIESEL/DISTILLATE OIL (U	0.0621	0.062	0.0603	0.0524	0.0443	0.0364
	052-FOOD AND AGRICULTURAL PROCESSING			**0.0725**	**0.0752**	**0.0731**	**0.0655**	**0.058**	**0.0505**
060-005-0110	060-SERVICE AND CON	005-BOILERS	0110-NATURAL GAS	0.0033	0.0028	0.0026	0.0025	0.0025	0.0025
060-005-0144	060-SERVICE AND CON	005-BOILERS	0144-SEWAGE GAS	0	0.0006	0.0006	0.0006	0.0006	0.0006
060-005-1220	060-SERVICE AND CON	005-BOILERS	1220-DISTILLATE OIL (UNSPEC	0.0024					
060-005-1520	060-SERVICE AND CON	005-BOILERS	1520-RESIDUAL OIL - GRADE #5	0	0	0	0	0	0
060-010-0110	060-SERVICE AND CON	010-PROCESS HEATERS	0110-NATURAL GAS	0	0	0	0	0	0
060-040-0012	060-SERVICE AND CON	040-I.C. RECIPROCATING EN	0012-FUEL (UNSPECIFIED)	0	0.0001	0.0001	0.0001	0.0001	0.0001
060-040-0142	060-SERVICE AND CON	040-I.C. RECIPROCATING EN	0142-LANDFILL GAS	0.0036	0	0	0	0	0
060-040-1200	060-SERVICE AND CON	040-I.C. RECIPROCATING EN	1200-DIESEL/DISTILLATE OIL (U	0.0003	0	0	0	0	0
060-995-0110	060-SERVICE AND CON	995-OTHER	0110-NATURAL GAS	0.0383	0.0493	0.052	0.0526	0.0536	0.0532
060-995-1500	060-SERVICE AND CON	995-OTHER	1500-RESIDUAL OIL (UNSPECIF	0	0	0	0	0	0
	060-SERVICE AND COMMERCIAL			**0.0479**	**0.0528**	**0.0553**	**0.0558**	**0.0568**	**0.0564**
099-040-1200	099-OTHER (FUEL COM	040-I.C. RECIPROCATING EN	1200-DIESEL/DISTILLATE OIL (U	0.0093	0.0129	0.0116	0.0095	0.0074	0.0047
099-995-0000	099-OTHER (FUEL COM	995-OTHER	0000-MATERIAL NOT SPECIFIE	0	0.0007	0.0009	0.0009	0.001	0.0011
	099-OTHER (FUEL COMBUSTION)			**0.0093**	**0.0136**	**0.0125**	**0.0104**	**0.0084**	**0.0058**
120-122-0242	120-LANDFILLS	122-CLASS II AND III LANDFIL	0242-MUNICIPAL SOLID WASTE	0	0	0	0	0	0
120-132-0136	120-LANDFILLS	132-FLARES	0136-WASTE GAS	0	0.0059	0.0063	0.007	0.0077	0.0084
	120-LANDFILLS			**0**	**0.0059**	**0.0063**	**0.007**	**0.0077**	**0.0084**
130-130-0110	130-INCINERATORS	130-INCINERATION	0110-NATURAL GAS	0	0.0008	0.0008	0.0008	0.0008	0.0008
130-132-0136	130-INCINERATORS	132-FLARES	0136-WASTE GAS	0	0.0006	0.0007	0.0006	0.0007	0.0008
	130-INCINERATORS			**0**	**0.0014**	**0.0015**	**0.0014**	**0.0015**	**0.0016**
	Landfills & Incinerators			0	0.0073	0.0078	0.0084	0.0092	0.01
310-316-1600	310-OIL AND GAS PRO	316-MISCELLANEOUS FUGITI	1600-CRUDE OIL (UNSPECIFIED	0	0	0	0	0	0
310-320-0136	310-OIL AND GAS PRO	320-VAPOR RECOVERY/FLAR	0136-WASTE GAS	0.0378					
310-995-1600	310-OIL AND GAS PRO	995-OTHER	1600-CRUDE OIL (UNSPECIFIED	0	0	0	0	0	0
	310-OIL AND GAS PRODUCTION			**0.0378**	**0**	**0**	**0**	**0**	**0**
330-338-0010	330-PETROLEUM MARK	338-COOLING TOWERS	0010-HYDROCARBON COMPOU	0	0.0025	0.0038	0.0041	0.0041	0.0041
	330-PETROLEUM MARKETING			**0**	**0.0025**	**0.0038**	**0.0041**	**0.0041**	**0.0041**

EIC	EICSUM	EICSOU	EICMAT	1990	2000	2005	2010	2015	2020
410-400-5700	410-CHEMICAL	400-CHEMICAL MANUFACTUI	5700-PESTICIDES (UNSPECIFIE	0	0	0	0	0	0
410-403-5018	410-CHEMICAL	403-FIBERGLASS AND FIBER	5018-FIBERGLASS	0	0	0	0	0	0
410-404-5000	410-CHEMICAL	404-PLASTICS AND PLASTIC	5000-PLASTICS (UNSPECIFIED)	0	0.0026	0.0026	0.0026	0.0026	0.0026
410-995-4999	410-CHEMICAL	995-OTHER	4999-CHEMICALS (UNSPECIFIE	0	0	0	0	0	0
	410-CHEMICAL			0	0.0026	0.0026	0.0026	0.0026	0.0026
420-338-0010	420-FOOD AND AGRICU	338-COOLING TOWERS	0010-HYDROCARBON COMPOU	0	0.0017	0.0017	0.0019	0.002	0.0022
420-408-6090	420-FOOD AND AGRICU	408-WINE FERMENTATION	6090-WINE	0	0	0	0	0	0
420-418-6000	420-FOOD AND AGRICU	418-AGRICULTURAL PRODU	6000-FOOD AND AGRICULTURA	0.2563	0.1516	0.1519	0.1523	0.1527	0.1531
420-420-6000	420-FOOD AND AGRICU	420-AGRICULTURAL CROP PI	6000-FOOD AND AGRICULTURA	0.003	0.0021	0.0021	0.0021	0.0021	0.0021
	420-FOOD AND AGRICULTURE			0.2593	0.1554	0.1557	0.1563	0.1568	0.1574
430-422-7078	430-MINERAL PROCES	422-SAND AND GRAVEL EXC	7078-SAND/AGGREGATE	0.0376	0.0323	0.0366	0.0398	0.0429	0.0465
430-424-7006	430-MINERAL PROCES	424-ASPHALTIC CONCRETE I	7006-ASPHALTIC CONCRETE	2.2777	0.0763	0.125	0.125	0.125	0.125
430-426-7078	430-MINERAL PROCES	426-CRUSHED STONE EXCA	7078-SAND/AGGREGATE	0.9051	0.728	0.8936	0.9647	1.0297	1.0652
430-426-7092	430-MINERAL PROCES	426-CRUSHED STONE EXCA	7092-STONES	0.0096	0.0249	0.0291	0.0319	0.0332	0.0346
430-426-7102	430-MINERAL PROCES	426-CRUSHED STONE EXCA	7102-GRANITE	0.6624	0.027	0.0331	0.0359	0.0382	0.0396
430-428-7078	430-MINERAL PROCES	428-SURFACE BLASTING	7078-SAND/AGGREGATE	0.0092	0.0175	0.0194	0.0208	0.0221	0.0242
430-429-0210	430-MINERAL PROCES	429-CEMENT (PORTLAND AN	0210-COAL (UNSPECIFIED)	0.0223	0.0082	0.009	0.01	0.011	0.0119
430-429-7016	430-MINERAL PROCES	429-CEMENT (PORTLAND AN	7016-CEMENT	0.8297	0.2922	0.3211	0.3573	0.3934	0.4223
430-429-7023	430-MINERAL PROCES	429-CEMENT (PORTLAND AN	7023-CLINKER	0.1425	0.1193	0.1313	0.1462	0.1611	0.1731
430-430-7018	430-MINERAL PROCES	430-CEMENT CONCRETE MA	7018-CEMENT CONCRETE	0	0.0048	0.005	0.0055	0.006	0.0069
430-434-7048	430-MINERAL PROCES	434-LIME MANUFACTURING	7048-LIME	0.1433	0.3167	0.3533	0.3776	0.402	0.4385
430-434-7050	430-MINERAL PROCES	434-LIME MANUFACTURING	7050-LIMESTONE	0.1886	0.058	0.0677	0.0741	0.0774	0.0806
430-436-7016	430-MINERAL PROCES	436-STORAGE PILES	7016-CEMENT	0	0.0161	0.0177	0.0197	0.0217	0.0234
430-436-7023	430-MINERAL PROCES	436-STORAGE PILES	7023-CLINKER	0	0.0233	0.0257	0.0285	0.0315	0.0338
430-436-7078	430-MINERAL PROCES	436-STORAGE PILES	7078-SAND/AGGREGATE	0	0	0	0	0	0
430-995-7000	430-MINERAL PROCES	995-OTHER	7000-MINERAL AND METAL PR	0.6229	0.5702	0.6184	0.6805	0.7524	0.8136
430-995-7004	430-MINERAL PROCES	995-OTHER	7004-ASBESTOS	0.0003					
430-995-7075	430-MINERAL PROCES	995-OTHER	7075-REFRACTORY - CASTABL	0.2552	0.0005	0.0005	0.0006	0.0007	0.0007
430-995-7078	430-MINERAL PROCES	995-OTHER	7078-SAND/AGGREGATE	0	0.0044	0.0052	0.0059	0.0066	0.0074
	430-MINERAL PROCESSES			6.1064	2.3197	2.6917	2.924	3.1549	3.3473
450-450-5610	450-WOOD AND PAPER	450-PULP AND PAPER MANU	5610-PAPER/PULP	0.0003	0.0005	0.0005	0.0005	0.0005	0.0005
450-456-0230	450-WOOD AND PAPER	456-SAWMILL/WOODWORKIN	0230-WOOD	0	0.031	0.031	0.0338	0.0365	0.0392
450-995-0230	450-WOOD AND PAPER	995-OTHER	0230-WOOD	0	0.0047	0.0071	0.0075	0.0075	0.0075
	450-WOOD AND PAPER			0.0003	0.0362	0.0386	0.0418	0.0445	0.0472
470-338-0010	470-ELECTRONICS	338-COOLING TOWERS	0010-HYDROCARBON COMPOU	0	0.0034	0.0055	0.007	0.0083	0.0093
470-470-4999	470-ELECTRONICS	470-SEMICONDUCTOR MANU	4999-CHEMICALS (UNSPECIFIE	0	0.0015	0.0024	0.003	0.0036	0.0041
	470-ELECTRONICS			0	0.0049	0.0079	0.01	0.0119	0.0134
499-995-0000	499-OTHER (INDUSTRI	995-OTHER	0000-MATERIAL NOT SPECIFIE	0	0.0556	0.0678	0.0788	0.0891	0.0983
499-995-6042	499-OTHER (INDUSTRI	995-OTHER	6042-LEATHER	0.0099	0	0	0	0	0
	499-OTHER (INDUSTRIAL PROCESSES)			0.0099	0.0556	0.0678	0.0788	0.0891	0.0983
610-600-0230	610-RESIDENTIAL FUEI	600-WOOD COMBUSTION - W	0230-WOOD	0.4352	0.422	0.4071	0.3964	0.3914	0.3936
610-602-0230	610-RESIDENTIAL FUEI	602-WOOD COMBUSTION - FI	0230-WOOD	0.3918	0.3278	0.3298	0.3327	0.3381	0.3466
610-606-0110	610-RESIDENTIAL FUEI	606-FUEL COMBUSTION - SP	0110-NATURAL GAS	0.0168	0.0164	0.0163	0.0163	0.0161	0.016
610-606-1220	610-RESIDENTIAL FUEI	606-FUEL COMBUSTION - SP	1220-DISTILLATE OIL (UNSPEC	0.0015	0.0012	0.0011	0.0009	0.0009	0.0008
610-608-0110	610-RESIDENTIAL FUEI	608-FUEL COMBUSTION - WA	0110-NATURAL GAS	0.0364	0.0385	0.0395	0.0405	0.0416	0.0428
610-610-0110	610-RESIDENTIAL FUEI	610-FUEL COMBUSTION - CO	0110-NATURAL GAS	0.0041	0.0039	0.0037	0.0037	0.0037	0.0036
610-995-0110	610-RESIDENTIAL FUEI	995-OTHER	0110-NATURAL GAS	0.0082	0.0077	0.0074	0.0073	0.0073	0.0075
610-995-0120	610-RESIDENTIAL FUEI	995-OTHER	0120-LIQUIFIED PETROLEUM G	0.0007	0.0008	0.0007	0.0007	0.0005	0.0005
	610-RESIDENTIAL FUEL COMBUSTION			0.8947	0.8183	0.8056	0.7985	0.7996	0.8114
620-614-5400	620-FARMING OPERAT	614-TILLING DUST	5400-DUST	15.7503	15.7032	15.6795	15.656	15.6326	15.6091
620-615-5400	620-FARMING OPERAT	615-HARVEST OPERATIONS	5400-DUST	0.429	0.4277	0.4271	0.4264	0.4258	0.4251
620-616-5400	620-FARMING OPERAT	616-CATTLE FEEDLOT DUST	5400-DUST	0.0388	0.0272	0.0272	0.0272	0.0272	0.0272
	620-FARMING OPERATIONS			16.2181	16.1581	16.1338	16.1096	16.0856	16.0614
630-622-5400	630-CONSTRUCTION A	622-BUILDING CONSTRUCTI	5400-DUST	1.0421	1.0271	1.1069	1.1765	1.2558	1.3369
630-624-5400	630-CONSTRUCTION A	624-BUILDING CONSTRUCTI	5400-DUST	0.4717	0.4338	0.4656	0.4946	0.5297	0.5654
630-626-5400	630-CONSTRUCTION A	626-BUILDING CONSTRUCTI	5400-DUST	0.102	0.1076	0.112	0.1142	0.1167	0.1189
630-628-5400	630-CONSTRUCTION A	628-BUILDING CONSTRUCTI	5400-DUST	0.2726	0.2795	0.291	0.2958	0.3022	0.3075
630-634-5400	630-CONSTRUCTION A	634-ROAD CONSTRUCTION E	5400-DUST	2.597	2.4772	2.5597	2.6088	2.6878	2.7451
	630-CONSTRUCTION AND DEMOLITION			4.4854	4.3252	4.5352	4.6899	4.8922	5.0738
650-650-5400	650-FUGITIVE WINDBL	650-DUST FROM AGRICULTU	5400-DUST	15.1644	15.119	15.0963	15.0736	15.0511	15.0286
650-651-5400	650-FUGITIVE WINDBL	651-DUST FROM PASTURE L	5400-DUST	4.1987	4.186	4.1798	4.1735	4.1673	4.161
650-652-5400	650-FUGITIVE WINDBL	652-DUST FROM UNPAVED R	5400-DUST (ALL UNPAVED RDS	0.8657	0.6753	0.6753	0.6753	0.6753	0.6753
	650-FUGITIVE WINDBLOWN DUST			20.2288	19.9803	19.9514	19.9224	19.8937	19.8649
660-656-0200	660-FIRES	656-STRUCTURAL FIRES	0200-SOLID FUEL (UNSPECIFIE	0.0069	0.0072	0.0072	0.0072	0.0075	0.0076
660-658-0200	660-FIRES	658-AUTOMOBILE FIRES	0200-SOLID FUEL (UNSPECIFIE	0.0067	0.0076	0.0081	0.0086	0.009	0.0096
	660-STRUCTURAL & AUTO FIRES			0.0136	0.0148	0.0153	0.0158	0.0165	0.0172
670-660-0262	670-WASTE BURNING /	660-AGRICULTURAL BURNIN	0262-AGRICULTURAL WASTE	0.0032	0.0032	0.0032	0.0032	0.0032	0.0032
670-662-0262	670-WASTE BURNING /	662-AGRICULTURAL BURNIN	0262-AGRICULTURAL WASTE	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011
670-664-0200	670-WASTE BURNING /	664-RANGE IMPROVEMENT	0200-SOLID FUEL (UNSPECIFIE	7	8	17	17.4	17.4	17.4
670-666-0200	670-WASTE BURNING /	666-FOREST MANAGEMENT	0200-SOLID FUEL (UNSPECIFIE	0.0123	0.0378	0.089	0.089	0.089	0.089
670-668-0200	670-WASTE BURNING /	668-WEED ABATEMENT	0200-SOLID FUEL (UNSPECIFIE	0.0482	0.0421	0.04	0.0384	0.0365	0.034

EIC	EICSUM	EICSOU	EICMAT						
670-670-0200	670-WASTE BURNING /	670-NON-AGRICULTURAL OP	0200-SOLID FUEL (UNSPECIFIE	0.2385	0.2577	0.2638	0.2689	0.2743	0.2803
	670-PRESCRIBED FIRES:			7.3033	8.3419	17.3971	17.8006	17.8041	17.8076
690-680-6000	690-COOKING	680-COMMERCIAL CHARBRO	6000-FOOD AND AGRICULTURA	0.3186	0.323	0.3561	0.3799	0.4093	0.4382
	690-COOKING			0.3186	0.323	0.3561	0.3799	0.4093	0.4382
710-701-1100	710-LIGHT DUTY PASS	701-NON-CATALYST STARTS	1100-GASOLINE (UNSPECIFIED	0.0036	0.0009	0	0	0	0
710-706-1100	710-LIGHT DUTY PASS	706-NON-CATALYST HOT ST/	1100-GASOLINE (UNSPECIFIED	0.0324	0.0081	0.0045	0.0018	0	0
710-708-1100	710-LIGHT DUTY PASS	708-NON-CATALYST EVAPOR	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
710-710-1100	710-LIGHT DUTY PASS	710-NON-CATALYST EVAPOR	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
710-712-1100	710-LIGHT DUTY PASS	712-NON-CATALYST HOT SO	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
710-714-1100	710-LIGHT DUTY PASS	714-NON-CATALYST DIURNA	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
710-718-0248	710-LIGHT DUTY PASS	718-NON-CATALYST TIRE WE	0248-RUBBER TIRES	0.009	0.002	0.001	0	0	0
710-720-5410	710-LIGHT DUTY PASS	720-NON-CATALYST BRAKE \	5410-BRAKE DUST	0.0127	0.003	0.002	0	0	0
710-731-1100	710-LIGHT DUTY PASS	731-CATALYST STARTS	1100-GASOLINE (UNSPECIFIED	0.0058	0.0117	0.0136	0.0136	0.0156	0.0156
710-734-1100	710-LIGHT DUTY PASS	734-CATALYST HOT STABILIZ	1100-GASOLINE (UNSPECIFIED	0.065	0.1116	0.126	0.1388	0.1543	0.1669
710-736-1100	710-LIGHT DUTY PASS	736-CATALYST EVAPORATIV	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
710-738-1100	710-LIGHT DUTY PASS	738-CATALYST EVAPORATIV	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
710-740-1100	710-LIGHT DUTY PASS	740-CATALYST HOT SOAK	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
710-742-1100	710-LIGHT DUTY PASS	742-CATALYST DIURNAL	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
710-744-0248	710-LIGHT DUTY PASS	744-CATALYST TIRE WEAR	0248-RUBBER TIRES	0.065	0.078	0.087	0.096	0.104	0.111
710-746-5410	710-LIGHT DUTY PASS	746-CATALYST BRAKE WEAR	5410-BRAKE DUST	0.101	0.1215	0.1363	0.151	0.1617	0.1745
710-761-1210	710-LIGHT DUTY PASS	761-DIESEL STARTS	1210-DIESEL (UNSPECIFIED)	0	0	0	0	0	0
710-764-1210	710-LIGHT DUTY PASS	764-DIESEL HOT STABILIZED	1210-DIESEL (UNSPECIFIED)	0.053	0.015	0.008	0.003	0.001	0
710-766-0248	710-LIGHT DUTY PASS	766-DIESEL TIRE WEAR	0248-RUBBER TIRES	0.001	0	0	0	0	0
710-768-5410	710-LIGHT DUTY PASS	768-DIESEL BRAKE WEAR	5410-BRAKE DUST	0.003	0.001	0	0	0	0
722-701-1100	722-LIGHT DUTY TRUC	701-NON-CATALYST STARTS	1100-GASOLINE (UNSPECIFIED	0.0018	0	0	0	0	0
722-706-1100	722-LIGHT DUTY TRUC	706-NON-CATALYST HOT ST/	1100-GASOLINE (UNSPECIFIED	0.0135	0.0036	0.0027	0.0009	0	0
722-708-1100	722-LIGHT DUTY TRUC	708-NON-CATALYST EVAPOR	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
722-710-1100	722-LIGHT DUTY TRUC	710-NON-CATALYST EVAPOR	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
722-712-1100	722-LIGHT DUTY TRUC	712-NON-CATALYST HOT SO	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
722-714-1100	722-LIGHT DUTY TRUC	714-NON-CATALYST DIURNA	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
722-718-0248	722-LIGHT DUTY TRUC	718-NON-CATALYST TIRE WE	0248-RUBBER TIRES	0.003	0.001	0	0	0	0
722-720-5410	722-LIGHT DUTY TRUC	720-NON-CATALYST BRAKE \	5410-BRAKE DUST	0.0069	0.002	0.001	0	0	0
722-731-1100	722-LIGHT DUTY TRUC	731-CATALYST STARTS	1100-GASOLINE (UNSPECIFIED	0.002	0.0039	0.0058	0.0058	0.0058	0.0068
722-734-1100	722-LIGHT DUTY TRUC	734-CATALYST HOT STABILIZ	1100-GASOLINE (UNSPECIFIED	0.0223	0.0388	0.0437	0.0495	0.0563	0.0612
722-736-1100	722-LIGHT DUTY TRUC	736-CATALYST EVAPORATIV	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
722-738-1100	722-LIGHT DUTY TRUC	738-CATALYST EVAPORATIV	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
722-740-1100	722-LIGHT DUTY TRUC	740-CATALYST HOT SOAK	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
722-742-1100	722-LIGHT DUTY TRUC	742-CATALYST DIURNAL	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
722-744-0248	722-LIGHT DUTY TRUC	744-CATALYST TIRE WEAR	0248-RUBBER TIRES	0.02	0.025	0.029	0.033	0.034	0.038
722-746-5410	722-LIGHT DUTY TRUC	746-CATALYST BRAKE WEAR	5410-BRAKE DUST	0.0313	0.0392	0.0451	0.05	0.0539	0.0579
722-761-1210	722-LIGHT DUTY TRUC	761-DIESEL STARTS	1210-DIESEL (UNSPECIFIED)	0	0	0	0	0	0
722-764-1210	722-LIGHT DUTY TRUC	764-DIESEL HOT STABILIZED	1210-DIESEL (UNSPECIFIED)	0.027	0.012	0.009	0.005	0.003	0.001
722-766-0248	722-LIGHT DUTY TRUC	766-DIESEL TIRE WEAR	0248-RUBBER TIRES	0.001	0.001	0.001	0	0	0
722-768-5410	722-LIGHT DUTY TRUC	768-DIESEL BRAKE WEAR	5410-BRAKE DUST	0.002	0.002	0.001	0.001	0	0
723-701-1100	723-LIGHT DUTY TRUC	701-NON-CATALYST STARTS	1100-GASOLINE (UNSPECIFIED	0.0009	0	0	0	0	0
723-706-1100	723-LIGHT DUTY TRUC	706-NON-CATALYST HOT ST/	1100-GASOLINE (UNSPECIFIED	0.0099	0.0027	0.0009	0.0009	0	0
723-708-1100	723-LIGHT DUTY TRUC	708-NON-CATALYST EVAPOR	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
723-710-1100	723-LIGHT DUTY TRUC	710-NON-CATALYST EVAPOR	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
723-712-1100	723-LIGHT DUTY TRUC	712-NON-CATALYST HOT SO	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
723-714-1100	723-LIGHT DUTY TRUC	714-NON-CATALYST DIURNA	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
723-718-0248	723-LIGHT DUTY TRUC	718-NON-CATALYST TIRE WE	0248-RUBBER TIRES	0.003	0	0	0	0	0
723-720-5410	723-LIGHT DUTY TRUC	720-NON-CATALYST BRAKE \	5410-BRAKE DUST	0.003	0.001	0	0	0	0
723-731-1100	723-LIGHT DUTY TRUC	731-CATALYST STARTS	1100-GASOLINE (UNSPECIFIED	0.0029	0.0058	0.0078	0.0097	0.0097	0.0117
723-734-1100	723-LIGHT DUTY TRUC	734-CATALYST HOT STABILIZ	1100-GASOLINE (UNSPECIFIED	0.031	0.0621	0.0805	0.0931	0.1038	0.1116
723-736-1100	723-LIGHT DUTY TRUC	736-CATALYST EVAPORATIV	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
723-738-1100	723-LIGHT DUTY TRUC	738-CATALYST EVAPORATIV	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
723-740-1100	723-LIGHT DUTY TRUC	740-CATALYST HOT SOAK	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
723-742-1100	723-LIGHT DUTY TRUC	742-CATALYST DIURNAL	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
723-744-0248	723-LIGHT DUTY TRUC	744-CATALYST TIRE WEAR	0248-RUBBER TIRES	0.016	0.024	0.025	0.028	0.029	0.031
723-746-5410	723-LIGHT DUTY TRUC	746-CATALYST BRAKE WEAR	5410-BRAKE DUST	0.0255	0.0382	0.0402	0.0431	0.046	0.049
723-761-1210	723-LIGHT DUTY TRUC	761-DIESEL STARTS	1210-DIESEL (UNSPECIFIED)	0	0	0	0	0	0
723-764-1210	723-LIGHT DUTY TRUC	764-DIESEL HOT STABILIZED	1210-DIESEL (UNSPECIFIED)	0.011	0.003	0.002	0.001	0.001	0
723-766-0248	723-LIGHT DUTY TRUC	766-DIESEL TIRE WEAR	0248-RUBBER TIRES	0	0	0	0	0	0
723-768-5410	723-LIGHT DUTY TRUC	768-DIESEL BRAKE WEAR	5410-BRAKE DUST	0	0	0	0	0	0
724-701-1100	724-MEDIUM DUTY TRU	701-NON-CATALYST STARTS	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
724-706-1100	724-MEDIUM DUTY TRU	706-NON-CATALYST HOT ST/	1100-GASOLINE (UNSPECIFIED	0.0027	0.0009	0	0	0	0
724-708-1100	724-MEDIUM DUTY TRU	708-NON-CATALYST EVAPOR	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
724-710-1100	724-MEDIUM DUTY TRU	710-NON-CATALYST EVAPOR	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
724-712-1100	724-MEDIUM DUTY TRU	712-NON-CATALYST HOT SO	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
724-714-1100	724-MEDIUM DUTY TRU	714-NON-CATALYST DIURNA	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
724-718-0248	724-MEDIUM DUTY TRU	718-NON-CATALYST TIRE WE	0248-RUBBER TIRES	0	0	0	0	0	0
724-720-5410	724-MEDIUM DUTY TRU	720-NON-CATALYST BRAKE \	5410-BRAKE DUST	0.001	0	0	0	0	0
724-731-1100	724-MEDIUM DUTY TRU	731-CATALYST STARTS	1100-GASOLINE (UNSPECIFIED	0	0.0029	0.0039	0.0048	0.0048	0.0058
724-734-1100	724-MEDIUM DUTY TRU	734-CATALYST HOT STABILIZ	1100-GASOLINE (UNSPECIFIED	0.0097	0.031	0.0388	0.0465	0.0524	0.0583
724-736-1100	724-MEDIUM DUTY TRU	736-CATALYST EVAPORATIV	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
724-738-1100	724-MEDIUM DUTY TRU	738-CATALYST EVAPORATIV	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
724-740-1100	724-MEDIUM DUTY TRU	740-CATALYST HOT SOAK	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0

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724-742-1100	724-MEDIUM DUTY TRU	742-CATALYST DIURNAL	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
724-744-0248	724-MEDIUM DUTY TRU	744-CATALYST TIRE WEAR	0248-RUBBER TIRES	0.005	0.012	0.013	0.013	0.015	0.016
724-746-5410	724-MEDIUM DUTY TRU	746-CATALYST BRAKE WEAR	5410-BRAKE DUST	0.0088	0.0187	0.0207	0.0216	0.0226	0.0245
724-761-1210	724-MEDIUM DUTY TRU	761-DIESEL STARTS	1210-DIESEL (UNSPECIFIED)	0	0	0	0	0	0
724-764-1210	724-MEDIUM DUTY TRU	764-DIESEL HOT STABILIZED	1210-DIESEL (UNSPECIFIED)	0.003	0.002	0.002	0.002	0.001	0
724-766-0248	724-MEDIUM DUTY TRU	766-DIESEL TIRE WEAR	0248-RUBBER TIRES	0	0	0	0	0	0
724-768-5410	724-MEDIUM DUTY TRU	768-DIESEL BRAKE WEAR	5410-BRAKE DUST	0	0	0	0	0	0
732-701-1100	732-LIGHT HEAVY DUTI	701-NON-CATALYST STARTS	1100-GASOLINE (UNSPECIFIED	0.0018	0	0	0	0	0
732-706-1100	732-LIGHT HEAVY DUTI	706-NON-CATALYST HOT ST/	1100-GASOLINE (UNSPECIFIED	0.0027	0	0	0	0	0
732-707-1100	732-LIGHT HEAVY DUTI	707-NON-CATALYST IDLE EX	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
732-708-1100	732-LIGHT HEAVY DUTI	708-NON-CATALYST EVAPOR	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
732-710-1100	732-LIGHT HEAVY DUTI	710-NON-CATALYST EVAPOR	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
732-712-1100	732-LIGHT HEAVY DUTI	712-NON-CATALYST HOT SO/	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
732-714-1100	732-LIGHT HEAVY DUTI	714-NON-CATALYST DIURNA	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
732-718-0248	732-LIGHT HEAVY DUTI	718-NON-CATALYST TIRE WE	0248-RUBBER TIRES	0	0	0	0	0	0
732-720-5410	732-LIGHT HEAVY DUTI	720-NON-CATALYST BRAKE \	5410-BRAKE DUST	0.001	0	0	0	0	0
732-731-1100	732-LIGHT HEAVY DUTI	731-CATALYST STARTS	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
732-734-1100	732-LIGHT HEAVY DUTI	734-CATALYST HOT STABILIZ	1100-GASOLINE (UNSPECIFIED	0.0029	0.0029	0.0049	0.0078	0.0078	0.0087
732-735-1100	732-LIGHT HEAVY DUTI	735-CATALYST IDLE EXHAUS	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
732-736-1100	732-LIGHT HEAVY DUTI	736-CATALYST EVAPORATIVI	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
732-738-1100	732-LIGHT HEAVY DUTI	738-CATALYST EVAPORATIVI	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
732-740-1100	732-LIGHT HEAVY DUTI	740-CATALYST HOT SOAK	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
732-742-1100	732-LIGHT HEAVY DUTI	742-CATALYST DIURNAL	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
732-744-0248	732-LIGHT HEAVY DUTI	744-CATALYST TIRE WEAR	0248-RUBBER TIRES	0.002	0.003	0.005	0.006	0.005	0.005
732-746-5410	732-LIGHT HEAVY DUTI	746-CATALYST BRAKE WEAR	5410-BRAKE DUST	0.002	0.003	0.0059	0.0059	0.0059	0.0059
733-701-1100	733-LIGHT HEAVY DUTI	701-NON-CATALYST STARTS	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
733-706-1100	733-LIGHT HEAVY DUTI	706-NON-CATALYST HOT ST/	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
733-707-1100	733-LIGHT HEAVY DUTI	707-NON-CATALYST IDLE EX	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
733-708-1100	733-LIGHT HEAVY DUTI	708-NON-CATALYST EVAPOR	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
733-710-1100	733-LIGHT HEAVY DUTI	710-NON-CATALYST EVAPOR	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
733-712-1100	733-LIGHT HEAVY DUTI	712-NON-CATALYST HOT SO/	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
733-714-1100	733-LIGHT HEAVY DUTI	714-NON-CATALYST DIURNA	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
733-718-0248	733-LIGHT HEAVY DUTI	718-NON-CATALYST TIRE WE	0248-RUBBER TIRES	0	0	0	0	0	0
733-720-5410	733-LIGHT HEAVY DUTI	720-NON-CATALYST BRAKE \	5410-BRAKE DUST	0	0	0	0	0	0
733-731-1100	733-LIGHT HEAVY DUTI	731-CATALYST STARTS	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
733-734-1100	733-LIGHT HEAVY DUTI	734-CATALYST HOT STABILIZ	1100-GASOLINE (UNSPECIFIED	0	0.001	0.001	0.001	0.001	0.001
733-735-1100	733-LIGHT HEAVY DUTI	735-CATALYST IDLE EXHAUS	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
733-736-1100	733-LIGHT HEAVY DUTI	736-CATALYST EVAPORATIVI	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
733-738-1100	733-LIGHT HEAVY DUTI	738-CATALYST EVAPORATIVI	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
733-740-1100	733-LIGHT HEAVY DUTI	740-CATALYST HOT SOAK	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
733-742-1100	733-LIGHT HEAVY DUTI	742-CATALYST DIURNAL	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
733-744-0248	733-LIGHT HEAVY DUTI	744-CATALYST TIRE WEAR	0248-RUBBER TIRES	0.001	0	0.001	0.001	0.001	0.001
733-746-5410	733-LIGHT HEAVY DUTI	746-CATALYST BRAKE WEAR	5410-BRAKE DUST	0.001	0.001	0.001	0.001	0.001	0.001
734-701-1100	734-MEDIUM HEAVY DU	701-NON-CATALYST STARTS	1100-GASOLINE (UNSPECIFIED	0.0018	0	0	0	0	0
734-706-1100	734-MEDIUM HEAVY DU	706-NON-CATALYST HOT ST/	1100-GASOLINE (UNSPECIFIED	0.0009	0	0	0	0	0
734-707-1100	734-MEDIUM HEAVY DU	707-NON-CATALYST IDLE EX	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
734-708-1100	734-MEDIUM HEAVY DU	708-NON-CATALYST EVAPOR	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
734-710-1100	734-MEDIUM HEAVY DU	710-NON-CATALYST EVAPOR	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
734-712-1100	734-MEDIUM HEAVY DU	712-NON-CATALYST HOT SO/	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
734-714-1100	734-MEDIUM HEAVY DU	714-NON-CATALYST DIURNA	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
734-718-0248	734-MEDIUM HEAVY DU	718-NON-CATALYST TIRE WE	0248-RUBBER TIRES	0	0	0	0	0	0
734-720-5410	734-MEDIUM HEAVY DU	720-NON-CATALYST BRAKE \	5410-BRAKE DUST	0	0	0	0	0	0
734-731-1100	734-MEDIUM HEAVY DU	731-CATALYST STARTS	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
734-734-1100	734-MEDIUM HEAVY DU	734-CATALYST HOT STABILIZ	1100-GASOLINE (UNSPECIFIED	0.001	0.001	0.001	0.001	0.001	0.001
734-735-1100	734-MEDIUM HEAVY DU	735-CATALYST IDLE EXHAUS	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
734-736-1100	734-MEDIUM HEAVY DU	736-CATALYST EVAPORATIVI	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
734-738-1100	734-MEDIUM HEAVY DU	738-CATALYST EVAPORATIVI	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
734-740-1100	734-MEDIUM HEAVY DU	740-CATALYST HOT SOAK	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
734-742-1100	734-MEDIUM HEAVY DU	742-CATALYST DIURNAL	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
734-744-0248	734-MEDIUM HEAVY DU	744-CATALYST TIRE WEAR	0248-RUBBER TIRES	0.001	0.001	0.001	0.001	0.001	0.001
734-746-5410	734-MEDIUM HEAVY DU	746-CATALYST BRAKE WEAR	5410-BRAKE DUST	0.001	0.001	0.001	0.001	0.001	0.001
736-701-1100	736-HEAVY HEAVY DUT	701-NON-CATALYST STARTS	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
736-706-1100	736-HEAVY HEAVY DUT	706-NON-CATALYST HOT ST/	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
736-707-1100	736-HEAVY HEAVY DUT	707-NON-CATALYST IDLE EX	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
736-708-1100	736-HEAVY HEAVY DUT	708-NON-CATALYST EVAPOR	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
736-710-1100	736-HEAVY HEAVY DUT	710-NON-CATALYST EVAPOR	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
736-712-1100	736-HEAVY HEAVY DUT	712-NON-CATALYST HOT SO/	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
736-714-1100	736-HEAVY HEAVY DUT	714-NON-CATALYST DIURNA	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
736-718-0248	736-HEAVY HEAVY DUT	718-NON-CATALYST TIRE WE	0248-RUBBER TIRES	0	0	0	0	0	0
736-720-5410	736-HEAVY HEAVY DUT	720-NON-CATALYST BRAKE \	5410-BRAKE DUST	0	0	0	0	0	0
736-731-1100	736-HEAVY HEAVY DUT	731-CATALYST STARTS	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
736-734-1100	736-HEAVY HEAVY DUT	734-CATALYST HOT STABILIZ	1100-GASOLINE (UNSPECIFIED	0.001	0.001	0.001	0	0	0
736-735-1100	736-HEAVY HEAVY DUT	735-CATALYST IDLE EXHAUS	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
736-736-1100	736-HEAVY HEAVY DUT	736-CATALYST EVAPORATIVI	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
736-738-1100	736-HEAVY HEAVY DUT	738-CATALYST EVAPORATIVI	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
736-740-1100	736-HEAVY HEAVY DUT	740-CATALYST HOT SOAK	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
736-742-1100	736-HEAVY HEAVY DUT	742-CATALYST DIURNAL	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
736-744-0248	736-HEAVY HEAVY DUT	744-CATALYST TIRE WEAR	0248-RUBBER TIRES	0.001	0.001	0	0	0	0
736-746-5410	736-HEAVY HEAVY DUT	746-CATALYST BRAKE WEAR	5410-BRAKE DUST	0.001	0.001	0	0	0	0

EIC	EICSUM	EICSOU	EICMAT						
742-761-1210	742-LIGHT HEAVY DUT	761-DIESEL STARTS	1210-DIESEL (UNSPECIFIED)	0	0	0	0	0	0
742-764-1210	742-LIGHT HEAVY DUT	764-DIESEL HOT STABILIZED	1210-DIESEL (UNSPECIFIED)	0.009	0.006	0.007	0.005	0.004	0.003
742-765-1210	742-LIGHT HEAVY DUT	765-DIESEL IDLE EXHAUST	1210-DIESEL (UNSPECIFIED)	0	0	0	0	0	0
742-766-0248	742-LIGHT HEAVY DUT	766-DIESEL TIRE WEAR	0248-RUBBER TIRES	0	0	0.001	0.001	0.001	0.001
742-768-5410	742-LIGHT HEAVY DUT	768-DIESEL BRAKE WEAR	5410-BRAKE DUST	0	0	0.001	0.001	0.001	0.001
743-761-1210	743-LIGHT HEAVY DUT	761-DIESEL STARTS	1210-DIESEL (UNSPECIFIED)	0	0	0	0	0	0
743-764-1210	743-LIGHT HEAVY DUT	764-DIESEL HOT STABILIZED	1210-DIESEL (UNSPECIFIED)	0.021	0.007	0.007	0.005	0.003	0.003
743-765-1210	743-LIGHT HEAVY DUT	765-DIESEL IDLE EXHAUST	1210-DIESEL (UNSPECIFIED)	0	0	0	0	0	0
743-766-0248	743-LIGHT HEAVY DUT	766-DIESEL TIRE WEAR	0248-RUBBER TIRES	0.001	0	0	0	0	0
743-768-5410	743-LIGHT HEAVY DUT	768-DIESEL BRAKE WEAR	5410-BRAKE DUST	0.001	0	0	0	0	0
744-761-1210	744-MEDIUM HEAVY DU	761-DIESEL STARTS	1210-DIESEL (UNSPECIFIED)	0	0	0	0	0	0
744-764-1210	744-MEDIUM HEAVY DU	764-DIESEL HOT STABILIZED	1210-DIESEL (UNSPECIFIED)	0.158	0.108	0.107	0.093	0.076	0.064
744-765-1210	744-MEDIUM HEAVY DU	765-DIESEL IDLE EXHAUST	1210-DIESEL (UNSPECIFIED)	0.001	0	0	0	0	0
744-766-0248	744-MEDIUM HEAVY DU	766-DIESEL TIRE WEAR	0248-RUBBER TIRES	0.002	0.003	0.003	0.004	0.005	0.005
744-768-5410	744-MEDIUM HEAVY DU	768-DIESEL BRAKE WEAR	5410-BRAKE DUST	0.003	0.003	0.003	0.0039	0.0049	0.0059
746-761-1210	746-HEAVY HEAVY DU	761-DIESEL STARTS	1210-DIESEL (UNSPECIFIED)	0	0	0	0	0	0
746-764-1210	746-HEAVY HEAVY DU	764-DIESEL HOT STABILIZED	1210-DIESEL (UNSPECIFIED)	0.77	0.301	0.24	0.178	0.123	0.095
746-765-1210	746-HEAVY HEAVY DU	765-DIESEL IDLE EXHAUST	1210-DIESEL (UNSPECIFIED)	0.029	0.017	0.015	0.013	0.011	0.011
746-766-0248	746-HEAVY HEAVY DU	766-DIESEL TIRE WEAR	0248-RUBBER TIRES	0.026	0.025	0.029	0.035	0.04	0.043
746-768-5410	746-HEAVY HEAVY DU	768-DIESEL BRAKE WEAR	5410-BRAKE DUST	0.0098	0.0089	0.0099	0.0127	0.0137	0.0157
750-701-1100	750-MOTORCYCLES (M	701-NON-CATALYST STARTS	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
750-706-1100	750-MOTORCYCLES (M	706-NON-CATALYST HOT ST/	1100-GASOLINE (UNSPECIFIED	0.0072	0.0045	0.0054	0.0045	0.0036	0.0027
750-708-1100	750-MOTORCYCLES (M	708-NON-CATALYST EVAPOR	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
750-710-1100	750-MOTORCYCLES (M	710-NON-CATALYST EVAPOR	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
750-712-1100	750-MOTORCYCLES (M	712-NON-CATALYST HOT SO	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
750-714-1100	750-MOTORCYCLES (M	714-NON-CATALYST DIURNA	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
750-718-0248	750-MOTORCYCLES (M	718-NON-CATALYST TIRE WE	0248-RUBBER TIRES	0	0	0	0	0	0
750-720-5410	750-MOTORCYCLES (M	720-NON-CATALYST BRAKE \	5410-BRAKE DUST	0.002	0	0.002	0	0	0
750-731-1100	750-MOTORCYCLES (M	731-CATALYST STARTS	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
750-734-1100	750-MOTORCYCLES (M	734-CATALYST HOT STABILIZ	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
750-736-1100	750-MOTORCYCLES (M	736-CATALYST EVAPORATIV	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
750-738-1100	750-MOTORCYCLES (M	738-CATALYST EVAPORATIV	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
750-740-1100	750-MOTORCYCLES (M	740-CATALYST HOT SOAK	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
750-742-1100	750-MOTORCYCLES (M	742-CATALYST DIURNAL	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
750-744-0248	750-MOTORCYCLES (M	744-CATALYST TIRE WEAR	0248-RUBBER TIRES	0	0	0	0	0	0
750-746-5410	750-MOTORCYCLES (M	746-CATALYST BRAKE WEAR	5410-BRAKE DUST	0	0	0	0	0	0.002
760-761-1210	760-HEAVY DUTY DIES	761-DIESEL STARTS	1210-DIESEL (UNSPECIFIED)	0	0	0	0	0	0
760-764-1210	760-HEAVY DUTY DIES	764-DIESEL HOT STABILIZED	1210-DIESEL (UNSPECIFIED)	0.023	0.026	0.026	0.024	0.024	0.023
760-766-0248	760-HEAVY DUTY DIES	766-DIESEL TIRE WEAR	0248-RUBBER TIRES	0	0	0	0	0	0.001
760-768-5410	760-HEAVY DUTY DIES	768-DIESEL BRAKE WEAR	5410-BRAKE DUST	0	0.001	0.001	0.001	0.001	0.001
762-701-1100	762-HEAVY DUTY GAS	701-NON-CATALYST STARTS	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
762-706-1100	762-HEAVY DUTY GAS	706-NON-CATALYST HOT ST/	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
762-708-1100	762-HEAVY DUTY GAS	708-NON-CATALYST EVAPOR	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
762-710-1100	762-HEAVY DUTY GAS	710-NON-CATALYST EVAPOR	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
762-712-1100	762-HEAVY DUTY GAS	712-NON-CATALYST HOT SO	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
762-714-1100	762-HEAVY DUTY GAS	714-NON-CATALYST DIURNA	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
762-718-0248	762-HEAVY DUTY GAS	718-NON-CATALYST TIRE WE	0248-RUBBER TIRES	0	0	0	0	0	0
762-720-5410	762-HEAVY DUTY GAS	720-NON-CATALYST BRAKE \	5410-BRAKE DUST	0	0	0	0	0	0
762-731-1100	762-HEAVY DUTY GAS	731-CATALYST STARTS	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
762-734-1100	762-HEAVY DUTY GAS	734-CATALYST HOT STABILIZ	1100-GASOLINE (UNSPECIFIED	0.001	0.001	0.001	0.001	0.001	0.001
762-736-1100	762-HEAVY DUTY GAS	736-CATALYST EVAPORATIV	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
762-738-1100	762-HEAVY DUTY GAS	738-CATALYST EVAPORATIV	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
762-740-1100	762-HEAVY DUTY GAS	740-CATALYST HOT SOAK	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
762-742-1100	762-HEAVY DUTY GAS	742-CATALYST DIURNAL	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
762-744-0248	762-HEAVY DUTY GAS	744-CATALYST TIRE WEAR	0248-RUBBER TIRES	0	0	0	0.001	0.001	0.001
762-746-5410	762-HEAVY DUTY GAS	746-CATALYST BRAKE WEAR	5410-BRAKE DUST	0	0	0.001	0.001	0.001	0.001
770-701-1100	770-SCHOOL BUSES (S	701-NON-CATALYST STARTS	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
770-706-1100	770-SCHOOL BUSES (S	706-NON-CATALYST HOT ST/	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
770-707-1100	770-SCHOOL BUSES (S	707-NON-CATALYST IDLE EX	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
770-708-1100	770-SCHOOL BUSES (S	708-NON-CATALYST EVAPOR	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
770-710-1100	770-SCHOOL BUSES (S	710-NON-CATALYST EVAPOR	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
770-712-1100	770-SCHOOL BUSES (S	712-NON-CATALYST HOT SO	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
770-714-1100	770-SCHOOL BUSES (S	714-NON-CATALYST DIURNA	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
770-718-0248	770-SCHOOL BUSES (S	718-NON-CATALYST TIRE WE	0248-RUBBER TIRES	0	0	0	0	0	0
770-720-5410	770-SCHOOL BUSES (S	720-NON-CATALYST BRAKE \	5410-BRAKE DUST	0	0	0	0	0	0
770-731-1100	770-SCHOOL BUSES (S	731-CATALYST STARTS	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
770-734-1100	770-SCHOOL BUSES (S	734-CATALYST HOT STABILIZ	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
770-735-1100	770-SCHOOL BUSES (S	735-CATALYST IDLE EXHAUS	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
770-736-1100	770-SCHOOL BUSES (S	736-CATALYST EVAPORATIV	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
770-738-1100	770-SCHOOL BUSES (S	738-CATALYST EVAPORATIV	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
770-740-1100	770-SCHOOL BUSES (S	740-CATALYST HOT SOAK	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
770-742-1100	770-SCHOOL BUSES (S	742-CATALYST DIURNAL	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
770-744-0248	770-SCHOOL BUSES (S	744-CATALYST TIRE WEAR	0248-RUBBER TIRES	0	0	0	0	0	0
770-746-5410	770-SCHOOL BUSES (S	746-CATALYST BRAKE WEAR	5410-BRAKE DUST	0	0	0	0	0	0
770-761-1210	770-SCHOOL BUSES (S	761-DIESEL STARTS	1210-DIESEL (UNSPECIFIED)	0	0	0	0	0	0
770-764-1210	770-SCHOOL BUSES (S	764-DIESEL HOT STABILIZED	1210-DIESEL (UNSPECIFIED)	0.012	0.013	0.014	0.014	0.013	0.012

EIC	EICSUM	EICSOU	EICMAT						
770-765-1210	770-SCHOOL BUSES (S	765-DIESEL IDLE EXHAUST	1210-DIESEL (UNSPECIFIED)	0	0	0	0	0	0
770-766-0248	770-SCHOOL BUSES (S	766-DIESEL TIRE WEAR	0248-RUBBER TIRES	0	0	0	0	0	0
770-768-5410	770-SCHOOL BUSES (S	768-DIESEL BRAKE WEAR	5410-BRAKE DUST	0	0	0	0	0	0
780-701-1100	780-MOTOR HOMES (M	701-NON-CATALYST STARTS	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
780-706-1100	780-MOTOR HOMES (M	706-NON-CATALYST HOT ST/	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
780-708-1100	780-MOTOR HOMES (M	708-NON-CATALYST EVAPOR	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
780-710-1100	780-MOTOR HOMES (M	710-NON-CATALYST EVAPOR	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
780-712-1100	780-MOTOR HOMES (M	712-NON-CATALYST HOT SO	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
780-714-1100	780-MOTOR HOMES (M	714-NON-CATALYST DIURNA	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
780-718-0248	780-MOTOR HOMES (M	718-NON-CATALYST TIRE WE	0248-RUBBER TIRES	0	0	0	0	0	0
780-720-5410	780-MOTOR HOMES (M	720-NON-CATALYST BRAKE \	5410-BRAKE DUST	0	0	0	0	0	0
780-731-1100	780-MOTOR HOMES (M	731-CATALYST STARTS	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
780-734-1100	780-MOTOR HOMES (M	734-CATALYST HOT STABILIZ	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
780-736-1100	780-MOTOR HOMES (M	736-CATALYST EVAPORATIV	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
780-738-1100	780-MOTOR HOMES (M	738-CATALYST EVAPORATIV	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
780-740-1100	780-MOTOR HOMES (M	740-CATALYST HOT SOAK	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
780-742-1100	780-MOTOR HOMES (M	742-CATALYST DIURNAL	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
780-744-0248	780-MOTOR HOMES (M	744-CATALYST TIRE WEAR	0248-RUBBER TIRES	0	0.001	0.001	0.002	0.002	0.002
780-746-5410	780-MOTOR HOMES (M	746-CATALYST BRAKE WEAR	5410-BRAKE DUST	0	0.001	0.001	0.002	0.002	0.002
780-761-1210	780-MOTOR HOMES (M	761-DIESEL STARTS	1210-DIESEL (UNSPECIFIED)	0	0	0	0	0	0
780-764-1210	780-MOTOR HOMES (M	764-DIESEL HOT STABILIZED	1210-DIESEL (UNSPECIFIED)	0.001	0.002	0.002	0.002	0.002	0.002
780-766-0248	780-MOTOR HOMES (M	766-DIESEL TIRE WEAR	0248-RUBBER TIRES	0	0	0	0	0	0
780-768-5410	780-MOTOR HOMES (M	768-DIESEL BRAKE WEAR	5410-BRAKE DUST	0	0	0	0	0	0
	ON-ROAD MOTOR VEHICLES			1.7168	1.2309	1.2516	1.2439	1.2328	1.2647
810-806-1140	810-AIRCRAFT	806-AGRICULTURAL AIRCRA	1140-AVIATION GASOLINE	0.0003	0.0003	0.0004	0.0004	0.0004	0.0004
810-808-1400	810-AIRCRAFT	808-JET AIRCRAFT - MILITAR	1400-JET FUEL (UNSPECIFIED)	0.0283	0.0274	0.0275	0.0275	0.0275	0.0275
810-810-1400	810-AIRCRAFT	810-JET AIRCRAFT - COMME	1400-JET FUEL (UNSPECIFIED)	0.0189	0.0188	0.023	0.0257	0.028	0.0298
810-812-1400	810-AIRCRAFT	812-JET AIRCRAFT - CIVIL	1400-JET FUEL (UNSPECIFIED)	0.0098	0.0097	0.0109	0.0117	0.0124	0.0129
	810-AIRCRAFT			0.0573	0.0562	0.0618	0.0653	0.0683	0.0706
820-820-1210	820-TRAINS	820-LOCOMOTIVES - ROAD H	1210-DIESEL (UNSPECIFIED)	0.0919	0.1172	0.1215	0.1123	0.1106	0.1099
	820-TRAINS			0.0919	0.1172	0.1215	0.1123	0.1106	0.1099
830-830-1500	830-SHIPS AND COMME	830-SHIPS MANEUVERING - I	1500-RESIDUAL OIL (UNSPECIF	0	0	0	0	0	0
830-836-1210	830-SHIPS AND COMME	836-SHIPS MANEUVERING - I	1210-DIESEL (UNSPECIFIED)	0	0	0	0	0	0
830-840-1500	830-SHIPS AND COMME	840-SHIPS BERTHING - U.S. S	1500-RESIDUAL OIL (UNSPECIF	0.006	0.0057	0.0055	0.0054	0.0052	0.0049
830-844-1210	830-SHIPS AND COMME	844-SHIPS BERTHING - U.S. I	1210-DIESEL (UNSPECIFIED)	0.0144	0.0134	0.013	0.0127	0.0122	0.0115
830-846-1210	830-SHIPS AND COMME	846-SHIPS BERTHING - FORE	1210-DIESEL (UNSPECIFIED)	0.0046	0.0043	0.0041	0.0041	0.0039	0.0037
	830-SHIPS AND COMMERCIAL BOATS			0.025	0.0234	0.0226	0.0222	0.0213	0.0201
840-864-1100	840-RECREATIONAL BO	864-RECREATIONAL BOATS	1100-GASOLINE (UNSPECIFIED	0.1999	0.3028	0.4508	0.4978	0.5632	0.5918
840-864-1100	840-RECREATIONAL BO	864-RECREATIONAL BOATS	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
840-864-1100	840-RECREATIONAL BO	864-RECREATIONAL BOATS	1100-GASOLINE (UNSPECIFIED	0.0052	0.0064	0.0068	0.0073	0.0078	0.0083
840-864-1100	840-RECREATIONAL BO	864-RECREATIONAL BOATS	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
840-864-1210	840-RECREATIONAL BO	864-RECREATIONAL BOATS	1210-DIESEL (UNSPECIFIED)	0.0015	0.0017	0.0018	0.002	0.0022	0.0023
	840-RECREATIONAL BOATS			0.2066	0.3109	0.4594	0.5071	0.5732	0.6024
850-872-1100	850-OFF-ROAD RECRE	872-OFF-ROAD MOTORCYCL	1100-GASOLINE (UNSPECIFIED	0.0006	0.0006	0.0008	0.0008	0.0008	0.0008
850-874-1100	850-OFF-ROAD RECRE	874-ALL-TERRAIN VEHICLES	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
850-876-1100	850-OFF-ROAD RECRE	876-FOUR-WHEEL DRIVE VEI	1100-GASOLINE (UNSPECIFIED	0.002	0.002	0.0024	0.0025	0.0027	0.0029
	850-OFF-ROAD RECREATIONAL VEHICLES			0.0026	0.0026	0.0032	0.0033	0.0035	0.0037
860-883-1100	860-OFF-ROAD EQUIPN	883-LAWN AND GARDEN EQU	1100-GASOLINE (UNSPECIFIED	0.055	0.0471	0.0237	0.0171	0.0171	0.0171
860-883-1100	860-OFF-ROAD EQUIPN	883-LAWN AND GARDEN EQU	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
860-883-1100	860-OFF-ROAD EQUIPN	883-LAWN AND GARDEN EQU	1100-GASOLINE (UNSPECIFIED	0.017	0.0232	0.0257	0.0262	0.0303	0.0303
860-883-1100	860-OFF-ROAD EQUIPN	883-LAWN AND GARDEN EQU	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
860-883-1210	860-OFF-ROAD EQUIPN	883-LAWN AND GARDEN EQU	1210-DIESEL (UNSPECIFIED)	0.0114	0.0086	0.007	0.0065	0.0069	0.003
860-884-1100	860-OFF-ROAD EQUIPN	884-TRANSPORT REFRIGERA	1100-GASOLINE (UNSPECIFIED	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
860-884-1100	860-OFF-ROAD EQUIPN	884-TRANSPORT REFRIGERA	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
860-884-1210	860-OFF-ROAD EQUIPN	884-TRANSPORT REFRIGERA	1210-DIESEL (UNSPECIFIED)	0.067	0.0478	0.046	0.0427	0.0342	0.0245
860-885-0110	860-OFF-ROAD EQUIPN	885-LIGHT COMMERCIAL EQU	0110-NATURAL GAS	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
860-885-1100	860-OFF-ROAD EQUIPN	885-LIGHT COMMERCIAL EQU	1100-GASOLINE (UNSPECIFIED	0.0016	0.0013	0.0011	0.0011	0.0012	0.0012
860-885-1100	860-OFF-ROAD EQUIPN	885-LIGHT COMMERCIAL EQU	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
860-885-1100	860-OFF-ROAD EQUIPN	885-LIGHT COMMERCIAL EQU	1100-GASOLINE (UNSPECIFIED	0.0042	0.0155	0.0226	0.0249	0.0249	0.026
860-885-1100	860-OFF-ROAD EQUIPN	885-LIGHT COMMERCIAL EQU	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
860-885-1210	860-OFF-ROAD EQUIPN	885-LIGHT COMMERCIAL EQU	1210-DIESEL (UNSPECIFIED)	0.0671	0.0451	0.042	0.0371	0.0292	0.0223
860-886-0110	860-OFF-ROAD EQUIPN	886-INDUSTRIAL EQUIPMENT	0110-NATURAL GAS	0.0014	0.0013	0.0013	0.0013	0.0013	0.0014
860-886-1100	860-OFF-ROAD EQUIPN	886-INDUSTRIAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
860-886-1100	860-OFF-ROAD EQUIPN	886-INDUSTRIAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
860-886-1100	860-OFF-ROAD EQUIPN	886-INDUSTRIAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED	0.001	0.0011	0.0011	0.0011	0.0011	0.0011
860-886-1100	860-OFF-ROAD EQUIPN	886-INDUSTRIAL EQUIPMENT	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
860-886-1210	860-OFF-ROAD EQUIPN	886-INDUSTRIAL EQUIPMENT	1210-DIESEL (UNSPECIFIED)	0.0231	0.0145	0.0144	0.012	0.0084	0.006
860-887-1100	860-OFF-ROAD EQUIPN	887-CONSTRUCTION AND MI	1100-GASOLINE (UNSPECIFIED	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002
860-887-1100	860-OFF-ROAD EQUIPN	887-CONSTRUCTION AND MI	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
860-887-1100	860-OFF-ROAD EQUIPN	887-CONSTRUCTION AND MI	1100-GASOLINE (UNSPECIFIED	0.0005	0.0074	0.009	0.0096	0.0096	0.0099
860-887-1100	860-OFF-ROAD EQUIPN	887-CONSTRUCTION AND MI	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
860-887-1210	860-OFF-ROAD EQUIPN	887-CONSTRUCTION AND MI	1210-DIESEL (UNSPECIFIED)	0.4442	0.2654	0.2354	0.1847	0.1405	0.1127
860-888-1100	860-OFF-ROAD EQUIPN	888-LOGGING EQUIPMENT	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
860-888-1100	860-OFF-ROAD EQUIPN	888-LOGGING EQUIPMENT	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
860-888-1100	860-OFF-ROAD EQUIPN	888-LOGGING EQUIPMENT	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0

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860-888-1100	860-OFF-ROAD EQUIPM	888-LOGGING EQUIPMENT	1100-GASOLINE (UNSPECIFIED)	0	0	0	0	0	0
860-888-1210	860-OFF-ROAD EQUIPM	888-LOGGING EQUIPMENT	1210-DIESEL (UNSPECIFIED)	0	0	0	0	0	0
860-889-0110	860-OFF-ROAD EQUIPM	889-AIRPORT GROUND SUPP	0110-NATURAL GAS	0	0	0	0	0	0
860-889-1100	860-OFF-ROAD EQUIPM	889-AIRPORT GROUND SUPP	1100-GASOLINE (UNSPECIFIED)	0	0	0	0	0	0
860-889-1100	860-OFF-ROAD EQUIPM	889-AIRPORT GROUND SUPP	1100-GASOLINE (UNSPECIFIED)	0	0	0	0	0	0
860-889-1210	860-OFF-ROAD EQUIPM	889-AIRPORT GROUND SUPP	1210-DIESEL (UNSPECIFIED)	0.0014	0.0008	0.0007	0.0007	0.0006	0.0004
860-890-1210	860-OFF-ROAD EQUIPM	890-DREDGING	1210-DIESEL (UNSPECIFIED)	0	0	0	0	0	0
860-891-1210	860-OFF-ROAD EQUIPM	891-OIL DRILLING AND WOR	1210-DIESEL (UNSPECIFIED)	0	0	0	0	0	0
860-892-1210	860-OFF-ROAD EQUIPM	892-MILITARY TACTICAL SUP	1210-DIESEL (UNSPECIFIED)	0.0002	0.0002	0.0001	0	0	0
860-995-1210	860-OFF-ROAD EQUIPM	995-OTHER	1210-DIESEL (UNSPECIFIED)	0	0	0	0	0	0
	860-OFF-ROAD EQUIPMENT			0.6958	0.4799	0.4307	0.3656	0.3059	0.2565
870-893-1100	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPM	1100-GASOLINE (UNSPECIFIED	0.0013	0.0042	0.0052	0.006	0.0066	0.007
870-893-1100	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPM	1100-GASOLINE (UNSPECIFIED	0	0	0	0	0	0
870-893-1210	870-FARM EQUIPMENT	893-AGRICULTURAL EQUIPM	1210-DIESEL (UNSPECIFIED)	0.744	0.5022	0.4381	0.3611	0.2773	0.2151
	870-FARM EQUIPMENT			0.7453	0.5064	0.4433	0.3671	0.2839	0.2221
640-635-5400	640-PAVED ROAD DUS	635-PAVED ROAD TRAVEL D	5400-DUST (FREEWAYS)	0.7162	0.831	0.9268	1.0321	1.1222	1.2113
640-637-5400	640-PAVED ROAD DUS	637-PAVED ROAD TRAVEL D	5400-DUST (MAJOR STREETS)	3.3045	3.8965	4.3978	4.9575	5.4567	5.9657
640-639-5400	640-PAVED ROAD DUS	639-PAVED ROAD TRAVEL D	5400-DUST (COLLECTOR STRS	0.9667	1.1291	1.2667	1.419	1.5519	1.6854
640-641-5400	640-PAVED ROAD DUS	641-PAVED ROAD TRAVEL D	5400-DUST (LOCAL STRS)	2.5077	2.959	3.3428	3.7714	4.1546	4.5457
	640-PAVED ROAD DUST			7.4951	8.8156	9.9341	11.18	12.2854	13.4081
645-638-5400	645-UNPAVED ROAD D	638-UNPAVED ROAD TRAVEL	5400-DUST (CITY & CO. RDS)	11.619	11.3063	11.3063	11.3063	11.3063	11.3063
645-640-5400	645-UNPAVED ROAD D	640-UNPAVED ROAD TRAVEL	5400-DUST (US FOREST & PRK	1.1313	1.6511	1.7953	1.9136	2.0406	2.1811
645-644-5400	645-UNPAVED ROAD D	644-UNPAVED ROAD TRAVEL	5400-DUST (BLM RDS)	7.3191	9.0756	9.541	9.954	10.4581	11.0938
645-646-5400	645-UNPAVED ROAD D	646-UNPAVED ROAD TRAVEL	5400-DUST (FARM RDS)	2.5895	2.5817	2.5778	2.5739	2.57	2.5661
	645-UNPAVED ROAD DUST			22.6589	24.6147	25.2204	25.7478	26.375	27.1473
Summary Level+EICs.gpw									

APPENDIX D

ARB MASTER LIST OF CONTROL MEASURES

COMPILED FROM AIR POLLUTION CONTROL DISTRICTS

SB 656 List of Air District Measures that Reduce Particulate Matter

A. Wood-Burning Fireplaces and Wood-Burning Heaters

(wood-burning heaters include woodstoves and fireplace inserts)

Measures reduce directly emitted PM10 and PM2.5, and as an added benefit reduce NOx, VOC, CO, and air toxic emissions.

	Strategy	Source Type	District, Rule, and Adoption Date*
1.	**Public Awareness Program** Informs the public about the indoor wood combustion control program. The program covers three areas: program effectiveness and tracking; key program elements; and communication strategy. The goal is to inform the public about potential health hazards of wood smoke and to encourage better wood burning practices or use of heating devices (e.g. some programs recommend use of manufactured firelogs instead of wood in fireplaces).	Existing	SJVAPCD Rule 4901 7/17/03
	Curtailment During Periods with Predicted High PM Levels		
2.	***Mandatory*** a) Restricts use of wood-burning fireplaces and heaters during periods when atmospheric conditions and the level of wood burning activity are predicted to result in high PM concentrations. Exempts households that use wood as primary sole source of heat and households in areas where natural gas service is not available.	Existing	SJVAPCD Rule 4901 7/17/03
	b) Prohibits use of wood-burning appliances during periods when atmospheric conditions and the level of wood burning activity are predicted to result in high PM concentrations. Exempts U.S. EPA certified wood-burning appliances. A secondary source of heat is required in all dwellings.	Existing	GBUAPCD for the Town of Mammoth Lakes Rule 431 12/7/90
3.	***Voluntary*** Informs the public about periods predicted to have high PM concentrations and encourages public to refrain from using wood-burning fireplaces and heaters during such periods. Some air districts exempt U.S. EPA certified wood-burning appliances from curtailment.	Existing	SCAQMD, YSAQMD SLOAPCD Programs

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
	Require All Specified Wood-Burning Devices Installed be U.S. EPA-Certified, Phase II or Equivalent		
4.	***Wood-Burning Heaters*** Prevents the sale and installation of wood-burning heaters that are not U.S. EPA-certified or equivalent. These wood-burning heaters must meet Phase II standards established in Subpart AAA of Part 60 of Title 40 of the Code of Federal Regulations. Phase II devices are designed to achieve more efficient combustion and lower particulate emissions than conventional devices.	New and modified	SJVAPCD Rule 4901 7/17/03
5.	***Wood-Burning Heaters and Wood-Burning Fireplaces*** Prevents the sale and installation of wood-burning heaters and wood-burning fireplaces that emit PM in higher concentrations than specified for U.S. EPA certified Phase II wood heaters. Allowable wood-burning appliances must be air district or U.S. EPA certified. The requirement also applies to masonry fireplaces.	New and modified	NSoCAPCD Reg. 4-1-400 2/2/93 and SLOAPCD Rule 504 10/19/93
6.	***Prohibits the Installation of Non-EPA Certified Wood-Burning Appliances & Wood-Burning Fireplaces (except pellet stoves)*** Prohibits the installation of any non-U.S. EPA certified wood-burning appliance in dwellings, except for pellet stoves. Prohibits the installation of wood-burning fireplaces, including low emission fireplaces that are exempt from U.S. EPA testing.	New and modified	GBUAPCD for the Town of Mammoth Lakes Rule 431 12/7/90
	Number of Units		
7.	***New Residential Developments*** Limits the number of wood-burning fireplaces and wood-burning heaters that may be installed in new residential developments.	New	SJVAPCD Rule 4901 7/17/03
8.	***New Nonresidential Properties*** Limits the number of wood-burning appliances that may be installed in new nonresidential properties.	New	GBUAPCD for the Town of Mammoth Lakes Rule 431 12/7/90

Date when rule was adopted or last amended

lote: The specific air district rules included on the list represent guidance or appropriate example measures in terms of cope and level of emission control. There may be other district rules which may also represent similar, suitable levels of ontrol.

	Strategy	Source Type	District, Rule, and Adoption Date*
	Number of Units (continuation)		
9.	**Additional Units in Existing Properties** Limits the number of additional wood-burning appliances that may be installed in existing residential and nonresidential properties.	New	GBUAPCD for the Town of Mammoth Lakes Rule 431 12/7/90
10.	**Replacement of Non-Certified Appliances Upon Sale of Property**		
	a) Assures that each wood-burning heater included in real property upon sale or transfer is U.S. EPA Phase II certified or equivalent. Non-complying devices must be removed or rendered inoperable.	Existing	SJVAPCD Rule 4901 7/17/03
	b) Requires replacing, removing or rendering inoperable any non-U.S. EPA certified wood-burning appliance upon sale of a dwelling (excluding pellet stoves, but including fireplaces).	Existing	GBUAPCD for the Town of Mammoth Lakes Rule 431 12/07/90
11.	**Control of Wood Moisture Content** Sets moisture standard for "seasoned wood" offered for sale, since burning dry wood increases heating performance.	New, existing, and modified	SJVAPCD Rule 4901 7/17/03
12.	**Prohibit Fuel Types** Prohibits the burning of materials not intended for use in wood-burning fireplaces and wood-burning heaters (e.g., garbage, treated wood, and plastic products).	New, existing, and modified	SJVAPCD Rule 4901 7/17/03

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

B. Non-Agricultural Open Burning

Measures reduce directly emitted PM10 and PM2.5, and as an added benefit reduce VOC, NOx, CO, and air toxic emissions.

	Strategy	Source Type	District, Rule, and Adoption Date*
	Prohibition of Residential Open Burning		
13.	***Of All Outdoor Residential Open Burning*** Prohibits outdoor residential open burning. Limits open burning to permitted activities (e.g., agricultural burning, infectious disease, wildland vegetation management) or exempted activities (ceremonial fires, recreational fires, cooking fires, etc.)	Existing	SJVAPCD Rules 4103 & 4106 6/21/01
14.	***Where Waste Service is Available*** Prohibits burning of greenwaste if served by an organized waste disposal service. No other residential waste may be burned anywhere.	Existing	MBUAPCD Rule 438 4/16/03
15.	***In Specified Highly Populated Areas*** Prohibits outdoor burning of green waste in populated areas in specified geographical locations.	Existing	SMAQMD Rule 407 6/4/98
16.	***Within Small Lots and Setbacks*** Prohibits outdoor burning of natural vegetation from the premises on lots smaller than one acre in size, where the burn pile is less than 100 feet from neighboring residence, or where greenwaste collection is offered by a franchise hauler.	Existing	LCAQMD Rule 433 10/15/02
	Mandatory Curtailment of Non-Agricultural Open Burning		
17.	***During Periods with Predicted High PM or Ozone Levels*** Prohibits planned burning or further ignitions during days when atmospheric conditions and the level of open burning are predicted to result in high PM or ozone concentrations (can prohibit additional burns on burn days.	Existing	MBUAPCD Rule 438 4/16/03

Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
	Control Smoke Production		
18.	***Limits during Burn Days in Smoke Sensitive Areas*** Requires Fire Chief to grant permit and limit burns to 25 per day in specific Smoke Sensitive Area (defined by rule); permit is only valid with daily authorization number.	Existing	MBUAPCD Rule 438 4/16/03
19.	***Emission Limits for Mechanized Burners*** Sets emission limits for mechanized burners not to equal or exceed No. 1 on Ringelmann Chart published by the U.S. Bureau of Mines for periods aggregating more than 30 minutes in any eight-hour period. Requires burning permit.	Existing	ShCAQMD Rule 2.6 9/24/02
	Performance Standards for Allowed Burns		
20.	***Drying Times*** Establishes minimum drying times for any green waste to be burned and pile size limits. Sets bounds on time of day for ignition and completion.	Existing	BAAQMD Regulation V 11/2/94
21.	***Burn Duration*** Restricts ignition hours and requires smoldering fires to be extinguished.	Existing	LCAQMD Rules 431-433.5 10/15/02
22.	***Preparation of Fuels & Management of Burns*** a) Sets requirements for burn piles (e.g. stack to ignite quickly, burn with minimum of smoke, ignite only for burn within same day, avoid public nuisance) prior and during burning.	Existing	MaCAPCD Rule 300 et. seq. 7/19/88
	b) Sets requirements for burns on land to be cleared for residential or commercial development. APCO can restrict or prohibit the burning of poison oak	Existing	MBUAPCD Rule 438 4/16/03
23.	***Permits Required*** Requires permits for all types of outdoor burning.	Existing	NCUAQMD Regulation 2 7/18/02

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

C. Fugitive Dust

Measures reduce directly emitted PM10.

	Strategy	Source Type	District, Rule, and Adoption Date*
24.	**Construction: Earthmoving**		
	a) Requires water or chemical stabilizers/dust suppressants be applied, in conjunction with optional wind barriers, to limit visible dust emissions (VDE) to 20% opacity. Specifies that a Dust Control Plan must be submitted for areas of 40 acres or larger where earth movement of 2500 cubic yards or more on at least 3 days is intended. Note: This rule was amended August 19, 2004.	Existing	SJVAPCD Rule 8021 11/15/01
	b) Prohibits VDE beyond property line and an upwind/downwind PM10 differential of more than 50 $\mu g/m^3$. Requires implementation of Best Available Control Measures (BACM) for all sources such that visible emissions do not exceed this limit 100 feet from the point of origin of earth-moving activities. List of BACM is contained in the Rule 403 Implementation Handbook. Specifies that a Dust Control Plan or a commitment to implement Table 1 and 2 control measures through a large operation notification (LON) is required for large operations projects with a disturbed surface area 100 acres or larger, or projects with daily earth movement of 10,000 cubic yards or more. Note: This rule was amended April 2, 2004. The amendments incorporate a new list of BACM and implements new requirements (project signage, dust control supervisor) for large operations (now defined as 50 acres or 5,000 cubic yards of daily earth-movement).	Existing	SCAQMD Rule 403 2/14/97
25.	**Construction: Demolition**		
	a) Requires application of dust suppressants to limit VDE to not more than 20% opacity. Sets bulk material and track-out requirements. Note: This rule was amended August 19, 2004.	Existing	SJVAPCD Rule 8021 11/15/01
	b) Prohibits VDE beyond property line. Requires application of BACM. Specifies that upwind-downwind PM10 levels must not exceed 50 ug/m^3. Sets track-out requirements. Note: This rule was amended April 2, 2004. The amendments require track-out control device for projects greater than 5 acres or 100 cubic yards of daily	Existing	SCAQMD Rule 403 2/14/97

Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
	Construction: Demolition (continuation) import/export and lowers track-out clean-up prohibitions from 50 to 25 feet.		
26.	**Construction: Grading Operations** a) Requires pre-watering to limit VDE to 20% opacity. Requires phasing of work to reduce disturbed soil. Note: This rule was amended August 19, 2004.	Existing	SJVAPCD Rule 8021 11/15/01
	b) Requires water application to increase moisture content to proposed cut, and grading each phase separately to coincide with the construction phase. Specifies that chemical stabilizers are to be applied to graded areas where construction will not begin for more than 60 days after grading. Note: This rule was amended April 2, 2004. The amendments require new Table 1 BACM (e.g., pre-application of water to depth of proposed cuts, reapplication of water as necessary to ensure that visible emissions do not extend more than 100 feet from the sources, and stabilization of soils once earth-moving is complete).	Existing	SCAQMD Rule 403 2/14/97
27.	**Inactive Disturbed Land** a) Requires restricting vehicle access. Specifies that water/dust suppressants must be applied to meet stabilized surface definition; if area is greater than 0.5 acres and the area is inactive more than 7 days, must comply with stabilized soil definition. Note: This rule was amended August 19, 2004	Existing	SJVAPCD Rule 8021 11/15/01
	b) Prohibits VDE beyond property line and an upwind/downwind PM10 differential of more than 50 $\mu g/m^3$. Requires BACM (e.g., chemical stabilization, frequent watering, and revegetation) at all times and high wind measures (e.g., chemical stabilization to maintain a stabilized surface or watering three times per day) under high wind conditions. Note: This rule was amended April 2, 2004. The amendments clarify new Table 1 BACM.	Existing	SCAQMD Rule 403 2/14/97

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
28.	**Bulk Materials: Handling/Storage** a) Establishes wind barrier and watering or stabilization requirements to limit VDE to 20% opacity. Specifies bulk materials must be stored in accordance with the definition for stabilized surface. Requires outdoor materials be covered with tarps, plastic, etc. Note: This rule was amended August 19, 2004.	Existing	SJVAPCD Rule 8031 11/15/01
	b) Prohibits VDE beyond property line and an upwind/downwind PM10 differential of more than 50 $\mu g/m^3$. Requires use of BACM (e.g., wind sheltering, watering, chemical stabilizers, altering load-in/load-out procedures, or coverings). Note: This rule was amended April 2, 2004. The amendments establish new Table 1 BACM (control measures 09-1 though 09-5) for importing/exporting of bulk materials.	Existing	SCAQMD Rule 403 2/14/97
29.	**Storage, Handling, and Transport of Petroleum Coke, Coal, and Sulfur** Limits opacity from operations to ½ Ringelmann; ensures enclosure of all coke piles including compliance schedule; requires District approved plan or Best Available Control Measures (BACM) for any open piles of coal or sulfur; requires street-sweeping or limits silt loading on roads and truck exteriors with quarterly testing; requires paving and maintenance of roads; requires covers or slot-tops for transport trucks.	New, existing, and modified	SCAQMD Rule 1158 6/11/99
30.	**Carryout and Track-out** a) Requires track-out removal at the end of the workday, if the track-out is less than 50 feet; or removal as soon as possible if the track-out exceeds 50 feet. Specifies a track-out control device must be installed at all access points to public roads. Requires maintaining sufficient length of paved interior roads to allow dirt/mud to drop off before leaving site and mud/dirt removal from interior paved roads with sufficient frequency to prevent track-out Note: This rule was amended August 19, 2004. (continued on next page)	Existing	SJVAPCD Rule 8041 11/15/01

Date when rule was adopted or last amended
Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
	Carryout and Track-out (continuation) b) Requires removing any track-out within one hour; or selecting a Table 3 track-out prevention option and removing track-out at the end of the workday, if the track-out is less than 50 feet, and removing track-out as soon as possible, if it exceeds 50 feet. Table 3 track-out options include road surface paved or chemically stabilized from point of intersection with a public paved road to distance of at least 100 feet by 20 feet, or installation of track-out control device from point of intersection with a public paved road to a distance of at least 25 feet by 20 feet. Note: This rule was amended April 2, 2004. Beginning January 1, 2005, the amendments require sites greater than five acres or those with more than 100 cubic yards of daily import/export to install a track-out control device (four options provided) and prohibits material from .extending more than 25 feet from a site entrance	Existing	SCAQMD Rule 403 2/14/97
31.	**Carryout and Track-out: Clean-Up Methods** Requires manual sweeping; sweeping with a rotary brush/broom with sufficient wetting to limit VDE to 20% opacity; or operating a PM10 street sweeper with 80% efficiency per SCAQMD Rule 1186. Note: This rule was amended August 19, 2004.	Existing	SJVAPCD Rule 8041 11/15/01
32.	**Disturbed Open Areas** a) Applies to non-agricultural areas of 3 acres or larger which have been unused for 7 days or more. Requires water/dust suppressants application to unvegetated areas sufficient to limit VDE to 20% opacity. Specifies vegetation must be established to limit VDE to 20% opacity. Requires paving, applying gravel, or applying stabilizers to limit VDE to 20% opacity. Upon evidence of trespass, requires posting of "no trespass" signs or installing barriers to prevent access to area. Note: This rule was amended August 19, 2004. (continued on next page)	Existing	SJVAPCD Rule 8051 11/15/01

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
	Disturbed Open Areas (continuation) b) Applies to non-agricultural areas of one-half acre or larger for residential use; and all non-residential areas. Requires application of chemical stabilizers; watering with sufficient frequency to establish a surface crust, or establishing drought-resistant vegetation as quickly as possible. Note: This rule was amended April 2, 2004. The amendments clarify new Table 1 BACM and remove exemption for residential properties less than one-half acre.	Existing	SCAQMD Rule 403 2/14/97
33.	**Paved Road Dust: New/Modified Public and Private Roads** a) Requires paved shoulders for all roads with average daily vehicle trips (ADVT) of 500 or more. If ADVT is 500-3000, then average shoulder width is at least 4 feet. If ADVT is greater than 3000, then average shoulder width is at least 8 feet. Curbing adjacent to and contiguous with a paved lane or shoulder can be used in lieu of shoulder width requirements. Intersections, auxiliary entry and exit lanes may be constructed adjacent to and contiguous with a paved roadway in lieu of shoulder requirements. Specifies if ADVT is 500 or greater, and medians are part of the roadway, then medians are to be constructed with minimum 4-foot shoulder widths adjacent to traffic lanes. Where speed limits are below 45 mph, medians are to be constructed with curbing. Specifies medians are to be landscaped to meet stabilized surface requirements. As an option to shoulder paving or vegetation requirements, oils or chemical dust suppressants can be used, according to the specified widths, and must be maintained to limit VDE to 20% opacity. Specifies requirements for contingency notification. Note: This rule was amended August 19, 2004. b) Establishes curbing or paved shoulder requirements in the event of a contingency notification: For ADVT of 500 or more, curbing or paved shoulders are required, for ADVT of 500-3000, shoulder widths shall be at least 4 feet, for ADVT greater than 3000, shoulder widths shall be at least 8 feet. Establishes median requirements in the event of a contingency notification. For medians with ADVT of 500 or more, must pave median area with	Existing Existing	SJVAPCD Rule 8061 11/15/01 SCAQMD Rule 1186 2/14/97

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
	Paved Road Dust: New/Modified Public and Private Roads (continuation) typical roadway materials, unless speed limits less than 45 mph, or medians are landscaped with ground cover and there is curbing, or medians are treated with chemical stabilizers to maintain stabilized surface. Note: This rule was amended April 2, 2004. The amendments invoke contingency requirements for new / widened roads, beginning January 1, 2006.		
34.	**Paved Road Dust: Street Sweeping** Requires use of certified PM10 efficient street sweepers by governmental agencies or their street sweeping contractors where the contract date, purchase date, or lease date is after January 1, 2000. Specifies certified sweepers are to be used for all routine street sweeping except roads with curbs, paved road shoulders greater than 4 feet width, within 1000 feet of an unpaved road, and provided documentation of such is provided. Certified sweepers are to be maintained according to manufacturer's specifications. Note: This rule was amended April 2, 2004. The amendments remove certified equipment exemption.	Existing	SCAQMD Rule 1186 9/10/99
35.	**Paved Road Dust: Street Sweeping Sand & Cinders Used for Anti-skid Material on Icy Roads, VMT Limit, & Free Bus** Requires vacuum-street sweeping on roads to remove sand and cinders that were placed on the road during winter storms as an anti-skid material. Street sweeping is required after the roads dry sufficiently for the street sweepers to remove the material. This rule also limits the peak daily VMT (vehicle miles traveled) projected with future development, and encourages the use of a free bus system to reduce VMT.	Existing	GBUAPCD for the Town of Mammoth Lakes Rule 431 12/7/90

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
36.	**Unpaved Parking Lots/Staging Areas** Requires, for days with 75 or more vehicle trips, limiting VDE to 20% opacity and implementing at least one of the following control measures: 1) applying water, 2) applying uniform layer of washed gravel, 3) applying chemical/organic dust suppressant, 4) using vegetative materials, 5) paving, 6) using any other method to limit VDE to 20% opacity. Requires, for days with 100 or more vehicle trips, limiting VDE to 20% opacity, complying with requirements for stabilized surface, or implementing at least one of the following control measures: 1) applying water, 2) applying chemical/organic dust suppressant, 3) applying road mix, 4) paving, 5) using any other method that results in a stabilized surface. Sets as an option to the above, obtaining a Fugitive PM10 Management Plan that: 1) achieves at least 50% control efficiency, 2) describes location, length, and area of unpaved traffic areas, 3) describes traffic conditions (vehicle trips per unit time, types of vehicles), 4) describes control measures used and application details, and 5) describes expected results of road surface condition. Note: This rule was amended August 19, 2004.	Existing	SJVAPCD Rule 8061 11/15/01
37.	**Unpaved Roads: Control Requirements** a) Requires, for days with 75 or more vehicle trips, limiting VDE to 20% opacity and implementing at least one of the following control measures: 1) applying water, 2) applying uniform layer of washed gravel, 3) applying chemical/organic dust suppressant, 4) using vegetative materials, 5) paving, or 6) using any other method to limit VDE to 20% opacity. Requires, for days with 100 or more vehicle trips, limiting VDE to 20% opacity, complying with requirements for stabilized surface, or implementing at least one of the following control measures: (continued on next page)	Existing	SJVAPCD Rule 8061 11/15/01

Date when rule was adopted or last amended

lote: The specific air district rules included on the list represent guidance or appropriate example measures in terms of cope and level of emission control. There may be other district rules which may also represent similar, suitable levels of ontrol.

	Strategy	Source Type	District, Rule, and Adoption Date*
	Unpaved Roads: Control Requirements (continuation) 1) applying water, 2) applying chemical/organic dust suppressant, 3) applying roadmix, 4) paving, or 5) using any other method that results in stabilized surface. Sets as option to above, obtaining a Fugitive PM10 Management Plan that: 1) achieves at least 50% control efficiency, 2) describes location, length, and area of unpaved traffic areas, 3) describes traffic conditions (vehicle trips per unit time, vehicle types), 4) describes controls measures used and application details, and 5) describes expected results of road surface condition. Note: This rule was amended August 19, 2004. b) Sets applicability standard: unpaved road must be more than 50 feet wide at all points or must not be within 25 feet of property line, or have more than 20 vehicle trips per day. Specifies all roads with ADT greater than the average ADT of all unpaved roads within its jurisdiction must be treated. Requires annual treatment of unpaved public roads beginning in 1998 and continuing for each of 8 years thereafter by implementing one of the following: 1) paving at least one mile with typical roadway material, 2) applying chemical stabilizers to at least two miles to maintain stabilized surface, 3) implementing at least one of the following on at least three miles of road surface: a) installing signage at ¼ mile intervals limiting speed to 15 mph, b) installing speed control devices every 500 feet, or c) maintaining roadway in a manner which limits speed to 15 mph. Note: This rule was amended April 2, 2004. The amendments clarify 20% opacity standard that was previously in the definition of a stabilized surface and reference test methods in Rule 403 Implementation Handbook.	Existing	SCAQMD Rule 1186 2/14/97

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
38.	**Weed Abatement Activities**		
	a) Sets pre-activity requirements: 1) pre-watering to limit VDE to 20% opacity, or 2) phasing work to reduce amount of disturbed surface area. Requires, during active operations, applying water to limit VDE to 20% opacity. Sets stabilization requirements during periods of inactivity: 1) restricting vehicle access to area, or 2) applying water or chemical stabilizers to meet conditions of a stabilized surface. Note: This rule was amended August 19, 2004.	Existing	SJVAPCD Rule 8021 11/15/01
	b) Specifies weed abatement activities are subject to standards of Rule 403, unless: 1) mowing or cutting is used, instead of discing, and stubble is maintained at least three inches above the soil, or 2) if discing is used, there is a determination of a potential fire hazard. Specifies that after discing, the requirement for taking action on disturbed surface areas applies. Note: This rule was amended April 2, 2004. The amendments require pre-application of watering if disking for weed abatement.	Existing	SCAQMD Rule 403 7/9/93
39.	**Windblown Dust: Definitions** Defines windblown dust as any visible emissions from any disturbed surface area which is generated by wind action alone. Specifies wind gusts as maximum instantaneous wind speed. Note: This rule was amended April 2, 2004 to specify that high wind conditions are when instantaneous wind speeds exceed 25 mph.	Existing	SCAQMD Rule 403 7/9/93
40.	**Windblown Dust: Construction/Earth Moving** Requires, for earthmoving, ceasing all active operations, applying water to soil not more than 15 minutes prior to moving such soil if subject to large operation requirements or if seeking an exemption from property line or upwind/downwind standard. Requires, for unpaved roads at construction sites, applying chemical stabilizers prior to a wind event, applying water twice per hour during active operations, stopping all vehicular traffic if subject to large operation requirements or if seeking an exemption from property line or upwind/downwind standard. Note: This rule was amended April 2, 2004.	Existing	SCAQMD Rule 403 2/14/97

Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
41.	**Windblown Dust: Disturbed Areas** Requires, if operations remain inactive for not more than 4 consecutive days, application of water and chemical stabilizers in sufficient concentrations to maintain a stabilized surface for 6 months traffic if subject to large operation requirements or if seeking an exemption from property line or upwind/downwind standard. Requires application of chemical stabilizers prior to wind event; applying water 3 times per day; if evidence of wind driven fugitive dust, increasing watering to 4 times per day; or establish vegetative ground cover within 21 days after active operations have ceased traffic if subject to large operation requirements or if seeking an exemption from property line or upwind/downwind standard. Note: This rule was amended April 2, 2004.	Existing	SCAQMD Rule 403 2/14/97
42.	**Windblown Dust: Bulk Materials/Storage Piles** a) Requires application of water twice per hour or installation of temporary coverings if subject to large operation requirements or if seeking an exemption from property line or upwind/downwind standard. Note: This rule was amended April 2, 2004.	Existing	SCAQMD Rule 403 2/14/97
	b) Additional bulk material control requirements for Coachella Valley sources. Note: This rule was amended April 2, 2004.	Existing	SCAQMD Rule 403.1 1/15/93
43.	**Wind Blown Dust: Open Areas** Requires 50% vegetation cover, or 75% wet or saturated water cover, or 4-inch deep gravel on open areas that may cause or contribute to an exceedance of the federal PM-10 standard.	Existing	GBUAPCD for Owens Lake Board Order #981116-01 11/16/98

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
44.	**Agricultural Operations**		
	a) Limits fugitive dust from off-field agricultural sources such as unpaved roads with more than 75 trips/day and bulk materials handling by requiring producers to draft and implement a Fugitive Dust Management Plan with district approved control methods. Note: This rule was amended September 16, 2004.	Existing	SJVAPCD Rule 8081 11/15/01
	b) Producers that voluntarily implement district approved conservation practices and complete and maintain the self-monitoring plan can maintain an exemption from the Rule 403 general requirements. Note: This rule was amended April 2, 2004, extending applicability to the Coachella Valley.	Existing	SCAQMD Rule 403 2/14/97
	c) Cease tilling/mulching activities when wind speeds are greater than 25 mph (Coachella Valley). Note: This rule was amended April 2, 2004. The program is implemented through Rule 403.	Existing	SCAQMD Rule 403.1 1/5/93
	d) Limits fugitive dust from paved and unpaved roads and livestock operations by requiring: 1) ceasing all hay grinding activities between 2 and 5 p.m. if visible emissions extend more than 50 feet from a hay grinding source, and 2) treating all unpaved access connections to livestock operations and unpaved feed lane access areas with either pavement, gravel (maintained to a depth of 4 inches), or asphaltic road-base. Note: This rule was amended April 2, 2004.	Existing	SCAQMD Rule 1186 2/14/97
	e) Reduces fugitive dust from livestock feed yards by requiring a dust plan that contains procedures assuring moisture factor between 20% and 40% for manure in the top three inches of occupied pens and outlines manure management practices, including removal.	Existing	ICAPCD Rule 420 8/13/02

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

D. Combustion Sources

Measures reduce NOx, SOx, VOC, CO, or PM10 and PM2.5.

	Strategy	Source Type	District, Rule, and Adoption Date*
45.	**Boilers, Steam Generators, and Process Heaters** (NOx)		
	a) Limits NOx emissions from gaseous fuel or liquid fuel fired boilers, steam generators, or process heaters with a total rated heat input greater than 5 million Btu/hr to between 5-40 ppmv depending on fuel type, use, and burner capacity.	New, existing and modified	SJVAPCD Rule 4306 9/18/03
	b) Limits NOx emissions from any petroleum refinery boiler or process heater with a maximum rated capacity greater than 40 million Btu/hr to 0.03 pound per million BTU of heat input (25 ppmv) when firing at the maximum rated capacity. Alternative Emission Control Plans allowed which result in equivalent emissions. All units subject to this rule are now under the SCAQMD's RECLAIM Program.	New and existing	SCAQMD Rule 1109 3/12/84
	c) Limits NOx emissions from gaseous fuel or liquid fuel fired boilers, steam generators, or process heaters with a total rated heat input greater than 5 million Btu/hr to between 30-40 ppmv depending on fuel type.	New, existing and modified	SMAQMD Rule 411 7/22/99 and SCAQMD Rule 1146 11/17/00
	d) Limits NOx emissions from gaseous, liquid, or solid fossil fuel fired boilers, steam generators, or process heaters with a total rated heat input starting at 2 million Btu/hr up to 5 million Btu/hr used in any industrial, institutional, or commercial operation to 30 ppmv or 0.037 pounds per million Btu of heat input.	New, existing and modified	SCAQMD Rule 1146.1 5/13/94
	e) Limits NOx emissions from any boilers, steam generators, or process heater with a total rated heat input starting at 1 million Btu/hr up to 5 million Btu/hr to 30 ppmv.	New, existing and modified	VCAPCD Rule 74.15.1 6/13/00
	(continued on next page)		

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
	Boilers, Steam Generators, and Process Heaters (continuation)		
	f) Limits NOx emissions from new and existing natural gas-fired large (commercial) water heaters, small (industrial) boilers, and process heaters that have a rated heat input starting at 75,000 Btu/hr up to and including 2 million Btu/hr to between 30-55 ppmv depending on burner size. Exempts residential and low use units.	New, existing and modified	SCAQMD Rule 1146.2 1/9/98
	g) Limits NOx emissions from new natural gas-fired large (commercial) water heaters, small (industrial) boilers, and process heaters that have a rated heat input starting at 75,000 Btu/hr up to and including 2 million Btu/hr to between 30-55 ppmv depending on burner size. Exempts residential and low use units.	New	SBAPCD Rule 360 10/17/02 and VCAPCD Rule 74.11.1 9/14/99
46.	**Turbines** (NOx)		
	a) Limits NOx emissions to the atmosphere from the operation of stationary gas turbines to between 9-65 ppmv depending on turbine operating capacity, yearly run time, and fuel type. Exemptions include emergency standby and laboratory units.	New, existing and modified	SMAQMD Rule 413 5/1/97
	b) Limits NOx emissions to the atmosphere from the operation of stationary gas turbines to between 3-65 ppmv depending on turbine operating capacity, yearly run time, and fuel type. Exemptions include emergency standby and laboratory units.	New, existing and modified	SJVAPCD Rule 4703 4/25/02
	c) Limits NOx emissions from the operation of gas turbines to 9-25 ppm for turbines in size range of 2.9 to 10 MW. Note: Ammonia slip limits for gas turbines in power plants are listed in: 1) ARB's May 2004 Report to the Legislature on Gas-Fired Power Plant NOx Emission Controls and Related Environmental Impacts Reference: http://www.arb.ca.gov/energy/noxlegrpt.htm 2) ARB's September 1999 Guidance for Power Plant Siting and Best Available Control Technology Reference: http://www.arb.ca.gov/energy/powerpl/guidocfi.pdf	New and existing	SCAQMD Rule 1134 8/8/97

Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
47.	**IC Engines** (NOx, VOC)		
	a) Limits NOx emissions from gaseous- and liquid-fueled stationary and portable engines over 50 bhp to 36 ppm or higher and VOC to 250 ppm or higher depending on use category of engine (i.e. portable, stationary, oil field, fired by sewage digester gas, etc.)	New, existing and modified	SCAQMD Rule 1110.2 11/14/97
	b) Limits NOx emissions from spark ignited internal combustion engines over 50 bhp to 25-75 ppmv, VOC emissions to 250-750 ppmv, and CO emissions to 2000 ppmv depending on engine type and size.	New, existing and modified	SJVAPCD Rule 4702 8/21/03
	c) Limits NOx emissions from spark ignited internal combustion engines over 50 bhp from 25-125 ppmv depending on engine type and size and NMHC to 250-750 ppmv depending on engine size.	New, existing and modified	SMAQMD Rule 412 6/1/95
48.	**Lime Kilns** (NOx)		
	Limits NOx emissions from lime kilns to between 0.10-0.20 lbs/MM Btu depending on fuel type.	New, existing and modified	SJVAPCD Rule 4313 3/27/03
49.	**Cement Kilns** (NOx, PM10, PM2.5)		
	a) Limits NOx emissions from cement kilns during periods of operation other than start-up or shut-down to between 6.4-7.2 lb/ton clinker produced averaged over a 30 day period depending on kiln type. Additional limits are specified for start-up and shut-down periods.	New, existing, and modified	MDAQMD Rule 1161 3/25/02
	b) Limits NOx emissions from cement kilns to 11.6 lbs/ton of clinker produced averaged over any 24 consecutive hour period and to 6.4 lbs/ton of clinker produced averaged over a 30 day period.	New and existing	KCAPCD Rule 425-3 10/13/94
	c) Limits PM emissions to 30 pounds per hour for kiln feed rates of 75 tons per hour or greater. Limits PM emissions to 0.40 pound per ton of kiln feed for kiln feed rates less than 75 tons per hour.	New and existing	SCAQMD Rule 1112.1 2/7/86

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
50.	**Petroleum Coke Calcining Operations** (SOx) Does not allow operation of petroleum coke calcining equipment unless the uncontrolled emissions of oxides of sulfur from such basic equipment, expressed as sulfur dioxide (SO2), are reduced by at least 80 percent.	New, existing, and modified	SCAQMD Rule 1119 3/2/79
51.	**Furnaces** (NOx) a) Glass Melting Furnaces Sets NOx emission limits of 4.0 pounds per ton of glass pulled for glass melting furnaces.	New and existing	SCAQMD Rule 1117 1/6/84
	Sets NOx emission limits of 5.5 pounds per ton of glass pulled for glass melting furnaces.	New and existing	BAAQMD Rule 9-12 1/19/94
	b) Central Furnaces Sets a NOx emission limit of 40 ng/joule for gas fired residential units with rating less than 175,000 Btu/hr.	New and existing	SCAQMD Rule 1111 7/8/83 and SDAPCD Rule 69.6 6/17/98
52.	**Residential Water Heaters** (NOx) a) Limits NOx emissions from water heaters with heat input rates equal to or less than 75,000 Btu per hour to 20 ng/joule of heat output and sets future limit to 10 ng/joule of heat output.	New	SCAQMD Rule 1121 12/10/99
	b) Limits NOx emissions from water heaters with heat input rates equal to or less than 75,000 Btu per hour to 40 ng/joule of heat output.	New	SJVAPCD Rule 4902 6/17/93

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
53.	**Commercial Charbroiling Operations** (VOC, PM10, PM2.5) Requires new and existing chain driven charbroilers to be equipped with a catalytic oxidizer control device.	New and existing	SJVAPCD Rule 4692 3/21/02 and SCAQMD Rule 1138 11/14/97
E. Composting and Related Operations Measures reduce ammonia and VOC.			
54.	**General Administrative Requirements** Requires composting and chipping and grinding facilities to register and provide facility and throughput information including, general facility information, type and amount of feedstock, products generated and process description. Annual updates also required.	New, existing, and modified	SCAQMD Rule 1133 1/10/03
55.	**Chipping and Grinding Operations** (Ammonia, VOC) Prevents inadvertent decomposition associated with stockpiling of green and/or food wastes by establishing holding or processing time requirements for chipping and grinding activities.	New, existing, and modified	SCAQMD Rule 1133.1 1/10/03
56.	**Composting** (Ammonia, VOC) Requires co-composting operations (biosolids and/or manure combined with bulking agents) to reduce VOC and ammonia emissions by 80% by conducting active composting within a total permanent enclosure and conducting curing using an aeration system that operates under negative pressure for a least 90% of its operating cycle and venting of VOC and ammonia emissions to a control device (biofilter). As an alternative, facilities subject to this rule may also submit a compliance plan that presents and demonstrates an alternative method of compliance. The rule requires recordkeeping and source testing which includes the submittal of a testing protocol. Exemptions are also provided for facilities that meet certain specific requirements.	New, existing, and modified	SCAQMD Rule 1133.2 1/10/03

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

F. Storage, Transfer, and Dispensing Operations

Measures reduce VOC.

	Strategy	Source Type	District, Rule, and Adoption Date*
57.	**Gasoline Transfer and Dispensing Facilities** Limits emissions of VOC from gasoline dispensing facilities through equipment and operational requirements. For equipment and testing requirements see ARB Executive Orders.	New, existing and modified	BAAQMD Rule 8-7 11/6/02
58.	**Organic Liquid Storage** a) Limits VOC emissions from storage tanks with a capacity of 264 gallons and greater through operational and equipment requirements.	New, existing and modified	BAAQMD Rule 8-5 11/27/02
	b) Limits VOC emissions from any above-ground stationary tank with a capacity of 75,00 liters (19,815 gallons) or greater used for storage of organic liquids, and any above-ground tank with a capacity between 950 liters (251 gallons) and 75,000 liter (19,815 gallons) used for storage of gasoline by setting tank roof, other performance, and self-inspection requirements. Sets forth conditions for the cleaning and degassing of aboveground and underground stationary tanks, reservoirs, or other containers storing or last used to store VOC.	New, existing, and modified	SCAQMD Rule 463 3/11/94 in combination with SCAQMD Rule 1149 7/14/95

G. Leaks and Releases

Measures reduce VOC

59.	**Equipment Leaks (Valves and Flanges)** a) Limits VOC and methane emissions from leaking equipment at petroleum refineries, chemical plants, bulk plants, and bulk terminals including, but not limited to: valves, connectors, pumps, compressors, pressure relief devices, diaphragms, hatches, sight-glasses, fittings, sampling ports, meters, pipes, vessels, and refinery wastewater collection system components to between 100-500 ppm depending on equipment type. Note: This rule was amended January 21, 2004.	New, existing and modified	BAAQMD Rule 8-18 11/27/02

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
	Equipment Leaks (Valves and Flanges) (continuation) b) Limits VOC emissions from leaking equipment at petroleum facilities and chemical plants by setting forth leak standards and requirements for component identification, operator inspection, maintenance, and atmospheric pressure relief devices.	New, existing and modified	BAQQMD Rule 1173 12/6/02
H. Product Manufacturing Measures reduce VOC.			
60.	**Coatings and Ink Manufacturing** Sets forth operational and "housekeeping" requirements for coatings and ink manufacturing.	New, existing and modified	SCAQMD Rule 1141.1 11/17/00
61.	**Fiberboard Manufacturing** Limits VOC emissions from fiberboard manufacturing by requiring use of capture and control systems with specified efficiencies	New, existing, and modified	PCAPCD Rule 229 6/28/94
62.	**Food Product Manufacturing and Processing** Limits VOC emissions from solvents used in food product manufacturing and processing operations by limiting the VOC content of products used to between 120-400 g/l depending on product, or by the use of a control device.	New, existing and modified	SCAQMD Rule 1131 6/6/03
63.	**Pharmaceuticals and Cosmetics Manufacturing Operations** Sets forth equipment and operational requirements for pharmaceuticals and cosmetic manufacturing.	New, existing and modified	SCAQMD Rule 1103 3/12/99

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
64.	**Polyester Resin Operations** Limits VOC emissions from all polyester resin operations that fabricate, rework, repair, or touch-up products through operational controls and by limiting the monomer content of products to between 28%-50% depending on product type.	New, existing and modified	SCAQMD Rule 1162 11/9/01
65.	**Polymeric Cellular Products (Foam)** a) Sets forth emission limits for polymeric cellular products manufacturing operations. All steps of the manufacturing operation and the storage of the final product for a maximum of 48 hours are subject to the requirements of this rule. b) Limits VOC emissions from the manufacture of foam products composed of polystyrene, polyethylene or polypropylene to between 2.4-2.8 lbs of VOC emissions per 100 lbs of product produced and by requiring emission abatement devices. A control device with at least 98% efficiency may be used in lieu of the above emissions requirements.	New, existing, and modified New, existing, and modified	SCAQMD Rule 1175 5/13/94 BAAQMD Rule 8-52 7/7/99
66.	**Surfactant Manufacturing** Requires the total emissions of VOC from the surfactant manufacturing equipment, before being vented to the atmosphere, be reduced to 0.5 pound per 1000 pounds of surfactant produced or by 95 percent (wt) or more; and all ports used for inspection, taking samples, or adding ingredients must be closed when not in use.	New, existing and modified	SCAQMD Rule 1141.2 1/11/02

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

I. Coating Operations

Measures reduce VOC.

	Strategy	Source Type	District, Rule, and Adoption Date*
67.	**Adhesives and Sealants** a) Reduces VOC emissions from the application of adhesives, adhesive primers, sealants, sealant primers, or any other primers through operational controls and by limiting the VOC content of products to between 30-850 g/l depending on product type. Emission control equipment can be used in lieu of meeting VOC limits.	New, existing and modified	VCAPCD Rule 74.20 9/9/03
	b) Reduces VOC emissions from the application of adhesives, adhesive primers, sealants, sealant primers, or any other primers through operational controls and by limiting the VOC content of products to between 30-850 g/l depending on product type. Emission control equipment can be used in lieu of meeting VOC limits. This rule has more stringent standards for a few categories than the rule above.	New, existing and modified	SCAQMD Rule 1168 10/23/03
68.	**Architectural Coatings** Several districts have adopted regulations consistent with ARB's Suggested Control Measure (SCM) which limits the content of VOC in architectural coatings to between 100-730 g/l. ARB's SCM was adopted in June 22, 2000. For example see rules adopted by SJVAPCD, SDAPCD, SMAQMD, SBAPCD, TeCAPCD, MDAQMD, and AVAQMD. Note: The SCAQMD rule 1113 includes additional significantly more stringent future VOC limits.	New, existing and modified	AVAQMD Rule 1113 3/18/03
69.	**Glass Coatings** Limits VOC emissions from the coating of glass products by limiting the VOC content of coating products to between 2.3-6.7 lbs/gal, depending on the product, or installing control equipment.	New, existing and modified	SJVAPCD Rule 4610 4/17/03

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
70.	**Graphic Arts** Limits VOC emissions from graphic arts operations by limiting the VOC content of products to between 150-300 g/l or by installing a control device.	New, existing and modified	SCAQMD Rule 1130 10/8/99
71.	**Magnet Wire Coating Operations** This rule applies to all coating operations on magnet wire, where the wire is continuously drawn through a coating applicator. Under this rule, any person shall not use or apply any magnet wire coating which contains more than 200 grams VOC per liter (1.67 lb/gal) of coating, less water and exempt compounds. The rule also provides for use of approved emission control systems.	New, existing and modified	SCAQMD Rule 1126 1/13/95
72.	**Marine Coating Operations** Applies to coating operations of marine and fresh water vessels, oil drilling platforms, navigational aids and component parts; and structures intended for exposure to a marine environment. Limits VOC emissions from marine coatings by limiting VOC content of coatings to between 275-650 g/l depending on product. Requires use of non-VOC materials for surface preparation and equipment cleaning. Allows use of specified air pollution control equipment which captures VOC emissions associated with coating, cleaning , and surface preparation, in lieu of use of low-VOC coatings and non-VOC materials used in cleaning and surface preparation.	New, existing and modified	SDAPCD Rule 67.18 5/15/96
73.	**Metal Container, Closure, and Coil Coating Operations** Limits VOC emissions from metal container, metal closure and metal coil coating operations through operational controls and by limiting the VOC content of products up to 660 g/l depending on product type.	New, existing and modified	SCAQMD Rule 1125 1/13/95

*Date when rule was adopted or last amended

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	Strategy	Source Type	District, Rule, and Adoption Date*
74.	**Metal Parts and Products Coatings** Limits VOC emissions from the coating of metal parts and products not regulated by other specific regulations by limiting coating VOC content to between 2.3-3.5 lbs/gal depending on process and coating type.	New, existing and modified	SCAQMD Rule 1107 11/9/01
75.	**Motor Vehicle Assembly Line Coating Operations** Sets forth VOC emission limits and VOC content of motor vehicle coatings. This rule applies to all assembly line coating operations conducted during the manufacturing of new motor vehicles.	New, existing and modified	SCAQMD Rule 1115 5/12/95
76.	**Paper, Fabric, and Film Coating Operations** This rule applies to all persons applying coatings or wash primers to paper, fabric, or film substrates. The drying and curing processes covered under this rule include, but are not limited to, heated, forced-air dried, and non-heated processes. The rule specifies VOC content of applicable coatings and sets forth application method and cleaning requirements.	New, existing and modified	SCAQMD Rule 1128 3/8/96
77.	**Plastic, Rubber, and Glass Coatings** Specifies VOC content of coatings used on plastic, rubber, and glass and sets forth transfer efficiency requirements. The rule allows for use of an approved emission control system in lieu of VOC content limits.	New, existing and modified	SCAQMD Rule 1145 2/14/97
78.	**Screen Printing Operations** Specifies VOC content of screen printing materials and applies to persons performing screen printing operations or who sell, distribute, or require the use of screen printing materials.	New, existing and modified	SCAQMD Rule 1130.1 12/13/96

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
79.	**Spray Booth Facilities** Further reduces VOC emissions from spray coating or laminating operations in high VOC-emitting facilities. This rule applies to any spray booth facility, except petroleum industry facilities, that uses VOC-containing materials that amount to more than 40,000 pounds (20 tons) per year of VOC emissions in any emission inventory year and requires that emissions be reduced by 65% beyond applicable rule requirements through the use of a control device or low VOC product.	New, existing and modified	SCAQMD Rule 1132 1/19/01
80.	**Vehicle Refinishing** Limits VOC emissions from coatings applied on Group I vehicles and equipment and Group II vehicles through operating requirements and by limiting VOC content of products to between 2.8-7.0 lbs/gal.	New, existing and modified	SCAQMD Rule 1151 12/11/98
81.	**Wood Flat Stock Coatings** Limits VOC content of coatings, inks, and adhesives applied to wood flat stock for the purpose of manufacturing a finished wood panel intended for attachment to the inside walls of buildings, including, but not limited to, homes and office buildings, mobile homes, trailers, prefabricated buildings and similar structures, boats and ships, or a finished exterior wood siding intended for use in construction to 250 g/l. A control device may be installed in lieu of the VOC requirement.	New, existing and modified	SCAQMD Rule 1104 8/13/99
82.	**Wood Products Coatings** Specifies VOC content of wood products coatings between 275-760 g/l depending on product. Requires wood strippers to have a maximum VOC content of 350 g/l or a maximum vapor pressure of 2mm Hg. The rule allows for use of an approved emission control system in lieu of VOC content limits and also includes an averaging provision. Exempts facilities that use less than one gallon of coatings per day.	New, existing and modified	SCAQMD Rule 1136 6/14/96

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

J. Solvent Cleaning and Degreasing

Measures reduce VOC.

	Strategy	Source Type	District, Rule, and Adoption Date*
83.	**Cleaning Operations**		
	a) Limits VOC emissions from solvent cleaning operations and activities by reducing VOC content of cleaning products to between 25 g/l-900 g/l depending on process.	New, existing, and modified	SCAQMD Rule 1171 11/7/03
	b) Limits VOC emissions from solvent cleaning operations and activities by reducing VOC content of cleaning products to between 50 g/l-900 g/l depending on process.	New, existing and modified	SMAQMD Rule 466 5/23/03 and SJVAPCD 4663 12/20/01
84.	**Degreasing Operations**		
	a) Limits VOC emissions from cold cleaners and vapor degreasers by limiting product VOC content to 25 g/l. Air-tight and airless cleaning systems can be used in lieu of meeting the VOC limit.	New, existing and modified	SCAQMD Rule 1122 12/6/02
	b) Limits VOC emissions from cold cleaners by limiting product VOC content to 25 g/l for (900g/l for exempted categories.)	New, existing, and modified	VCAPCD Rule 74.6 11/11/03
	c) Limits VOC emissions from batch-loaded vapor degreasers by setting equipment and operating requirements.	New, existing, and modified	VCAPCD Rule 74.6.1 11/11/03
	d) Limits VOC emissions from cold cleaners to 50 g/l. Limits VOC emissions from vapor degreasers by setting equipment requirements. Air-tight and airless cleaning systems can be used in lieu of meeting the VOC limit.	New, existing, and modified	SMAQMD Rule 454 5/23/02

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
85.	**Use of Solvents** (VOC) Limits VOC emissions from VOC containing materials or equipment not subject to VOC limits in any other, specific district regulation to no more than 833 lbs/month. A control device may be used in lieu of the monthly throughput limit.	New, existing and modified	SCAQMD Rule 442 12/15/00
K. Miscellaneous Measures reduce VOC, SOX, ammonia, or PM10 and PM2.5.			
86.	**Soil Decontamination** (VOC) a) Limits the emissions of organic compounds from soil that has been contaminated by organic chemical or petroleum chemical leaks or spills, and requires description of an acceptable procedure for controlling emissions from underground storage tanks during removal or replacement through the use of operational requirements and by limiting the amount of soil to be processed daily.	New, existing and modified	BAAQMD Rule 8-40 12/15/99
	b) Limits VOC emissions from excavating, grading, handling and treating VOC contaminated soil as a result of leakage from storage or transfer operations, accidental spillage, or other deposition by requiring that soil with VOC concentrations above 1000 ppm be containerized, sealed, and shipped away for disposal.	New, existing and modified	SCAQMD Rule 1166 5/11/01
87.	**Solid Waste Landfills** (VOC) a) Limits VOC emissions from municipal solid waste landfills through installation of gas collection and control systems.	New, existing, and modified	SCAQMD Rule 1150.1 3/17/00
	b) Limits VOC emissions from the waste decomposition process at solid waste disposal sites through requirements for gas collection and control systems.	New, existing, and modified	BAAQMD Rule 8-34 10/6/99

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
88.	**Woodworking Operations** (PM10) Requires any woodworking facility that uses a pneumatic conveyance system connected to woodworking equipment to vent sawdust emissions to a PM10 emissions control device, such that there are no visible emissions; to cover sawdust storage bins at all times; and to take measures to prevent visible emissions from waste disposal activities from crossing any property line.	New, existing, and modified	SCAQMD Rule 1137 2/1/02
L. General Rules to Reduce Directly Emitted PM from Stationary and Area Sources These rules are generic and apply to sources that may not be regulated through a specific rule or permit requirement. The rules are intended to reduce directly emitted PM10 and PM2.5.			
89.	**Visible Emission Limits** (PM10, PM2.5) Prohibits discharges into the atmosphere from any single source of emission of any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour which is: 1) as dark or darker in shade as that designated as No. 1 on the Ringlemann Chart (20% opacity), as published by the United States Bureau of Mines, or 2) of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in 1). Provides the option of exempting permitted outdoor residential burns. Note: Several districts have adopted similar rules (e.g., SMAQMD, BAAQMD, SCAQMD, SDAPCD).	New, existing and modified	MaCAPCD Rule 202 9/17/74
90.	**Combustion Contaminants** (PM10, PM2.5) Prohibits discharges into the atmosphere from the burning of fuel of combustion contaminants exceeding 0.23 gram per cubic meter (0.1 grain per cubic foot) of gas calculated to 12% of carbon dioxide at standard conditions averaged over a minimum of 25 consecutive minutes.	New, existing and modified	MDAQMD Rule 409 5/7/76

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
91.	**Grain Loading** (PM10) Prohibits release or discharge into the atmosphere from any source or single processing unit, exclusive of sources emitting combustion contaminants only, PM emissions in excess of 0.1 grains per cubic foot of dry exhaust gas at standard conditions.	New, existing and modified	MaCAPCD Rule 207 11/9/76
M. Programs that Reduce PM Emissions from Mobile Sources Measures primarily reduce directly emitted PM10, PM2.5, NOx, and VOC.			
	Incentive Programs (PM10, PM2.5, NOx) A funding source is needed in order to rely on incentives programs.		
92.	***DMV Funds (AB 2766 Funds): Motor Vehicle Registration Fee Program (Many districts implement this program)*** State law authorizes air districts to assess motor vehicle registration fees of between $2-$4 (MV Fees) to reduce air pollution from motor vehicles and for related planning, monitoring, enforcement, and technical studies necessary for the implementation of the California Clean Air Act. Twenty-six air districts have implemented a motor vehicle registration fee program. ARB's guidance stresses funding cost-effective projects that help implement clean air plans and that reduce the most emissions per dollar spent. Example: SCAQMD's Mobile Source Air Pollution Reduction Review Committee; BAAQMD's Transportation Fund for Clean Air (vehicle buy-back clean school buses, vehicle incentives, etc.); SJVAPCD's REMOVE Program. Note: Legislation effective January 1, 2005, allows air districts to increase the fee to $6. Spending of the additional $2 is limited to four programs: 1) Carl Moyer, 2) Lower Emission School Buses, 3) accelerated vehicle retirement or repair program, and 4) previously unregulated agricultural sources. (continued on next page)	New or modified	SCAQMD BAAQMD SJVAPCD Programs

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
	Incentive Programs (continuation)		
93.	***Heavy-Duty Engine Incentive Program*** a) Helps fleets pay for new lower emission heavy-duty engines, lower emission retrofits, and engine replacements. Public and private fleets are eligible if they use medium or heavy-duty on-road gas or diesel vehicles over 14,000 pounds gross weight or off-road commercial equipment including construction, agricultural, stationary agricultural water pump, commercial marine vessels, locomotives, forklifts, or airport ground support equipment. The program is funded by the air district and by the Carl Moyer Incentive Program sponsored by ARB. (continued on next page)	New or modified	SMAQMD Program
	b) Provides incentive funds for the differential cost associated with the reduced emission technology as compared with the cost of conventional technology. Eligible funding categories include heavy-duty on-road vehicles, off-road vehicles, locomotives, marine vessels, electric forklifts, electric airport ground support equipment and stationary agricultural irrigation pump engines. The SJVAPCD received $25 million in State transportation funds from special legislation for the Valley Emergency Clean Air Program (VECAP). The air district added the VECAP funds to the Heavy Duty Engine Incentive Program.	New or modified	SJVAPCD Program
94.	***Lower Emission School Bus Program*** The Lower-Emission School Bus Program provides financial incentives to school districts to replace older school buses using both air district and ARB grant funding.	New or modified	BAAQMD VCAPCD SCAQMD Programs
95.	***Moyer Program*** The Carl Moyer Memorial Air Quality Standards Attainment Program provides funds on an incentive-basis for the incremental cost of cleaner than required engines and equipment. Eligible projects include cleaner on-road, off-road, marine, locomotive and stationary agricultural pump engines, as well as forklifts, airport ground support equipment, and auxiliary power units. The program achieves near-term reductions in NOx and PM emissions. Most districts currently implement this program.	New or modified	Most Districts

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
	Incentive Programs (continuation)		
96.	***Sacramento Emergency Clean Air Transportation (SECAT) Program*** Encourages cleanup of the existing HDD truck fleet by providing funds to pay for the cost of retrofitting existing engines with newer, cleaner engines or paying a significant amount of the cost of a newer vehicle. The goal is to reduce NOx emissions from HDD trucks by 3 tons per day by 2005 by upgrading 3,000 to 6,000 trucks. The program will disperse a total of $70 million by 2005 (from State transportation funds under special legislation plus funds from the federal Congestion Mitigation and Air Quality Improvement (CMAQ) Program.	New or modified	SMAQMD Program
97.	***Light and Medium Duty Vehicle Program*** Provides incentives for certain new on-road original equipment manufacturer (OEM) alternative fuel vehicles with a Gross Vehicle Weight Rating (GVWR) up to 14,000 pounds, including passenger cars, pick-up trucks, small buses, and vans. Vehicles must be certified by the ARB as achieving standards for ULEV, SULEV, or ZEV vehicles. With the exception of hybrid electric vehicles, no vehicles with the ability to operate on gasoline or diesel fuel are funded.	New	SJVAPCD Program
98.	***Lawn Mower Buy Back Program*** Encourages trading of gasoline-powered mowers, by providing funds to offset the purchase cost of electric mowers (e.g., in early 2004, the SMAQMD participated in a program that paid 50% of the purchase price for 700 mowers).	Existing	BAAQMD SJVAPCD SMAQMD SCAQMD Programs

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
	Transportation Related Programs (PM10, PM2.5, NOx, VOC, CO)		
99.	***On-Road Motor Vehicle Mitigation Options*** Requires employers who employ 250 or more employees to implement a program to reduce mobile source emissions generated from employee commutes and meet an annual emission reduction target (ERT) for their worksite. Provides employers with a menu of emission reduction options including: old-vehicle scrapping, clean on-road vehicles, clean off-road vehicles, pilot credit generation program, and other specified credit programs. As an alternative to meeting a worksite ERT, allows employers to implement an employee commute reduction program. This is the only program of this type with emission reduction mandates. Other districts programs are in place that require reporting of average vehicle ridership, but they have no emission reduction mandates. Note: This rule was amended February 6, 2004.	New, existing, and modified	SCAQMD Rule 2202 1/1/02
100.	***Transportation Outreach Program*** Requires employers with 100 or more employees to register with the air district annually and collect survey data on their employee's commute distances and ridesharing participation every two years. This rule allows the air district to devote resources and efforts in assisting employers with their voluntary trip reduction efforts.	New, existing, and modified	VCAPCD Rule 211 8/11/98
101.	***Spare the Air Program*** Many air districts have implemented public outreach programs to encourage the general public and employers to take actions to reduce transportation related emissions. SMAQMD, SJVAPCD, and BAAQMD have implemented Spare the Air Programs. Spare the Air is a voluntary, summertime effort aimed at reducing air pollution (specifically, ground-level ozone). (continued on next page)	New, existing, and modified	SMAQMD, SJVAPCD, BAAQMD Programs

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

	Strategy	Source Type	District, Rule, and Adoption Date*
	Transportation Related Programs (continuation)		
102.	***Public Awareness Programs*** Some air districts have implemented public awareness programs that: 1) support voluntary employer based trip reduction programs, 2) encourage alternative modes of transportation, 3) encourage cities and counties to incorporate air quality beneficial policies into local planning and development activities, 4) promote demonstrations of low emission vehicles and refueling infrastructure, and/or 5) continue public education by informing residents about air quality status, air pollutant health effects, sources of pollution, and actions individuals and communities can take to help improve air quality.	Existing and modified	BAAQMD SCAQMD SMAQMD SJVAPCD Programs
103.	***Leveraging Other Sources for Transportation Funding*** Some air districts apply for and receive money for transportation-related projects from federal, state, and local funding sources, the most notable being the federal Congestion Mitigation and Air Quality Improvement (CMAQ) program. The projects funded are usually small scale and include incentives, facilities, support services, and public awareness for carpools, vanpools, telecommuting, public transit, biking and walking.	New, existing, and modified	BAAQMD SCAQMD SMAQMD SJVAPCD SDAPCD Programs

Reference: *District rules and regulations can be obtained at http://www.arb.ca.gov/drdb/drdb.htm*

*Date when rule was adopted or last amended

Note: The specific air district rules included on the list represent guidance or appropriate example measures in terms of scope and level of emission control. There may be other district rules which may also represent similar, suitable levels of control.

APPENDIX E

CONTINGENCY MEASURES FROM ARB MASTER LIST

OF DISTRICT CONTROL MEASURES

CONTINGENCY CONTROL MEASURES

In the event that implementation of the plan is not providing adequate progress toward achieving the standard, the District will consider implementing a series of contingency control measures. These measures are control options that would be instituted in addition to the measures already identified in the plan. These measures would be implemented should the area violate the federal PM_{10} standard, or should the air monitoring and emissions data provide compelling evidence that adequate progress is not being made toward achieving the standard. In addition, the District may institute measures for specific sources or types of sources should future evidence reveal specific source to receptor relationships.

These measures are based on a review of ARB's master list of suggested control measures (Appendix C) which Districts are required to consider under SB 656. The list consisted of various measures compiled from other districts and a list of statewide measures adopted by the ARB, generally involving mobile source exhaust emissions.

Since area sources, rather than exhaust emissions from mobile sources, are major contributors to violations of the PM_{10} standard in the NCCAB, the District's consolidated list was based on ARB's master list of 103 rules developed by other districts around the State (mostly San Joaquin Valley and the South Coast). These measures focus on fugitive dust and to some degree smoke.

The District initially reviewed ARB's master list of 103 measures and based on applicability, feasibility, air quality benefit and cost effectiveness, developed an overall initial ranking (high, medium low) of the measures. This process resulted in an initial consolidated list of 23 measures. This list was further refined by considering only the measures having the highest ranking. The second level of review produced a further consolidated list of 13 measures most relevant to the NCCAB.

The 13 prospective measures are presented in Table E-1, along with a capsulized description of the measure, its cost effectiveness, size of the affected emission category, ranking as well as which District programs or rules are already in place to address the issue. The 14 measures focus on control of fugitive dust from a variety of sources and smoke from land management and residential wood burning.

The prospective measures can be grouped into the following general categories:

- Paved Road Dust
- Unpaved Roads
- Agricultural PM_{10} Best Management Practices (BMPs)
- Construction/Demolition
- Disturbed Open Areas
- Cement Manufacturing Materials Handling
- Smoke Management
- Public Education

As noted in Table E-1, many of the measures represent duplication or enhancements to existing MBUAPCD programs including rules, the District's CEQA review process, as well as

existing enforcement practices. MBUAPCD rules with the most common overlap include Rule 400 - Visible Emissions, Rule 402 - Nuisances, and Rule 438 - Open Outdoor Fires. However, prospective measures pertaining to agricultural sources, including tilling and unpaved agricultural roads (ARB#44), as well as paving or using dust surfactants for public and private unpaved roads (ARB#37), would represent new areas of regulatory activity.

Since the major District activities to be considered under SB 656 are identified in Table 5-1, the measures presented in Table E-1 are contingency measures to be considered at a future time should air monitoring and emissions inventory data indicate a lack of progress toward achieving the standard. District specific refinements to any of adopted measures will be undertaken during the rule development process.

TABLE E-1 CONTINGENCY CONTROL MEASURES FROM STATEWIDE SB 656 MASTER LIST OF EXISTING APCD RULES COMPILED BY ARB

No.	ARB Rf #	Type	Source APCD	Capsulized Description	ARB CE	~MBU	Rk*
1.	24 a)	FD	SJVAPCD	**Construction: Earthmoving** - Limits VDE 20%, FDCP > 40 acres or 2,500 cubic yards, req chem stabilizer, wind screens.	5 **4.54**	R400 R402 CEQA	H
2.	25 a) b)	FD	SJVAPCD SCAQMD	**Construction: Demolition** - Req FD suppressants so VDE ≤ 20%, limits track out length. No VDE beyond property line.	5 **4.54**	R400 R402 CEQA	HM
3.	26 a) b)	FD	SJVAPCD SCAQMD	**Construction: Grading** - Req pre-watering so VDE ≤ 20%, phased work plan. Chem stabilizers if left ≥ 60 days.	5 **4.54**	R400 R402 CEQA	H
4.	30 a) b)	FD	SJVAPCD SCAQMD	**Carry-out and Track-out** - Req daily TO removal, pave onsite roads, TO sensor, prohibit offsite TO. Req freq TO removal, chem stab, TO cntrl device.	5- 20+	400 ENF CEQA	HM DUP
5.	31	FD	SJVAPCD	**Carry-out and TO**: Clean-up methods, req sweeping w sufficient wetting to limit VDE to 20%; or operating a PM10 street sweeper with 80% efficiency	5- 20+	400 ENF CEQA	HM
6.	32 a)	FD	SJVAPCD	**Disturbed Land** - For non-ag areas ≥ 3 ac or left unused ≥ 7 days. Reg DS, veg, limit access, or pave so VDE<20%.	5-10	R400 R402 CEQA	HM
7.	33 a)	FD	SJVAPCD	**Paved Rd Dust:** Req pavd shldrs for pub & pri rds for ADT≥500. If ADT 500-3000, w≥4' If ADT>3k, w≥8'. Options for oil, CS, veg or veg median. VDE≤20%.	5-10 **9.93**	New Area	HM F?
8.	37 a) b)	FD	SJVAPCD SCAQMD	**Unpavd Rds:** Req pub & priv rds VDE≤20% for veh trips >75 & >100 using: wtr, gravel, CS, veg, or pave. Op - Enf FDMP w eff ≥50%. Est pav schle for exst rds. Ann pave, CS reqs, 15 mph spd limit, spd cntrl devices.	5-15 **25.22**	New Area	H F?
9.	39	FD	SCAQMD	**Windblown Dust: Regulatory Definition** - SJVAPCD	NA	R101	H
10.	40	FD	SCAQMD	**Windblown Dust: Constr/Earth Moving** - Reqs wtr prior to earthmoving. For unpavd rds CS prior to hi WS (>25) event , wtr 2x/hr wtr at constr site during act. ops.	5-10 **4.54**	400 402 CEQA	HM
11.	41	FD	SCAQMD	**Windblown Dust: Disturbed Areas** - Req wtr and CS for inactive sfc. Req CS hi WS, addl wtr if FD over PL.	5-10 **0.675**	400	HM
12.	44 a) c)	FD	SJVAPCD SCAQMD	**Ag Operations** - FDMP >75 trip/day on unpavd rd No Ag tilling/mulching if WS >25 mph	5-15 **15.68**	New - Ag area	H
13.	1	SMP	SJVAPCD	**Public Awareness Program** - Inform public about the health hazards of wood smoke and encourage better indoor wood burning practices.	0-5	New	HM

Notes/Abbreviations for Table:

CE - Cost Effectiveness ($1,000/Ton reduced).
Bold Numbers - Bold numbers in CE column represents emissions for category (tons/day), when available.
Rk - Initial Usefulness Ranking (H-High, M-Medium, L-Low, F-Feasibility, DUP-Appears to Duplicate Existing MBUAPCD Rules or Enforcement procedures).
R- Rule
FD - Fugitive Dust.
FDMP - Fugitive Dust Mitigation Plan.
VDE - Visually Detectable Emissions, same as Visible Emissions (VE) in MBUAPCD Rule 400.
R1 - Ringlemann No. 1 (20% VDE).
PL - Property Line.
WS- Wind Speed
TO - Track-Out
Ac - Acre
SMP - Smoke Management Program
NA - Not Available
Veg - Vegetation.
DS - Dust Suppressants.
CS - Chemical Stabilizers.