PM_{10} IMPLEMENTATION/MAINTENANCE PLAN

AND REDESIGNATION REQUEST

FOR SACRAMENTO COUNTY

OCTOBER 28, 2010
(WITH ERRATA SHEET INCORPORATED)

SACRAMENTO METROPOLITAN
AIR QUALITY MANAGEMENT DISTRICT

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TABLE OF CONTENTS

1. INTRODUCTION

1.1 Background Information

Particulate matter (PM) is the term for the mixture of solid and liquid particles in the ambient air that we breathe. Because particles originate from a variety of activities and processes, their chemical and physical compositions vary widely. Components of PM include nitrates, sulfates, elemental carbon, organic carbon compounds, acid aerosols, trace metals, and geologic materials. PM can be directly emitted to the air or can be produced by secondary formation in the atmosphere when precursor gaseous pollutants, such as nitrogen oxides and sulfur oxides, chemically react with ammonia to form fine aerosol particles.

Sources of PM are mainly due to human (anthropogenic) activities, such as residential fuel combustion smoke and soot, entrained road dust, motor vehicle exhaust precursor pollutants, and dust emissions from construction and farming activities. PM can also be generated from natural sources such as windblown dust and wildfires.

For air quality monitoring purposes, PM is measured and expressed as the mass of particles in micrograms per cubic meter ($\mu g/m^3$) of air. Ambient PM concentrations can build up in the Sacramento region due to its valley geography, stagnant wintertime meteorology, and urban emission sources. PM may eventually be removed from the atmosphere by gravitational settling or deposition, rainout (attaching to water droplets as they fall to the ground), and washout (being absorbed by water molecules in clouds and later falling to the ground with rain).

Ambient air quality standards for particulate matter focus on the smaller particle sizes that are responsible for adverse health effects because of their ability to reach the lower regions of the respiratory tract. PM_{10} standards established to protect human health refer to the air pollutant that consists of particles ten microns or less in diameter (about one seventh the width of a human hair). PM_{10} standards are also designed to protect visibility and prevent vegetation damage.

1.2 Health Impacts

In developing the national ambient air quality standards (NAAQS) for PM_{10} exposure, the major emphasis has been placed upon community epidemiological studies, along with additional toxicological and controlled human exposure studies. These studies show that exposure to elevated levels of particulate matter causes adverse human health effects, including reduced lung functions, increased respiratory complications, cardiovascular disease, lowering the body's defense against infections, injury to lung tissue, nonfatal heart attacks, increased risk of cancer and, in extreme cases, premature death. People most sensitive to the effects of PM_{10} are those with influenza, asthma and other chronic lung and heart disease, as well as the elderly, young children, and exercising adults.

PM_{10} is likely to penetrate deep into the lung tissue and lodge in the alveoli, the small air sacs in the lung where the essential oxygen transfer occurs. PM_{10} is too small for the natural filtering process of the human body (small hairs and mucous throughout the nasal and lung passage) to remove. Researchers studied health effects from short-term and long-term exposure to particulate matter concentrations in the air.

Short-Term PM_{10} Exposure Studies

In developing a short-term (24-hour) health-based standard for PM_{10}, EPA examined the acute health effects in reported studies, including mortality (death) and various morbidity (illness) indicators such as reduced lung function, the rates of upper and lower respiratory illness, and related hospital admissions. Studies cited by EPA showed a decrease in lung function following particulate pollution occurrences (Dockery, 1982) (Dassen, 1986).

Some children, particularly asthmatics, showed higher effects to PM_{10} indicating that they may be a more vulnerable subgroup in the population. Respiratory illness is particularly important in children since many studies have indicated that respiratory illness events (mostly viral) during childhood are important determinants for future risk of chronic respiratory symptoms in adult life.

Based on mortality data examined, EPA concluded there is evidence that elevated particulate levels may increase the risk of death. A large share of the acute-exposure mortality and hospitalization occurrences are within the elderly population. These studies indicate the most susceptible population segment for mortality risk from particulate exposure consists of elderly individuals with preexisting cardiovascular and respiratory diseases, such as caused by smoking.

Long-Term PM_{10} Exposure Studies

In initially developing a more long-term (annual average period) health-based standard for PM_{10}, EPA considered chronic health effects for both mortality and morbidity related to elevated particulate levels. EPA cited several studies which noted a correlation between mortality rates and long-term particulate pollution levels (EPA, 1986). These studies raised concerns for possible premature death resulting from particulate pollution, and their results were considered part of the determination of the margin of safety for the standard.

However, in 2006, after evaluating more recent long-term PM_{10} exposure research studies, EPA concluded that the long-term health impacts were mainly related to exposure to fine-sized particles 2.5 microns or less in diameter (71 FR 61198). The annual PM_{10} standard was no longer warranted with the annual $PM_{2.5}$ standard in place. In addition, EPA mentioned that the 24-hour PM_{10} standard “that would reduce 24-hour exposures would also likely reduce long-term average exposures, thus providing some

margin of safety against the possibility of health effects associated with long-term exposures."

Economic and Social Costs

Adverse health effects related to ambient particulate matter exposure result in a number of economic costs and social consequences. These include increased medical costs, hospital admissions, work loss days, school absences, caregiver burdens, and premature deaths. The economic valuation estimates for the health impacts associated with particulate matter exposures are in the billions of dollars per year for the Sacramento region, mainly due to premature deaths.

1.3 Description of Sacramento County PM_{10} Nonattainment Area

Physical Geography (SMAQMD, 2004)

Sacramento County encompasses approximately 994 square miles and is located at the southern end of the Sacramento Valley, which is in the northern portion of California's Central Valley (see Figure 1.1). It is bounded by the Coast and Diablo ranges on the west and the Sierra Nevada on the east.

The prevailing wind is from the southwest, primarily because of marine breezes through the San Francisco Bay Delta, although during winter, the sea breezes diminish and winds from the north occur more frequently. Between late spring and early fall, a layer of warm air often overlays a layer of cool air from the San Francisco Bay Delta, resulting in an inversion. Typical winter inversions are formed when the sun heats the upper layers of air, trapping below them air that has been cooled by contact with the colder surface of the earth during the night. Calm conditions and poor ventilation allow for increased ambient air pollution concentrations (CARB, 1994).

Sacramento County hosts an array of habitat types, which include annual grasslands and croplands, valley-foothill riparian habitat, valley-foothill woodlands, freshwater emergent wetlands, and riverine habitat. Surface water resources in Sacramento County include the Sacramento, American, Cosumnes, and Mokelumne Rivers, all of which flow to the Sacramento-San Joaquin Delta.

Population and Economy

The region has experienced tremendous growth in population over the past twenty years. From 1990–2009, Sacramento County's population grew from approximately 1,041,000 to 1,433,000 (California Department of Finance, 2009). A broad spectrum of land uses characterizes the developed lands. The Sacramento County infrastructure has a well-established and comprehensive transportation system, which is dominated by highways and freeways. Downtown Sacramento has high-rise office buildings and high density housing, surrounded by suburban development.

The major economic activity in the area is government services and retail trade, along with significant agricultural, industrial, and construction industries. The agricultural lands in Sacramento County are dominated by crop lands in the valley and rangelands in the foothills and produce a wide variety of crops.

Figure 1.1: Location of Sacramento County

1.4 Purpose of Plan

The Sacramento Metropolitan Air Quality Management District (SMAQMD) has prepared this plan in compliance with the federal Clean Air Act requirements pertaining to PM_{10} nonattainment areas. In 2002, EPA officially determined that Sacramento County had attained the PM_{10} NAAQS by the attainment deadline (67 FR 7082). The purpose of this plan is to fulfill the requirements for EPA to redesignate Sacramento County from nonattainment to attainment of the PM_{10} NAAQS by preparing the following plan elements and tasks:

- Document the extent of the PM_{10} problem in Sacramento County.
- Determine the emission inventory sources contributing to the PM_{10} problem.
- Identify the appropriate control measures that achieved attainment of the PM_{10} NAAQS.
- Demonstrate maintenance of the PM_{10} NAAQS.
- Request formal redesignation to attainment of the PM_{10} NAAQS.

1.5 Plan Development and Public Review Process

The SMAQMD is a local government air quality regulatory agency for the jurisdiction of Sacramento County. This PM_{10} plan is developed for the Sacramento County nonattainment area by the SMAQMD staff with participation from the Sacramento Area Council of Governments (SACOG) and the California Air Resources Board (CARB). SACOG is the Metropolitan Planning Organization (MPO) for the Sacramento region, representing six counties and over 20 member cities. SACOG develops regional transportation and land use development plans and acts as a forum for governmental and public input on regional issues.

Because of recent changes in the regional travel demand model data used in transportation plans, SACOG was a key contributor in the preparation of the updated motor vehicle emissions inventory and transportation emissions budgets. CARB staff also provided information regarding mobile and area-wide emissions inventory category estimates, state and federal control measures, and PM_{10} air quality data analysis.

Existing public working groups are used to disseminate information and seek input from a wide variety of key community stakeholders during the development and review process of the draft plan. SACOG's Regional Planning Partnership is an advisory committee with close to 100 representatives from local, regional, state, federal, and tribal governments, as well as representatives of business, environmental, and minority organizations and associations (SACOG, 2010). This venue, which includes local, regional, state, and federal air quality and government agencies, serves as the interagency consultation process to provide comments on transportation conformity budgets and issues.

A minimum of 30 days for a public hearing notice and review period is needed to solicit comments on the proposed PM_{10} plan. This outreach includes publishing a public notice in the Sacramento Bee newspaper and mailing a notice to several thousand interested parties and over 2,000 e-mail addresses. The Board of Directors for the Sacramento Metropolitan Air Quality Management District is required to hold a public hearing prior to considering approval of the PM_{10} plan, which is scheduled for October 28, 2010.

1.6 Overview of Plan Contents

This document includes the information and analyses to fulfill the federal PM_{10} air quality implementation, maintenance, and redesignation planning requirements for the Sacramento County nonattainment area. The following chart contains a brief description of each chapter in this plan.

Chapter 1	Provides an introduction that contains background information on PM_{10} air pollution, health impacts, Sacramento County nonattainment area, purpose and development of the plan.
Chapter 2	Explains the current PM_{10} nonattainment status and defines federal Clean Air Act PM_{10} requirements for implementation, maintenance and redesignation to attainment.
Chapter 3	Analyzes PM_{10} air quality data and trends in Sacramento County.
Chapter 4	Presents the PM_{10} and precursor pollutants baseline emissions inventory and the emission forecasts that are based on existing control strategies and growth assumptions.
Chapter 5	Describes control measure requirements and identifies the appropriate control measures that achieved attainment and will provide for maintenance of the PM_{10} NAAQS.
Chapter 6	Includes the data analysis and provisions for a maintenance demonstration.
Chapter 7	Discusses the maintenance contingency plan.
Chapter 8	Assesses the motor vehicle emissions budgets for transportation conformity purposes.
Chapter 9	Evaluates the fulfillment of the redesignation requirements.
Chapter 10	Summarizes the key points and major conclusions of this report.

1.7 References

CARB. *California Surface Wind Climatology*, Aerometric Data Division, CA: California Air Resources Board, Sacramento, CA [1994.] p. 13.

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USEPA, *National Ambient Air Quality Standards for Particulate Matter*, Federal Register, Volume 71, October 17, 2006, p. 61198.

2. FEDERAL CLEAN AIR ACT REQUIREMENTS

2.1 PM_{10} Standards

On July 1, 1987, EPA revised the NAAQS for particulate matter with a new PM_{10} indicator as the basis for the standards (52 FR 24634). The level of the federal PM_{10} standards was set at 150 $\mu g/m^3$ for a 24-hour average concentration[1] and 50 $\mu g/m^3$ for an annual average concentration. The new PM_{10} standards replaced the previous standards for total suspended particulates (TSP less than 30 microns in diameter). The change from the TSP standards to PM_{10} was in response to updated information from health officials indicating adverse human health effects from the smaller PM_{10} penetrating deep into the lower respiratory tract and lung tissue.

In 1997, EPA retained the existing 24-hour and annual PM_{10} standards after reviewing the PM NAAQS. However, EPA expanded the PM NAAQS by adding new $PM_{2.5}$ standards based on updated human health research impacts from fine-sized particles 2.5 microns or less in diameter. $PM_{2.5}$ standards were set at 65 $\mu g/m^3$ for a 24-hour average concentration and 15 $\mu g/m^3$ for an annual average concentration (62 FR 38652).

In 2006, EPA reaffirmed the 24-hour PM_{10} standard after reviewing the air quality criteria and PM NAAQS again. EPA concluded that the research "evidence continues to support a 24-hour averaging time for a coarse particulate standard, based primarily on evidence suggestive of associations between short-term (24-hour) exposure and morbidity effects and, to a lesser degree, mortality" (71 FR 61198). However, effective December 18, 2006, EPA revoked the annual average PM_{10} standard based on the more recent studies indicating long-term health impacts were mainly related to $PM_{2.5}$ exposure. EPA also tightened the 24-hour average $PM_{2.5}$ standard by lowering the concentration level from 65 $\mu g/m^3$ to 35 $\mu g/m^3$ (71 FR 61202).

2.2 Nonattainment Designation

Upon enactment of the 1990 Clean Air Act Amendments, Sacramento County was designated as unclassifiable for PM_{10} pursuant to Section 107(d)(4)(B)(iii) of the Clean Air Act. However, during 1989 and 1990, two different SMAQMD PM_{10} monitors (Del Paso Manor and Stockton Boulevard sites) exceeded and violated the 24-hour PM_{10} standard. A violation at a monitoring site occurs if the expected number of 24-hour NAAQS exceedance days per calendar year is greater than 1.0 averaged over 3 consecutive years of representative data (40 CFR 50, Appendix K). Effective January 20, 1994, EPA took final action to redesignate Sacramento County as a "moderate" nonattainment area for the PM_{10} NAAQS (58 FR 67334). Monitoring sites in Sacramento County have not violated the annual PM_{10} NAAQS.

[1] When comparing a 24-hour average PM_{10} concentration to the federal standard of 150 $\mu g/m^3$, the concentration value is rounded to the nearest 10 $\mu g/m^3$. Therefore, the minimum concentration exceeding the 24-hour standard is 155 $\mu g/m^3$, which rounds to 160 $\mu g/m^3$.

Areas designated as nonattainment after the enactment of the 1990 CAAA and classified as moderate must attain the PM_{10} NAAQS "as expeditiously as practicable but no later than the end of the sixth calendar year after the area's designation as nonattainment" (CAA Section 188(c)(1)). Therefore, Sacramento County's attainment deadline for the PM_{10} NAAQS was established as December 31, 2000.

2.3 Attainment Determination

Effective March 18, 2002, EPA officially determined that Sacramento County had attained the PM_{10} NAAQS by the attainment deadline based on PM_{10} air quality monitoring data recorded during 1998 to 2000 (67 FR 7082). The attainment determination was based on the following table which summarizes the one-in-six day PM_{10} data collected at five monitoring sites in Sacramento County and reported to EPA. The PM_{10} concentrations showed no measured exceedances of the 24-hour PM_{10} NAAQS or violations of the annual standard between 1998 and 2000. Since then, the air monitoring network includes six PM_{10} stations throughout Sacramento County, and there have not been any measured violations of the PM_{10} NAAQS. However, this determination of attainment by itself does not redesignate Sacramento County to attainment for PM_{10} and additional planning requirements need to be fulfilled.

Table 2.1: Summary of PM_{10} Air Quality Data – Sacramento County 1998-2000

Monitoring site	Highest 24 hour concentration ($\mu g/m^3$)			Annual average ($\mu g/m^3$)			3-year annual average ($\mu g/m^3$)
	1998	1999	2000	1998	1999	2000	
North Highlands	73	73	82	22	26	23	24
Del Paso Manor	104	141	58	22	27	21	23
Sacramento – Health Center	79	88	86	23	25	31	26
Sacramento – Branch Center Rd	81	86	56	27	33	27	29
Sacramento – T Street	75	99	64	23	29	25	26

2.4 Clean Air Act PM_{10} Planning Requirements

Various federal Clean Air Act planning requirements apply to PM_{10} moderate nonattainment areas. Key sections of the Clean Air Act that relate to nonattainment planning requirements for the preparation of this PM_{10} plan include:

- Section 110(a) and Section 172 of the Clean Air Act contain general nonattainment planning provisions, regarding the public review, adoption, submittal, and content of implementation plans.
- Section 189 of the Clean Air Act specifies additional plan provisions for particulate matter nonattainment areas.
- Section 175A of the Clean Air Act pertains to the submittal of maintenance plans.

- Section 107(d)(3) includes requirements for redesignating a nonattainment area to attainment.
- General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990 provides a detailed discussion of EPA's interpretation of the Title I requirements (57 FR 13498).

2.5 State Implementation Plan

State and air district commitments for attaining and maintaining the NAAQS are outlined in a planning document known as the state implementation plan (SIP). The purpose of a SIP is to identify a comprehensive strategy needed to achieve the NAAQS by the mandated deadline and requirements. The rules and programs in a SIP are then implemented over time to reduce the emissions that go into the air, reducing unhealthful concentrations of air pollutants and helping areas reach federal air quality standards. The following SIP elements are briefly described:

Emissions Inventory

The SIP must include, "a comprehensive, accurate, current inventory of actual emissions from all sources of the relevant pollutant or pollutants in such area, including such periodic revisions as the [EPA] may determine necessary to assure that the requirements of this part are met." [CAA Section 172(c)(3)]

The SIP needs to "identify and quantify the emissions, if any, of any such pollutant or pollutants which will be allowed, in accordance with [Section 173(a)(1)(B) of the Clean Air Act], from the construction and operation of major new or modified stationary sources in each such area." The SIP needs to "demonstrate to the satisfaction of the [EPA] that the emissions quantified for this purpose will be consistent with the achievement of reasonable further progress and will not interfere with attainment of the applicable national ambient air quality standard by the applicable attainment date." [CAA Section 172(c)(4)]

Control Measures

The SIP must "provide for the implementation of all reasonably available control measures as expeditiously as practicable (including such reductions in emissions from existing sources…through the adoption, at a minimum, of reasonably available control technology)". [CAA Section 172(c)(1)]

"Such plan provisions shall include enforceable emission limitations, and such other control measures, means or techniques (including economic incentives such as fees, marketable permits, and auctions of emission rights), as well as schedules and timetables for compliance, as may be necessary or appropriate to provide for attainment…by the applicable attainment date". [CAA Section 172(c)(6)]

Attainment Demonstration

The SIP needs to include a demonstration (including air quality modeling) that will provide for attainment of the national ambient air quality standards by the applicable attainment date, or a demonstration that attainment by such date is impracticable. [CAA Section 189(a)(1)(B)]

Reasonable Further Progress

The SIP is required to contain quantitative milestones which are to be achieved every 3 years until the area is redesignated to attainment and which demonstrate reasonable further progress (RFP) in emission reductions toward attainment by the applicable date. [CAA Section 172(c)(2) and Section 189(c)(1)]

Contingency Measures

The SIP needs to include "specific measures to be undertaken if the area fails to make reasonable further progress, or to attain the national primary ambient air quality standard by the [applicable] attainment date". Contingency measures are to "take effect in any such case without further action by the State or the [EPA]." [CAA Section 172(c)(9)]

Permits for New and Modified Major Stationary Sources (New Source Review)

The SIP needs to include provisions for a permit program to require permits for the construction and operation of new or modified major stationary sources anywhere in the nonattainment area, in accordance with Section 173, Permit Requirements. [CAA Section 172(c)(5) and Section 189(a)(1)(A)]

In addition, the SIP must include provisions to ensure that the control requirements applicable to "major stationary sources of PM_{10} shall also apply to major stationary sources of PM_{10} precursors, except where the [EPA] determines that such sources do not contribute significantly to PM_{10} levels which exceed the [NAAQS] in the area." [CAA Section 189(e)]

After EPA redesignates Sacramento County to attainment for the PM_{10} NAAQS, major stationary sources will be subject to the prevention of significant deterioration (PSD) requirements under Section 160 et seq. of the Clean Air Act, rather than the new source review (NSR) nonattainment area provisions of Section 173 (Calcagni, 1992, p. 6).

Milestone Progress Reports

After an RFP milestone date occurs as specified in the implementation plan, a progress tracking report must be submitted to EPA that demonstrates all applicable measures in

the plan have been implemented and the RFP emission reduction target has been met. [CAA Section 189(c)(2)]

2.6 Clean Data Policy

EPA issued a Clean Data Policy on May 10, 1995, which describes the process by which EPA will determine that an area has attained the ozone standard and that certain SIP planning requirements will not apply so long as the area remains in attainment (Seitz, 1995). The area must continue to operate an appropriate air quality monitoring network to verify its attainment status. This policy is a determination that certain SIP requirements are written so as to be applicable only if the area is not attaining the standard. EPA interprets that this Clean Data Policy is applicable to the SIP provisions of the CAA with regard to:

- Attainment demonstrations,
- Rate of progress plans or reasonable further progress demonstrations,
- Contingency measures (related to meeting attainment and RFP),
- Reasonably available control measures (RACM) analysis,
- Milestone progress reports, and
- Sanction clocks that had been started for failure to meet related SIP submittal requirements.

In addition, the Clean Data Policy states, "The issuance of a determination pursuant to this policy will have no immediate impact on the way conformity is demonstrated. Areas will continue to demonstrate conformity using the build/no-build test and [no-greater]-than-1990 test…(and attainment/RFP SIP, if one with a budget has been submitted)." Since areas that are subject to a clean data determination are not required to submit an RFP or attainment demonstration SIP, those areas will not generally have approved budgets until a maintenance plan is approved as part of the approval of a redesignation request. Areas must still produce a basic emissions inventory, and the applicable tests for general conformity still apply.

EPA's Clean Data Policy interpretations of the Clean Air Act were initially set forth in its General Preamble discussions of the relevant provisions of Title I, Part D. EPA incorporated the statutory interpretation set forth in the Clean Data Policy in a final rule, 40 CFR 51.918, to implement the 8-hour ozone NAAQS (70 FR 71644). On December 14, 2004, EPA issued a memorandum that applied the Clean Data Policy to fine particulate matter NAAQS (Page, 2004). EPA also incorporated the statutory interpretation set forth in the Clean Data Policy in a final rule, 40 CFR 51.1004(c), to implement the $PM_{2.5}$ NAAQS (72 FR 20603).

In addition, EPA has applied the Clean Data Policy to the PM_{10} NAAQS and stated, "Our interpretation that an area that is attaining the standards is relieved of obligations to demonstrate RFP and to provide an attainment demonstration and contingency measures pursuant to part D of the CAA, pertains whether the standard is PM_{10}, ozone,

or $PM_{2.5}$" (71 FR 13024). Furthermore, EPA interprets "that RACM requirements are a component of an area's attainment demonstration. Thus, for the same reason the attainment demonstration no longer applies…the requirement for RACM no longer applies" (71 FR 6354).

Therefore, under EPA's Clean Data Policy, the following implementation plan elements are not applicable for an area that has already attained the NAAQS and are not included in this PM_{10} plan:

- Attainment demonstration,
- Rate of progress plan or reasonable further progress demonstrations,
- Contingency measures (related to meeting attainment and RFP),
- Reasonably available control measures (RACM) analysis.

The Clean Data Policy is the approach being pursued for Sacramento County's PM_{10} planning requirements. Any requirements solely related to designation or classification, such as new source review, remain in effect until the area is redesignated to attainment. Prevention of significant deterioration requirements will apply to Sacramento County after redesignation.

2.7 Implementation Plan Submittal Elements

The following implementation plan elements have been fulfilled and are included or verified in this PM_{10} plan:

1. The area must continue to operate an appropriate PM_{10} air quality monitoring network in order to verify its attainment status.

Chapter 3 of this PM_{10} plan includes and documents a description of the current PM_{10} air quality monitoring network in Sacramento County in accordance with 40 CFR 58 – Ambient Air Quality Surveillance.

2. A comprehensive, accurate, current inventory of actual emissions from all sources of the relevant pollutants must be completed for the area.

Chapter 4 of this PM_{10} plan includes and documents a comprehensive updated inventory of actual emissions from all sources of PM_{10} and nitrogen oxides (NO_X), a precursor pollutant of PM_{10} in Sacramento County.

3. The control measures for the area, which were responsible for bringing the area into attainment, must be approved by EPA as meeting reasonably available control measures (RACM) and reasonably available control technology (RACT) requirements.

Chapter 5 of this PM_{10} plan includes and describes the PM_{10} and applicable PM_{10} precursor control measures implemented in Sacramento County, which were responsible for bringing the area into attainment. It is anticipated that EPA will approve these measures as meeting RACM and RACT requirements.

4. Provide for a permit program to require permits for the construction and operation of new or modified major stationary sources of PM_{10} and applicable PM_{10} precursors (new source review) anywhere in the nonattainment area.

Chapter 5 of this PM_{10} plan includes and describes the new source review permit program to require permits for the construction and operation of new or modified major stationary sources of PM_{10} and applicable PM_{10} precursors.

2.8 Maintenance Plan Requirements

Section 175A of the Clean Air Act contains planning requirements pertaining to the general framework of a maintenance plan. A maintenance plan is a SIP revision that is submitted after a nonattainment area attains the applicable national primary ambient air quality standard in order to demonstrate future compliance. An approved maintenance plan is one of the requirements for redesignating a nonattainment area to attainment. CAA Section 175A requires a maintenance plan to:

- Provide for maintenance of the NAAQS for at least 10 years after redesignation is approved by EPA.
- Contain such additional measures, if any, as may be necessary to ensure such maintenance.
- Include contingency provisions to ensure prompt correction of any violation of the standard after redesignation.
- Provide a contingency measure to implement all control measures contained in the nonattainment SIP.

CAA requirements also specify that a subsequent maintenance plan is required 8 years after redesignation. This second plan must provide for maintenance of the NAAQS for 10 more years after expiration of the first 10-year maintenance period.

In 1992, EPA issued additional discussion, clarification and guidance on requirements for redesignation requests and maintenance plans (Calcagni, 1992). This Calcagni memorandum includes the following additional provisions needed in a maintenance plan:

- Attainment emissions inventory to identify the level of emissions in the area sufficient to attain the NAAQS.
- Maintenance demonstration of the NAAQS either by showing that future emissions will not exceed the attainment level or by modeling to show future emissions will not cause a violation of the standard.

- Verification of continued attainment through operation of an appropriate air quality monitoring network.
- Tracking the progress of the maintenance demonstration by a periodic review or update of the factors and assumptions used in the maintenance demonstration.

2.9 Redesignation Requirements

Section 107(d)(3)(E) of the Clean Air Act contains the applicable provisions for approving a redesignation request to attainment. EPA must determine that the following redesignation requirements have been met for an area:

1. Attained the applicable NAAQS without any further violations.
2. Has a fully approved applicable implementation plan under CAA Section 110(k).
3. Demonstrate that the air quality improvement is due to permanent and enforceable emission reductions.
4. Has a fully approved maintenance plan, including a contingency plan, for the area pursuant to CAA Section 175A.
5. Met all relevant requirements under CAA Section 110 and Part D, including Section 172(c) nonattainment plan requirements and Section 176(c)(4) SIP conformity criteria and procedures.

For an area for which an attainment determination has been made, the SIP submissions discussed and suspended under the Clean Data Policy would not be required for the area's redesignation request to be approved since they would no longer be considered applicable requirements under CAA Section 107(d)(3)(E).

Upon redesignation to attainment for the PM_{10} NAAQS, new source review permitting requirements for major stationary sources would no longer apply and prevention of significant deterioration requirements would be in effect as required by SMAQMD Rule 203 – Prevention of Significant Deterioration.

2.10 References

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USEPA. *Final Rule to Implement the 8-Hour Ozone National Ambient Air Quality Standard – Phase 2*, Federal Register, Volume 70, November 29, 2005, p. 71644-71646.

USEPA. *Approval and Promulgation of Implementation Plans; Designation of Areas for Air Quality Planning Purposes; State of Arizona; Finding of Attainment for Ajo Particulate Matter of 10 Microns or Less (PM_{10}) Nonattainment Area; Determination Regarding Applicability of Certain Clean Air Act Requirements*, Federal Register, Volume 71, February 8, 2006, p. 6352-6356.

USEPA. *Approval and Promulgation of Implementation Plans; Designation of Areas for Air Quality Planning Purposes; State of Arizona; Particulate Matter of 10 Microns or Less; Finding of Attainment for Yuma Nonattainment Area; Determination Regarding Applicability of Certain Clean Air Act Requirements*, Federal Register, Volume 71, March 14, 2006, p. 13021-13025.

USEPA. *National Ambient Air Quality Standards for Particulate Matter*, Federal Register, Volume 71, October 17, 2006, p. 61198.

USEPA. *National Ambient Air Quality Standards for Particulate Matter*, Federal Register, Volume 71, October 17, 2006, p. 61202.

USEPA. *Clean Air Fine Particle Implementation Rule*, Federal Register, Volume 72, April 25, 2007, p. 20586-20667.

3. PM_{10} MONITORING NETWORK AND AIR QUALITY DATA

3.1 Introduction to PM_{10} Data

Particulate matter is the term for solid or liquid particles found in the air. Some particles are large or dark enough to be seen with the naked eye and can take the form as soot or smoke. Others are so small they can be detected only with an electron microscope. Because particles originate from a variety of sources (cars, buses, diesel trucks (mobile), fireplaces, woodstoves, power plants (stationary), construction demolition, wind blown dust, etc.), their chemical and physical compositions vary widely. Particulate matter can be directly emitted or can be formed in the atmosphere when gaseous pollutants such as sulfur dioxide ($SO_{2)}$ and nitrogen oxides (NO_X) react to form fine particles.

In 1987, EPA replaced the earlier total suspended particulate (TSP) air quality standard with a PM_{10} standard. TSP is an outmoded regulatory measure of the mass concentration of particulate matter (PM) in community air. It was defined by the (unintended) size-selectivity of the inlet to the filter that collected the particles. Under windy conditions the mass tended to be dominated by large wind-blown soil particles of relatively low toxicity.

The PM_{10} standard focuses on smaller particles that are likely responsible for adverse health effects because of their ability to reach the lower regions of the respiratory tract. The PM_{10} standard includes particles with a diameter of 10 micrometers or less (0.0004 inches or one-sixth the width of a human hair – Figure 3.1). EPA's health-based national ambient air quality standards for PM_{10} were set at 50 $\mu g/m^3$ (measured as an annual mean) and 150 $\mu g/m^3$ (measured as a daily concentration). However, effective December 18, 2006, EPA revoked the annual average PM_{10} standard based on more recent studies indicating long-term health impacts were mainly related to $PM_{2.5}$ exposure.

Figure 3.1: Human Hair Diameter

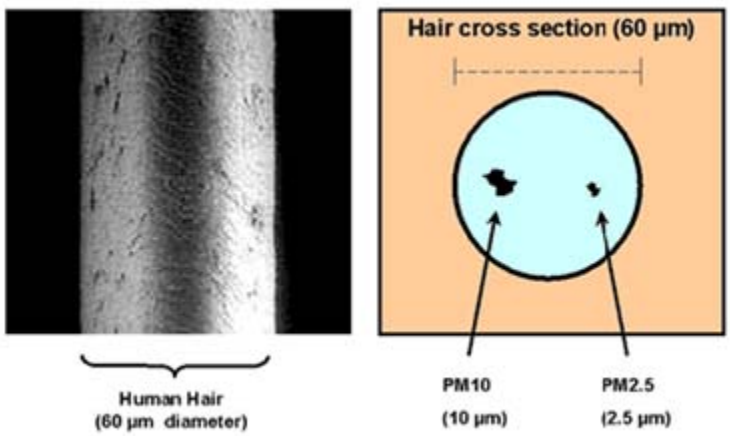


Table 3.1 below shows the standard set forth by EPA for PM_{10}

Pollutant	Primary Standard	Averaging Times	Secondary Standard
Particulate Matter (PM_{10})	Revoked	Annual (Arith. Mean)	
	150 µg/m^3	24-hour	Same as Primary

EPA determined that the Sacramento PM_{10} nonattainment area attained the PM_{10} NAAQS as of December 31, 2000. The PM_{10} concentrations reported at the time included five different monitoring sites, which showed no measured exceedances of the 24-hour PM_{10} NAAQS between 1998 and 2000. There are currently six monitoring sites in Sacramento County that collect PM_{10} data. Although the area has not been officially re-designated, it has not violated these standards since the 2000 attainment determination.

3.2 PM_{10} Monitoring Network

The District operates a network of PM monitors for use in air quality planning and to meet federal requirements. Federal regulations require PM_{10} monitoring networks to meet basic objectives:

- Monitoring the highest concentration of a pollutant
- Monitoring representative concentrations in areas of high population density
- Monitoring the impact of major pollutant sources
- Monitoring pollutant background concentrations

"Network Design Criteria for Ambient Air Quality Monitoring,"[2] Title 40 Code of Federal Regulations, Appendix D to Part 58 defines minimum monitoring requirements based on the population of the Metropolitan Statistical Area (MSA) and the design value for each NAAQS. Sacramento County is within the Sacramento-Arden Arcade-Roseville MSA. The minimum number of monitors for each pollutant is based on the MSA population as described in 40 CFR 58 Appendix D. Currently, the Sacramento-Arden Arcade-Roseville MSA has a population of 2.1 million. The monitoring network within the MSA exceeds the minimum monitoring requirements for all criteria pollutants. Section 3.0 of the 2010 Annual Air Monitoring Network Plan for Sacramento County submitted to EPA July 19, 2010 discusses the minimum required monitors for PM_{10} which is two to four monitors.

There are two types of PM_{10} monitors used throughout the monitoring network: 1) the Federal Reference Method (FRM) filter-based high-volume size-selective inlet sampler (hi-vols or SSI), and 2) the Federal Equivalent Method (FEM) tapered element oscillating microbalance (TEOM), which measures PM_{10} on a continuous basis. The

[2] "Network Design Criteria for Ambient Air Quality Monitoring," Federal Register 40 Appendix D to Part 58

schedule for PM_{10} sample collection is one in six days for the FRM filter-based high-volume samplers, while the FEM TEOM monitors operate on a daily 24-hour schedule.

There are currently six PM_{10} monitoring sites within Sacramento County. The District operates five of the monitoring sites (Goldenland Court, North Highlands, Del Paso Manor Site, Branch Center Rd #2, and Stockton Blvd). The California Air Resources Board operates the T Street monitoring site. FRM filter-based high-volume samplers are located at all of the six sites listed above for PM_{10}. Del Paso Manor and the Stockton Blvd operate both the FRM filter-based samplers and FEM TEOM monitors. Table 3.2 provides a summary of the monitoring sites in Sacramento County, and Figure 3.2 shows a map of the locations of Sacramento County monitoring stations.

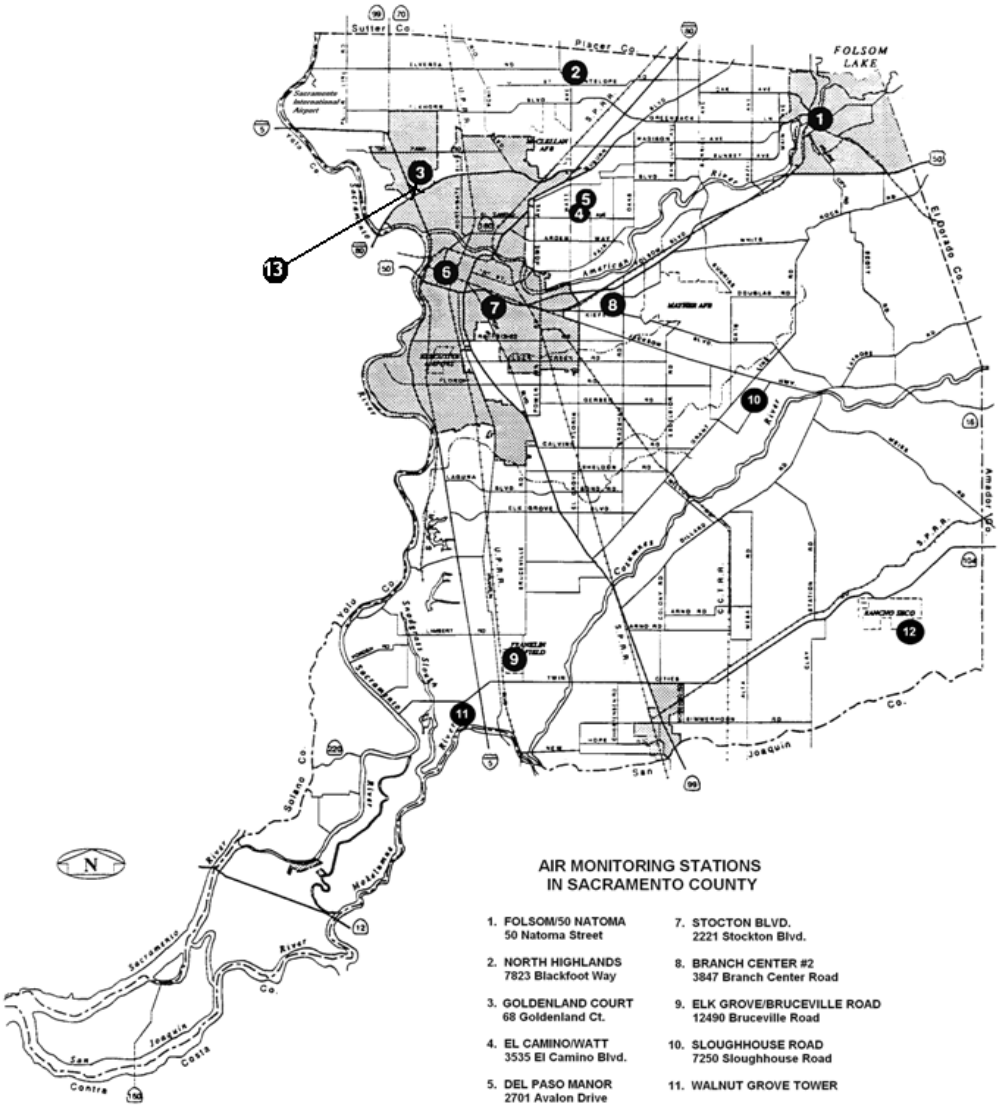
The District plans for modifications to the operation of its air quality monitoring network for PM_{10} are presented in the 2010 Annual Air Monitoring Network Plan. The District is evaluating relocating the PM_{10} TEOM monitor at the Del Paso Manor site to the Goldenland Court site. The District is also considering the possibility of shutting down the PM_{10} SSI and PM_{10} TEOM monitors at the Stockton Blvd site. This site's PM_{10} SSI monitor is not required, and TEOM data is not usable for forecasting or analysis due to potential inaccuracies during the winter time when there is wood combustion. The SMAQMD older model TEOM monitors contain a heater for reducing moisture, which can remove volatile compounds from ambient air samples (such as those in wood smoke). In addition, the District is evaluating the possibility of shutting down the PM_{10} SSI monitors at the Goldenland Court and the North Highlands sites as they are not required. The maintenance plan commits to continue to maintain and operate a PM_{10} ambient monitoring network in Sacramento County that meets or exceeds the minimum monitoring requirements.

Table 3.2: Summary of Monitoring Sites in Sacramento County

List of Monitoring Sites Within Sacramento County			
Site Name	**Purpose**	**AQS ID**	**Pollutants/Parameters Monitored[3]**
Branch Center Rd #2 3847 Branch Center Road	SLAMS	06-067-0284	PM_{10}-SSI
Elk Grove - Bruceville Road 12490 Bruceville Road	SLAMS/ PAMS	06-067-0011	O_3,NO_2,Total NMHC, Speciated VOC, BAM $PM_{2.5}$, Ambient Temp., Wind Direction, Wind Speed, Relative Humidity, Barometric Pressure, Precipitation, Ultraviolet Radiation, Solar Radiation, Upper Level Meteorology (Wind Dir., Wind Speed, Virtual Temp.)
Del Paso Manor 2701 Avalon Drive	SLAMS/ PAMS/ STN/ SPM	06-067-0006	O_3,CO,NO_2, SO_2,Total NMHC, Speciated VOC, Carbonyl, BAM $PM_{2.5}$, TEOM PM_{10}, $PM_{2.5}$-FRM (main & collocated), PM_{10}-SSI (main & collocated), Speciated $PM_{2.5}$ (SASS), Black Carbon, Scattering Coeff., Ambient Temp., Wind Direction, Wind Speed, Relative Humidity, Solar Radiation
El Camino – Watt 3535 El Camino	SLAMS	06-067-0007	CO
Folsom-50 Natoma 50 Natoma Street	SLAMS/ PAMS	06-067-0012	O_3,NO_2,Total NMHC, Speciated VOC, BAM $PM_{2.5}$, Ambient Temp., Wind Direction, Wind Speed, Relative Humidity, Solar Radiation
Goldenland Court	SLAMS/PAMS	06-067-0014	O_3, CO, NO_2, Total NMHC, PM_{10}-SSI, Ambient Temp, Wind Direction, Wind Speed, Relative Humility, Solar Radiation
North Highlands 7823 Blackfoot Way	SLAMS/ SPM	06-067-0002	O_3,CO,NO_2,SO_2,PM_{10}-SSI
Stockton Blvd 2221 Stockton Blvd	SLAMS	06-067-4001	$PM_{2.5}$-FRM, TEOM PM_{10}, PM_{10}-SSI
Sloughhouse Road 7250 Sloughhouse Road	SPM	06-067-5003	O_3, Wind Direction, Wind Speed, $PM_{2.5}$ (E-BAM, winter $PM_{2.5}$ SPM study)
T Street 1309 T Street	SLAMS	06-067-0010	O_3, NO_2, PM_{10}-SSI, BAM $PM_{2.5}$, $PM_{2.5}$-FRM, Speciated $PM_{2.5}$ (SASS), Ambient Temp., Wind Direction, Wind Speed, Relative Humidity, Barometric Pressure
Walnut Grove Tower	Upper Air Research (non-SLAMS site)	N/A, non-SLAMS site	Upper level ozone, Wind Direction, Wind Speed, Ambient Temp
Rancho Seco	SPM (non-SLAMS site)	N/A, non-SLAMS site	$PM_{2.5}$ (E-BAM, winter $PM_{2.5}$ SPM study)

[3] Definition of SLAMS – State and Local Monitoring Stations; NAMS – National Air Monitoring Station; PAMS – Photochemical Assessment Monitoring Stations; STN – Speciation Trends Network, SPM – Suspended Particulate Matter; FRM – Federal Reference Method; BAM – Beta Attenuation Method; NMHC – Non-Methane Hydrocarbon; SSI – Size Selective Inlet; VOC – Volatile Organic Compound

Figure 3.2: Sacramento County Monitoring Stations



3.3 PM_{10} Data Trends

Sacramento County was designated as nonattainment for PM_{10} effective on January 20, 1994 (58 FR 67334). The PM_{10} monitoring data showed that Sacramento County violated the 150 $\mu g/m^3$ federal standard three days between the years of 1989 to 1991. Table 3.3 lists the 24-hour PM_{10} exceedances.

Table 3.3: Sacramento County Exceedances Violating 24-Hour PM_{10} Standard

Monitoring Site	Date	24-Hour PM_{10} Conc.
Stockton Blvd.	November 18, 1989	155 $\mu g/m^3$
Stockton Blvd.	December 18, 1989	158 $\mu g/m^3$
Del Paso Manor	December 25, 1990	187 $\mu g/m^3$

Table 3.4 shows the historical maximum 24-hour average PM_{10} concentrations for the monitoring sites in Sacramento County for the years 1989-2009 collected by PM_{10} SSI monitors. The highest 24-hour average value of 187 $\mu g/m^3$ was from the nonattainment designation period in 1990. The lowest peak 24-hour PM_{10} value of 58 $\mu g/m^3$ was monitored in 2004. The annual peak monitoring site changes from year to year throughout the 21-year period, which suggests the potential for elevated PM_{10} concentrations is mainly caused by emissions from area-wide and mobile source activities in the Sacramento area. The peak 1999 24-hour PM_{10} concentration of 141 $\mu g/m^3$ occurred on July 5th at the Del Paso Manor monitoring site, and was likely impacted by emissions from Fourth of July fireworks.

Table 3.4: PM_{10} Historical Maximum 24-Hour Average Concentrations ($\mu g/m^3$) for Sacramento County Monitoring Sites, 1989-2009

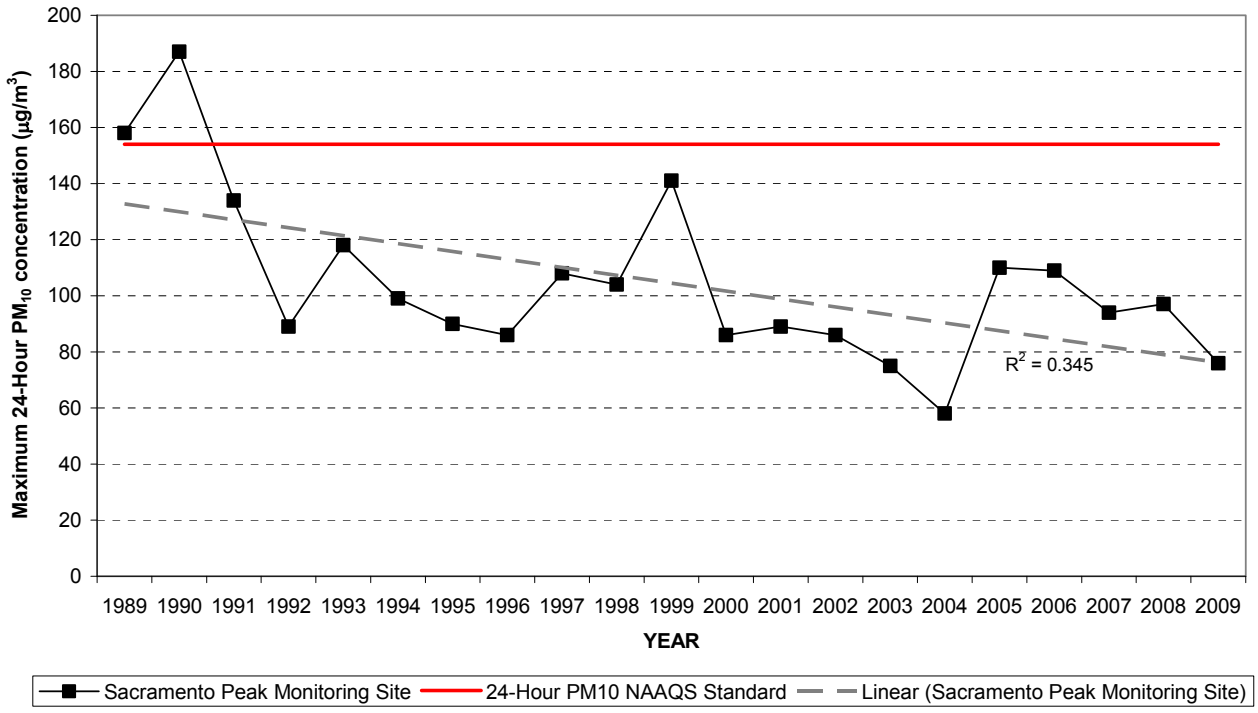
Year	Branch Center Rd	Citrus Heights-Sunrise Blvd*	Del Paso Manor	Earhart Dr / Airport Rd / Goldenland Ct**	North Highlands	Stockton Blvd	T Street	Peak Site
1989	120	139	147		125	158	140	158
1990	113	153	187		96	95	140	187
1991	95	98	127	76	96	98	134	134
1992	71	89	84	62	79	85	72	89
1993	80	61	118	104	63	75	77	118
1994	83		98	76	92	94	99	99
1995	81		65	90	69	67	85	90
1996	68		83	59	65	86	75	86
1997	85		70	36	52	107	108	108
1998	81		104	93	73	79	75	104
1999	86		141	70	73	88	99	141
2000	56		59	73	82	86	64	86
2001	78		68	51	64	58	89	89
2002	77		86	73	53	85	77	86
2003	75		54	57	62	53	65	75
2004	45		49	47	44	44	58	58

2005	61		72	56	110	64	53	110
2006	81		63	81	65	56	109	109
2007	56		70	94	56	56	53	94
2008	89		71	71	97	88	73	97
2009	76		45	48	33	45	47	76

*Citrus Heights-Sunrise Blvd site closed in 1993.
**Earhart Dr site closed 1997 and relocated to Airport Rd site 1998. Airport Rd site closed June 2008 and relocated to Goldenland Ct site.
Data source: California Air Resources Board ADAM air quality data base of PM_{10} FRM SSI monitors. Pre-1994 data supplemented by SMAQMD data.

The chart in Figure 3.3 plots the annual peak 24-hour average PM_{10} concentration for the years 1989-2009 monitored in Sacramento County. This data shows no further violations of the 24-hour average PM_{10} standard since the nonattainment designation period. The historical trend (broken) line indicates a decline in the maximum 24-hour average PM_{10} concentrations at the peak monitoring site over the 21-year period. The trend line R^2 statistic (coefficient of determination = 0.34) is low, which represents a weak correlation due to the variability in the data caused by year-to-year differences in meteorological conditions and air pollutant emissions patterns.

Figure 3.3: Peak 24-Hour Average PM_{10} Concentrations Sacramento County 1989-2009



Note: The 1999 peak concentration of 141 µg/m^3 occurred on July 5th at the Del Paso Manor monitoring site, and was likely impacted by emissions from Fourth of July fireworks.

PM_{10} TEOM Data

As previously mentioned in this chapter, PM_{10} data from tapered element oscillating microbalance (TEOM) monitors is not used for analysis due to its potential inaccuracies during the winter time when there is wood combustion. In Sacramento County, daily TEOM monitors have recorded three separate days exceeding, the 24-hour average PM_{10} NAAQS since they were first operated in winter 1992.

Three TEOM sampler sites exceeded PM_{10} concentrations over 200 $\mu g/m^3$ on October 4, 1995. The Earhart Drive site's TEOM monitor measured a concentration of 156 $\mu g/m^3$ on October 21, 1995. The Stockton Blvd-Health Department site's TEOM monitor recorded a concentration of 160 $\mu g/m^3$ on September 22, 2006. All of these TEOM exceedances of the 24-hour average PM_{10} NAAQS were flagged and suspected of being caused by high wind events.

A violation at a monitoring site occurs if the expected number of 24-hour NAAQS exceedance days per calendar year is greater than 1.0 averaged over 3 consecutive years of representative data (40 CFR 50, Appendix K). The TEOM exceedance days are based on daily monitoring data sampling. The most exceedance days at TEOM sites in any 3-year period would include 1995, and it would be two. Therefore, the expected average number of exceedance days per calendar year was less than 1.0, and there was no violation of the 24-hour PM_{10} NAAQS.

3.4 PM_{10} Seasonality Analysis

A PM_{10} seasonality analysis was conducted to evaluate whether the potential for high PM_{10} was an all year round problem or a more seasonal occurrence in Sacramento County. Various meteorological factors[4] can vary during the year and play an important role in their effect on PM_{10} levels.

Wind. Wind speed and direction are important, because they are indicative of the level of pollutant dispersion. Predominant winds are from south-southwest during the spring, summer and fall. During the winter, predominant winds are coming from north-west and south-east. Wind speeds average around 8 miles per hour (mph) during the spring, summer, and early fall. Typically, during the late fall and winter, air flows experience a significant decrease in speed leading to calm conditions. The light winds and calm conditions result in higher air pollution potential, because pollutants can accumulate in the area for several days before being dispersed. Wind velocities average approximately 5.9 mph for the month of November and 6.4 mph for the month of December.

[4] Average wind speed, precipitation, and temperature data for Sacramento from:
National Oceanic and Atmospheric Administration (NOAA) National Data Center website at
http://ols.nndc.noaa.gov/plolstore/plsql/olstore.prodspecific?prodnum=C00095-PUB-A0001#OVERVIEW

Precipitation. Sacramento averages approximately 18 inches of precipitation per year, with 90 percent of the annual precipitation falling between November and April. November through March averages greater than 2 inches of precipitation per month, while the summer months of June through September average less than 1/5 of an inch of precipitation per month. As expected, fugitive dust levels are greater in hot, dry months when little atmospheric moisture is present to control fugitive dust, although studies have also suggested that secondary particulate (nitrates and sulfates) formation is enhanced with elevated humidity levels. While elevated PM_{10} levels have occasionally occurred when no measurable precipitation was present, elevated levels have occurred with increased humidity.

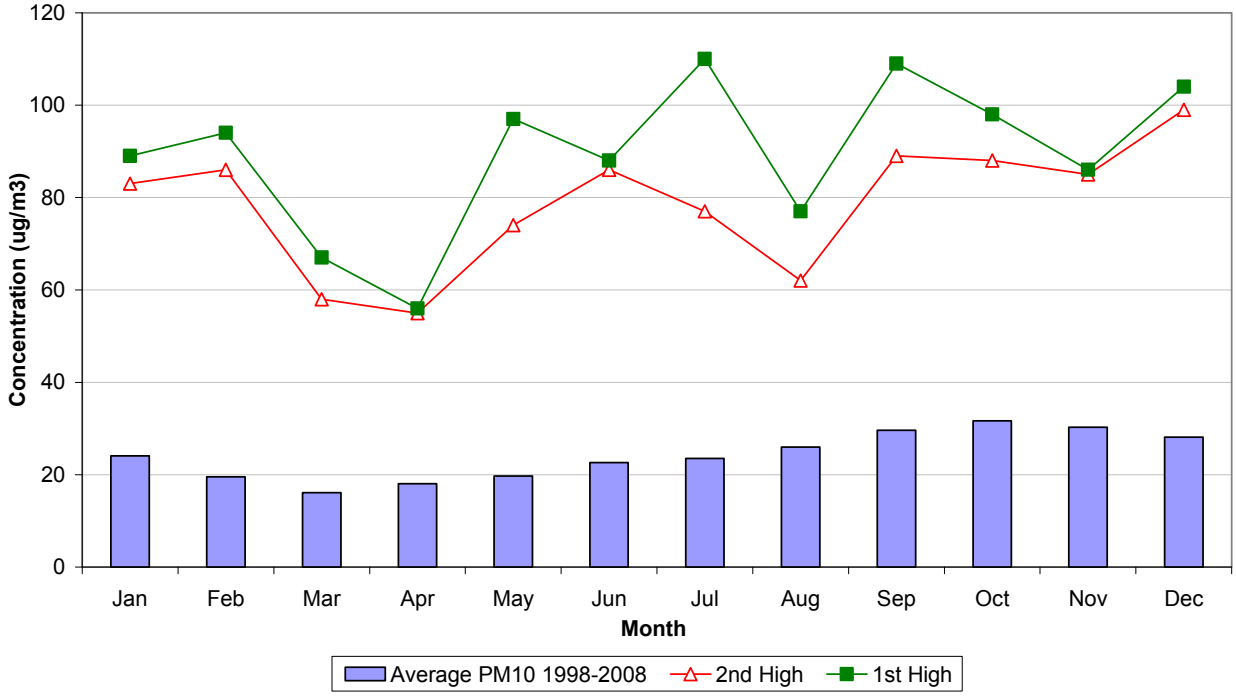
Atmospheric Stability and Dispersion. Vertical air movement is important in the dispersion of air pollutants. A temperature inversion acts as a nearly impenetrable lid to the vertical mixing of the atmosphere and inhibits the dilution of pollution near the ground. Inversions occur with great frequency throughout the year in the Sacramento Valley, and when they are accompanied by low wind speeds in the winter, pollution concentration levels can escalate.

Temperature. Sacramento temperatures can reach a high of 115 degrees Fahrenheit during the summer, and can experience low readings of 18-20 degrees during winter months. Low temperatures in the presence of increased humidity are conducive to the formation of secondary particulates. In addition, as winter temperatures drop, more residents are likely to utilize wood combustion devices such as fireplaces and woodstoves for residential heating, increasing PM_{10} levels. Although in November 2007, the District began to implement a program (Rule 421) for mandatory episodic wood combustion curtailment on poor air quality days. Rule 421 has been shown to lower particulate matter during those poor air quality days.[5]

PM_{10} Air Quality Data. Figure 3.4 illustrates the monthly variation in average and peak PM_{10} concentrations monitored in Sacramento County for 1998-2008. Elevated concentrations generally occur in fall and winter timeframes, with lowest concentrations during spring. The peaks shown in months of May and September may occur due to occasions of high winds combined with agricultural burning and agricultural tilling activities. Peaks during winter months typically occur from increased secondary formation of particulates and more residential wood combustion. This seasonality analysis of PM_{10} FRM SSI data excluded the July 5, 1999 peak concentration of 141 $\mu g/m^3$ at the Del Paso Manor monitoring site since it was likely impacted by emissions from Fourth of July fireworks.

[5] "Report on Rule 421 – Mandatory Episodic Curtailment of Wood and Other Solid Fuel Burning Effectiveness," SMAQMD staff report package for May 28, 2009 Board of Directors meeting.

Figure 3.4: Monthly Average and Peak PM_{10} Concentration Values* for Sacramento County, 1998-2008



*PM_{10} FRM SSI 24-hour filter average concentration (µg/m^3)
Note: This seasonality analysis excluded the July 5, 1999 peak concentration of 141 µg/m^3 at the Del Paso Manor monitoring site since it was likely impacted by emissions from Fourth of July fireworks.

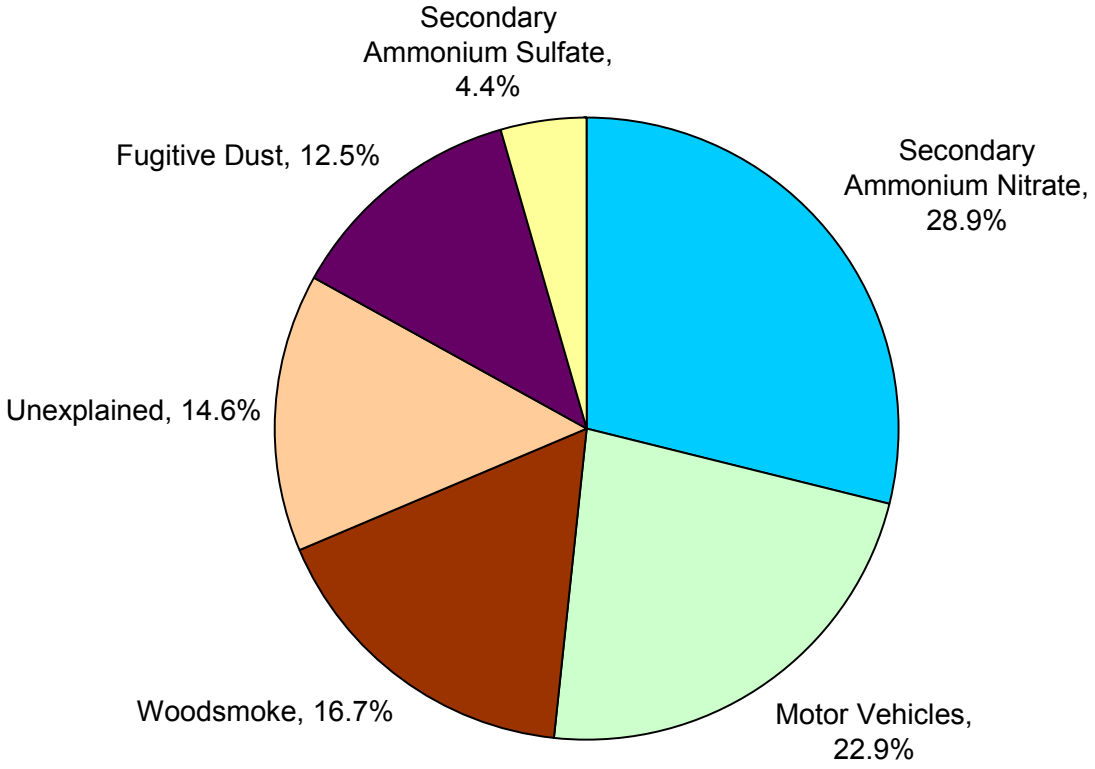
3.5 PM_{10} Speciation Analysis

In 1999, the California Air Resources Board submitted a technical paper on wintertime $PM_{2.5}$ and PM_{10} source apportionment for Sacramento, California (Motallebi, 1999). The Chemical Mass Balance (CMB) modeling calculated source contributions for ambient air quality samples (>40 µg/m^3) collected from November to January for 1991-1996. Results show that the main source types that contribute to the wintertime PM_{10} air quality problem in Sacramento were (1) secondary particles of ammonium nitrate [29%]; (2) motor vehicle exhaust (from cars, trucks, and buses fueled with diesel, leaded gasoline, and unleaded gasoline) [23%]; (3) wood smoke (from wood stoves, fire places, and agricultural burning) [17%]; and (4) fugitive dust (from tilling and roads) [12%].

Other sources that have contributed to a lesser extent were secondary particles of ammonium sulfate [4%] and traces of residual and crude oil combustion and marine-generated aerosols (suggesting coastal transport). Approximately 15% of the measured PM_{10} was not explained by the selected source types at the 13th and T Streets site.

Figure 3.5 is a pie chart of the average source contributions to wintertime PM_{10} 1991-1996 in Sacramento based on Chemical Mass Balance modeling for 24-hour PM_{10} samples greater than 40 µg/m^3.

Figure 3.5
Average CMB Source Estimates to 24-Hour PM_{10}
Sacramento 13th and T Street, Winter 1991-1996



Average PM_{10} mass = 51.5 µg/m^3

3.6 PM_{10} Air Quality Data Conclusions

PM_{10} air quality data includes solid and liquid particles with a diameter of 10 micrometers or less. EPA's health-based national ambient air quality standard for 24-hour PM_{10} is 150 µg/m^3 (measured as a daily concentration). There are currently six PM_{10} monitoring sites within Sacramento County.

EPA determined that the Sacramento PM_{10} nonattainment area attained the PM_{10} NAAQS as of December 31, 2000 since no exceedances of the 24-hour PM_{10} NAAQS were measured between 1998 and 2000. The air quality monitoring data shows an overall declining trend in peak 24-hour PM_{10} concentrations from 1989 to 2009. Data

collected since the 2000 attainment determination continues to show that Sacramento County meets the federal PM_{10} standard.

A PM_{10} seasonality analysis was conducted to evaluate whether the potential for high PM_{10} was an all year round problem or a more seasonal occurrence in Sacramento County. Elevated concentrations during 1998-2008 generally occur in fall and winter timeframes, with lowest concentrations during spring.

The Chemical Mass Balance (CMB) model was used to identify the source contributions for ambient air quality samples collected during November to January for 1991-1996. CMB results show that the main source types contributing to wintertime PM_{10} air quality in Sacramento were secondary ammonium nitrate particles, motor vehicles exhaust, wood smoke, and fugitive dust.

Historically in Sacramento County, violations of the 24-hour PM_{10} NAAQS have only occurred during late November and December. These peak concentrations typically occur due to wintertime weather conditions (e.g., atmospheric stability, low wind dispersion, and colder temperatures) conducive to PM_{10} pollutant build up in conjunction with increased secondary formation of particulates and more residential wood combustion activities.

3.7 References

Motallebi, Nehzat. *Wintertime $PM_{2.5}$ and PM_{10} Source Apportionment at Sacramento California*. Air and Waste Management Association 1999: 25-34.

U.S. Code of Federal Regulations, Title 40, Appendix K to Part 50, referenced November 17, 2009.

USEPA. *Designation of Areas for Air Quality Planning Purposes*, Federal Register, Volume 58, December 21, 1993, p. 67334.

4. EMISSIONS INVENTORY

4.1 Introduction to Emissions Inventory

An emissions inventory is an account of pollutant emissions that estimates the amount of air pollutants emitted from many sources. It is a starting point used in air quality modeling and attainment demonstrations.

Although it is impractical to directly measure and compile emissions from a multitude of sources on a continuous basis, surveys and sampling may be used to increase understanding. For example, actual emission measurements are taken on a subset of devices to determine an average emission rate, source tests at stationary emission sources provide a snapshot of emission rates that are then be applied over time, and field measurements of fugitive dust emissions taken at area sources (such as construction sites) are used to determine an average emission rate under a variety of conditions.

Emission factors, representative values that relate the quantity of emitted pollutants to an associated activity, may be developed by using the methods mentioned above, and are used to determine the total emissions. These factors are multiplied by activity and control factors to estimate emissions from sources.

For this emissions inventory, 2008 is the base year, the year from which the inventory is projected forward and backward. This baseline year is the year from which rate of progress calculations, control measure development, and other calculations are based.

More detailed information and emissions inventory tables are provided in Appendix A – Emissions Inventory.

4.2 Emissions Inventory Requirements

Emissions are updated as part of the overall requirement for “plan revisions to include a comprehensive, accurate, current inventory of actual emissions from all sources of the relevant pollutants” under sections 172(c)(3) and 182(a)(1) of the Clean Air Act.

4.3 Precursors to PM_{10}

This maintenance plan includes an emissions inventory for total primary PM_{10} and NO_X as a PM_{10} precursor. An analysis of inventories from the California Air Resources Board (CEFS Version 1.06 Sacramento Metropolitan AQMD, Rf#980) along with Chemical Mass Balance (CMB) modeling analysis (Motallebi, 1999) indicate that emissions of sulfur oxides (SO_X) from Sacramento County sources are an insignificant contributor to secondary particulate formation. Adjusting for the past decrease in SO_X emissions, current ambient ammonium sulfate concentrations are estimated to be about 1 $\mu g/m^3$. Therefore, SO_X emissions are not included in this chapter.

4.4 Emissions Inventory Source Categories

Due to the large number and wide variety of emission processes and sources, a hierarchical system of emission inventory categories was developed for more efficient use of the data. The anthropogenic (man-made) emissions inventory is divided into four broad categories: stationary sources, area-wide sources, on-road mobile sources, and other mobile sources. Each of these major categories is subdivided into more descriptive subcategory sources. Each of these subcategories is further defined into more specific emission processes.

4.4.1 Stationary Sources

The stationary source category of the emissions inventory includes non-mobile, fixed sources of air pollution. They are mainly comprised of individual, industrial, manufacturing, and commercial facilities called "point sources." The more descriptive subcategories include fuel combustion (e.g. electric utilities), waste disposal (e.g. landfills), petroleum production and marketing, and industrial processes (e.g. mineral). Industrial facility operators reported the process and emissions data used to calculate emissions from point sources.

4.4.2 Area-Wide Sources

The area-wide sources inventory category includes aggregated emissions data from processes that are individually small and widespread or not well-defined point sources. The area-wide subcategories include residential fuel combustion, farming operations, construction and demolition activities, and road dust. Emissions from these sources are calculated from fuel usage, product sales, population, employment data, and other parameters for a wide range of activities that generate air pollution across Sacramento County. More detailed information on the area-wide source category emissions can be found on the CARB website:
http://www.arb.ca.gov/ei/areasrc/areameth.htm.

4.4.3 On-Road Motor Vehicles

The on-road motor vehicles inventory category consists of trucks, automobiles, buses, and motorcycles. EMFAC, the California model for on-road motor vehicle emissions, has undergone significant revision since the EMFAC2002 model (version 2.2). As discussed below, this analysis relies on updated model parameters.

Improved Motor Vehicle Emissions Model, EMFAC2007

The California Air Resources Board has continued to update and improve its EMFAC on-road motor vehicle emissions model with extensive new data. CARB's EMFAC2007

model (version 2.3) was released November 2006. The most significant improvements in EMFAC2007 include:

- Revised vehicle fleet information based on California Department of Motor Vehicles registration records specific to each county, which reflect the growth in vehicle populations and the increasing average age of the fleet;
- Current base year and forecast year VMTs and speed distributions from regional transportation and metropolitan planning organizations;
- Redistribution of heavy-duty diesel truck populations based on VMT;
- Enhanced emission rate data for heavy-duty diesel trucks that include the results of testing larger sample sizes and recent model years; and
- New temperature and relative humidity profiles better representing the meteorological conditions corresponding to air pollution problems.

EMFAC software and detailed information on the vehicle emission model can be found on the CARB website: http://www.arb.ca.gov/msei/onroad/on-road.htm.

Vehicle Activity Data

On-road motor vehicle emission estimates for this plan were developed using the latest available transportation data and California's new EMFAC2007 model[6]. The current and forecasted vehicle miles traveled (VMT) are from SACOG-supplied activity data (submitted to CARB July 2010)[7] based on transportation modeling prepared for the Sacramento region's August 2009 MTIP analysis.

4.4.4 Other Mobile Sources

The emission inventory category for other mobile sources includes aircraft, trains, boats, and off-road vehicles and equipment used for construction, farming, commercial, industrial, and recreational activities. The OFFROAD2007 model was released November 2006 by CARB and used to calculate the air pollution emissions from off-road vehicles and equipment. In general, emissions are calculated based on estimated equipment population, engine size and load, usage activity, and emissions factors.

Aircraft, boat, and train emissions are estimated outside the OFFROAD model. More detailed information on the OFFROAD 2007 mobile emissions model can be found on the CARB website: http://www.arb.ba.gov/msei/offroad/offroad.htm

[6] ARB conducted off model runs to incorporate SACOG's regional travel demand model forecasts prepared for the August 2009 MTIP analysis that were not included in the released EMFAC2007 model (version 2.3).
[7] SACOG (Griesenbeck) e-mail transmitting travel data to CARB (Wade) and SMAQMD (Anderson) on July 12, 2010.

4.5 Base Year Emissions and Forecasts

4.5.1 Anthropogenic Emissions Tables by Source Category

In Sacramento County, violations of the 24-hour PM_{10} NAAQS have only occurred during late November and December. These peak concentrations typically occur due to wintertime weather conditions (e.g., atmospheric stability, low wind dispersion, and colder temperatures) conducive to PM_{10} pollutant build up in conjunction with increased secondary formation of particulates and more residential wood combustion activities. Therefore, emissions inventories for PM_{10} and NO_X are compiled for an average winter day. Emissions of volatile organic compounds (VOC) and sulfur oxides (SO_X) are considered to be insignificant contributors to the formation of PM_{10} in Sacramento County, based on previous CMB analyses (see page 3-11).

The following tables (Table 4.1 and 4.2) show the anthropogenic emissions inventory of PM_{10} and NO_X by source categories for Sacramento County. The emissions inventory is shown for average winter day in units of tons per day. Inventories were obtained from the California Air Resources Board (CARB) on September 3, 2010 for the years 2008, 2012, and 2022.[8]

[8] CARB (Ruiz) e-mail transmitting emissions inventory data for the Sacramento PM_{10} Maintenance Plan to SMAQMD (Tollstrup) on September 3, 2010.

Table 4.1
PM_{10} Emissions (tons per day)
Sacramento County

AVERAGE WINTER DAY INVENTORY	2008	2012	2022
TOTAL EMISSIONS	**35**	**35**	**36**
STATIONARY	1	1	2
AREAWIDE	30	30	31
ON-ROAD MOTOR VEHICLES	2	2	2
OTHER MOBILE	1	1	1
STATIONARY			
Fuel Combustion	0.5	0.5	0.6
Industrial Processes	1.0	0.9	1.1
AREAWIDE			
Residential Fuel Combustion	9.9	9.2	10.2
Farming Operations	2.4	2.3	2.1
Construction and Demolition	7.0	7.2	7.8
Paved Road Dust	6.1	6.2	6.4
Unpaved Road Dust	3.6	3.6	3.6
Other	1.2	1.3	1.4
ON-ROAD MOTOR VEHICLES	2.2	2.1	2.1
OTHER MOBILE			
Aircraft	0.1	0.1	0.1
Trains	0.1	0.1	0.1
Boats	0.1	0.1	0.1
Equipment (Off-Road/Farm)	1.1	1.0	0.4

Data Source: CARB (Ruiz) e-mail transmitting emissions inventory data for the Sacramento PM_{10} Maintenance Plan to SMAQMD (Tollstrup) on September 3, 2010.

Table 4.2
NO_X Emissions (tons per day)
Sacramento County

AVERAGE WINTER DAY INVENTORY	2008	2012	2022
TOTAL EMISSIONS	**82**	**67**	**42**
STATIONARY	4	4	4
AREAWIDE	4	4	4
ON-ROAD MOTOR VEHICLES	50	38	18
OTHER MOBILE	24	21	15
STATIONARY			
Fuel Combustion	3.9	4.0	4.2
Industrial Processes	0.1	0.1	0.1
AREAWIDE			
Residential Fuel Combustion	4.4	4.3	4.4
Managed Burning and Disposal	0.1	0.1	0.1
ON-ROAD MOTOR VEHICLES	49.6	37.6	18.1
OTHER MOBILE			
Aircraft	2.0	2.3	3.0
Trains	3.4	3.3	3.6
Boats	0.5	0.5	0.5
Off-Road Equipment	16.0	13.6	7.6
Farm Equipment	1.8	1.4	0.6

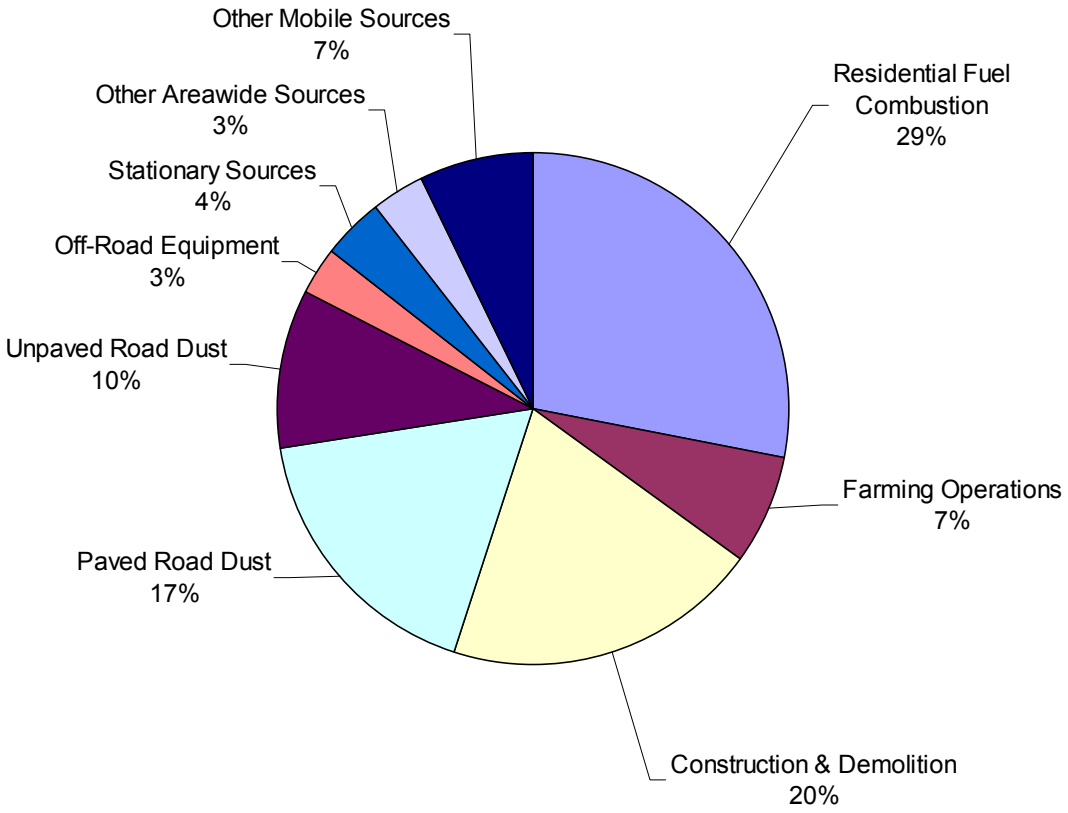
Data Source: CARB (Ruiz) e-mail transmitting emissions inventory data for the Sacramento PM_{10} Maintenance Plan to SMAQMD (Tollstrup) on September 3, 2010.

4.5.2 2008 Base Year Emissions Distribution

The following pie chart (Figure 4.1) shows the 2008 PM_{10} emission inventory categories as a percentage of the total inventory for Sacramento County. In 2008, the PM_{10} inventory was mainly comprised of area-wide sources – Paved Road Dust, Residential Fuel Combustion, and Construction & Demolition.

Figure 4.1
2008 PM_{10} Emissions Distribution
Sacramento County

35 Tons Per Day (avg. winter day)



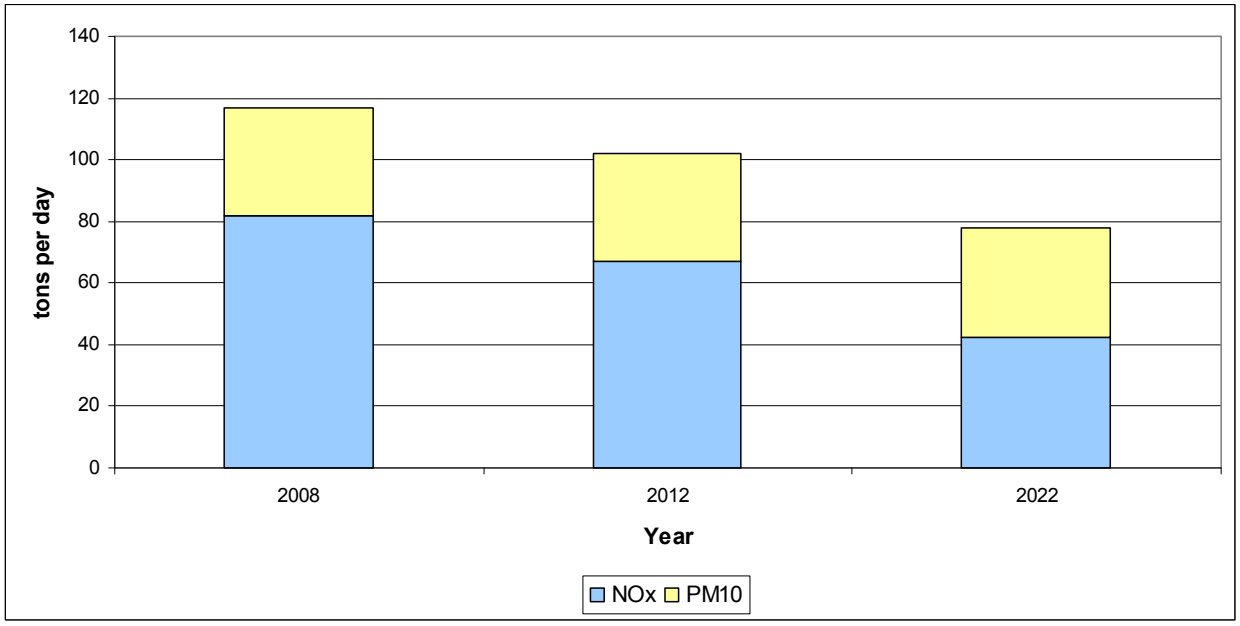
Data Source: CARB (Ruiz) e-mail transmitting emissions inventory data for the Sacramento PM_{10} Maintenance Plan to SMAQMD (Tollstrup) on September 3, 2010.

The main contribution of NO_X emissions comes from on-road motor vehicles and then other mobile sources. In 2008, on-road motor vehicles accounted for about 60% of the NO_X inventory, and other mobile sources contributed almost 30%.

4.6 Analysis of Emissions Inventory Forecasts

Figure 4.2, shows that between 2008 and 2022, combined values of PM_{10} and NO_X emissions are expected to steadily decline from 117 tons per day down to 78 tons per day, for a 33% decrease.

Figure 4.2
PM_{10} & NO_X Emissions and Forecasts
Sacramento County



Data Source: CARB (Ruiz) e-mail transmitting emissions inventory data for the Sacramento PM_{10} Maintenance Plan to SMAQMD (Tollstrup) on September 3, 2010 for average winter day.

An examination of the inventory forecast indicates that the three largest categories of primary PM_{10} will continue to be paved road dust, residential fuel combustion, and construction & demolition. Table 4.3 shows that between 2008 and 2022, these sub-categories of primary PM_{10} are expected to increase.

Table 4.3
Major Categories of PM_{10} Expected Increase
Sacramento County for 2008-2022

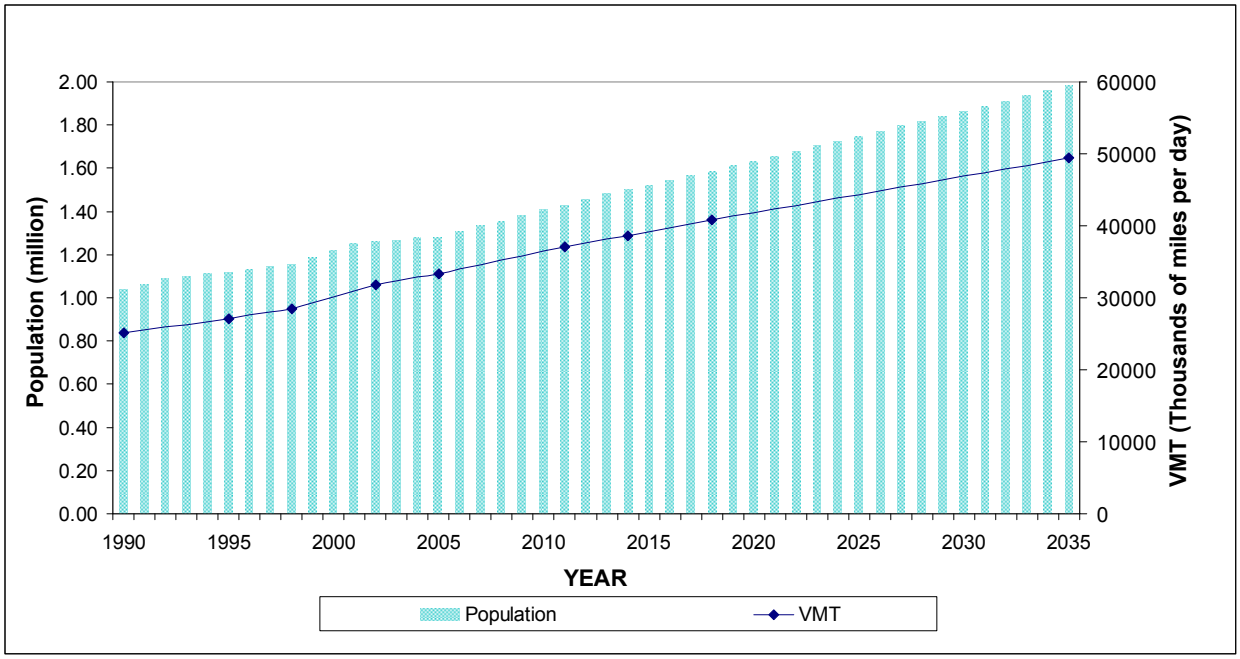
PM_{10} Inventory Category	Paved Road Dust		Residential Fuel Combustion		Construction & Demolition	
Tons Per Day	2008	2022	2008	2022	2008	2022
	6.12	6.35	9.91	10.24	7.01	7.76
Percent Increase	4%		3%		11%	

The increase in paved road dust is forecasted to correlate to the increase in centerline road miles. The increase in residential fuel combustion PM_{10} is estimated by assumptions on population growth and the effectiveness of residential wood burning control measures. The PM_{10} emissions increase from construction & demolition activities is related to the expected growth in population and economic development.

The NO_X emissions inventory forecast indicates a steady decline due to emission controls, despite expected increases in population and vehicle miles traveled (VMT). Between 2008 and 2022, NO_X emissions from on-road motor vehicles are estimated to emit 50 tons per day down to 18 tons per day, for a 64% decrease. Other mobile source NO_X emissions decline from 24 tons per day down to 15 tons per day, for a 37% decrease.

Figure 4.3 illustrates trends in population and VMT. Between 2008 and 2022, population and VMT in Sacramento County are expected to increase by 24% and 21%, respectively.

Figure 4.3
Population and Vehicle Miles Traveled (VMT) Forecasts
Sacramento County (1990-2035)



Data sources:

1. SACOG household population forecasts are from SACOG's Tina Glover 7-3-08 email. Data are derived from the December 2007 SACSIM travel model. http://www.arb.ca.gov/app/emsinv/trends/ems_trends_results.php
2. 2005 to 2035 VMT data are based on SACSIM regional travel demand model forecasts for SACOG's August 2009 MTIP analysis (submittal to CARB, June 2010). Pre-2005 VMT data are from CARB EMFAC2007 model runs (version 2.3).
3. Yearly values not given in either SACOG report are interpolated.

4.7 General Conformity and Airport Emissions Inventory

General conformity is the federal regulatory process for preventing major federal actions[9] or projects from interfering with air quality planning goals. Conformity provisions ensure that federal funding and approval are given only to those activities and projects that are consistent with state air quality implementation plans (SIPs). Conformity with the SIP means that major federal actions will not cause new air quality violations, worsen existing violations, or delay timely attainment of the national ambient air quality standards (NAAQS).

Current federal rules require that federal agencies use the emissions inventory from an approved SIP's attainment or maintenance demonstration to support a conformity determination. The emissions inventory in this PM_{10} implementation/maintenance plan may be used for general conformity purposes. A specific inventory for airport emissions is provided for the potential general conformity analysis of future airport expansions.

Sacramento County has prepared a master plan for future growth in airport activities that shows an increase in emissions. The Sacramento County Airport System is comprised of four airports: Sacramento International (SMF), Mather (MHR), Executive (SAC), and Franklin (F32). In addition, the County Airport System manages the aviation activities at McClellan Airport on behalf of another County agency. Three private airports also operate in Sacramento County: Rancho Murieta, Rio Linda, and Sunset.[10]

To facilitate future conformity determinations, the emissions from growth in airport activities are estimated for 2012 and 2022. The PM_{10} and NO_X airport emissions forecasts associated with aircraft operations and ground support equipment in Sacramento County are provided in Table 4.4. This table reflects elementary mathematical rounding convention to nearest tenths, for example 0.25 or greater is 0.3 and 0.24 or less is 0.2. Numbers less than 0.05 are rounded up to 0.1 to avoid the erroneous impression that the emissions are zero.

[9] Federal actions are defined as any activity engaged in by a department, agency, or instrumentality of the Federal government, or any activity that they support, fund, license, permit, or approve, other than activities related to transportation plans, programs, and projects that are applicable to transportation conformity requirements. (40 CFR 93.152)

[10] Information from Sacramento County Airport System; comment letter dated October 24, 2008.

Table 4.4
Airport (Aircraft Operations + Ground Support Equipment) Emissions[a]
for Sacramento County Only

Year	Operations	PM_{10} (tons/day)	NO_X (tons/day)
2012	Aircraft Operations Only	0.1	2.3
	Ground Support Equipment	0.1	0.3
2022	Aircraft Operations Only	~~0.2~~ 0.1	3.0
	Ground Support Equipment	0.1	0.2

[a] Data Source: CARB CEFS Version 1.06 Sacramento Metropolitan AQMD (Rf#980), February 28, 2007, for average winter day.

4.8 Emission Reduction Credits

Certain pollutant emission reductions due to equipment shutdown or voluntary control may be converted to emission reduction credits (ERCs) and registered with the Air District. These ERCs may then be used as "offsets" to compensate for an increase in emissions from a new or modified major emission source regulated by the Air District. In the SMAQMD, ERCs may also be used as an alternative to strict compliance with specified rules. Thus, if a permitted source cannot meet the applicable emission standard requirements, usually because it is technically infeasible or not cost effective, the source may lease or purchase ERCs to achieve the required reductions.

Since ERCs represent potential emissions, they need to be taken into account in the emission inventories. One method is to assume that the use of ERCs will already be included within the projected rate of stationary source growth in the emissions inventory. However, if the use of available ERCs exceeds anticipated emissions growth, future emissions could be underestimated. Therefore, to ensure that the use of ERCs will not be inconsistent with the future PM_{10} maintenance goals, the amount of ERCs issued for reductions that occurred prior to the 2008 base year are added to the emission inventory forecasts in the maintenance demonstration.

Pre-2008 Emission Reduction Credits

For this PM_{10} maintenance plan, the amounts of unused banked ERCs of emissions reductions that occurred prior to the 2008 baseline year in Sacramento County are listed in Table 4.5. The ERCs consist of emissions reduced from stationary sources and military aircraft. Including these ERCs here simply maintains the validity of previously banked ERCs and other reductions.

Future Bankable Rice Burning Emission Reduction Credits

California legislation[11] in 1991 (known as the Connelly bill) required rice farmers to phase down rice field burning on an annual basis, beginning in 1992. A burn cap of 125,000 acres in the Sacramento Valley Air Basin was established, and growers with 400 acres or less were granted the option to burn their entire acreage once every four years. Since the rice burning reductions were mandated by state law, they would ordinarily not be "surplus" and eligible for banking. However, the Connelly bill included a special provision declaring that the reductions qualified for banking if they met the State and local banking rules.

Reductions in rice burning may be banked in the future under an ERC rule[12] currently in development. The total amounts of potential bankable rice burning ERCs in Sacramento County are summarized in Table 4.5.

Available Wood Stove/Fireplace Change Out Incentive Program Emission Reduction Credits

The Wood Stove/Fireplace Change Out Incentive Program was established in June 2006 to provide financial incentives to remove or replace existing fireplaces and dirty wood stoves. About half of the emission reductions from this program will be available for the ERC bank. These potential ERCs from the Wood Stove/Fireplace Change Out Incentive Program are summarized in Table 4.5.

Summary of Emission Reduction Credits

ERCs issued for reductions that occurred prior to the 2008 base year and potential future bankable ERCs from rice burning and Wood Stove/Fireplace Change Out Incentive Program are summarized for Sacramento County in Table 4.5. These ERCs are in tons per day for average winter day and will be included in the PM_{10} maintenance demonstration.

[11] Connelly-Areias-Chandler Rice Straw Burning Reduction Act of 1991, section 41865 of California Health and Safety Code.
[12] This rice burning ERC rule must be approved by EPA into the SIP for the rice ERCs to be used for compliance with federal air quality requirements.

Table 4.5
Emission Reduction Credits Added to the Maintenance Demonstration
Sacramento County

Emissions in tons/day (avg. winter day)	PM_{10}	NO_X	SO_X
Pre-2008 Emission Reduction Credits	0.081	1.469	0.222
Future Bankable Rice Burning Emission Reduction Credits	0.109	0.090	0.019
Wood Stove/Fireplace Change Out Incentive Program	0.067	0.004	0.001
Total ERCs	**0.257**	**1.563**	**0.242**
Total ERCs (rounded up)	**0.3**	**1.6**	**0.3**

4.9 Emissions Inventory Documentation

More detailed tables of the PM_{10} and NO_X emissions inventory are provided in Appendix A. This appendix contains the estimated 2008, 2012, and 2022 emissions inventory for Sacramento County.

Emission inventories are constantly being updated to incorporate new and better information and methodologies. Detailed information on emission methodologies, changes and forecasts can be found on CARB websites: http://www.arb.ca.gov/ei/ei.htm and http://www.arb.ca.gov/msei/msei.htm

4.10 Emissions Inventory Conclusions

The emissions inventory is an account of pollutant emissions that estimates the amount of air pollutants emitted from many sources. This maintenance plan includes an emissions inventory for total primary PM_{10} and NO_X as a PM_{10} precursor. 2008 is the base year, the year from which the inventory is projected forward. An examination of the emissions inventory indicates that the three largest categories of primary PM_{10} are the area-wide sources for paved road dust, residential fuel combustion, and construction & demolition, while mobile source categories contribute over 85% of the NO_X emissions inventory. Between 2008 and 2022, total PM_{10} emissions are expected to increase 2-3% and NO_X emissions are expected to steadily decrease by 48%, despite increasing vehicle miles traveled and population in Sacramento County. The combined inventory of PM_{10} and NO_X precursors is projected to decline about 33%.

4.11 References

Motallebi, Nehzat. *Wintertime $PM_{2.5}$ and PM_{10} Source Apportionment at Sacramento California*. Air and Waste Management Association 1999: 25-34.

5. CONTROL MEASURES

5.1 Introduction to Control Measures

This chapter briefly describes the control measure requirements and identifies the appropriate control measures that enabled Sacramento County to attain the PM_{10} NAAQS and also provide for maintenance of the standard. The control strategy includes a combination of actions taken by local, state, and federal agencies to reduce PM_{10} and applicable PM_{10} precursor emissions from various source categories. Control measures are developed and adopted into regulatory rules and programs, which are then implemented, monitored, and enforced. No new control measure commitments are included in this plan since the existing control strategy is predicted to maintain the PM_{10} NAAQS throughout the future 10-year maintenance period.

5.2 Control Measure Requirements

Sections 172(c)(1) and 189(a)(1)(C) of the Clean Air Act require that PM_{10} nonattainment area plans include provisions to ensure that reasonably available control measures (RACM) are implemented, including, at a minimum, the adoption of reasonably available control technology (RACT). Section 189(e) of the Clean Air Act requires control requirements that apply to major stationary sources of PM_{10} also apply to major stationary sources of PM_{10} precursor pollutants.

However, the RACM and RACT requirements make certain allowances. EPA will allow rejection of any of the RACM, provided it can be shown that emissions from the sources affected do not contribute significantly to PM_{10} levels which exceed the NAAQS (Calcagni, 1991, p.7). Also, a SIP can commit to less than all the available measures when attainment and RFP requirements have been adequately and appropriately demonstrated or already achieved. Thus, where an area is already attaining the standard, no additional RACM measures are required (71 FR 27444).

EPA provided a list of certain RACM measures in the General Preamble to Title I of the Clean Air Act that were suggested for incorporation into a PM_{10} SIP (57 FR 13498). These EPA-established RACM for PM_{10} control strategies include:

1. Fugitive dust control measures,
2. Residential wood combustion control measures, and
3. Prescribed burning control measures.

5.3 RACM/RACT Evaluation

Since EPA determined that Sacramento County already attained the PM_{10} NAAQS, RACM requirements are suspended under EPA's Clean Data Policy. Therefore, no additional RACM measures are required. Rules previously adopted prior to the

nonattainment designation period and control measures that were implemented afterwards and brought the nonattainment area into attainment are identified.

Fugitive Dust Control Measures

Fugitive dust is particulate matter suspended in the air either by mechanical disturbance of the surface material or by wind action blowing across the surface. RACM for fugitive dust primarily focuses on stabilizing the particulate on the road surface, or eliminating the particulate. Several RACM measures have already been adopted in the past, and are currently being enforced in the Sacramento area. An example is the California Vehicle Code (23114) which requires that haul trucks cover their load or maintain adequate freeboard. This plan does not include any fugitive dust control measures above those already in place. The SMAQMD proposes to evaluate additional RACM PM_{10} measures as potential contingency plan measures.

The following District measures were previously implemented to reduce fugitive dust emissions:

Rule Number and Topic	Date Initially Adopted
• Rule 401 Ringelmann Chart/Opacity	8-3-77
• Rule 403 Fugitive Dust	8-3-77
• Rule 404 Particulate Matter	3-11-70
• Rule 405 Dust and Condensed Fumes	8-1-62

Residential Wood Combustion Control Measures

Incomplete combustion in residential wood stoves and fireplaces can lead to elevated PM_{10} concentrations. The residential wood combustion control measures are intended to reduce emissions from existing stoves and fireplaces through inspections, education, shifting to cleaner fuels, voluntary or mandatory curtailment of burning during meteorological conditions which trap particulates (such as stagnant air and inversions), and limit the future growth of wood combustion emissions. The highest recorded PM_{10} levels in the county have occurred during the winter months when stagnation and inversions were evident.

The following District measures were implemented to reduce residential wood combustion emissions. These measures were adopted after attaining the federal PM_{10} standard and will help in maintaining the standard.

- The Wood Stove/Fireplace Change Out Incentive Program was established in June 2006 to provide financial incentives to remove or replace existing fireplaces and dirty wood stoves.

- Rule 417, Wood Burning Appliances, was approved by the Board of Directors on October 26, 2006 to prohibit installing new fireplaces and dirty wood burning devices.
- Rule 421, Mandatory Episodic Curtailment of Wood and Other Solid Fuel Burning, was adopted on October 25, 2007 to restrict wood burning on forecasted high $PM_{2.5}$ days during November through February. It was amended on September 24, 2009 to tighten the forecast thresholds for burning restrictions. Emission reductions from Rule 421 were included in the emission inventory projections used in the maintenance demonstration.
- The Spare The Air public education program has incorporated ambient $PM_{2.5}$ air pollution awareness and AQI forecasting during November through February.

Prescribed Burning Control Measures

EPA suggests that a prescribed burning program include the following elements:

- smoke dispersion evaluation
- burn planning, authorization, and administration
- requirements to ensure burner qualifications
- public education and awareness
- surveillance and enforcement
- emissions inventories and emission efforts
- state oversight

The existing District Rule 501 – Agricultural Burning (initially adopted September 13, 1971) is equivalent to these specifications and meets the RACM requirements for prescribed burning. In addition, Sacramento County is included in the Sacramento Valley Air Basin Smoke Management Program[13] which ensures that agricultural burning is prohibited on days meteorologically conducive to potentially elevated PM_{10} concentrations.

Other Burning Control Measures

The following District measures were previously implemented to reduce burning emissions:

Rule Number and Topic	Date Initially Adopted
• Rule 407 Open Burn	3-11-70
• Rule 408 Incinerator Burning	3-11-70
• Rule 409 Orchard Heaters	5-15-72

[13] Specifics can be found in the "Smoke Management Guidelines for Agricultural and Prescribed Burning," CARB, May 14, 2001. Title 17 California Code of Regulations, Subchapter Z, Section 80100 et. seq. <http://www.arb.ca.gov/smp/regs/RevFinRegwTOC.pdf>

Sulfur Dioxide Control Measures

The following District measures were previously implemented to reduce sulfur dioxide emissions:

Rule Number and Topic	Date Initially Adopted
• Rule 406 Specific Contaminants	3-11-70
• Rule 420 Sulfur Content of Fuels	8-3-77

RACT Measures

Reasonably available control technology (RACT) is the lowest emission limitation that a particular source is capable of meeting by the application of control technology that is "reasonably available" considering technological and economic feasibility. RACT applies to existing stationary sources, and EPA recommends that major stationary sources be the minimum starting point for RACT analysis (Calcagni, 1991). Generally, it is recommended that RACT be applied to existing sources in the nonattainment area that are reasonable to control, based on the attainment needs of the area.

SMAQMD's various fugitive dust and combustion restriction rules have been applied to major stationary sources within Sacramento County to reduce PM_{10} emissions and meet RACT requirements. However, PM_{10} emissions from existing stationary sources only add up to less than 2% of the total emissions inventory of PM_{10} and NO_X.

In addition to RACT for major PM_{10} stationary sources, CAA Section 189(e) suggests that moderate PM_{10} nonattainment areas apply RACT for major stationary sources of PM_{10} precursors, unless EPA determines such sources do not contribute significantly to PM_{10} exceedance levels (Calcagni, 1991). The District has applied RACT rules to existing NO_X sources. The NO_X RACT evaluations of reduction measures were completed to satisfy ozone nonattainment mandates (SMAQMD, 2006) (SMAQMD, 2008). The evaluation/demonstration satisfies the RACT requirements for PM_{10} required due to the secondary formation of atmospheric ammonium nitrates, which are a significant component of PM_{10} concentrations in the Sacramento area.

The following District control measures to reduce NO_X emissions from existing stationary sources were implemented:

- Rule 411 – NO_X from Boilers, Process Heaters, and Steam Generators (initially adopted 2-2-95)
- Rule 412 – Stationary Internal Combustion Engines at Major Stationary Sources of NO_X (initially adopted 6-1-95)
- Rule 413 – Stationary Gas Turbines (initially adopted 4-6-95)
- Rule 414 – Natural Gas Fired Water Heaters (initially adopted 8-1-96)

State Control Measures

Several emission reduction programs have been implemented by the California Air Resources Board (CARB) to reduce directly emitted particulates and secondary PM precursor pollutants (NO_X and SO_X). These measures primarily address cleaner fuel specifications for diesel and reformulated gasoline, and mobile source engine emission standards that CARB has implemented statewide.

5.4 New Source Review Program

Sections 172(c)(5) and 189(a)(1)(A) of the Clean Air Act require the SIP to include provisions for a new source review (NSR) program to require permits for the construction and operation of new or modified major stationary sources anywhere in the nonattainment area, in accordance with Section 173, Permit Requirements. The term major stationary sources for a PM_{10} "moderate" nonattainment classification means any stationary source which directly emits, or has the potential to emit, 100 tons per year or more of PM_{10}. NSR requirements also apply to major stationary sources of PM_{10} precursors. The proposed sources are required to comply with the lowest achievable emission rate.

The District's New Source Review Rule (Rule 202) requires that all new or modified sources of PM_{10}, nitrogen oxides, sulfur oxides, or reactive organic compounds apply best available control technology (BACT) to control those emissions. Rule 202 requirements meet or are more stringent than those required for a moderate nonattainment area and therefore satisfy the Clean Air Act's NSR permit program requirement. The Calcagni memo states that, "the Part D new source review program will be replaced by the prevention of significant deterioration (PSD) program once the area has been redesignated" (Calcagni, 1992). Rule 203 – Prevention of Significant Deterioration will be implemented after EPA redesignates Sacramento County to attainment.

5.5 Control Measures Conclusions

The SMAQMD has adopted and implemented a number of PM control measures to reduce emissions from fugitive dust, wood burning devices, and agricultural burning. In addition, the SMAQMD has applied RACT rules to existing PM_{10} and NO_X sources, which will directly reduce fugitive dust, combustion particulates, and the secondary formation of atmospheric ammonium nitrates, a significant component of PM_{10} concentrations in the Sacramento area. Several emission reduction programs have also been implemented by the California Air Resources Board (CARB) to reduce directly emitted particulates and secondary PM precursor pollutants (NO_X and SO_X) from mobile sources. These measures primarily address cleaner fuel specifications for diesel and reformulated gasoline, and mobile source engine emission standards that CARB has implemented statewide. No new control measure commitments are included in this plan

since the existing control strategy is predicted to maintain the PM_{10} NAAQS throughout the future 10-year maintenance period.

5.6 References

Calcagni, John. *PM-10 Moderate Area SIP Guidance: Final Staff Work Product*, Air Quality Management Division, EPA, April 2, 1991.

Calcagni, John. *Procedures for Processing Requests to Redesignate Areas to Attainment*, Air Quality Management Division, EPA, September 4, 1992, p. 6.

SMAQMD. *Analysis of Reasonably Available Control Technology for the 8-Hour Ozone State Implementation Plan (RACT SIP) Staff Report*, September 26, 2006.

SMAQMD. *Updated Analysis of Reasonably Available Control Technology for the 8-Hour Ozone State Implementation Plan (Updated RACT SIP) Staff Report*, September 22, 2008.

USEPA. *General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990*, *Appendix C*, Federal Register, Volume 57, April 16, 1992, p. 13498. (http://www.epa.gov/ttn/oarpg/t1pfpr.html)

USEPA. *Approval and Promulgation of Air Quality Implementation Plans; West Virginia; Redesignation of the City of Weirton PM-10 Nonattainment Area to Attainment and Approval of the Maintenance Plan*, Federal Register, Volume 71, May 11, 2006, p. 27440-27447.

6. MAINTENANCE DEMONSTRATION

6.1 Introduction to Maintenance Demonstration

The maintenance demonstration is a key element in a SIP maintenance plan that shows future compliance of the national ambient air quality standard (NAAQS) will continue to be achieved. This chapter describes the basic requirements for a maintenance demonstration, provides a maintenance demonstration analysis, and discusses methods for implementing verification and tracking procedures.

6.2 Maintenance Demonstration Requirements

Section 175A of the Clean Air Act (CAA) contains planning requirements pertaining to the general framework of a maintenance plan. These requirements include a maintenance demonstration to provide for maintenance of the NAAQS for at least 10 years after redesignation is approved by EPA (not 10 years after submittal of a redesignation request). Therefore, the maintenance planning period also must factor in time necessary for EPA review and approval action on the redesignation request. Section 107(d)(3)(D) allows EPA up to 18 months from receipt of a complete submittal to process a redesignation request. Since this maintenance plan and redesignation request are being submitted simultaneously in 2010, the maintenance planning years are from 2012 to 2022.

Section 175A also specifies that the maintenance plan shall contain such additional measures, if any, as may be necessary to ensure such maintenance. In 1992, EPA issued additional discussion, clarification and guidance on requirements for redesignation requests and maintenance plans (Calcagni, 1992). This Calcagni memorandum included the following additional provisions needed for a maintenance demonstration plan:

- Maintenance demonstration of the NAAQS either by showing that future emissions will not exceed the attainment level or by modeling to show future emissions will not cause a violation of the standard.
- Verification of continued attainment through operation of an appropriate air quality monitoring network.
- Tracking the progress of the maintenance demonstration by a periodic review or update of the factors and assumptions used in the maintenance demonstration.

6.3 Maintenance Demonstration Analysis

The maintenance demonstration must show that the future mix of sources and emission rates, when combined with implemented control strategies during the 10-year maintenance planning period, will not cause any violations of the NAAQS. The method used for the maintenance demonstration is performed by proportional rollback modeling to show that future emissions will not cause a violation of the 24-hour PM_{10} NAAQS

(150 µg/m^3). The premise of proportional rollback is that the change in individual pollution sources are directly proportional to the change in associated ambient concentrations due to that individual source as determined by receptor modeling using the Chemical Mass Balance (CMB) model.

Four steps were taken to demonstrate maintenance of the 24-hour PM_{10} NAAQS.

Step 1: PM_{10} and Precursor Emissions Source Inventories

Table 6.1 contains the emissions source inventories for PM_{10} and secondary PM_{10} precursor pollutants for 1995, 2008, 2012, and 2022. Emission reduction credits (described in Section 4.8) are added to the 2012 and 2022 emission forecasts to ensure their use will not be inconsistent with the PM_{10} maintenance demonstration.

The additional increase in 1.0 ton per day of PM_{10} to Paved Road Dust and 0.5 ton per day of PM_{10} to Road Construction Dust in the 2022 transportation budgets are accounted for in the maintenance demonstration emission forecasts for Fugitive Dust PM_{10}. The additional increase in the 2008, 2012, and 2022 NO_X and PM_{10} transportation budgets due to rounding up to the nearest ton are also accounted for in the maintenance demonstration emission forecasts for Total NO_X and Fugitive Dust PM_{10}.

The PM_{10} and precursor emissions source inventory categories are assumed to directly impact the matching CMB ambient PM_{10} speciation categories for projection purposes in Step 2. For example, as shown in the following table, Total NO_X emissions are matched to CMB ambient Ammonium Nitrate concentrations.

Category No.	Emissions Source Category	CMB Ambient Source Category
1.	Total NO_X	Ammonium Nitrate
2.	Mobile Sources PM_{10} (all on-road and off-road mobile sources)	Motor Vehicles PM_{10}
3.	Wood Burning PM_{10} (residential fuel combustion, fires, waste burning and disposal)	Wood Smoke PM_{10}
4.	Fugitive Dust PM_{10} (mineral processes, farming operations, construction and demolition, paved road dust, unpaved road dust, and fugitive windblown dust)	Fugitive Dust PM_{10}
5.	Total SO_X	Ammonium Sulfate
6.	Total PM_{10} (all direct PM_{10} emission source categories)	Unidentified Other

Table 6.1
PM_{10} and Precursor Emissions Source Inventories
Sacramento County

	Emissions (tons/day, winter average)			
Emissions Source Category	**1995***	**2008**	**2012**	**2022**
1. Total NO_X + 1.6 tpd ERCs	118.2	82.1	67.7 + 1.6	43.1 + 1.6
2. Mobile Sources PM_{10}	3.6	3.6	3.3	2.8
3. Wood Burning PM_{10}**	10.2	10.2	9.5	10.5
4. Fugitive Dust PM_{10}	17.8	20.2	20.4	22.8
5. Total SO_X*** + 0.3 tpd ERCs	2.2	0.6	0.7 + 0.3	0.7 + 0.3
6. Total PM_{10} + 0.3 tpd ERCs	33.0	35.2	34.5 + 0.3	35.9 + 0.3

*1995 source emissions are listed since 1991-1996 ambient monitoring data used for CMB modeling analysis.

**Reflects mandatory episodic wood burning restrictions (SMAQMD Rule 421) implemented Nov 2007.

***SO_X emissions obtained from CARB CEFS Version 1.06 winter average inventory.

Step 2: Ambient PM_{10} Speciation Concentrations

CMB receptor modeling results for 1991-1996 wintertime (Nov-Jan) ambient 24-hour PM_{10} samples (>40 $\mu g/m^3$) were used to derive an average speciation profile to represent high value 1995 PM_{10} winter concentrations. However, the 1995 ambient PM_{10} speciation profile may have changed over time due to emission source inventory changes and may no longer reflect current ambient data. Therefore, the 1995 ambient PM_{10} speciation concentrations are forecasted to 2008 by applying the ratio of associated emissions source category changes listed in Step 1.

Table 6.2 contains the 1995 CMB analysis concentration profile and the projected speciation adjustments to 2008. The percent adjustment is assumed linear at 1 to 1, except ammonium nitrate concentrations are assumed to change 0.7% for every 1% change in NO_X emissions, based on evaluation of San Joaquin Valley Air Pollution Control District modeling results from their 2007 PM_{10} Maintenance Plan (SJVAPCD, 2007).

Table 6.2
Ambient PM_{10} Speciation Concentrations
Sacramento County

PM_{10} CMB Source Category	1995 CMB* Analysis ($\mu g/m^3$)	1995 (% Total)	2008 Projection Factor	2008 Conc. ($\mu g/m^3$)	2008 (% Total)
1. Ammonium Nitrate	14.9	28.9%	0.786	11.7	24.4%
2. Motor Vehicles	11.8	22.9%	0.996	11.7	24.5%
3. Wood Smoke	8.6	16.6%	0.997	8.5	17.8%
4. Fugitive Dust	6.4	12.4%	1.135	7.3	15.1%
5. Ammonium Sulfate	2.3	4.4%	0.277	0.6	1.3%
6. Unidentified Other	7.6	14.7%	1.065	8.1	16.9%
Total PM_{10}	51.5	100.0%		48.0	100.0%

*Average CMB speciation analysis of 1991-1996 wintertime (Nov-Jan) ambient 24-hour PM_{10} samples >40 ($\mu g/m^3$) for 13th and T St. site assumed to represent 1995.

Step 3: Speciated 2008 Base Peak PM_{10} Concentrations

2008 base peak 24-hour PM_{10} concentrations are derived by applying the % total speciation categories to the recent peak PM_{10} monitored value of 109 $\mu g/m^3$ (shown in Table 6.3). The 109 $\mu g/m^3$ represents the 2008 design (high) value for 24-hour PM_{10} concentrations monitored during 2006-2008 in Sacramento County.

The PM_{10} monitoring data used to determine the design value concentrations are from the FRM filter based high-volume samplers. TEOM data samples were not used for this analysis due to potential inaccuracies during the winter time when there is wood combustion.[14]

Step 4: Predicted Future Peak 24-Hour PM_{10} from 2008 Base Peak

Predicted peak 24-hour PM_{10} concentrations for 2012 and 2022 in Table 6.3 are estimated by using applicable emissions forecast changes (with ERCs) to project 2008 base peak PM_{10} concentrations. The reduction in source contributions from motor vehicles and nitrates in future years is due to the existing emissions control strategies that have already been accounted for in the emissions forecast inventories. Increases in future wood smoke, fugitive dust, and sulfate concentrations can be attributed to population growth, the construction of more roads, and increasing fuel combustion. The unidentified other PM_{10} concentrations are forecasted using the change in total PM_{10} since their associated emission source categories are not known.

[14] The SMAQMD older model TEOM monitors contain a heater for reducing moisture, which can remove volatile compounds from ambient air samples, such as those in wood smoke.

Table 6.3
Predicted Peak PM_{10} from "2008" Base Peak
Sacramento County

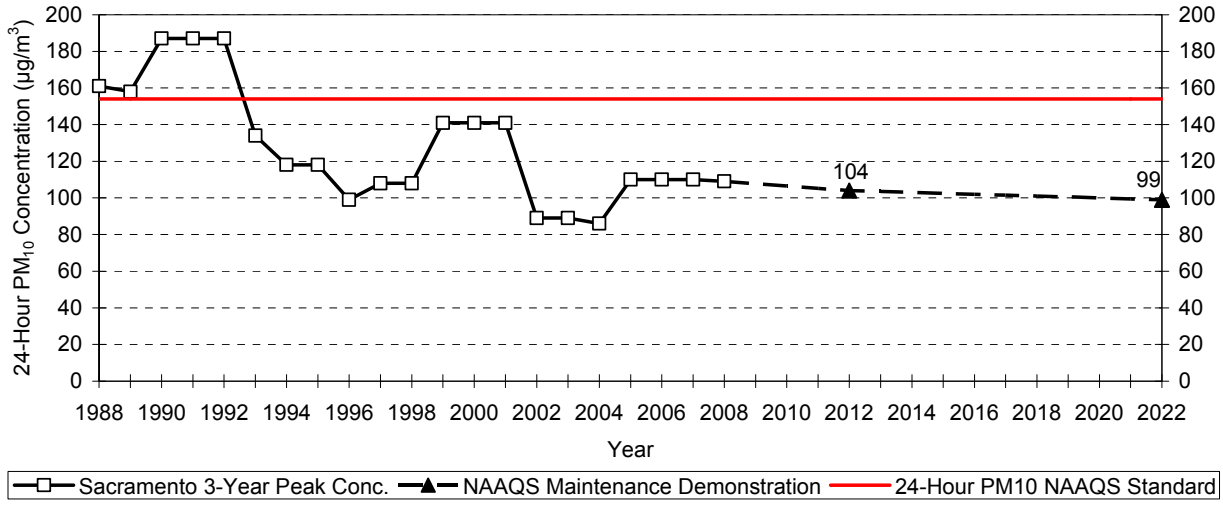
	2008	2008 Peak Conc.	2012 Projection	2012 Peak Conc.	2022 Projection	2022 Peak Conc.
PM_{10} CMB Source Category	**(% Total)**	**(µg/m^3)**	**Factor**	**(µg/m^3)**	**Factor**	**(µg/m^3)**
1. Ammonium Nitrate	24.4%	26.6	0.891	23.7	0.681	18.1
2. Motor Vehicles	24.5%	26.7	0.932	24.9	0.775	20.7
3. Wood Smoke	17.8%	19.4	0.931	18.1	1.032	20.0
4. Fugitive Dust	15.1%	16.5	1.010	16.7	1.129	18.6
5. Ammonium Sulfate	1.3%	1.4	1.532	2.2	1.677	2.4
6. Unidentified Other	16.9%	18.4	0.991	18.2	1.028	18.9
Total PM_{10}	100.0%	**109***		**104**		**99**

*109 µg/m^3 was peak monitored value from 2006-2008 in Sacramento County (T Street, 2006)

6.4 Results of Maintenance Demonstration

Overall peak 24-hour PM_{10} concentrations are forecasted to decline in Sacramento County. Figure 6.1 shows historical 3-year peak 24-hour PM_{10} concentrations from 1988-2008 and the predicted peak during the 10-year maintenance period, 2012-2022. The peak 24-hour PM_{10} concentration is predicted to be 104 µg/m^3 at the start of the maintenance period in 2012 and 99 µg/m^3 at the end of the maintenance period in 2022. Therefore, 10-year maintenance of the 24-hour PM_{10} NAAQS (150 µg/m^3) is demonstrated through 2022, due to declining NO_X and motor vehicle exhaust emissions, despite increasing fugitive dust and wood smoke emissions.

Figure 6.1
3-Year Peak* 24-Hour PM_{10} Concentration Trend and
NAAQS 10-Year Maintenance Demonstration for Sacramento County



*For example: 3-year maximum for 2008 is the peak concentration of 109 µg/m^3
Data Source: Ambient PM10 monitoring data from FRM high volume samplers with size selective inlet.

6.5 Future Monitoring Network

EPA guidance states that once an area has been redesignated, the area should continue to operate an appropriate air quality monitoring network, in accordance with 40 CFR Part 58, to verify the attainment status of the area (Calcagni, 1992). The maintenance plan should contain provisions for continued operation of air quality monitors that will provide such verification.

As mentioned in Chapter 3 of this report, there are two types of PM_{10} monitors currently used throughout the monitoring network: 1) the Federal Reference Method (FRM) filter based high-volume sampler (hi-vols), 2) the Federal Equivalent Method (FEM) Tapered Element Oscillating Microbalance (TEOM), which measures PM_{10} on a continuous 24-hour basis. The schedule for PM_{10} sample collection is one in six days for the filter based high-volume samplers. There are currently six PM_{10} monitoring sites within Sacramento County.

The SMAQMD will assure the on-going quality of the measured data by performing the operational procedures for data collection, including routine calibrations, pre-run and post-run test procedures, and routine service checks. An annual review of the entire air quality monitoring network is required by federal regulations as a means to determine if the network is effectively meeting the objectives of the monitoring program. If relocation or a closure is recommended in the annual network review, reports are submitted to EPA and ARB to document compliance with siting criteria. The data collection procedures already in place, in conjunction with the annual review program, will ensure

that the future PM_{10} ambient monitoring network in Sacramento County meets or exceeds the minimum monitoring requirements and that ambient PM_{10} concentrations are monitored appropriately to verify the attainment status of the area.

6.6 Verification and Tracking the Maintenance Demonstration

EPA guidance states that the maintenance plan submittal should indicate how the progress of the maintenance plan will be tracked. “This is necessary due to the fact that the emission projections made for the maintenance demonstration depend on assumptions of point and area source growth” (Calcagni, 1992). Options for tracking the progress of the maintenance demonstration would be to periodically (typically every 3 years) review and update the emissions inventory, if needed, and reevaluate the assumptions and inputs used in the demonstration. In any event, the indicators for triggering contingency measures (specified in Chapter 7) should be monitored as well.

The SMAQMD will review the assumptions and data for the PM_{10} maintenance demonstration in 2015 and 2018 to fulfill the verification and tracking requirements. The SMAQMD will also continue to operate an appropriate PM_{10} ambient monitoring network in Sacramento County to track maintenance of the PM_{10} standard and monitor the indicator for triggering the maintenance contingency plan.

In addition, two years prior to the end of the maintenance planning period, Clean Air Act (CAA Section 175A) requirements specify that a subsequent maintenance plan is required. This second plan must provide for maintenance of the NAAQS for 10 more years after expiration of the first 10-year maintenance period. Therefore, the SMAQMD will prepare and submit another maintenance plan in 2020 to demonstrate maintenance of the PM_{10} standard through 2032.

6.7 References

Calcagni, John. *Procedures for Processing Requests to Redesignate Areas to Attainment*. Air Quality Management Division, EPA, September 4, 1992, p. 11-12.

SJVAPCD. *2007 PM_{10} Maintenance Plan and Request for Redesignation*, *Appendix F. Modeling Analysis*. September 20, 2007, p. 60-98.

7. MAINTENANCE CONTINGENCY PLAN

7.1 Introduction to Contingency Plan

A contingency plan provides for future actions and additional measures to implement if needed to mitigate any unexpected increases in emissions and ambient air quality concentrations to ensure specific targets and goals are achieved to maintain the applicable NAAQS. This chapter mentions the federal requirements for a PM_{10} maintenance contingency plan and discusses the proposed SMAQMD contingency plan to fulfill these requirements.

7.2 Contingency Plan Requirements

Section 175A (d) of the Clean Air Act requires a maintenance plan to:

- Include contingency provisions, as necessary, to promptly correct any violation of the standard that occurs after redesignation of the area to attainment.
- Provide a contingency provision to implement all control measures contained in the nonattainment SIP for the area before redesignation to attainment.

EPA guidance further states that fully adopted contingency measures that will take effect without further action are not required in order for the maintenance plan to be approved (Calcagni, 1992). However, the contingency plan is considered to be an enforceable part of the SIP and should ensure that the contingency measures are adopted expediently once they are triggered. The plan should clearly identify the measures to be adopted, a schedule and procedure for adoption and implementation, and a specific time limit for action. It is also necessary for the contingency plan to identify specific indicators or triggers which will be used to determine when the contingency measures need to be implemented. EPA will review the maintenance contingency plan on a case-by-case basis.

In addition, Section 175A (d) of the Clean Air Act specifies that the failure of any area, which has been redesignated as an attainment area, to maintain the national ambient air quality standard concerned shall not result in a requirement for a SIP revision unless EPA, in its discretion, requires such submittal.

7.3 Maintenance Contingency Plan

The contribution of sources to the PM_{10} problem can vary at different seasons of the year under a variety of different meteorological conditions. Therefore, the SMAQMD is proposing a contingency strategy to evaluate applicable PM_{10} events that trigger the contingency plan and take appropriate action to ensure continued maintenance of the PM_{10} NAAQS. It is recommended that the SMAQMD implement the contingency plan during the maintenance period if a PM_{10} monitor should violate the 24-hour PM_{10} NAAQS (150 $\mu g/m^3$) not due to natural or exceptional events.

After verification of a monitoring violation of the PM_{10} NAAQS, which includes sufficient time for sample weighing and processing, the following major steps are envisioned for the contingency plan process:

1. First, the SMAQMD will examine the event and determine if it needs to be classified as a natural or exceptional event in accordance with EPA requirements. If the data qualify for flagging, the SMAQMD would proceed with preparing and submitting the necessary documentation for a natural or exceptional event, as required by EPA's "Treatment of Data Influenced by Exceptional Events" Rule (72 CFR 13560). The flagged data would not be considered to trigger the maintenance contingency plan.

2. Second, if the event does not qualify as a natural or exceptional event, the SMAQMD would then analyze the event to determine its possible causes. Any applicable emission reductions from already adopted rules that have not yet been implemented would be evaluated to determine if these new emission reductions would be sufficient to prevent future PM_{10} exceedances. These already adopted controls could include CARB and District $PM_{2.5}$ and NO_X measures to address ozone and $PM_{2.5}$ SIP requirements. In addition, the District would evaluate applicable reasonably available control measures (RACM) that could potentially provide the corrective action needed. This evaluation step will take no more than 18 months.

3. Third, if the additional emission reductions from already adopted rules are insufficient, the SMAQMD would proceed with selecting specific RACM measures for adoption and implementation that would be applicable to addressing the seasonal PM_{10} problem. The contingency provision to implement all control measures contained in the nonattainment SIP for the area before redesignation to attainment does not apply since there were no additional SIP measures proposed beyond existing measures. This adoption and implementation step will take no more than 12 months.

Details of the potential rules would be developed at that time. The rule development and adoption process would be subject to individual and specific public review and a separate Board of Directors public hearing.

7.4 Contingency Plan Conclusions

The proposed contingency plan is expected to ensure prompt correction of any violation of the PM_{10} NAAQS that occurs after redesignation and provide continued maintenance of the standard. The plan identifies a specific indicator or trigger to determine when the contingency requirements are activated for evaluating, selecting, developing, and adopting the most appropriate contingency measures in an expedient timeframe. A suggested list of reasonably available control measures is in Appendix B, which may provide cost-effective, particulate matter emissions reduction benefits.

7.5 References

Calcagni, John. *Procedures for Processing Requests to Redesignate Areas to Attainment*, Air Quality Management Division, EPA, September 4, 1992.

USEPA, *Treatment of Data Influenced by Exceptional Events*, Federal Register, Volume 72, March 22, 2007, p. 13560-13581.

8. TRANSPORTATION CONFORMITY BUDGETS

8.1 Introduction to Transportation Conformity

Transportation conformity is the federal regulatory procedure for linking and coordinating the transportation and air quality planning processes. Under the 1990 Clean Air Act Amendments, federal agencies may not approve or fund transportation plans and projects unless they are consistent with state air quality implementation plans (SIPs). Conformity with the SIP requires that transportation activities (1) not cause or contribute new air quality violations, (2) increase the frequency or severity of any existing violation, or (3) delay timely attainment of National Ambient Air Quality Standards (NAAQS). The quantification and comparison of on-road motor vehicles emissions is one of the elements for determining transportation conformity between air quality and transportation planning.

This chapter provides a summary of principal transportation conformity requirements and proposed motor vehicles emissions budgets (MVEB) for PM_{10} and for NO_X, which is a significant PM_{10} precursor forming ammonium nitrate particulates.

8.2 Transportation Conformity Requirements

The CAA Section 176 states that no federal department engage in, support in any way or provide financial assistance for or license or approve any activity that does not conform to the State Implementation Plan (SIP). To implement this requirement, EPA established the Transportation Conformity Rule (40 CFR §93). This Rule:

- Establishes criteria and procedures for determining whether long range metropolitan transportation plans (MTPs), short range metropolitan transportation improvement programs (MTIPs), and projects conform to the SIP.
- Ensures that transportation plans and projects are consistent with the applicable SIP, such that associated transportation emissions are less than or equal to motor vehicle emissions budgets established for demonstrating reasonable further progress, attainment or maintenance of health-based air quality standards.
- Ensures that transportation plans, programs, and other individual projects do not cause new air quality violations, exacerbate existing ones, or delay attainment of air quality standards.

8.3 Latest Planning Assumptions

Sacramento County had rapid growth in population, number of households, number of dwelling units, and jobs in the last two decades and these trends are expected to continue. Forecasting of these factors is important in establishing the MVEB. Sacramento Area Council of Governments (SACOG) adopted population, dwelling units and employment forecasts in September 2007. These are applied to vehicle miles traveled (VMT) forecasting. The current and forecasted VMT estimates are from

SACOG-supplied activity data which are from the SACSIM regional travel demand model prepared for the August 2009 Metropolitan Transportation Improvement Program (MTIP) analysis (SACOG, 2010). The 2009 MTIP is based on transportation projects included in the SACOG Metropolitan Transportation Plan for 2035 (MTP2035).

8.4 SACOG's MTP2035

Over the past several years, the Sacramento region has embarked on a process of defining and implementing a new, higher density, land use pattern which reduces congestion, encroachment on open space, average vehicle miles traveled per household and air pollutants. The program, called Blueprint, was initiated by SACOG with the goal of reducing traffic congestion in future metropolitan transportation plans.

In December 2004, Blueprint smart growth principles and a 2050 growth scenario were approved by SACOG (SACOG, 2004) to achieve the following objectives:

1. Provide a variety of transportation choices
2. Offer housing choices
3. Take advantage of compact development
4. Use existing assets
5. Increase mixed land use
6. Encourage natural resource conservation
7. Ensure distinctive, attractive communities with quality design

The region then began the more detailed planning efforts for the long range MTP2035. SACOG works with local jurisdictions, California Department of Transportation (CalTrans), and transportation and planning agencies to define interim land use allocations and specific transportation project needs. Federal MTP guidelines require that the land use allocations represent what is most likely to be built. Therefore, the specific Blueprint smart growth policies affect land use allocations only to the extent that the local jurisdictions and SACOG are able to demonstrate that the policies will actually be implemented. The MTP2035 was adopted by the SACOG Board on March 20, 2008 (SACOG, 2008).

SACOG's Transportation Model

The transportation analysis for the 2009 MTIP and MTP2035 relied on the latest planning assumptions and SACOG's new regional travel demand forecasting model, SACSIM (Bradley et al, 2007). The SACSIM model was used to estimate future traffic volumes and public transit ridership in the 6-county Sacramento region. SACSIM incorporates an "activity-based" travel model which simulates the population of households allocated to parcels and creates a one-day activity and trip travel schedule for each person in the population.

The activity and travel schedule are sensitive to transportation network accessibility and a variety of demographic and land use variables. SACSIM also incorporates a mode choice (i.e. bus, car, bike, walking, etc) model which determines how each travel destination is reached.

The network traffic assignment models load the trips onto the network, resulting in vehicle miles traveled at four time intervals (AM peak, midday, PM peak, and evening/early morning) and speed within each time period. To develop the travel forecasting, information on the characteristics and constraints of the transportation system and residents' travel survey data were collected. The SACSIM travel outputs were compared to actual base year data to be able to demonstrate adequate model performance results.

SACOG used the SACSIM travel demand model to forecast average weekday travel patterns for several future years, based on given assumptions about expected future population and employment projections (SACOG, 2007), land use allocations, and transportation system improvements and changes contained in the MTP2035. The results of the travel model predicted that growth in vehicle trips and growth in vehicle miles traveled will be slightly lower than the population growth rate for the Sacramento region through 2035.

8.5 Proposed Motor Vehicle Emission Budgets

To reflect the updated motor vehicle emission forecasts, the PM_{10} Implementation/Maintenance Plan and Redesignation Request for Sacramento County include transportation conformity budgets for 2008, 2012 and 2022. These years are selected because 2008 is the emission inventory base year, the beginning of the maintenance period is 2012, and the end of the 10 year maintenance period is 2022. The proposed transportation budgets listed in Table 8.1, incorporate:

1) The recent on-road motor vehicle emission inventory factors of EMFAC2007,[15]
2) Updated travel activity data from SACOG's August 2009 MTIP analysis, based on the SACSIM (Sacramento Activity-Based Travel Demand Simulation Model) transportation modeling system (SACOG, 2010), and
3) Latest regional and state control strategies.

The PM_{10} Motor Vehicle Emissions Budget for conformity purposes includes regional re-entrained dust from travel on paved roads, vehicular exhaust, travel on unpaved roads, and road construction. Transportation Conformity Rule (40 CFR Part 93, §93.122(e)(2)) requires that PM_{10} from construction-related fugitive dust be included in the regional PM_{10} emissions analysis if it is identified as a contributor to the nonattainment problem in a PM_{10} implementation plan.

[15] CARB's EMFAC2007 model (version 2.3) was released November 2006.

In addition to PM_{10}, Transportation Conformity Rule (40 CFR Part 93, §93.102(b)(2)(iii)) identifies volatile organic compounds (VOC) and oxides of nitrogen (NO_X) as PM_{10} precursor pollutants that must also have a motor vehicle emissions budget if deemed a significant contributor to the PM_{10} nonattainment problem. The CMB modeling analysis in Chapter 6 indicates that the secondary formation of ammonium nitrate from NO_X emissions contributes a significant amount to the wintertime ambient PM_{10} concentration.

An additional 1.5 tons per day of PM_{10} were added to the 2022 PM_{10} budgets in order to account for potential emission increases in Paved Road Dust (1.0 ton per day) and Road Construction Dust (0.5 ton per day) beyond 2022. This additional increase may be needed for SACOG to make a transportation conformity determination for a horizon year of 2035 or later for transportation planning purposes when using the latest year of motor vehicle emissions budgets (2022) in this maintenance plan. Transportation Conformity Rule (40 CFR Part 93, §93.124(a) allows an implementation plan to explicitly increase the motor vehicle emissions budgets for available use by the Metropolitan Planning Organization (MPO) and the Department of Transportation (DOT) for conformity purposes as long as emissions will be lower than needed to provide for continued maintenance.

The additional increase in 1.0 ton per day of PM_{10} to Paved Road Dust and 0.5 ton per day of PM_{10} to Road Construction Dust in the 2022 transportation budgets are accounted for in the maintenance demonstration emission forecasts for Fugitive Dust PM_{10} in Chapter 6. The additional increase in the 2008, 2012, and 2022 NO_X and PM_{10} transportation budgets due to rounding up to the nearest ton are also accounted for in the maintenance demonstration emission forecasts for Total NO_X and Fugitive Dust PM_{10}.

The proposed motor vehicle budgets for NO_X and PM_{10} average winter day emissions in Table 8.1 are for the Sacramento County which is the nonattainment area for federal PM_{10} standards.

Table 8.1: Motor Vehicle Emissions Budgets for Maintenance of PM_{10} NAAQS

Sacramento County	**2008**		**2012**		**2022**	
	NO_X	**PM_{10}**	**NO_X**	**PM_{10}**	**NO_X**	**PM_{10}**
Direct Exhaust (includes tire and brake wear for PM_{10})	49.6	2.2	37.6	2.1	18.1	2.1
Paved Road Dust	---	6.1	---	6.2	---	6.4 + 1.0
Unpaved Road Dust	---	3.6	---	3.6	---	3.6
Road Construction Dust	---	2.7	---	2.8	---	2.8 + 0.5
Total (rounded up to nearest ton)	**50**	**15**	**38**	**15**	**19**	**17**

8.6 Impact of New Emission Budgets

Currently, Sacramento County has no established PM_{10} budgets. The Metropolitan Planning Organization, SACOG, uses "build vs no build" test to determine transportation conformity for the region's transportation plans and programs for PM_{10}. If the proposed MVEBs are determined to be adequate by EPA, future transportation plans will need to conform to these motor vehicle emissions budgets in any future transportation plan amendment and updates. SACOG must ensure that the aggregate wintertime transportation emissions in Sacramento County (including, but not limited to, vehicle emissions, dust from paved and unpaved roads and road construction), rounded up to the nearest integer, do not exceed these levels when approving new metropolitan transportation plans and transportation improvement programs, even if the mix of projects changes or growth increases. Following EPA action, these new NO_X and PM_{10} MVEBs will remain in effect until other budgets are found adequate or approved by EPA.

8.7 References

Bradley, M.A., Bowman J.L. and Griesenbeck B. *Development and application of the SACSIM activity-based model system.* Berkeley, CA [2007.]

SACOG. *Examples from the Sacramento Region of the seven principles of smart growth: Better Ways to Grow.* Sacramento, CA: Sacramento Area Council of Governments, Sacramento, CA [2004.] Web. January 7, 2010. <http://www.sacog.org/regionalfunding/betterways.pdf>

SACOG. *SACOG Board of Directors approved 2013 and 2018 housing and employment allocations based on July 2007 California Department of Finance projections*. Sacramento, CA [2007.]

SACOG. *Sacramento Region Metropolitan Transportation Plan for 2035*, Sacramento Area Council of Governments. Sacramento, CA [2008.]

SACOG. *Sacramento County travel data for PM_{10} plan*, Griesenbeck e-mail to Anderson, SMAQMD, July 12, 2010, Sacramento Area Council of Governments [2010].

SMAQMD. *Sacramento Regional 8-Hour Ozone Attainment And Reasonable Further Progress Plan (with errata sheets incorporated).* Sacramento, CA: Sacramento Metropolitan Air Quality Management District, Sacramento, CA [2009.]

USEPA. *Transportation Conformity Rule Amendment To Implement Provisions Contained in the 2005 Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU),* Federal Register, Volume 73, January 24, 2008, p. 4420.

9. REDESIGNATION REQUEST

9.1 Introduction to Redesignation and Redesignation Requirements

The Sacramento Metropolitan Air Quality Management District is requesting that the Environmental Protection Agency (EPA) redesignate Sacramento County to attainment status for the PM_{10} National Ambient Air Quality Standards (NAAQS). The Air District has met the criteria for the EPA Administrator to promulgate redesignation as outlined in the Federal Clean Air Act (CAA) Section 107(d)(3)(E).

The EPA Administrator may not promulgate a redesignation of a nonattainment area (or portion thereof) to attainment unless —

- the Administrator determines that the area has attained the national ambient air quality standard;
- the Administrator has fully approved the applicable implementation plan for the area under Section 110 (k);
- the Administrator determines that the improvement in air quality is due to permanent and enforceable reductions in emissions resulting from implementation of the applicable implementation plan and applicable Federal air pollutant control regulations and other permanent and enforceable reductions;
- the Administrator has fully approved a maintenance plan for the area as meeting the requirements of Section 175A; and
- the State containing such area has met all requirements applicable to the area under Section 110 and Part D.

The following Table 9.1 includes the compliance statements for each of the redesignation criteria.

Table 9.1
Compliance with CAA Section 107(d)(3)(E) Criteria
for Redesignation to Attainment for PM_{10} NAAQS

Criterion	Compliance
Attainment of the PM_{10} NAAQS	USEPA found the Sacramento County to be in attainment of the PM_{10} NAAQS (67 FR 7082). 24-hour PM_{10} attainment demonstrated for last 3 years (2007-2009) in Table 9.2.
State Implementation Plan (SIP) Approval under CAA Section 110(k)	PM_{10} Implementation Plan elements are submitted in this Plan and are discussed in Sections 2.5 to 2.7. Chapter 3 describes the PM_{10} air quality monitoring network. Chapter 4 documents the emissions inventory. Chapter 5 discusses the control measures responsible for attainment and the SMAQMD new source review stationary source permit program.
Permanent and Enforceable Improvement in Air Quality	Section 9.2.3 in this Plan demonstrates that Sacramento County's improvement in PM_{10} air quality was due to permanent and enforceable emissions reductions achieved through Air District and CARB rules and regulations that will remain in effect after redesignation to attainment. Long term trends show emissions decreased and air quality improved in spite of growth in population and vehicle miles traveled.
Fully Approved Maintenance Plan	In accordance with EPA Guidance (Calcagni, 1992), the PM_{10} Maintenance Plan is submitted in this Plan with the request for redesignation. Chapter 4 includes the emission inventories, documenting a base year and forecast inventories for the maintenance period. Chapter 6 includes the maintenance demonstration analysis and a commitment to an appropriate future monitoring network, and verification and tracking of the maintenance demonstration. Chapter 7 describes the maintenance contingency plan.
CAA Section 110 and Part D requirements	Contingent to the EPA approval of this PM_{10} Implementation/Maintenance Plan and the Motor Vehicle Emissions Budgets, this would satisfy the CAA Section 110 and Part D requirements.

9.2 Evaluation of Redesignation

9.2.1 Attainment of PM_{10} NAAQS

USEPA published a Proposed Rule on July 25, 2001 (66 FR 38603), and a Final Rule of Attainment Finding on February 15, 2002 (67 FR 7082) determining that the Sacramento County had attained the PM_{10} NAAQS. The Final Rule became effective on March 18, 2002. The Rule contained the Sacramento PM_{10} monitoring data which showed no measured exceedances of the 24-hour PM_{10} NAAQS between 1998 and

2000. The February 15, 2002 finding determined that the Sacramento County attained the 24-hour and annual PM_{10} standards by the attainment date of December 31, 2000. Data collected since the 2000 attainment determination continues to show that Sacramento County has not had any violations and meets the federal PM_{10} standard.

Table 9.2 contains a summary of FRM PM_{10} air quality data for the six Sacramento County monitoring sites for the last 3 years, 2007-2009. The highest 24-hour PM_{10} concentration over this 3-year period was 97 $\mu g/m^3$, recorded at the North Highlands monitoring site. The 2009 design value of 97 $\mu g/m^3$ is below the 24-hour PM_{10} NAAQS of 150 $\mu g/m^3$. Therefore, the number of expected exceedances per year from all monitoring sites in the area is less than 1.0, which demonstrates continued attainment of the standard.

Table 9.2
Summary of PM10 Air Quality Data – Sacramento County 2007-2009

Sacramento County Monitoring Site	Highest 24-Hour Concentration ($\mu g/m^3$)		
	2007	**2008**	**2009**
North Highlands – Blackfoot Way	56	**97**	33
Sacramento – Branch Center Road 2	56	89	76
Sacramento – Del Paso Manor	70	71	45
Sacramento – Goldenland Court		56	48
Sacramento – Health Dept Stockton Blvd	56	88	45
Sacramento – T Street	53	73	47

9.2.2 Fully Approved State Implementation Plan

The Air District is submitting the required PM_{10} Implementation Plan elements to meet the requirement. Contingent to the approval of this Plan, the Sacramento nonattainment area would satisfy the requirement of having a fully approved applicable implementation plan. There have been no previous disapprovals, or partial, conditional, or limited approvals of required elements of a PM10 Implementation Plan. Approval of the PM_{10} State Implementation Plan would allow EPA to proceed with the redesignation of Sacramento County as attainment for the PM_{10} NAAQS.

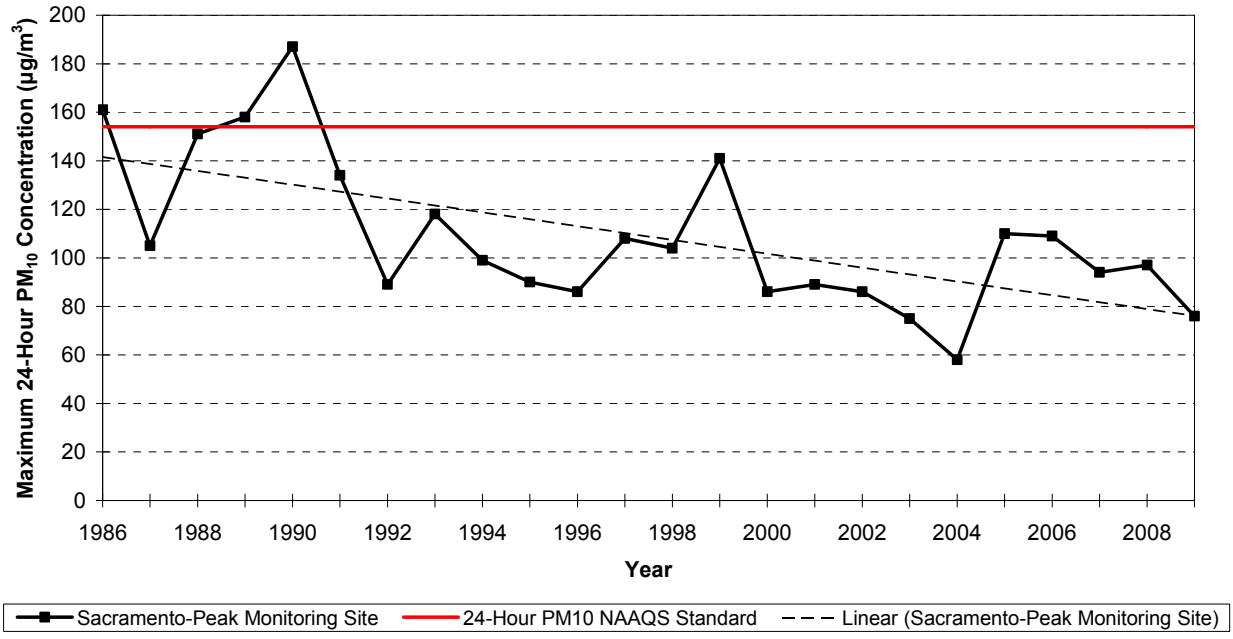
PM_{10} Implementation Plan elements are discussed in Sections 2.5 to 2.7. Chapter 3 describes the PM_{10} air quality monitoring network. Chapter 4 documents the emissions inventory. Chapter 5 discusses the control measures responsible for attainment and the SMAQMD new source review stationary source permit program.

9.2.3 Permanent and Enforceable Improvement in Air Quality

EPA redesignation guidance states that "the State must be able to reasonably attribute the improvement in air quality to emission reductions which are permanent and enforceable" (Calcagni, 1992). It also further notes that temporary emission reductions or "unusually favorable meteorology" would not qualify as an air quality improvement due to permanent and enforceable emission reductions.

Figure 9.1 shows the long term air quality trend of maximum 24-hour PM_{10} from 1986 to 2009. The air monitoring data shows no violation since 1991 and the annual maximum concentrations are maintained below the 24-Hour PM_{10} NAAQS[16]. Additionally, the data do not show any upward air quality trend for the annual maximum 24-hour PM_{10} concentrations at an air monitoring station.

Figure 9.1
Annual Maximum 24-hour PM_{10} Concentration ($\mu g/m^3$)
Sacramento County for 1986-2009



Data source: Ambient PM_{10} monitoring data from high volume samplers with size selective inlet (SMAQMD, 1996 and CARB, 2009)

Since the Sacramento County has not had a 24-hour PM_{10} violation for the past 19 years, this demonstrates that the attainment is not a result of temporary emission reductions or from "unusually favorable meteorology". The Sacramento County

[16] When comparing a 24-hour average PM_{10} concentration to the federal standard of 150 $\mu g/m^3$, the concentration value is rounded to the nearest 10 $\mu g/m^3$. Therefore, the minimum concentration exceeding the 24-hour standard is 155 $\mu g/m^3$, which rounds to 160 $\mu g/m^3$.

experienced a variety of meteorological conditions over the past 19 years (1991-2009.) Although the Sacramento County experienced growth in both population and vehicle miles traveled (VMT), these conditions have not lead to a violation of the 24-hour PM_{10} NAAQS due to the implementation of emission reduction measures which resulted in declining emissions. Figure 9.2 shows the population and VMT historical growth and projection for Sacramento County. Figure 9.3 shows the historical and projected emission inventory for PM_{10} and its NO_X precursor.

Figure 9.2
Population and VMT for Sacramento County
1990-2022 (historical data and projection)

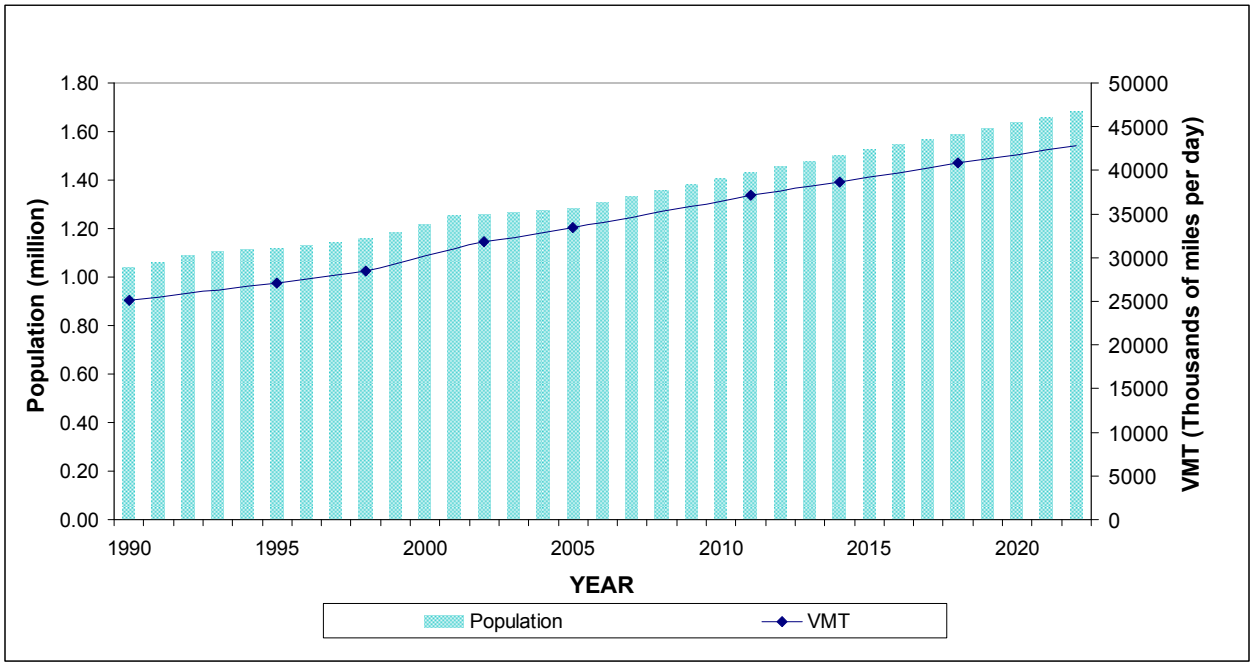
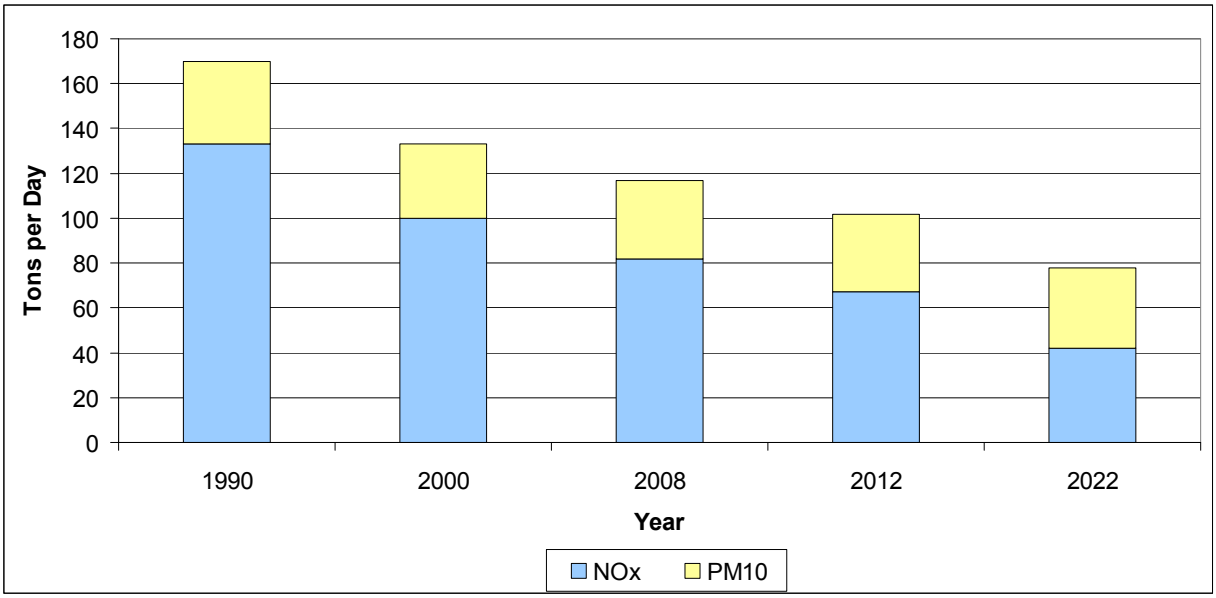


Figure 9.3
PM_{10} and NO_X Precursor Emissions for Sacramento County
1990-2022 (historical data and projection)



9.2.4 Fully Approved Maintenance Plan

In accordance with EPA guidance (Calcagni, 1992) the Air District is submitting this PM_{10} Maintenance Plan and request for redesignation for Sacramento County. Approval of this document would allow EPA to proceed with redesignation of the Sacramento County as attainment for the PM_{10} NAAQS. Chapter 4 includes the emission inventories, documenting a base year and forecast inventories for the maintenance period. Chapter 6 includes the maintenance demonstration analysis, showing continued maintenance of the PM_{10} NAAQS from 2012 to 2022. Chapter 6 also contains a commitment to a future monitoring network and verification and tracking of the maintenance demonstration. Chapter 7 describes the maintenance contingency plan to ensure prompt correction of any violation of the NAAQS.

9.2.5 CAA Section 110 and Part D Requirements

Contingent to the approval of this Implementation/Maintenance Plan and the Motor Vehicle Emissions Budgets discussed in Chapter 8, the Sacramento PM_{10} nonattainment area would meet the requirements of Section 110 and applicable portions of Part D of the Federal Clean Air Act. This would allow EPA to proceed with redesignation of the Sacramento County as attainment for the PM_{10} NAAQS.

9.3 References

Calcagni, John. *Memorandum, Procedures for Processing Requests to Redesignate Areas to Attainment.* United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC [1992.]

CARB. *CEPAM: 8-Hour Ozone SIP Baseline Emission Projections – Version 1.06 MAIN Planning Inventory Tool.* CA: California Air Resources Board, 28 February 2007. Web. 31 December 2009. <http://www.arb.ca.gov/app/emsinv/o3sip/fcemssumcat_o3v106.php.

CARB. *CEPAM: 2009 Almanac – Population and Vehicle Trends Tool.* CA: California Air Resources Board, Sacramento, CA [2009.]

CARB. *iADAM Air Quality Data Statistics.* CA: California Air Resources Board, Sacramento, CA, 15 April 2009. Web. 31 December 2009. < http://www.arb.ca.gov/adam/welcome.html>.

SJVAPCD. *2007 PM_{10} Maintenance Plan and Request for Redesignation.* Fresno, CA: San Joaquin Valley Air Pollution Control District, Fresno, CA [2007.]

SMAQMD. *Revised Draft 1995 Attainment and Maintenance Plan For The Federal PM_{10} Standard.* Sacramento, CA: Sacramento Metropolitan Air Quality Management District, Sacramento, CA [1996.]

USEPA *Designation of Areas for Air Quality Planning Purposes*, Federal Register, Volume 56, November 6, 1991, p. 56694.

USEPA. Proposed Rule: *Clean Air Act Attainment Finding; Bullhead City and Payson Nonattainment Areas, AZ; Sacramento and San Bernardino Nonattainment Areas, CA; Particulate Matter of 10 Microns or Less (PM-10).* Federal Register, Volume 66, July 25, 2001, p. 38603.

USEPA. *Final Rule: Clean Air Act Attainment Finding; Bullhead City and Payson Nonattainment Areas, AZ; Sacramento and San Bernardino Nonattainment Areas, CA; Particulate Matter of 10 Microns or Less (PM-10).* Federal Register, Volume 67, February 15, 2002, p. 7082.

USEPA. *Final Rule: Air Quality Designations for the 2006 24-Hour Fine Particle ($PM_{2.5}$) National Ambient Air Quality Standards.* Federal Register, Volume 74, November 13, 2009, p.58688.

10. SUMMARY AND CONCLUSIONS

10.1 PM_{10} Nonattainment Designation

Upon enactment of the 1990 Clean Air Act Amendments, Sacramento County was designated as unclassifiable for PM_{10}. However, during 1989 and 1990, two different SMAQMD PM_{10} monitors (Del Paso Manor and Stockton Boulevard sites) violated the 24-hour PM_{10} standard. Effective January 20, 1994, EPA took final action to redesignate Sacramento County as a "moderate" nonattainment area for the PM_{10} NAAQS with an attainment deadline of December 31, 2000.

10.2 PM_{10} Air Quality Data

PM_{10} air quality data includes solid and liquid particles with a diameter of 10 micrometers or less. EPA's health-based national ambient air quality standard for 24-hour PM_{10} is 150 $\mu g/m^3$ (measured as a daily concentration). There are currently six PM_{10} monitoring sites within Sacramento County. The Chemical Mass Balance (CMB) model was used to identify the source contributions for ambient air quality samples. CMB results show that the main source types contributing to PM_{10} air quality in Sacramento were secondary ammonium nitrate particles, motor vehicles exhaust, wood smoke, and fugitive dust. EPA determined that the Sacramento PM_{10} nonattainment area attained the PM_{10} NAAQS as of December 31, 2000 since no exceedances of the 24-hour PM_{10} NAAQS were measured between 1998 and 2000. There have been no violations of the PM_{10} NAAQS through 2009.

10.3 Emissions Inventory

The emissions inventory is an account of pollutant emissions that estimates the amount of air pollutants emitted from many sources. This maintenance plan includes an emissions inventory for total primary PM_{10} and NO_X as a PM_{10} precursor. 2008 is the base year, the year from which the inventory is projected forward and backward. An examination of the emissions inventory indicates that the three largest categories of primary PM_{10} are the area-wide sources for paved road dust, residential fuel combustion, and construction & demolition, while mobile source categories contribute over 85% of the NO_X emissions inventory. Between 2008 and 2022, total PM_{10} emissions are expected to increase 2-3% and NO_X emissions are expected to steadily decrease by 48%, despite increasing vehicle miles traveled and population in Sacramento County.

10.4 Control Measures

The SMAQMD has adopted and implemented a number of PM control measures to reduce emissions from fugitive dust, wood burning devices, and agricultural burning. In addition, the SMAQMD has applied RACM/RACT rules to existing NO_X sources, which will directly reduce the secondary formation of atmospheric ammonium nitrates, a

significant component of PM_{10} concentrations in the Sacramento area. Several emission reduction programs have also been implemented by the California Air Resources Board (CARB) to reduce directly emitted particulates and secondary PM precursor pollutants (NO_X and SO_X) from mobile sources. These measures primarily address cleaner fuel specifications for diesel and reformulated gasoline, and mobile source engine emission standards that CARB has implemented statewide. No new control measure commitments are included in this plan since the existing control strategy is predicted to maintain the PM_{10} NAAQS throughout the future 10-year maintenance period.

10.5 Maintenance Demonstration

Overall peak 24-hour PM_{10} concentrations are forecasted to decline in Sacramento County. The peak 24-hour PM_{10} concentration is predicted to be 104 $\mu g/m^3$ at the start of the maintenance period in 2012 and 99 $\mu g/m^3$ at the end of the maintenance period in 2022. Therefore, 10-year maintenance of the 24-hour PM_{10} NAAQS (150 $\mu g/m^3$) is demonstrated through 2022, due to declining NO_X and motor vehicle exhaust emissions, despite increasing fugitive dust and wood smoke emissions. The SMAQMD will continue to operate an appropriate air quality monitoring network and review the assumptions and data for the PM_{10} maintenance demonstration to fulfill the verification and tracking requirements

10.6 Contingency Plan

The proposed contingency plan is expected to ensure prompt correction of any violation of the PM_{10} NAAQS that occurs after redesignation and continued maintenance of the standard. The plan identifies a specific indicator or trigger to determine when the contingency requirements are activated for selecting, developing, and adopting the most appropriate contingency measures in an expedient timeframe. Any applicable emission reductions from already adopted rules that have not yet been implemented would be evaluated to determine if these new emission reductions would be sufficient to prevent future PM_{10} exceedances. These already adopted controls could include CARB and District $PM_{2.5}$ and NO_X measures to address ozone and $PM_{2.5}$ SIP requirements. In addition, the District would evaluate applicable reasonably available control measures (RACM), which may provide cost-effective particulate matter emissions reduction benefits that could potentially provide the corrective action needed.

10.7 Transportation Conformity Budgets

Under the 1990 Clean Air Act Amendments, federal agencies may not approve or fund transportation plans and projects unless they are consistent with state air quality implementation plans (SIPs). The quantification and comparison of on-road motor vehicle emissions is the method for determining transportation conformity between air quality and transportation planning. Currently, Sacramento County has no established PM_{10} motor vehicle emissions budgets (MVEBs). The Metropolitan Planning Organization, SACOG, uses “build vs no build” test to determine transportation

conformity for the region's transportation plans and programs for PM_{10}. To reflect updated motor vehicle emission forecasts, this maintenance plan for Sacramento County includes transportation conformity budgets for 2008, 2012 and 2022 for PM_{10} (including motor vehicle exhaust and road-related dust) and oxides of nitrogen (NO_X), a significant PM_{10} precursor. If the proposed MVEBs are determined to be adequate or approved by EPA, SACOG must ensure that the aggregate transportation emissions do not exceed these motor vehicle emissions budgets in any future transportation plan amendment and updates.

10.8 Redesignation Request

The Sacramento Metropolitan Air Quality Management District is requesting that the Environmental Protection Agency (EPA) redesignate Sacramento County to attainment status for the PM_{10} national ambient air quality standards (NAAQS). The SMAQMD has met the following criteria for the EPA Administrator to promulgate redesignation as outlined in the Federal Clean Air Act (CAA) Section 107(d)(3)(E):

1. Attainment of the PM_{10} NAAQS: effective March 18, 2002, continuing through 2009.

2. Fully approved PM_{10} SIP for the area: submittal contained in this plan.

3. Improvement in air quality is due to permanent and enforceable reductions: control measures have reduced overall emissions despite increasing population and VMT, and not due to temporary emission reductions or unusually favorable meteorology.

4. Fully approved PM_{10} maintenance plan for the area: submittal contained in this plan.

5. Met CAA Section 110 and Part D requirements: contingent on the approval of this implementation and maintenance plan, and motor vehicle emissions budgets.

10.9 Overall Conclusions

Collective local and state air quality regulations were successful in attaining the PM_{10} national ambient air quality standard (NAAQS) in Sacramento County by the 2000 deadline. Continued attainment of the PM_{10} standard is demonstrated throughout the 10-year maintenance period, 2012-2022, from existing control strategies. In addition, it is anticipated that future PM_{10} and NO_X emission reductions will occur due to the adoption and implementation of new control measures needed for the attainment demonstration SIP efforts for achieving the $PM_{2.5}$ and 8-hour ozone NAAQS in the region.

PM_{10} IMPLEMENTATION/MAINTENANCE PLAN AND REDESIGNATION REQUEST FOR SACRAMENTO COUNTY

APPENDICES

A. EMISSIONS INVENTORY

B. CONTROL MEASURES

C. TRANSPORTATION CONFORMITY BUDGETS

Appendix A: Emissions Inventory

The following tables show the anthropogenic emissions inventory of PM_{10} and NO_X by source categories for Sacramento County. The emissions inventory is shown for average winter day in units of tons per day. Inventories were obtained from the California Air Resources Board (CARB) on September 3, 2010 for the years 2008, 2012, and 2022.[17] These inventories included recent CARB updates to the Residential Fuel Combustion and Paved Road Dust categories.

An average winter emission inventory of PM_{10} and NO_X is also shown for the years 1990, 1995, and 2000. These inventories are used in the emissions trend analysis and the CMB analysis. The data source is CARB CEFS Version 1.06 Sacramento County (Rf#980), except Residential Fuel Combustion and Paved Road Dust were adjusted by SMAQMD staff to reflect the recent changes in CARB methodology.

[17] CARB (Ruiz) e-mail transmitting emissions inventory data for the Sacramento PM_{10} Maintenance Plan to SMAQMD (Tollstrup) on September 3, 2010.

Sacramento PM10 Maintenance Plan - 2008 Emissions Data (Tons/Day)
(Sacramento County Only)

			WINTER DAY	
FYEAR	EIC SUM	EICSUMN	NOX	PM10
2008	10	ELECTRIC UTILITIES	0.69	0.25
2008	20	COGENERATION	0.00	0.00
2008	30	OIL AND GAS PRODUCTION (COMBUSTION)	0.06	0.01
2008	50	MANUFACTURING AND INDUSTRIAL	0.99	0.04
2008	52	FOOD AND AGRICULTURAL PROCESSING	0.25	0.01
2008	60	SERVICE AND COMMERCIAL	1.52	0.16
2008	99	OTHER (FUEL COMBUSTION)	0.42	0.02
2008	110	SEWAGE TREATMENT	0.00	0.00
2008	120	LANDFILLS	0.02	0.01
2008	130	INCINERATORS	0.01	0.00
2008	199	OTHER (WASTE DISPOSAL)	0.00	0.00
2008	210	LAUNDERING	0.00	0.00
2008	220	DEGREASING	0.00	0.00
2008	230	COATINGS AND RELATED PROCESS SOLVENTS	0.00	0.00
2008	240	PRINTING	0.00	0.00
2008	250	ADHESIVES AND SEALANTS	0.00	0.00
2008	299	OTHER (CLEANING AND SURFACE COATINGS)	0.00	0.00
2008	310	OIL AND GAS PRODUCTION	0.00	0.00
2008	330	PETROLEUM MARKETING	0.00	0.00
2008	410	CHEMICAL	0.03	0.03
2008	420	FOOD AND AGRICULTURE	0.00	0.10
2008	430	MINERAL PROCESSES	0.07	0.53
2008	440	METAL PROCESSES	0.01	0.01
2008	450	WOOD AND PAPER	0.00	0.18
2008	470	ELECTRONICS	0.00	0.00
2008	499	OTHER (INDUSTRIAL PROCESSES)	0.01	0.01
2008	510	CONSUMER PRODUCTS	0.00	0.00
2008	520	ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	0.00	0.00
2008	530	PESTICIDES/FERTILIZERS	0.00	0.00
2008	540	ASPHALT PAVING / ROOFING	0.00	0.01
2008	610	RESIDENTIAL FUEL COMBUSTION	4.42	9.91
2008	620	FARMING OPERATIONS	0.00	2.40
2008	630	CONSTRUCTION AND DEMOLITION	0.00	7.01
2008	640	PAVED ROAD DUST	0.00	6.12
2008	645	UNPAVED ROAD DUST	0.00	3.58
2008	650	FUGITIVE WINDBLOWN DUST	0.00	0.12
2008	660	FIRES	0.01	0.06
2008	670	WASTE BURNING AND DISPOSAL	0.06	0.20
2008	690	COOKING	0.00	0.82
2008		ALL ON-ROAD MOBILE	49.56	2.20
2008	810	AIRCRAFT	1.95	0.08
2008	820	TRAINS	3.37	0.09
2008	840	RECREATIONAL BOATS	0.52	0.06
2008	850	OFF-ROAD RECREATIONAL VEHICLES	0.01	0.00
2008	860	OFF-ROAD EQUIPMENT	16.00	1.04
2008	870	FARM EQUIPMENT	1.75	0.10
2008	890	FUEL STORAGE AND HANDLING	0.00	0.00
		2008 TOTALS:	**81.72**	**35.15**

CMB PM10 Source Categories (EIC SUM)			Adjusted MVEB	Adjusted Total
Motor Vehicles PM10 (On-Road Mobile, 810-870)		3.57		
Wood Smoke PM10 (610, 660, 670)		10.17		
Fugitive Dust PM10 (430, 620-650)		19.77	0.4	20.17
Total NOx	81.72		0.4	82.12
Total PM10		35.15		

Note that the increase in the motor vehicle emission budgets due to rounding up to the nearest integer is added to the Fugitive Dust PM10 and Total NOx emission forecasts.
Fugitive Dust PM10: 14.6 rounds up to 15 = 0.4 increase
Total NOx: 49.6 rounds up to 50 = 0.4 increase

Sacramento PM10 Maintenance Plan - 2012 Emissions Data (Tons/Day)
(Sacramento County Only)

			WINTER DAY	
FYEAR	EIC SUM	EICSUMN	NOX	PM10
2012	10	ELECTRIC UTILITIES	0.83	0.30
2012	20	COGENERATION	0.00	0.00
2012	30	OIL AND GAS PRODUCTION (COMBUSTION)	0.06	0.01
2012	50	MANUFACTURING AND INDUSTRIAL	1.05	0.04
2012	52	FOOD AND AGRICULTURAL PROCESSING	0.18	0.01
2012	60	SERVICE AND COMMERCIAL	1.50	0.16
2012	99	OTHER (FUEL COMBUSTION)	0.38	0.02
2012	110	SEWAGE TREATMENT	0.00	0.00
2012	120	LANDFILLS	0.02	0.01
2012	130	INCINERATORS	0.01	0.00
2012	199	OTHER (WASTE DISPOSAL)	0.00	0.00
2012	210	LAUNDERING	0.00	0.00
2012	220	DEGREASING	0.00	0.00
2012	230	COATINGS AND RELATED PROCESS SOLVENTS	0.00	0.00
2012	240	PRINTING	0.00	0.00
2012	250	ADHESIVES AND SEALANTS	0.00	0.00
2012	299	OTHER (CLEANING AND SURFACE COATINGS)	0.00	0.00
2012	310	OIL AND GAS PRODUCTION	0.00	0.00
2012	330	PETROLEUM MARKETING	0.00	0.00
2012	410	CHEMICAL	0.03	0.03
2012	420	FOOD AND AGRICULTURE	0.00	0.10
2012	430	MINERAL PROCESSES	0.07	0.57
2012	440	METAL PROCESSES	0.01	0.01
2012	450	WOOD AND PAPER	0.00	0.19
2012	470	ELECTRONICS	0.00	0.00
2012	499	OTHER (INDUSTRIAL PROCESSES)	0.01	0.02
2012	510	CONSUMER PRODUCTS	0.00	0.00
2012	520	ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	0.00	0.00
2012	530	PESTICIDES/FERTILIZERS	0.00	0.00
2012	540	ASPHALT PAVING / ROOFING	0.00	0.01
2012	610	RESIDENTIAL FUEL COMBUSTION	4.32	9.21
2012	620	FARMING OPERATIONS	0.00	2.32
2012	630	CONSTRUCTION AND DEMOLITION	0.00	7.22
2012	640	PAVED ROAD DUST	0.00	6.17
2012	645	UNPAVED ROAD DUST	0.00	3.58
2012	650	FUGITIVE WINDBLOWN DUST	0.00	0.12
2012	660	FIRES	0.01	0.06
2012	670	WASTE BURNING AND DISPOSAL	0.06	0.20
2012	690	COOKING	0.00	0.87
2012		ALL ON-ROAD MOBILE	37.61	2.13
2012	810	AIRCRAFT	2.25	0.09
2012	820	TRAINS	3.31	0.09
2012	840	RECREATIONAL BOATS	0.51	0.07
2012	850	OFF-ROAD RECREATIONAL VEHICLES	0.01	0.00
2012	860	OFF-ROAD EQUIPMENT	13.61	0.86
2012	870	FARM EQUIPMENT	1.44	0.08
2012	890	FUEL STORAGE AND HANDLING	0.00	0.00
		2012 TOTALS:	**67.28**	**34.54**

CMB PM10 Source Categories (EIC SUM)			Adjusted MVEB	Adjusted Total
Motor Vehicles PM10 (On-Road Mobile, 810-870)		3.32		
Wood Smoke PM10 (610, 660, 670)		9.47		
Fugitive Dust PM10 (430, 620-650)		19.97	0.4	20.37
Total NOx	67.28		0.4	67.68
Total PM10		34.54		

Note that the increase in the motor vehicle emission budgets due to rounding up to the nearest integer is added to the Fugitive Dust PM10 and Total NOx emission forecasts.
Fugitive Dust PM10: 14.6 rounds up to 15 = 0.4 increase
Total NOx: 37.6 rounds up to 38 = 0.4 increase

Sacramento PM10 Maintenance Plan - 2022 Emissions Data (Tons/Day)
(Sacramento County Only)

			WINTER DAY	
FYEAR	EIC SUM	EICSUMN	NOX	PM10
2022	10	ELECTRIC UTILITIES	1.00	0.37
2022	20	COGENERATION	0.00	0.00
2022	30	OIL AND GAS PRODUCTION (COMBUSTION)	0.05	0.01
2022	50	MANUFACTURING AND INDUSTRIAL	1.22	0.05
2022	52	FOOD AND AGRICULTURAL PROCESSING	0.09	0.01
2022	60	SERVICE AND COMMERCIAL	1.52	0.16
2022	99	OTHER (FUEL COMBUSTION)	0.26	0.01
2022	110	SEWAGE TREATMENT	0.00	0.00
2022	120	LANDFILLS	0.02	0.01
2022	130	INCINERATORS	0.02	0.00
2022	199	OTHER (WASTE DISPOSAL)	0.00	0.00
2022	210	LAUNDERING	0.00	0.00
2022	220	DEGREASING	0.00	0.00
2022	230	COATINGS AND RELATED PROCESS SOLVENTS	0.00	0.00
2022	240	PRINTING	0.00	0.00
2022	250	ADHESIVES AND SEALANTS	0.00	0.00
2022	299	OTHER (CLEANING AND SURFACE COATINGS)	0.00	0.00
2022	310	OIL AND GAS PRODUCTION	0.00	0.00
2022	330	PETROLEUM MARKETING	0.00	0.00
2022	410	CHEMICAL	0.03	0.03
2022	420	FOOD AND AGRICULTURE	0.00	0.11
2022	430	MINERAL PROCESSES	0.08	0.65
2022	440	METAL PROCESSES	0.01	0.01
2022	450	WOOD AND PAPER	0.00	0.22
2022	470	ELECTRONICS	0.00	0.01
2022	499	OTHER (INDUSTRIAL PROCESSES)	0.01	0.03
2022	510	CONSUMER PRODUCTS	0.00	0.00
2022	520	ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	0.00	0.00
2022	530	PESTICIDES/FERTILIZERS	0.00	0.00
2022	540	ASPHALT PAVING / ROOFING	0.00	0.01
2022	610	RESIDENTIAL FUEL COMBUSTION	4.36	10.24
2022	620	FARMING OPERATIONS	0.00	2.13
2022	630	CONSTRUCTION AND DEMOLITION	0.00	7.76
2022	640	PAVED ROAD DUST	0.00	6.35
2022	645	UNPAVED ROAD DUST	0.00	3.57
2022	650	FUGITIVE WINDBLOWN DUST	0.00	0.11
2022	660	FIRES	0.01	0.07
2022	670	WASTE BURNING AND DISPOSAL	0.05	0.19
2022	690	COOKING	0.00	1.00
2022		ALL ON-ROAD MOBILE	18.12	2.05
2022	810	AIRCRAFT	2.95	0.10
2022	820	TRAINS	3.62	0.10
2022	840	RECREATIONAL BOATS	0.51	0.12
2022	850	OFF-ROAD RECREATIONAL VEHICLES	0.01	0.00
2022	860	OFF-ROAD EQUIPMENT	7.58	0.37
2022	870	FARM EQUIPMENT	0.64	0.03
2022	890	FUEL STORAGE AND HANDLING	0.00	0.00
		2022 TOTALS:	**42.20**	**35.86**

CMB PM10 Source Categories (EIC SUM)			Adjusted MVEB	Adjusted Total
Motor Vehicles PM10 (On-Road Mobile, 810-870)		2.77		
Wood Smoke PM10 (610, 660, 670)		10.50		
Fugitive Dust PM10 (430, 620-650)		20.58	2.2	22.78
Total NOx	42.20		0.9	43.10
Total PM10		35.86		

Note that the 2022 motor vehicle emission budgets (MVEB) for Fugitive Dust PM10 are increased by 1.5 tpd to allow for potential increases in Paved Road Dust and Road Construction Dust from 2022 to 2035. This additional increase may be needed for SACOG to make a transportation conformity determination for a horizon year of 2035 or later for transportation planning purposes when using the latest year of motor vehicle emissions budgets (2022) from the PM10 Maintenance Plan.

In addition, the increase in the motor vehicle emission budgets due to rounding up to the nearest integer is added to the Fugitive Dust PM10 and Total NOx emission forecasts.
Fugitive Dust PM10: 16.3 rounds up to 17 = 0.7 increase
Total NOx: 18.1 rounds up to 19 = 0.9 increase

Sacramento PM10 Maintenance Plan - 1990 Emissions Data (Tons/Day)
(Sacramento County Only)

		CARB CEFS v.1.06	WINTER DAY	
FYEAR	EIC SUM	EICSUMN	NOX	PM10
1990	10	ELECTRIC UTILITIES	0.02	0.00
1990	20	COGENERATION	0.67	0.05
1990	30	OIL AND GAS PRODUCTION (COMBUSTION)	0.20	0.01
1990	50	MANUFACTURING AND INDUSTRIAL	0.92	0.03
1990	52	FOOD AND AGRICULTURAL PROCESSING	0.39	0.02
1990	60	SERVICE AND COMMERCIAL	2.72	0.20
1990	99	OTHER (FUEL COMBUSTION)	0.40	0.02
1990	110	SEWAGE TREATMENT	0.00	0.00
1990	120	LANDFILLS	0.00	0.00
1990	130	INCINERATORS	0.02	0.00
1990	199	OTHER (WASTE DISPOSAL)	0.00	0.39
1990	210	LAUNDERING	0.00	0.00
1990	220	DEGREASING	0.00	0.00
1990	230	COATINGS AND RELATED PROCESS SOLVENTS	0.00	0.00
1990	240	PRINTING	0.00	0.00
1990	250	ADHESIVES AND SEALANTS	0.00	0.00
1990	299	OTHER (CLEANING AND SURFACE COATINGS)	0.00	0.00
1990	310	OIL AND GAS PRODUCTION	0.00	0.00
1990	330	PETROLEUM MARKETING	0.00	0.00
1990	410	CHEMICAL	0.01	0.06
1990	420	FOOD AND AGRICULTURE	0.00	0.16
1990	430	MINERAL PROCESSES	0.13	0.87
1990	440	METAL PROCESSES	0.01	0.01
1990	450	WOOD AND PAPER	0.00	0.27
1990	470	ELECTRONICS	0.00	0.00
1990	499	OTHER (INDUSTRIAL PROCESSES)	0.00	0.00
1990	510	CONSUMER PRODUCTS	0.00	0.00
1990	520	ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	0.00	0.00
1990	530	PESTICIDES/FERTILIZERS	0.00	0.00
1990	540	ASPHALT PAVING / ROOFING	0.00	0.01
1990	610	RESIDENTIAL FUEL COMBUSTION	4.83	10.24
1990	620	FARMING OPERATIONS	0.00	2.81
1990	630	CONSTRUCTION AND DEMOLITION	0.00	7.44
1990	640	PAVED ROAD DUST	0.00	5.92
1990	645	UNPAVED ROAD DUST	0.00	3.31
1990	650	FUGITIVE WINDBLOWN DUST	0.00	0.14
1990	660	FIRES	0.01	0.04
1990	670	MANAGED BURNING AND DISPOSAL	0.14	0.30
1990	690	COOKING	0.00	0.42
1990		ALL ON-ROAD MOBILE	92.61	2.46
1990	810	AIRCRAFT	0.73	0.04
1990	820	TRAINS	4.50	0.09
1990	840	RECREATIONAL BOATS	0.33	0.04
1990	850	OFF-ROAD RECREATIONAL VEHICLES	0.02	0.03
1990	860	OFF-ROAD EQUIPMENT	20.88	1.67
1990	870	FARM EQUIPMENT	3.16	0.22
1990	890	FUEL STORAGE AND HANDLING	0.00	0.00
		1990 TOTALS:	**132.69**	**37.27**

CMB PM10 Source Categories (EIC SUM)

Motor Vehicles PM10 (On-Road Mobile, 810-870)	4.55
Wood Smoke PM10 (610, 660, 670)	10.58
Fugitive Dust PM10 (430, 620-650)	20.49

Note that these 1990 PM10 source emissions are adjusted to reflect updated CARB inventory changes to Residential Fuel Combustion and Paved Road Dust per September 3, 2010 e-mail.

Sacramento PM10 Maintenance Plan - 1995 Emissions Data (Tons/Day)
(Sacramento County Only)

		CARB CEFS v.1.06	WINTER DAY	
FYEAR	EIC SUM	EICSUMN	NOX	PM10
1995	10	ELECTRIC UTILITIES	0.01	0.00
1995	20	COGENERATION	0.66	0.14
1995	30	OIL AND GAS PRODUCTION (COMBUSTION)	0.33	0.00
1995	50	MANUFACTURING AND INDUSTRIAL	0.85	0.04
1995	52	FOOD AND AGRICULTURAL PROCESSING	0.25	0.04
1995	60	SERVICE AND COMMERCIAL	1.81	0.18
1995	99	OTHER (FUEL COMBUSTION)	0.45	0.02
1995	110	SEWAGE TREATMENT	0.00	0.00
1995	120	LANDFILLS	0.00	0.00
1995	130	INCINERATORS	0.03	0.01
1995	199	OTHER (WASTE DISPOSAL)	0.01	0.09
1995	210	LAUNDERING	0.00	0.00
1995	220	DEGREASING	0.00	0.00
1995	230	COATINGS AND RELATED PROCESS SOLVENTS	0.00	0.00
1995	240	PRINTING	0.00	0.00
1995	250	ADHESIVES AND SEALANTS	0.00	0.00
1995	299	OTHER (CLEANING AND SURFACE COATINGS)	0.00	0.00
1995	310	OIL AND GAS PRODUCTION	0.00	0.00
1995	330	PETROLEUM MARKETING	0.00	0.00
1995	410	CHEMICAL	0.02	0.00
1995	420	FOOD AND AGRICULTURE	0.00	0.22
1995	430	MINERAL PROCESSES	0.04	0.53
1995	440	METAL PROCESSES		
1995	450	WOOD AND PAPER	0.00	0.24
1995	470	ELECTRONICS	0.00	0.00
1995	499	OTHER (INDUSTRIAL PROCESSES)	0.00	0.00
1995	510	CONSUMER PRODUCTS	0.00	0.00
1995	520	ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	0.00	0.00
1995	530	PESTICIDES/FERTILIZERS	0.00	0.00
1995	540	ASPHALT PAVING / ROOFING	0.00	0.01
1995	610	RESIDENTIAL FUEL COMBUSTION	4.58	9.79
1995	620	FARMING OPERATIONS	0.00	2.69
1995	630	CONSTRUCTION AND DEMOLITION	0.00	5.30
1995	640	PAVED ROAD DUST	0.00	5.98
1995	645	UNPAVED ROAD DUST	0.00	3.14
1995	650	FUGITIVE WINDBLOWN DUST	0.00	0.13
1995	660	FIRES	0.01	0.05
1995	670	WASTE BURNING AND DISPOSAL	0.15	0.37
1995	690	COOKING	0.00	0.47
1995		ALL ON-ROAD MOBILE	82.25	2.05
1995	810	AIRCRAFT	1.09	0.05
1995	820	TRAINS	4.56	0.09
1995	840	RECREATIONAL BOATS	0.35	0.04
1995	850	OFF-ROAD RECREATIONAL VEHICLES	0.02	0.03
1995	860	OFF-ROAD EQUIPMENT	18.08	1.16
1995	870	FARM EQUIPMENT	2.70	0.16
1995	890	FUEL STORAGE AND HANDLING	0.00	0.00
		1995 TOTALS:	**118.24**	**33.01**

CMB PM10 Source Categories (EIC SUM)

Motor Vehicles PM10 (On-Road Mobile, 810-870)	3.58
Wood Smoke PM10 (610, 660, 670)	10.20
Fugitive Dust PM10 (430, 620-650)	17.77

Note that these 1995 PM10 source emissions are adjusted to reflect updated CARB inventory changes to Residential Fuel Combustion and Paved Road Dust per September 3, 2010 e-mail.

Sacramento PM10 Maintenance Plan - 2000 Emissions Data (Tons/Day)
(Sacramento County Only)

		CARB CEFS v.1.06	WINTER DAY	
FYEAR	EIC SUM	EICSUMN	NOX	PM10
2000	10	ELECTRIC UTILITIES	0.40	0.15
2000	20	COGENERATION	0.02	0.01
2000	30	OIL AND GAS PRODUCTION (COMBUSTION)	0.05	0.01
2000	50	MANUFACTURING AND INDUSTRIAL	0.83	0.04
2000	52	FOOD AND AGRICULTURAL PROCESSING	0.30	0.02
2000	60	SERVICE AND COMMERCIAL	1.64	0.17
2000	99	OTHER (FUEL COMBUSTION)	0.49	0.03
2000	110	SEWAGE TREATMENT	0.00	0.00
2000	120	LANDFILLS	0.02	0.01
2000	130	INCINERATORS	0.01	0.00
2000	199	OTHER (WASTE DISPOSAL)	0.00	0.00
2000	210	LAUNDERING	0.00	0.00
2000	220	DEGREASING	0.00	0.00
2000	230	COATINGS AND RELATED PROCESS SOLVENTS	0.00	0.00
2000	240	PRINTING	0.00	0.00
2000	250	ADHESIVES AND SEALANTS	0.00	0.00
2000	299	OTHER (CLEANING AND SURFACE COATINGS)	0.00	0.00
2000	310	OIL AND GAS PRODUCTION	0.00	0.00
2000	330	PETROLEUM MARKETING	0.00	0.00
2000	410	CHEMICAL	0.05	0.02
2000	420	FOOD AND AGRICULTURE	0.00	0.04
2000	430	MINERAL PROCESSES	0.14	0.59
2000	440	METAL PROCESSES	0.01	0.01
2000	450	WOOD AND PAPER	0.00	0.13
2000	470	ELECTRONICS	0.00	0.00
2000	499	OTHER (INDUSTRIAL PROCESSES)	0.00	0.11
2000	510	CONSUMER PRODUCTS	0.00	0.00
2000	520	ARCHITECTURAL COATINGS AND RELATED PROCESS SOLVENTS	0.00	0.00
2000	530	PESTICIDES/FERTILIZERS	0.00	0.00
2000	540	ASPHALT PAVING / ROOFING	0.00	0.01
2000	610	RESIDENTIAL FUEL COMBUSTION	4.32	9.34
2000	620	FARMING OPERATIONS	0.00	2.54
2000	630	CONSTRUCTION AND DEMOLITION	0.00	6.53
2000	640	PAVED ROAD DUST	0.00	6.03
2000	645	UNPAVED ROAD DUST	0.00	3.14
2000	650	FUGITIVE WINDBLOWN DUST	0.00	0.13
2000	660	FIRES	0.01	0.05
2000	670	MANAGED BURNING AND DISPOSAL	0.13	0.28
2000	690	COOKING	0.00	0.52
2000		ALL ON-ROAD MOBILE	63.26	1.90
2000	810	AIRCRAFT	1.72	0.07
2000	820	TRAINS	4.90	0.10
2000	840	RECREATIONAL BOATS	0.34	0.05
2000	850	OFF-ROAD RECREATIONAL VEHICLES	0.01	0.01
2000	860	OFF-ROAD EQUIPMENT	19.11	1.23
2000	870	FARM EQUIPMENT	2.34	0.14
2000	890	FUEL STORAGE AND HANDLING	0.00	0.00
		2000 TOTALS:	**100.11**	**33.36**

CMB PM10 Source Categories (EIC SUM)

Motor Vehicles PM10 (On-Road Mobile, 810-870)	3.50
Wood Smoke PM10 (610, 660, 670)	9.67
Fugitive Dust PM10 (430, 620-650)	18.96

Note that these 2000 PM10 source emissions are adjusted to reflect updated CARB inventory changes to Residential Fuel Combustion and Paved Road Dust per September 3, 2010 e-mail.

Appendix B: Control Measures

The following fugitive dust measures are considered to be potential reasonably available control measures (RACM) for PM_{10}:

Source Category	Control Action
Paved Roads	Improved sanding/salting applications/materials
	Truck covering
	Construction site measures
	Curb installation and shoulder stabilization
	Storm water drainage
Unpaved Roads	Paving and surface improvements (graveling)
	Chemical stabilization
	Traffic reduction plans
	Vehicle speed reduction
Storage Piles (Transfer Operations)	Wet suppression and dust control
Construction/Demolition	Paving permanent roads early in project
	Truck covering
	Access apron construction and cleaning
	Watering of graveled travel surfaces
Open Area Wind Erosion	Revegetation
	Limitation of off-road vehicle traffic
	Limitation of leafblowers
Agricultural Tilling	Land conservation practices

The following residential wood combustion control measures are considered to be potential reasonably available control measures for PM_{10}:

Source Category	Control Action
Integral Measures	Public awareness/education and voluntary curtailment program
	Mandatory curtailment during predicted periods of high PM_{10} concentrations
	New stoves EPA-certified Phase II
	Improved wood burning performance • Control of wood moisture content • Weatherization of homes with wood stoves • Educational opacity program
Existing Installations	Convert wood-burning fireplaces to gas logs
	Changeover to EPA-certified Phase II stoves or low emitting stoves
New Installations	Gas fireplaces or gas logs in new installations
	Upgrade offset
	Restriction on number or density of new stove and fireplace installations
	Requirement that new stove installations are low emitting
New and Existing Installations	Device offset and upgrade offset

Appendix C: Transportation Conformity Budgets

Sacramento County PM_{10} Maintenance Plan
Transportation Conformity Budgets
Average Winter Day

Tons per Winter Day

Sacramento County	2008		2012		2022	
	NO_X	PM_{10}	NO_X	PM_{10}	NO_X	PM_{10}
Direct Exhaust (includes tire and brake wear for PM_{10})	49.6	2.2	37.6	2.1	18.1	2.1
Paved Road Dust	---	6.1	---	6.2	---	6.4 + 1.0
Unpaved Road Dust	---	3.6	---	3.6	---	3.6
Road Construction Dust	---	2.7	---	2.8	---	2.8 + 0.5
Total	49.6	14.6	37.6	14.6	18.1	14.8 + 1.5
Total (rounded up to nearest ton)	**50**	**15**	**38**	**15**	**19**	**17**

Notes:

1. An additional 1.5 tons per day of PM_{10} was added to the 2022 PM_{10} budgets in order to account for potential increases in Paved Road Dust and Road Construction Dust beyond 2022. This additional increase may be needed for SACOG to make a transportation conformity determination for a horizon year of 2035 or later for transportation planning purposes when using the latest year of motor vehicle emissions budgets (2022) in the PM_{10} Maintenance Plan.

2. The additional increase in 1.0 ton per day of PM_{10} to Paved Road Dust and 0.5 ton per day of PM_{10} to Road Construction Dust in the 2022 transportation budgets are accounted for in the maintenance demonstration emission forecasts for Fugitive Dust PM_{10} to ensure consistency with the maintenance demonstration.

3. The additional increase in the 2008, 2012, and 2022 NO_X and PM_{10} transportation budgets due to rounding up to the nearest ton are accounted for in the maintenance demonstration emission forecasts for Total NO_X and Fugitive Dust PM_{10} to ensure consistency with the maintenance demonstration.

4. If the proposed MVEBs are determined to be adequate by EPA, future transportation plans will need to conform to these motor vehicle emissions budgets in any future transportation plan amendment and updates. SACOG must ensure that the aggregate wintertime transportation emissions in Sacramento County (including, but not limited to, vehicle emissions, dust from paved and unpaved roads and road construction), rounded up to the nearest integer, do not exceed these levels when approving new metropolitan transportation plans and transportation improvement programs, even if the mix of projects changes or growth increases.