Technical Support Document

for the

Proposed Action

on the

San Joaquin Valley 2008 $PM_{2.5}$ Plan

and the San Joaquin Valley Portions of the

Revised 2007 State Strategy

Air Division
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Acronyms & Terms

µ: micron (one millionth)
AERR: Air Emissions Report Rule, 40 CFR part 51, subpart A
ARB: California Air Resources Board (also CARB)
APCD: air pollution control district
AQMD: air quality management district
BAR: California Bureau of Automotive Repair
CAA: Federal Clean Air Act as amended in 1990
CARB: California Air Resources Board (also ARB)
CCAQS: Central California Air Quality Study
CCR: California Code of Regulations
CEFS: California Emissions Forecasting and Planning Inventory System
CEIDARS: California Emissions Inventory Development and Reporting System
CERR: Consolidated Emissions Reporting Rule, 40 CFR part 51, subpart A
CFR: Code of Federal Regulations
CMAQ: Congestion Mitigation and Air Quality funds
CMAQ: Community Multiscale Air Quality [model]
CMB: chemical mass balance
CO: carbon monoxide
CPM: condensable particulate matter
CRPAQS: California Regional Particulate Air Quality Study
District: San Joaquin Valley Air Pollution Control Agency
DPR: California Department of Pesticide Regulation
EC: elemental carbon
EPA: United States Environmental Protection Agency
FHWA: Federal Highway Administration
Fine particulate: $PM_{2.5}$
FMVCP: Federal motor vehicle control program
FR: Federal Register
FRM: Federal Reference Method
FTA: Federal Transit Administration
HNO_3: nitric acid
I/C: internal combustion
IMS95: 1995 Integrated Monitoring Study (in the San Joaquin Valley)
mb: millibars
MCR: mid-course review
MFB: mean fractional bias
MFE: mean fractional error
MM5: a mesoscale model
MMPR: meteorological model performance analysis
MOZART: Model for Ozone And Related Chemical Tracers
MPO: metropolitan planning organization
MVEB: motor vehicle emissions budget
NAAQS: national ambient air quality standard
NH_3: ammonia

NH_4NO_3: ammonium nitrate
NO_2: nitrogen dioxide
NO_x: oxides of nitrogen
NSR: new source review
NYQ: not yet quantified
O_3: ozone
OC: organic carbon
OH: hydroxyl radical
OTAQ: EPA's Office of Transportation and Air Quality
PBL: planetary boundary layer
PM: particulate matter
PM_{10}: particulate matter with a diameter of 10 μm or less, includes $PM_{2.5}$
$PM_{2.5}$: particulate matter with a diameter of 2.5 μm or less
PMC: coarse particulate matter
PMF: positive matrix factorization
RACM: reasonably available control measures
RACT: reasonably available control technology
RFP: reasonable further progress
RMD: Receptor Modeling Documentation
RRF: relative response factor
RTP: regional transportation plan
SANDWICH: Sulfate, adjusted nitrate, derived water, inferred carbonaceous material balance approach
SC: South Coast
SIP: state implementation plan
SJV: San Joaquin Valley
SJVAPCD: San Joaquin Valley Air Pollution Control District
SMAT: Speciated Modeled Attainment Test
SO_2: sulfur dioxide
SOA: secondary organic aerosol
STN: Speciation Trends Network
SO_x: oxides of sulfur
TCM: transportation control measures
tpd: tons per day
TIP: transportation improvement program
TSD: technical support document
VMT: vehicle miles traveled
VOC: volatile organic compounds
WOE: weight of evidence

Technical Support Document for Proposed Action on the San Joaquin Valley 2008 $PM_{2.5}$ Plan and San Joaquin Valley Portions of the Revised 2007 State Strategy

I. Introduction and Background

This document provides supporting information and analysis for EPA's proposed rulemaking actions on the San Joaquin Valley Air Pollution Control District's *2008 $PM_{2.5}$ Plan* (adopted April 30, 2008 and revised on June 17, 2010) and the related portions of the California Air Resources Board's *State Strategy for California's 2007 State Implementation Plan* (adopted with amendments on September 27, 2007 and revised and updated on April 24, 2009). It identifies the Clean Air Act requirements for $PM_{2.5}$ plans and EPA's regulations and policies interpreting these requirements. It also describes the elements of the SJV 2008 $PM_{2.5}$ Plan and 2007 State Strategy intended to address these requirements and EPA's evaluation of whether the State's submittals meet them.

A. The National Ambient Air Quality Standards for Fine Particulate ($PM_{2.5}$)

1. The $PM_{2.5}$ National Ambient Air Quality Standards

a. Level and Form of the Standard

On July 18, 1997, EPA revised the primary and secondary national ambient air quality standards (NAAQS) for particulate matter (PM) to add new annual and 24-hour standards for $PM_{2.5}$, particulate matter with a diameter of 2.5 microns or less. 62 FR 38652.[1] The annual standards are set at a level of 15 micrograms per cubic meter (μ/m^3), as determined by the 3-year average of annual mean $PM_{2.5}$ concentrations. The 24-hour standards were set at a level of 65 μ/m^3, as determined by the 3-year average of the 98th percentile of 24-hour concentrations. 40 CFR § 50.7.

b. Health Effects

EPA established primary air quality standards for $PM_{2.5}$ based on substantial evidence from numerous health studies demonstrating that serious health effects are associated with exposures to elevated levels of the pollutant. Epidemiological studies have shown statistically significant correlations between elevated $PM_{2.5}$ levels and premature mortality. Other important

[1] The original annual and daily standards for particulate matter generally less than or equal to 10 micrometers in diameter (referred to as PM_{10}) were established in 1987. 52 FR 24663 (July 1, 1987). In the 1997 PM NAAQS revision, EPA also revised the standards for PM_{10} but these revised PM_{10} standards were later vacated by the courts, and the 1987 PM_{10} standards remained in effect. In the 2006 NAAQS revision, the 24-hour PM_{10} standards were retained but the annual standards were revoked. See 71 FR 61144 (October 17, 2006). The San Joaquin Valley is designated as attainment for the PM_{10} NAAQS. See 73 FR 66759 (November 12, 2009).

health effects associated with $PM_{2.5}$ exposure include aggravation of respiratory and cardiovascular disease (as indicated by increased hospital admissions, emergency room visits, absences from school or work, and restricted activity days), changes in lung function and increased respiratory symptoms, as well as new evidence for more subtle indicators of cardiovascular health. Individuals particularly sensitive to $PM_{2.5}$ exposure include older adults, people with heart and lung disease, and children. See, EPA, *Air Quality Criteria for Particulate Matter*, No. EPA/600/P–99/002aF and EPA/600/P–99/002bF, October 2004.

Attainment of the 1997 $PM_{2.5}$ standards is estimated to lead to reductions in health impacts, including tens of thousands fewer premature deaths each year, thousands fewer hospital admissions and emergency room visits each year, hundreds of thousands fewer absences from work and school, and hundreds of thousands fewer respiratory illnesses in children annually. See 72 FR 20586, 20587 (April 25, 2007).

c. Revisions to the 24-Hour $PM_{2.5}$ Standards

In October 2006, EPA completed another review of the NAAQS for PM. With regard to the primary standards, the 24-hour $PM_{2.5}$ standards are strengthened to a level of 35 μ/m^3, based on the 3-year average of the 98th percentile of 24-hour concentrations. The annual standards remain unchanged. 71 FR 61144 (October 17, 2006). Attainment of the 2006 $PM_{2.5}$ standards is estimated to lead to additional reductions in health impacts over the 1997 standard, including approximately 1,200 to 13,000 fewer premature deaths each year, 1,630 fewer hospital admissions and 1,200 fewer emergency room visits for asthma each year, 350,000 fewer absences from work and school, and 155,300 fewer respiratory illnesses in children annually. 72 FR 20586, 20587.

2. Implementing the $PM_{2.5}$ NAAQS

a. Designations

The process for designating areas either attaining or not attaining following promulgation of a new or revised NAAQS is found in CAA section 107(d). Under this section, each state governor or tribal leader has an opportunity to recommend air quality designations, including the appropriate boundaries for areas to EPA. Under CAA section 107, state and tribal recommendations are due within one year of promulgation of a new or revised NAAQS. In the case of the 1997 $PM_{2.5}$ standards, however, Congress amended section 107 to extend the schedule for EPA to initiate the designations process until three calendar years of air quality data, measured at Federal Reference Method monitors, were gathered. See section 6102(c)(1)(d) of the Transportation Equity Act for the 21st Century. EPA and state air quality agencies initiated the monitoring process for the $PM_{2.5}$ NAAQS in 1999 and deployed all air quality monitors by January 2001. As a result, the designation process for the 1997 $PM_{2.5}$ NAAQS did not begin until 2004.

By no later than 120 days prior to promulgating designations, EPA is required to notify states or tribes of any intended modifications to their boundaries that EPA deems necessary. States and tribes then have an opportunity to provide a demonstration as to why the proposed

modifications suggested by EPA are inappropriate. CAA section 107(d(1)(B)(ii). Whether or not a state or tribe provides a recommendation, EPA must promulgate the designation that it deems appropriate.

In April 2003, EPA requested that California submit its designation recommendations, based on ambient air quality data from 2001 to 2003, and supporting documentation by February 15, 2004. California submitted its recommendations on February 11, 2004. See Letter, Catherine Witherspoon, CARB, to Wayne Nastri, EPA-Region 9, February 11, 2004. On December 17, 2004, EPA issued final $PM_{2.5}$ designations for areas violating the 1997 standards, including the San Joaquin Valley air basin. They were published in the **Federal Register** on January 5, 2005 (70 FR 944) and became effective on April 5, 2005. The designations are codified at 40 CFR part 81, subpart C.[2]

The designation of an area as nonattainment starts the process whereby a state or tribe must develop an implementation plan that includes, among other things, a demonstration showing how it will attain the ambient standards by the attainment dates required in the CAA. Under section 172(b) for $PM_{2.5}$, states have up to three years after final designations to submit their SIPs to EPA. The SIPs for the 1997 $PM_{2.5}$ SIP were due on April 5, 2008, three years after the effective date of the designations.

b. $PM_{2.5}$ Planning Requirements

In order to assist states in developing effective plans to address their $PM_{2.5}$ nonattainment problem, EPA issued the Clean Air Fine Particulate Implementation Rule, also known as the $PM_{2.5}$ implementation rule. 72 FR 20586 (April 25, 2007), codified at 40 CFR part 51, subpart Z. We proposed this rule on November 1, 2005 at 70 FR 65984. We issued this rule in accordance with the statutory requirements of the CAA set forth in subpart 1 of Part D of Title 1, *i.e.*, sections 171–179B.

The $PM_{2.5}$ implementation rule covers most CAA requirements for $PM_{2.5}$ state implementation plans. A list of these CAA requirements, the corresponding provision in the $PM_{2.5}$ implementation rule and preamble are given in Table IA-1 below.

[2] On November 13, 2009, EPA designated the SJV, along with other areas in the Country, as nonattainment for the 2006 24-hour $PM_{2.5}$ standards. 74 FR 58688. California is now required to submit a plan demonstrating attainment of the 35 $\mu g/m^3$ 24-hour standards by December 14, 2012. 74 FR 58688, 58689. The 2008 $PM_{2.5}$ Plan we are reviewing in this TSD addresses only the 1997 24-hour $PM_{2.5}$ standards of 65 $\mu g/m^3$ and annual standards of 15 $\mu g/m^3$.

Table IA-1
CAA Requirements for $PM_{2.5}$ Attainment State Implementation Plans

CAA Section	$PM_{2.5}$ Implementation Rule		Description	TSD
	Rule	Preamble		
172(a)(2)(A)	§ 51.1 004	20600-20602	Attainment date and attainment date extensions	II.E.
172(b)	§ 51.1002(a)	20599-50600	SIP submittal date	I.B.3.
172(c)(1)	§ 51.1010	20609-20633	Reasonably available control measures (including reasonably available control technology)	II.D.
172(c)(1)	§ 51.1007(a)	20601-20602	Demonstration of expeditious attainment	II.F.
172(c)(2)	§ 51.1009	20633-20640	Reasonable further progress	II.H.
172(c)(3)	§ 51.1008	20647-20651	Emissions inventory	II.A.
172(c)(6)	§ 51.1007(b) § 51.1010(b)	20601-20602 20658-20660	Enforceable limitation limits, other control measures, means or techniques and schedules and timetables for compliance as necessary for attainment	II.D. & F.
172(c)(7)	§ 51.1002(b)	20600	CAA section 110(a)(2) requirements	N/A
172(c)(9)	§ 51.1012	20642-20645	Contingency measures for failure to attain or make reasonable further progress	II.J.
302(g)	§ 51.1002(c)	20589-20597	$PM_{2.5}$ precursors to be evaluated for control	II.C.
172(c)(1)	§ 51.1007(b)	20629	Timing of emissions reductions for attainment	II.D. & F.
176(c)	§ 93.118(e)(4)	20645-20646	Motor vehicle emissions budgets	I.D.
172(c)(2) & (6)	§ 51.1011	20640	Mid-course review	II.I.
110(a)(2)(K)	§ 51.1007(a), § 51.112, and Appendix W	20605-20609	Air Quality Modeling	II.F.

In June 2007, a petition to the EPA Administrator was filed on behalf of several public health and environmental groups requesting reconsideration of four provisions in the $PM_{2.5}$ implementation rule. See Earthjustice, "Petition for Reconsideration in the Matter of the Final Clean Air Fine Particulate Implementation Rule, EPA Docket No. OAR-2003-0062," June 25, 2007. These provisions are:

1. Presuming that compliance with the (now remanded) Clean Air Interstate Rule satisfies the NO_x and SO_2 RACT requirements for electric generating units (EGUs). 72 FR 20586 at 20623-20628.

2. Allowing states to defer establishing emissions limits for condensable PM until January 1, 2011. 72 FR 20586 at 20652 (codified at 40 CFR § 51.1002(c)).

3. Revising the criteria for analyzing the economic feasibility of RACT from a presumption that a given source must bear a cost similar to other sources to a consideration of whether the cost of a measure is reasonable for the regulated entity to bear, in light of benefits. 72 FR 20586 at 20619-20620.

4. Allowing states to use emissions reductions from outside of the nonattainment area to demonstration RFP. 72 FR 20586 at 20636. EPA granted the petition for this provision on May 13, 2010. Letter, Gina McCarthy, Assistant Administrator for Air and Radiation, EPA, to David Baron and Paul Cort, Earthjustice, May 13, 2010.

The disputed provisions of the $PM_{2.5}$ implementation rule are, for the most part, not relevant to today's proposal because California did not rely on them in developing the $PM_{2.5}$ plan for the San Joaquin Valley. We address each of these provisions later in this TSD: the first three in section II.D. (RACM/RACT) and the fourth in section II.H. (RFP).

B. $PM_{2.5}$ Air Quality in the San Joaquin Valley

The San Joaquin Valley $PM_{2.5}$ nonattainment area is located in the southern part of California's Central Valley. It is home to almost 4 million people and is the nation's leading agricultural area. Stretching over 250 miles from north to south and averaging 80 miles wide, it is partially enclosed by the Coast Mountain range to the west, the Tehachapi Mountains to the south, and the Sierra Nevada range to the east. In total, the SJV $PM_{2.5}$ nonattainment area encompasses over 23,000 square miles and includes all or part of eight counties: San Joaquin, Stanislaus, Merced, Madera, Fresno, Tulare, Kings, and the valley portion of Kern. See Figure IB-3. The local air district is the San Joaquin Valley Air Pollution Control District (SJVAPCD or District).

1. $PM_{2.5}$Levels in the SJV

Annual and 24-hour $PM_{2.5}$ levels in the urban Bakersfield area in the southern SJV are the highest recorded in the United States at 22.6 µg/m^3 and 70 µg/m^3 for the 2007-2009 period.[3] Since comprehensive monitoring began for $PM_{2.5}$ in the SJV in the late 1990, the area has seen a significant decline in ambient levels, especially in the 2000-2005 time period. See Figures IB-1 and IB-2. However, over the past five years, $PM_{2.5}$ concentrations have increased at most monitoring sites in the Valley. Figure IB-3 is a map of the current monitoring system in the SJV.

[3] See EPA, Air Quality Subsystem, Design Value Report, August 9, 2010. These values are the highest design values in the SJV. A design value is an ambient concentration calculated using a specific methodology from monitored air quality data and is used to compare an area's air quality to a NAAQS. The methodologies for calculating design values for the annual and 24-hour $PM_{2.5}$ NAAQS are found in 40 CFR 50 Appendix N Sections 1(c)(1) 1(c)(2), respectively.

Figure IB-1

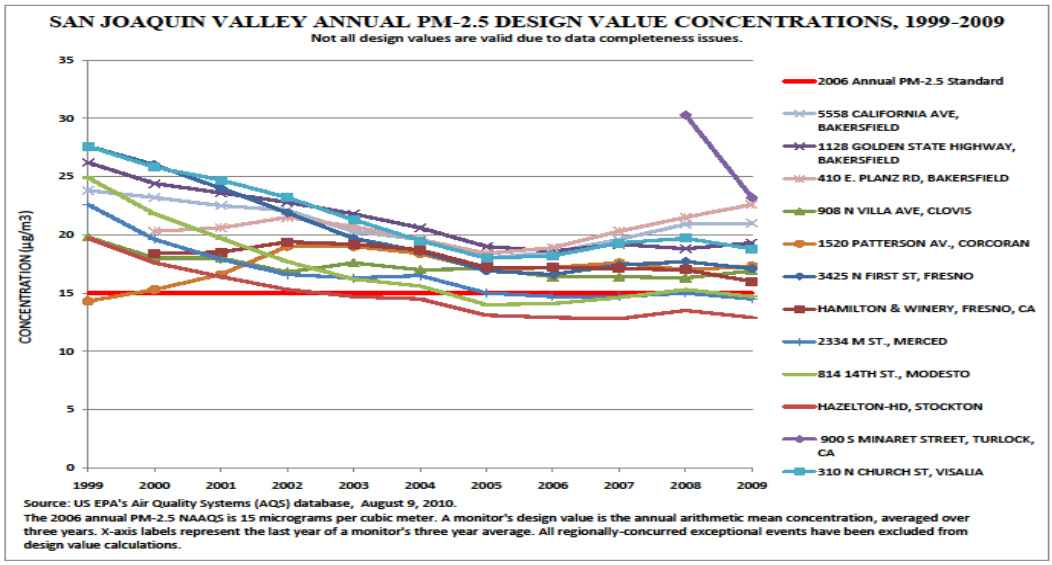


Figure IB-2

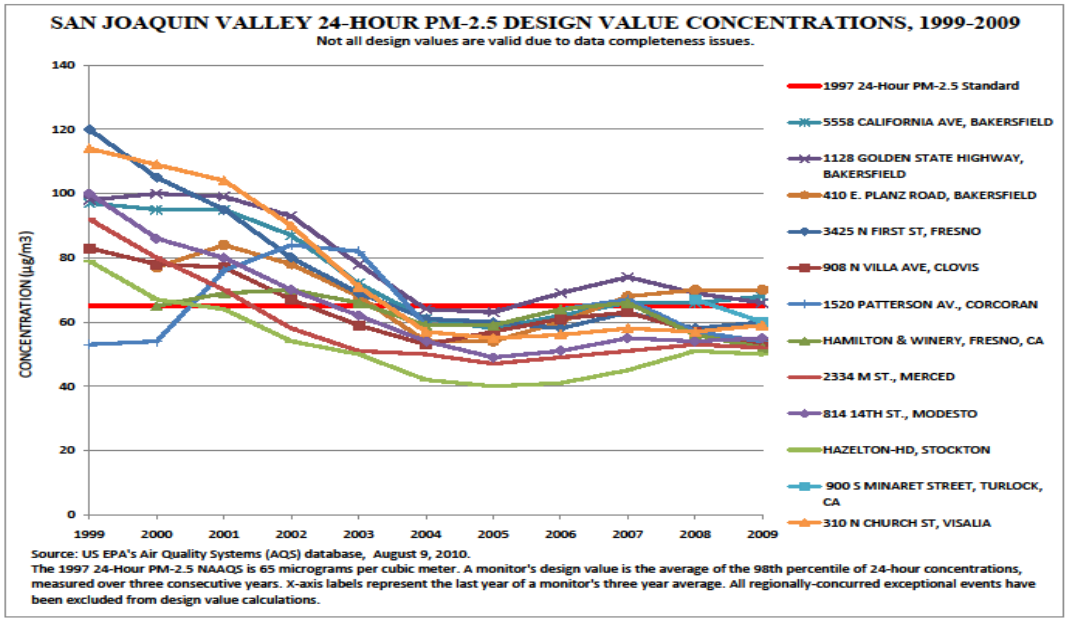
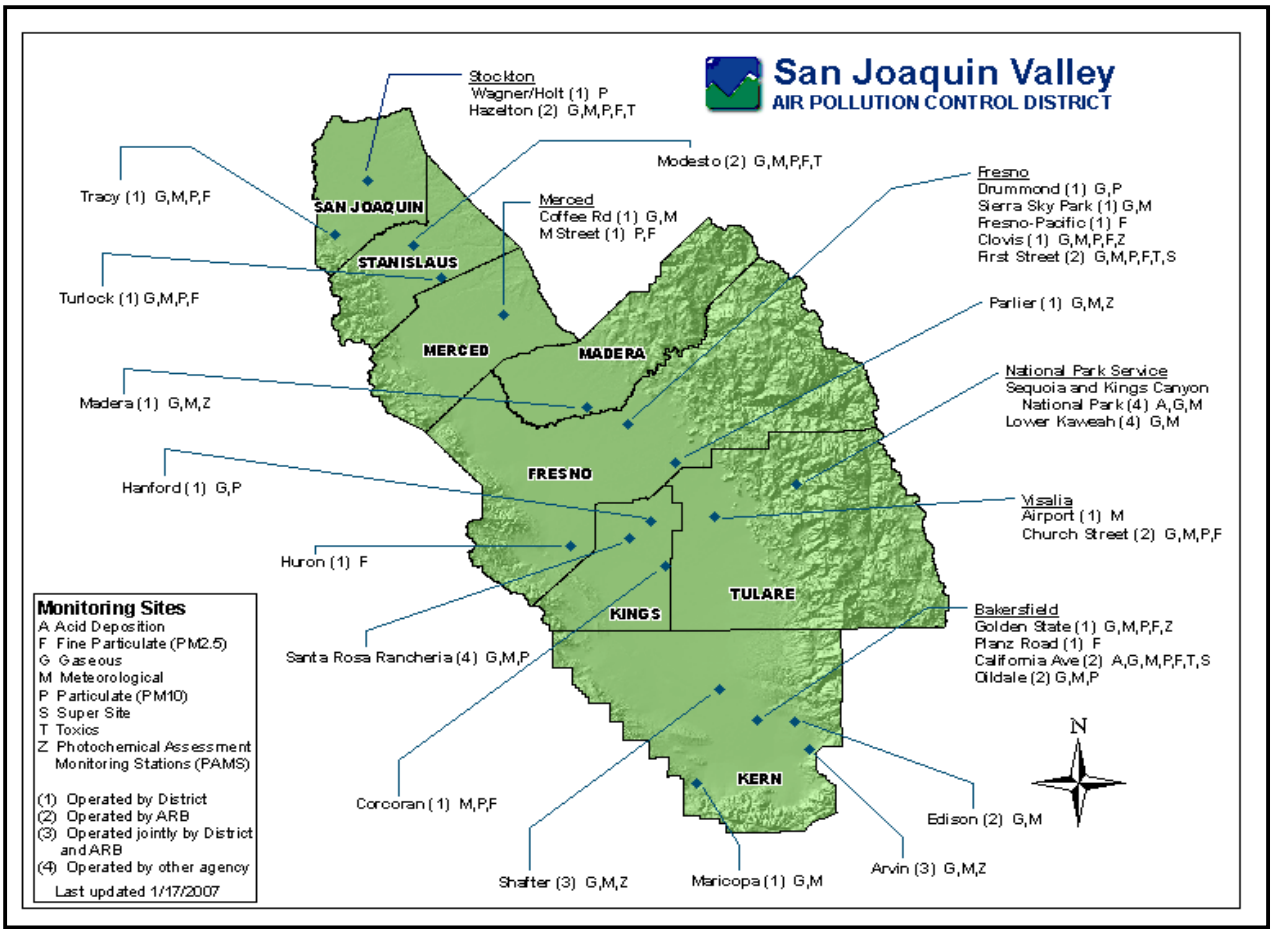


Figure IB-3 – Ambient Monitoring Locations In the San Joaquin Valley



Source: SJV 2008 $PM_{2.5}$ Plan, Figure 1-4.

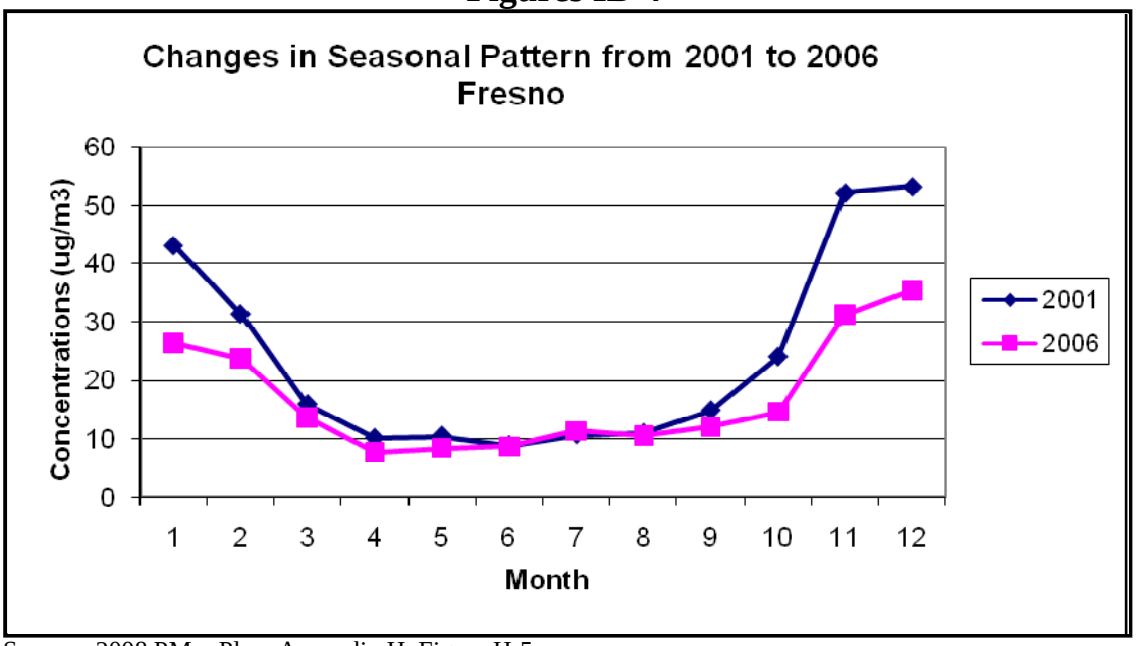
2. Seasonality and Chemical Composition of $PM_{2.5}$ in the SJV

$PM_{2.5}$ in the air is a complex mixture of components. Common components include: nitrate (NO_3); sulfate (SO_4); ammonium; elemental carbon; a great variety of organic compounds; and inorganic material (including metals, dust, sea salt, and other trace elements) generally referred to as crustal material, although it may contain material from other sources. Primary particles are emitted directly into the air as a solid or liquid particle (e.g., elemental carbon from diesel engines or fire activities, or condensable organic particles from gasoline engines). Secondary particles (e.g., nitrate and sulfate) form in the atmosphere as a result of chemical reactions between precursor pollutants such as NO_x, SO_2, VOC, and ammonia. Understanding the compounds that make up an area's $PM_{2.5}$ problem is necessary in order to develop control strategies that are effective for attaining the NAAQS. 72 FR 20586 at 20589.

In the SJV, the levels and nature of $PM_{2.5}$ vary by season. See Figures IB-4 to IB-7. Higher $PM_{2.5}$ concentrations occur during the winter, between late November and February, when ambient $PM_{2.5}$ is dominated by ammonium nitrate, formed from NO_x and ammonia

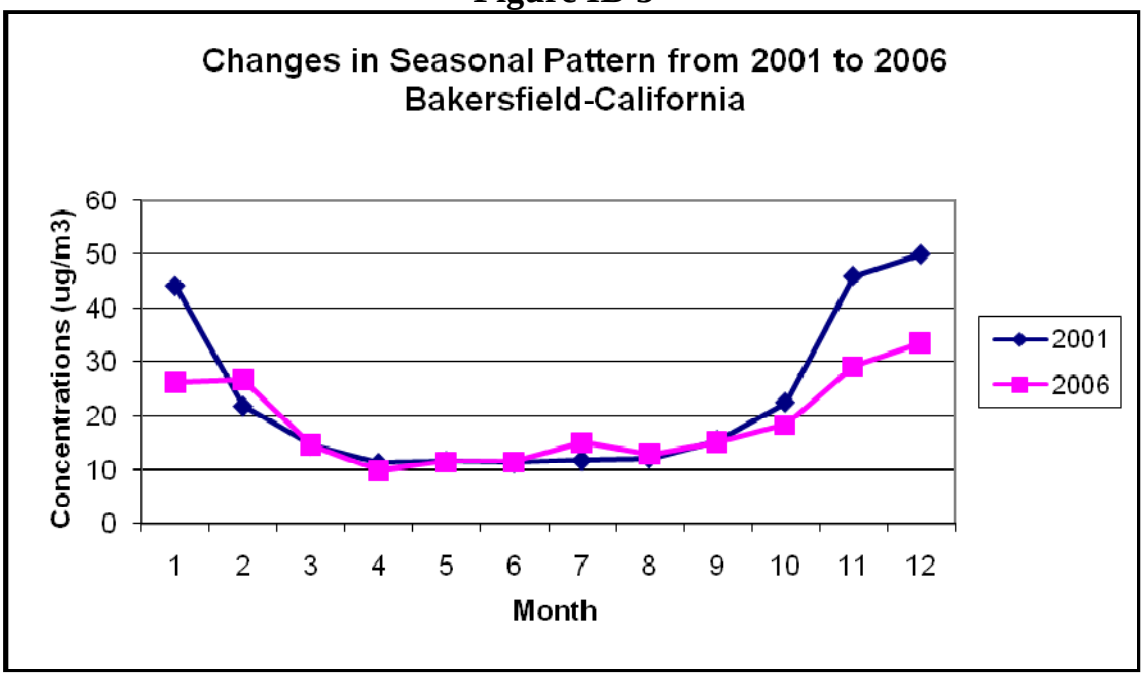
emissions, and directly-emitted particulates, such as wood smoke. During the winter, the SJV experiences extended periods of stagnant weather with cold, damp, foggy conditions; conditions that are conducive to the formation of secondary ammonium nitrate particulates and encourage wood burning. During the summer, $PM_{2.5}$ levels generally remain below 15 µg/m^3, the level of the annual standards.

Figures IB-4



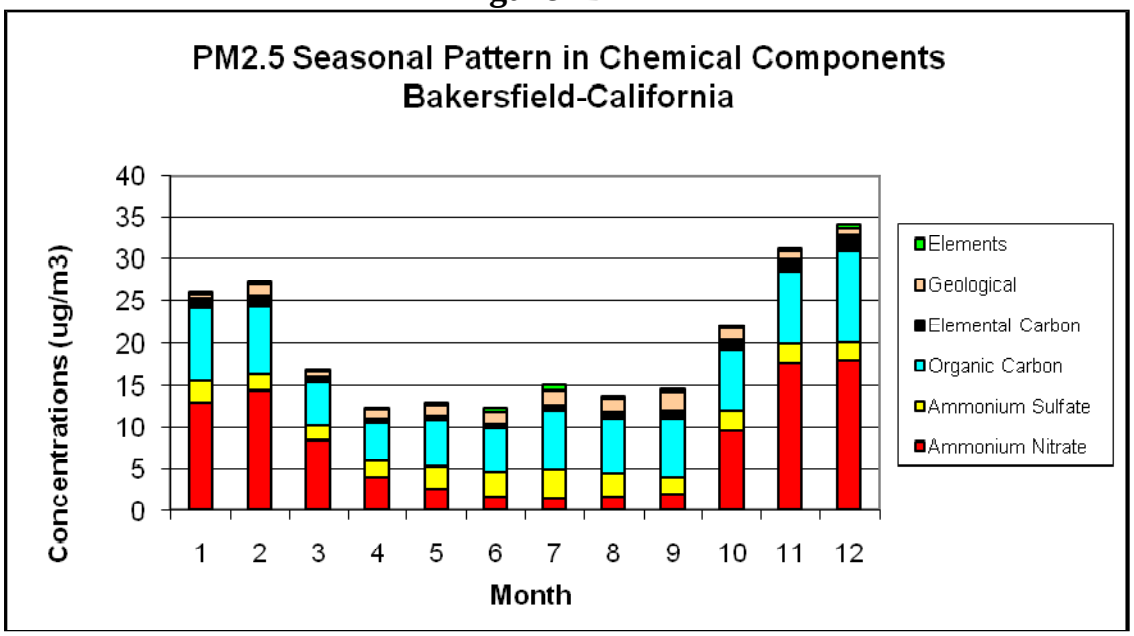
Source: 2008 $PM_{2.5}$ Plan, Appendix H, Figure H-5.

Figure IB-5



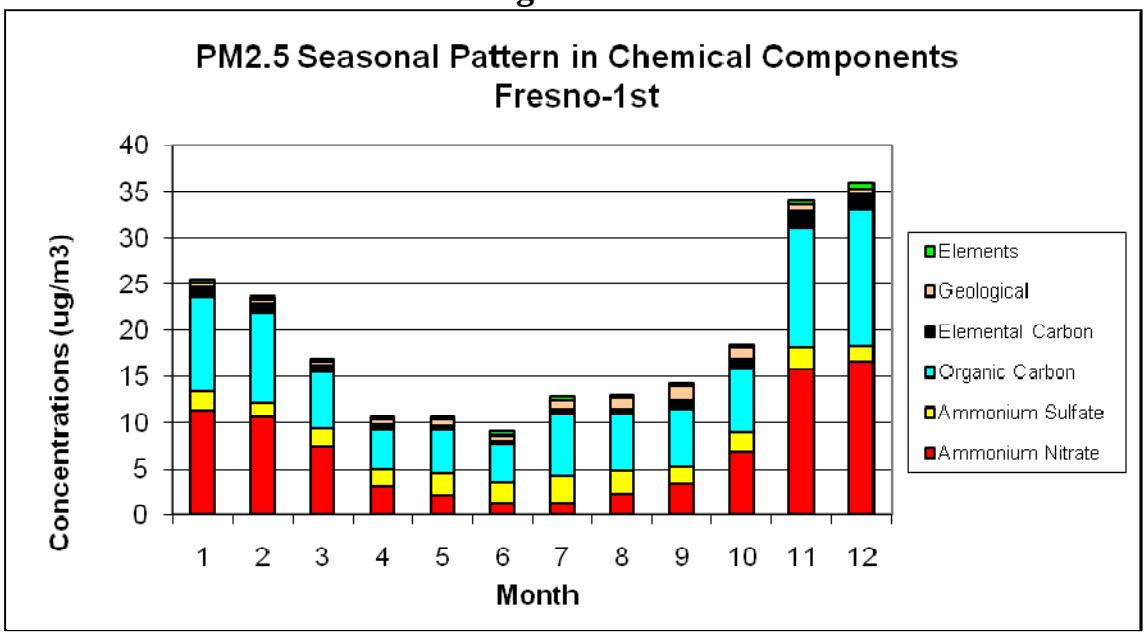
Source: 2008 $PM_{2.5}$ Plan, Appendix H, Figure H-4.

Figure IB-7



Source: 2008 $PM_{2.5}$ Plan, Appendix H, Figure H-6.

Figure IB-8



Source: 2008 $PM_{2.5}$ Plan, Appendix H, Figure H-7.

C. California's Submittals Constituting the SJV $PM_{2.5}$ State Implementation Plan

Four submittals or parts of submittals comprise the SJV $PM_{2.5}$ attainment state implementation plan. We will refer to these four submittals or parts of submittals collectively as the SJV $PM_{2.5}$ [attainment] SIP:

1. *2008 $PM_{2.5}$ Plan*, adopted on April 30, 2010 by the SJVAPCD and on May22, 2008 by CARB, submitted with the adopting resolutions and other supporting documentation by CARB on June 30, 2008. See San Joaquin Valley Unified Air Pollution Control District Governing Board Resolution: In the Matter of Adopting the San Joaquin Valley Unified Air Pollution Control District 2008 $PM_{2.5}$ Plan, April 30, 2008; CARB Resolution No. 08-28, May 22, 2008; and letter, James N. Goldstene, Executive Officer, CARB to Wayne Nastri, Regional Administrator, EPA Region 9, June 30, 2008 with enclosures. This document will be referenced in this TSD and the **Federal Register** proposal as the 2008 $PM_{2.5}$ Plan, the SJV 2008 $PM_{2.5}$ Plan, or simply the Plan.

2. *Proposed State Strategy for California's 2007 State Implementation Plan*, as amended and adopted on September 27, 2007 by CARB, submitted with the adopting resolution and other supporting documentation by CARB on November 16, 2007. See CARB Resolution No. 07-28, September 27, 2007 and letter, James N. Goldstene, Executive Officer, CARB, to Wayne Nastri, Regional Administrator, EPA Region 9, November 16, 2007, with enclosures. This document will be referenced in this TSD and the **Federal Register** proposal as the 2007 State Strategy.

3. *Status Report on the State Strategy for California's 2007 State Implementation Plan (SIP) and Proposed Revisions to the SIP Reflecting Implementation of the 2007 State Strategy*, adopted on April 24, 2009 by CARB, submitted with the adopting resolution and other supporting documentation by CARB on August 12, 2009.[4] See CARB Resolution No. 09-34, April 24, 2009 and letter, James N. Goldstene, Executive Officer, CARB, to Laura Yoshii, Acting Regional Administrator, EPA Region 9, August 12, 2009 with enclosures. This document will be referenced in this TSD and the **Federal Register** proposal as the 2009 State Strategy Status Report.

4. *2008 $PM_{2.5}$ Plan Amendment to Extend the Rule 4905 Amendment Schedule*, adopted on June 17, 2010 by the SJVAPCD, submitted with adopting resolution and other supporting documentation by CARB on September 15, 2010. See SJVUAPCD Governing Board Resolution No. 10-06-18, June 17, 2010 and letter, James N. Goldstene, Executive Officer, CARB to Jared Blumenfeld, Regional Administrator, EPA Region 9, September 15, 2010, with enclosures .

Future references to the 2007 State Strategy and the 2008 $PM_{2.5}$ Plan in this TSD and the **Federal Register** proposal will be to the Strategy and Plan as revised in 2009 and 2010,

[4] Only pages 11-27 of the 2009 State Strategy Status Report are submitted as a SIP revision. The balance of the report is for informational purposes only. See Attachment A to the CARB Resolution, No. 09-34.

respectively, unless explicitly noted otherwise. We will also refer to the 2007 State Strategy as revised in 2009 as the revised 2007 State Strategy.

In addition to these plan submittals, the District and CARB have adopted and submitted numerous rules that reduce emissions in the San Joaquin Valley and contribute to progress in meeting the $PM_{2.5}$ NAAQS in the area. See Appendices A and B of this TSD.

D. Public Notice and Hearing Requirements for and Completeness of SIP Submittals

1. Public Notice and Hearing Requirements for SIP Submittals

CAA sections 110(a) and (l) require a state to provide reasonable public notice and hearing prior to the adoption and submittal of a SIP or SIP revision. To meet this requirement, every SIP submittal should include evidence that adequate public notice was given and a public hearing was held consistent with EPA's implementing regulations in 40 CFR § 51.102.

Both the SJVAPCD and CARB have satisfied applicable statutory and regulatory requirements for reasonable public notice and hearing prior to adoption and submittal of the 2008 $PM_{2.5}$ Plan. The District conducted public workshops, provided public comment periods, and held a public hearing prior to the adoption of the Plan on April 30, 2008. See SJVUAPCD Governing Board Resolution, page 3. CARB also provide the required public notice and opportunity for public comment prior to its May 22, 2008 public hearing on the Plan. See CARB, Notice of Public Meeting to Consider the Approval of the SJV 2008 $PM_{2.5}$ SIP, April 25, 2008. The District also provided the required public notice and hearing on the 2010 revision to the Plan. See SJVAPCD Governing Board Resolution No. 10-06-18, June 17, 2010.

CARB also conducted public workshops, provided public comment periods, and held a public hearing prior to its adoption of the 2007 State Strategy on September 27, 2007. See CARB, Notice of Public Meeting to Consider Approval of the Proposed State Strategy for California's State Implementation Plan (SIP) for the Federal 8-Hour Ozone and $PM_{2.5}$ Standards, May 7, 2007 and CARB Resolution No. 07-28, September 27, 2007. CARB also provide the required public notice, opportunity for public comment, and public hearing prior to its April 24, 2009 adoption of revisions to the Strategy. See CARB, Notice of Public Hearing to Consider a Status Report on the State Strategy for California's 2007 State Implementation Plan and Consider Approval of a Proposed Revision to the State Implementation Plan Reflecting Implementation of the 2007 State Strategy, March 24, 2009 and CARB Resolution No. 09-34, April 24, 2009.

Each of the four SIP submittals that comprise the SJV $PM_{2.5}$ attainment state implementation plan include proof of publication for notices of SJVAPCD and CARB public hearings as evidence that all hearings were properly noticed.

2. Completeness Determinations on SIP Submittals

CAA section 110(k)(1)(B) requires EPA to determine whether a SIP submittal is complete within 60 days of receipt. This section also provides that any plan that we have not affirmatively determined to be complete or incomplete will become complete six months after the day of submittal by operation of law. A completeness review allows us to determine if the submittal includes all the necessary items and information we need to act on it.

We make completeness determinations using criteria we have established in 40 CFR part 51, Appendix V. These criteria fall into two categories: administrative information and

technical support information. The administrative information provides documentation that the state has followed basic administrative procedures during the SIP-adoption process and thus we have a legally-adopted SIP revision in front of us. The technical support information provides us the information we need to determine the impact of the proposed revision on attainment and maintenance of the air quality standards.

We notify a state of our completeness determination by letter unless the submittal became complete by operation of law. A finding of completeness does not approve the submittal as part of the SIP nor does it indicate that the submittal is approvable. It does start the 12 month clock we have to act on the SIP submittal. See CAA section 110(k)(2).

The June 30, 2008 submittal of the 2008 $PM_{2.5}$ Plan went complete by operation of law on December 30, 2008. We found the 2010 revision to the Plan complete on September 23, 2010. See letter, Deborah Jordan, EPA-Region 9 to James Goldstene, CARB, September 23, 2010. The November 16, 2007 submittal of the 2007 State Strategy and the August 12, 2009 submittal of the 2009 revisions to the Strategy went complete by operation of law on May 16, 2008 and February 12, 2010, respectively.

E. Adequacy of the Motor Vehicle Emissions Budgets in the SJV 2008 $PM_{2.5}$ Plan

1. Requirements for Motor Vehicle Emissions Budgets

CAA section 176(c) requires Federal actions in nonattainment and maintenance areas to conform to the SIP's goals of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of the standards. Conformity to the SIP's goals means that such actions will not: (1) cause or contribute to violations of a NAAQS, (2) worsen the severity of an existing violation, or (3) delay timely attainment of any NAAQS or any interim milestone.

Actions involving Federal Highway Administration (FHWA) or Federal Transit Administration (FTA) funding or approval are subject to the EPA's transportation conformity rule, codified at 40 CFR part 93, subpart A. Under this rule, metropolitan planning organizations (MPOs) in nonattainment and maintenance areas coordinate with state and local air quality and transportation agencies, EPA, FHWA, and FTA to demonstrate that an area's regional transportation plans (RTP) and transportation improvement programs (TIP) conform to the applicable SIP. This demonstration is typically done by showing that estimated emissions from existing and planned highway and transit systems are less than or equal to the motor vehicle emissions budgets (budgets) contained in the SIP. An attainment, maintenance, or RFP SIP should include budgets for the attainment year, each required RFP year or last year of the maintenance plan, as appropriate. Budgets are generally established for specific years and specific pollutants or precursors.

$PM_{2.5}$ attainment and RFP plans should identify budgets for direct $PM_{2.5}$ and $PM_{2.5}$ attainment plan precursors. All direct $PM_{2.5}$ SIP budgets should include direct $PM_{2.5}$ motor vehicle emissions from tailpipe, brake wear, and tire wear. A state must also consider whether re-entrained paved and unpaved road dust or highway and transit construction dust are significant contributors and should be included in the direct $PM_{2.5}$ budget. See 40 CFR § 93.102(b) and § 93.122(f) and the conformity rule preamble at 69 FR, 40004, 40031–40036 (July 1, 2004). In determining whether the on-road mobile source emissions of a $PM_{2.5}$ attainment plan precursor are significant, state and local agencies should use the criteria for insignificance findings provided in 40 CFR § 93.109(k). See also 70 FR 24280, 24282-24287 (May 6, 2005).

Before an MPO may use budgets in a submitted SIP, EPA must first determine that the budgets are adequate. In order for us to find the budgets adequate and eventually approvable, the submittal must meet the conformity adequacy requirements of 40 CFR § 93.118(e)(4) and be approvable under all pertinent SIP requirements. The budgets must reflect all of the motor vehicle control measures contained in the attainment and RFP demonstrations. See 40 CFR § 93.118(e)(4)(v).

2. Motor Vehicle Emissions Budgets in the SJV 2008 $PM_{2.5}$ Plan

The SJV 2008 $PM_{2.5}$ Plan included budgets for direct $PM_{2.5}$ and NO_x for the attainment year of 2014 and the RFP years of 2009 and 2012. See 2008 $PM_{2.5}$ Plan, Section 7.2.2 and Appendix C. The direct $PM_{2.5}$ budgets included tailpipe, brake wear, and tire wear emissions but did not include paved road, unpaved road, and road construction dust because these were determined to be insignificant contributors to $PM_{2.5}$ levels in the Valley. 2008 $PM_{2.5}$ Plan, p. 7-5. No budgets for SO_2 were included because on-road emissions of SO_2 were also considered insignificant. *Id.* No budgets were included for either VOC or ammonia because neither was considered a $PM_{2.5}$ attainment plan precursor in the 2008 $PM_{2.5}$ Plan. See section II.C of this TSD.

3. April 23, 2010 Budget Adequacy/Inadequacy Finding

On April 23, 2010, we notified CARB that we had found the budgets in the 2008 $PM_{2.5}$ Plan for the RFP milestone years 2009 and 2012 were adequate and that the MVEBs for the attainment year of 2014 were inadequate for transportation conformity purposes. We determined that the attainment year budgets were inadequate because they lacked specificity or enforceability of the emissions reductions relied on to demonstration attainment and therefore did not meet the requirements of our adequacy criteria at 40 CFR § 93.118(e)(4)). See letter Deborah Jordan, EPA Region 9, to James Goldstene, CARB, "RE: Adequacy Status of San Joaquin Valley $PM_{2.5}$ Reasonable Further Progress and Attainment Plan Motor Vehicle Emissions Budgets," April 23, 2010. Our finding is document below in Table IE-1. below. We published a notice of our findings at 75 FR 26749 (May 12, 2010). The finding is available at EPA's transportation conformity website, www.epa.gov/otaq/stateresources/transconf/pastsips.htm.

4. Proposed Action on the MVEBs

The adequacy determination was based on our preliminary review of the plan. During our subsequent more in depth review of the Plan, as documented in section II.H. of this TSD, we have determined that the 2008 $PM_{2.5}$ Plan does not provide for reasonable further progress as required by CAA section 172(c)(2). As a result of this determination, we are proposing to disapprove the budgets for the RFP years. Specifically, the budgets, when considered together with all other emission sources, are inconsistent with applicable requirements for reasonable further progress and attainment. See Table IE-1.

During our subsequent in-depth review of the 2008 $PM_{2.5}$ Plan, as documented in section II.C. of this TSD, we also determined that reductions in emissions of VOC may be effective at reducing $PM_{2.5}$ levels in the SJV. As such, EPA is proposing to find that VOC is a $PM_{2.5}$ attainment plan precursor that should be addressed in the SJV $PM_{2.5}$ SIP. Should we finalized this determination, the revised $PM_{2.5}$ SIP would need to include budgets for VOC for the RFP and attainment years. The 2008 Plan does not currently include either RFP or attainment year VOC MVEBs.[5]

[5] Note that the RFP budgets that EPA found adequate on April 23, 2010 remain adequate for transportation conformity purposes unless and until a final action finding the budgets inadequate and disapproving them becomes effective. In addition, no conformity analysis is required for VOC unless and until EPA or the State makes a final determination that VOC is a $PM_{2.5}$ attainment plan precursor in the SJV.

We are proposing to disapprove the budgets for the attainment year of 2014, which we have already found to be inadequate, based on our proposed determination that the SJV 2008 $PM_{2.5}$ Plan does not provide for attainment. See sections II.C. and II. G. of this TSD.

Table IE-1
Revised Adequacy Evaluation of the Motor Vehicle Emissions Budget in the SJV 2008 $PM_{2.5}$ Plan
September 2010

Adequacy Review Criteria (40 CFR part 93)		Is Criterion Satisfied?	Reference in SIP Document/Comments
Sec. 93.118(e)(4)(iv)	The motor vehicle emissions budget(s), when considered together with all other emission sources, is consistent with applicable requirements for reasonable further progress and attainment.	**N (Revised) /N**	EPA has concluded that the budgets for the years 2009 and 2012, when considered together with all other emission sources, are not consistent with the requirement to demonstrate reasonable further progress for the annual and 24-hour $PM_{2.5}$ standards. This finding is based on review of the Plan's RFP demonstrations in Chapter 8 which do not show a generally linear reduction in emissions as required by the $PM_{2.5}$ implementation rule (See 40 CFR § 51.1009). Other relevant materials include the District's control measure strategy in chapter 6 of the 2008 SJV $PM_{2.5}$ Plan. The attainment year 2014 motor vehicle emissions budgets reflect emissions reductions from CARB commitments to achieve $PM_{2.5}$ and NO_x reductions in the SJV and not from specified control measures that have been drafted or adopted in regulatory form. The budgets for $PM_{2.5}$ do not include emissions from re-entrained road dust (paved and unpaved) or road/transit construction activities because neither are significant contributors to $PM_{2.5}$ emissions in the SJV. See SJV $PM_{2.5}$ Plan, pp. 7-5 & 7-6. The SJV $PM_{2.5}$ Plan includes budgets only for direct $PM_{2.5}$ and NO_x. It does not include budgets for VOC, which EPA has proposed to find as a $PM_{2.5}$ attainment plan precursor for the SJV. Should EPA finalize this determination, VOC should be addressed in the RFP and attainment demonstrations. The Plan does not include budgets for the other $PM_{2.5}$ precursors because on-road vehicles are an insignificant contributor to $PM_{2.5}$ levels in the SJV (SO_2) or controls on them would be ineffective at reducing $PM_{2.5}$ levels in the SJV (ammonia). See SJV $PM_{2.5}$ Plan, pp. 7-4 & 7-5.

II. Evaluation of the San Joaquin Valley 2008 $PM_{2.5}$ Plan and Revised 2007 State Strategy

A. Emissions Inventories

1. Requirements for Emissions Inventories

CAA section 172(c)(3) requires a state to submit a "comprehensive, accurate, current inventory of actual emissions from all sources of the relevant pollutant." Pursuant to this section, the $PM_{2.5}$ implementation rule requires a state to submit, within three years of the designation of one of its areas as nonattainment, a statewide emissions inventories of direct $PM_{2.5}$ and $PM_{2.5}$ precursors. These inventories should meet the data requirements of EPA's Consolidated Emissions Reporting Rule (CERR, codified at 40 CFR part 51 subpart A). 40 CFR § 51.1008(a)(1).[6] Direct $PM_{2.5}$ includes condensable PM. 40 CFR § 51.1000 . $PM_{2.5}$ precursors are NO_X, SO_2, VOC, and ammonia (40 CFR § 51.1000). The state must report inventories for each, even if it has determined that control of any of these precursors is not necessary for attainment. 40 CFR § 51.1008(a)(1) and 72 FR 20586 at 20648.

The $PM_{2.5}$ implementation rule also requires a state to submit a baseline emissions inventory as part of the attainment and RFP demonstrations in its $PM_{2.5}$ attainment plan. The base year for this inventory should be calendar year 2002 or other suitable year for areas initially designated nonattainment for the $PM_{2.5}$ in 2004-2005. 40 CFR § 51.1008(b). The baseline inventory should be appropriate for the geographical area addressed by the $PM_{2.5}$ attainment plan and consistent with applicable EPA guidance. 72 FR 20586 at 20648. A state is also required to submit any additional emissions inventory information needed to support its attainment and RFP demonstrations. 72 FR 20586 at 20648 and 40 CFR § 51.1008(a)(2).

EPA has issued the "Emissions Inventory Guidance for Implementation of Ozone and Particulate Matter National Ambient Air Quality Standards (NAAQS) and Regional Haze Regulations," EPA–454/R–05–001, November 2005 (available at *www.epa.gov/ttn/ chief/eidocs/eiguid/index.html).* EPA developed this guidance document to complement the CERR and to provide specific guidance on how to develop baseline emissions inventories for 8-hour ozone, $PM_{2.5}$, and regional haze SIPs.

The emissions inventories required under the $PM_{2.5}$ implementation rule (as opposed to the CERR) are SIP provisions that must be approved by EPA under CAA section 110(k) and are subject to public hearing requirements pursuant to sections 110(a)(2) and (l). A state should include in its SIP submittal documentation explaining how the emissions data were calculated. In estimating mobile source emissions, a state should use the latest emissions models and planning assumptions available at the time the SIP is developed. 72 FR 20586 at 20647. For

[6] In late 2008, EPA promulgated the Air Emissions Reporting Rule (AERR) at 73 FR 76539 (December 17, 2008). The AERR updated the CERR reporting requirements by consolidating and harmonizing new emissions reporting requirements with pre-existing sets of reporting requirements under the NO_X SIP Call (which does not apply to California). Because this AERR was not finalized until after the submittal of the SJV $PM_{2.5}$ Plan, its data requirements, in that they differ from the CERR requirements, do not apply to the Plan.

California, the latest emissions model means the then most recently EPA approved version of EMFAC. Currently this is EMFAC2007. See 68 FR 3464 (January 18, 2008).

2. Emissions Inventories in the SJV $PM_{2.5}$ SIP

Note: We discuss the CARB's statewide inventory to provide background to our evaluation of the emissions inventories in the SJV 2008 $PM_{2.5}$ Plan. We are not proposing any SIP action on the statewide inventory here, only on the SJV inventories. EPA will address the statewide inventory in a separate rulemaking.

CARB submitted statewide inventories for direct $PM_{2.5}$ and $PM_{2.5}$ precursors (except for ammonia) as part of the 2007 State Strategy. See Appendix A for the emissions inventory output tables and Appendix F for documentation of the emissions inventory. Inventories are provided for the base year of 2002 and baseline years of 2005, 2006, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2017, 2018, 2020, and 2023.[7] These statewide emissions inventories are assembled and maintained by CARB in the California Emissions Inventory Development and Reporting System (CEIDARS) and the California Emission Forecasting and Planning Inventory System (CEFS) databases. Both systems are described in Appendix F. In 2004, CARB submitted the 2002 base year inventory including all necessary data elements to EPA as required by the CERR.

The inventories in Appendix A are summer season planning inventories on which the 2007 State Strategy is based. Baseline inventories incorporate reductions from control measures adopted prior to December 2006. 2008 $PM_{2.5}$ Plan, p. B-1 and 2007 State Strategy, Appendix A, p. 1. Specific adjustments for State and District rules adopted in the 2004 to 2006 time period, as well as adjustments to among other things, heavy duty truck VMT in 2005 and pesticide emissions, are described in the introductory section to Appendix A and can also be found in Appendix B to the December 2007 draft of the SJV 2008 $PM_{2.5}$ Plan.

The baseline planning inventories for direct $PM_{2.5}$ and all $PM_{2.5}$ precursors (including ammonia) for the SJV $PM_{2.5}$ nonattainment area together with additional documentation for the inventories are found in Appendix B of the SJV 2008 $PM_{2.5}$ Plan. Both average winter day and average annual day inventories are provided for the year 2005 (the reference year for the air quality modeling) and each year from 2009 to 2014. A winter inventory is provided because the majority of high $PM_{2.5}$ days in the SJV occur during the winter months between November and February. 2008 $PM_{2.5}$ Plan, Figures H-4 and H-5. The inventories use EMFAC2007 for estimating on-road motor vehicle emissions. 2008 $PM_{2.5}$ Plan, p. B-1. These inventories provide the basis for the control measure analysis and the RFP and attainment demonstrations.

As a starting point for the 2008 $PM_{2.5}$ Plan's inventories, the District used CARB's 2002 base year inventory. 2008 $PM_{2.5}$ Plan, p. B-1. The 2002 inventory was projected to 2005 and future years using CEFSv 1.06. 2008 $PM_{2.5}$ Plan, p. B-1.

[7] The 2007 State Strategy addresses both 8-hour ozone standard and the $PM_{2.5}$ standards; therefore, baseline inventories are given not only for years of importance for $PM_{2.5}$ plans but also ones of importance for 8-hour ozone plans.

All inventories include emissions from point, area, on-road, and non-road sources. None specifically show emissions from non-anthropogenic sources (that is, natural sources) although inventories developed for input into the air quality modeling do include such sources. 2008 $PM_{2.5}$ Plan, p. G-3.

A summary of the baseline planning inventories for the years 2005, 2009, 2012 and 2014 from the 2008 $PM_{2.5}$ Plan is provided in Table A-1 below.

3. Evaluation and Conclusions

The emissions inventories were made available to the public for comment at the same time as the draft 2008 $PM_{2.5}$ Plan and were subject to public hearing as part of final version of the Plan. See SJVAPCD Governing Board Resolution, p. 3.

Consistent with the $PM_{2.5}$ implementation rule, the Plan uses a 2002 base year inventory. When considered together with the inventory documentation in Appendix F of the State Strategy and the air quality modeling documentation in Appendices E-G of the Plan, it contains all the elements required by EPA's emissions inventory guidance. The inventories are based on the best and most current information available at the time the Plan was developed, address all source categories and use the latest EPA-approved version of the State's mobile source emissions model, EMFAC2007.

Based on our evaluation discussed above, we propose to find that the 2002 emissions inventory in the 2007 State Strategy and the 2008 $PM_{2.5}$ Plan meet the CAA section 172(c)(3) requirement for "comprehensive, accurate, current, inventory of actual emissions from all sources of the relevant pollutant" at the time of their submittal in 2008. We also find that the baseline inventories in the SJV 2008 $PM_{2.5}$ Plan provide an adequate basis for the reasonably available control measure, reasonable further progress and attainment demonstrations in the Plan.

Table A-1
Emissions Inventory Summary for the San Joaquin Valley $PM_{2.5}$ Nonattainment Area
(tons per day)

	Annual Average Day				Winter Average Day			
	2005	2009	2012	2014	2005	2009	2012	2014
$PM_{2.5}$								
Stationary Sources	13.3	13.8	14.2	14.4	12.8	13.3	13.7	14.0
Area Sources	51.5	46.8	45.8	45.2	54.6	51.2	49.2	47.9
On-Road Mobile Sources	12.1	11.3	9.9	8.9	12.2	11.4	10.0	9.0
Off-Road Mobile Sources	9.0	7.9	7.2	6.6	8.1	7.0	6.3	5.7
Total	86.0	79.8	77.0	75.0	87.6	82.9	79.1	76.6
Nitrogen Oxides								
Stationary Sources	80.1	62.7	58.7	56.5	71.9	58.5	56.2	55.0
Area Sources	13.5	11.0	10.8	10.7	18.2	16.3	15.9	15.7
On-Road Mobile Sources	327.9	297.4	243.8	206.7	342.1	311.5	255.1	216.0
Off-Road Mobile Sources	153.9	129.7	111.1	102.2	141.0	118.4	101.2	93.4
Total	575.4	500.9	424.4	376.2	573.1	504.7	428.4	380.1
Sulfur Dioxide								
Stationary Sources	20.4	20.6	21.5	22.0	19.6	20.0	20.9	21.4
Area Sources	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8
On-Road Mobile Sources	2.6	0.7	0.7	0.7	2.5	0.7	0.7	0.7
Off-Road Mobile Sources	2.4	0.8	0.8	0.8	2.3	08	0.8	0.8

Table A-1
Emissions Inventory Summary for the San Joaquin Valley $PM_{2.5}$ Nonattainment Area
(tons per day)

	Annual Average Day				Winter Average Day			
	2005	2009	2012	2014	2005	2009	2012	2014
Total	26.4	23.0	23.8	24.5	25.2	22.3	23.1	23.7
Volatile Organic Compounds (VOC)								
Stationary Sources	121.5	121.9	123.9	129.5	101.4	102.0	103.4	107.1
Area Sources	140.7	122.4	125.5	128.0	145.4	127.1	129.6	131.7
On-Road Mobile Sources	94.8	76.5	64.8	57.2	99.7	80.9	68.1	59.9
Off-Road Mobile Sources	62.7	54.3	50.8	48.5	55.7	48.6	45.8	43.9
Total	419.8	375.2	365.0	363.2	402.2	358.6	346.9	342.6
Ammonia								
Stationary Sources	19.8	21.0	22.2	23.0	19.8	21.0	22.2	23.0
Area Sources	355.9	381.9	405.8	423.1	356.9	382.9	406.7	424.0
On-Road Mobile Sources	6.2	5.3	5.0	4.8	6.2	5.3	5.0	4.8
Off-Road Mobile Sources	0	0	0	0	0	0	0	0
Total	382.0	408.3	433.0	451.0	382.9	409.2	433.9	451.8

Source: SJV 2008 $PM_{2.5}$ Plan, Appendix B, Tables B-1 to B-5.

B. Air Quality Modeling

1. Requirements for Air Quality Modeling

The $PM_{2.5}$ implementation rule requires states to submit an attainment demonstration based on modeling results. Specifically, 40 CFR § 51.1007(a) states:

> For any area designated as nonattainment for the $PM_{2.5}$ NAAQS, the State must submit an attainment demonstration showing that the area will attain the annual and 24-hour standards as expeditiously as practicable. The demonstration must meet the requirements of § 51.112 and Appendix W of this part and must include inventory data, modeling results, and emission reduction analyses on which the State has based its projected attainment date. The attainment date justified by the demonstration must be consistent with the requirements of § 51.1004(a). The modeled strategies must be consistent with requirements in § 51.1009 for RFP and in § 51.1010 for RACT and RACM. The attainment demonstration and supporting air quality modeling should be consistent with EPA's $PM_{2.5}$ modeling guidance.[8]

See also 72 FR 20586 at 20665.

Air quality modeling is used to establish emission attainment targets, a combination of emissions of $PM_{2.5}$ and $PM_{2.5}$ precursors that the area can accommodate without exceeding the NAAQS, and to assess whether the proposed control strategy will result in attainment of the standards. Air quality modeling is performed for a base year and compared to air quality monitoring data in order to determine model performance. Once the performance is determined to be acceptable, future year emissions inventory changes are simulated to determine the relationship between emissions reductions and changes in ambient air quality throughout the air basin.

The procedures for modeling $PM_{2.5}$ as part of an attainment SIP are contained in EPA's "Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for the 8-Hour Ozone and $PM_{2.5}$ NAAQS and Regional Haze."

2. Air Quality Modeling in the SJV 2008 $PM_{2.5}$ Plan

The 2008 $PM_{2.5}$ Plan uses multiple modeling analyses to demonstrate attainment of the $PM_{2.5}$ NAAQS in the SJV. It mainly relies on several variants of an approach based on receptor modeling for the annual $PM_{2.5}$ NAAQS. This approach begins with Chemical Mass Balance (CMB) modeling, which distinguishes the ambient $PM_{2.5}$ contributions of several broad emissions source categories based on how they match the chemical species components of $PM_{2.5}$ measurements. The CMB results are then refined with emissions inventory data to distinguish additional source categories, an area of influence analysis to better reflect particular sources affecting a monitor, and information from past photochemical modeling to assess how

[8] EPA's November 9, 2005 final rule revising the "Guideline on Air Quality Models" in 40 CFR part 51, Appendix W is available at www.epa.gov/ttn/scram/guidance/guide/appw_05.pdf.

secondarily formed $PM_{2.5}$ will respond to changes in precursor emissions. Several variants of this approach are used, with CMB results from different locations and different base case years. This modeling only addresses the annual $PM_{2.5}$ standard.

The receptor modeling approaches are supplemented with an attainment demonstration using photochemical modeling with the CMAQ (Community Multiscale Air Quality) model. This modeling incorporates data collected during the 2000 California Regional Particulate Air Quality Study (CRPAQS). The CMAQ modeling addresses both the annual and 24-hour $PM_{2.5}$ standards.

Based on verb tenses and on the structure of the Plan and appendices, it appears that the receptor modeling was completed first and was later supplemented with the photochemical modeling. Both the receptor and photochemical modeling focused primarily on the annual standard. The annual standard was viewed as controlling in the sense that any control strategy that provided for annual standard attainment would also provide sufficient emissions reductions for 24-hour standard attainment. At the time the Plan was prepared in 2006, ambient data for $PM_{2.5}$ was consistent with attainment of the 24-hour NAAQS. See 2008 $PM_{2.5}$ Plan, Appendix A, Table A-9.

The 2008 $PM_{2.5}$ Plan discusses air quality modeling in the "Executive Summary," Chapter 3 "What is Needed to Demonstrate Attainment?," Appendix E "District Additions to the Conceptual Model," Appendix F "SJV $PM_{2.5}$ SIP Modeling Protocol," Appendix G "Regional Air Quality Modeling," Appendix H "Weight of Evidence," and the additional appendices "2014 Receptor Modeling Documentation," "Meteorological Model Performance Analysis," and "Regional Model Performance Analysis."

A conceptual model of $PM_{2.5}$ formation in the San Joaquin Valley is in Appendices E and F, with additional material in Appendix H. The principal discussion of the photochemical modeling is in Appendices F and G, along with the two model performance appendices. Receptor modeling is covered in Chapter 3, Appendix F, and the Receptor Modeling Documentation appendix. The Weight of Evidence analysis in Appendix H discusses both the photochemical and receptor modeling, as well as ambient trends and other data in support of the attainment demonstration.

Consistent with the Guidance, EPA considers the photochemical modeling to be the main basis for the $PM_{2.5}$ attainment demonstration. Guidance, p. 15. The receptor modeling may be considered supplemental analysis to corroborate the photochemical modeling results, e.g. as part of a weight of evidence approach. Guidance, p. 213.

a. Conceptual Description

A conceptual description is a qualitative way of characterizing the nature of an area's nonattainment problem. It can be helpful in identifying potential stakeholders and for developing a modeling protocol. It can also influence the choice of air quality model, modeling domain, grid cell size, priorities for quality assuring and refining emissions estimates, and the choice of initial diagnostic tests to identify potentially effective control strategies. In general, a

conceptual description is useful for helping a state to identify priorities and allocate resources in performing a modeled attainment demonstration.

The Guidance at pp. 128-130 lists 13 elements that should be addressed in the conceptual description. These are:

1. nonattainment problem (e.g., local versus regional)
2. relative importance of primary and secondary components of $PM_{2.5}$
3. most prevalent components of measured $PM_{2.5}$
4. components of measurements versus emissions
5. areas with large gradients
6. indications of limiting precursor for secondary formation
7. monitored violations at locations subject to mesoscale wind patterns (e.g., at a coastline) differing from the general wind flow
8. recent changes in PM emissions in or near the nonattainment area
9. trends in design values or other air quality indicators that have accompanied emissions changes
10. spatial pattern to trends in design values or other air quality indicators
11. past modeling results
12. distinctive meteorological measurements coinciding with exceedances
13. correlations of PM or components with each other and other pollutants

The Plan contains ample discussion of the $PM_{2.5}$ problem in the San Joaquin Valley. Much of the same material is covered in Chapter 3 (pp. 3-3 – 3-9); most of Appendix E; the modeling protocol in Appendix F at pp. F-13 – F-18, F-21, F-52 – F-56; and various parts of Appendix H. Appendix E on "District Additions to the Conceptual Model" has substantial discussion of the effect on $PM_{2.5}$ concentrations of seasonal changes, the influence of meteorology including fog, dry deposition, and emissions variations. Analysis of data collected during the 2000 CRPAQS substantially added to the understanding of $PM_{2.5}$ in the SJV. The cited chapters and appendices excerpt a number of conclusions from papers stemming from CRPAQS.[9]

In brief, the $PM_{2.5}$ problem in the San Joaquin Valley is mainly due to secondary particulates, especially in winter, with a substantial primary component throughout the year and during some winter episodes. $PM_{2.5}$ concentrations are much higher in winter than in summer. April through September concentrations are generally less than 15 $\mu g/m^3$, the level of the annual NAAQS. Nonattainment of the annual NAAQS is driven by high wintertime concentrations, including episodes during stagnant, moist conditions. Stagnant conditions and surface radiation inversions restrict pollutant dispersion, allowing concentrations to build to high levels. The enclosure of the SJV by mountain ranges restricts air flow and helps the inversion form a cap over the polluted air. Concentrations are highest at the southern end of the Valley, which is more

[9] Appendix F at p. F-71 also includes by reference the paper "Conceptual Model of Particulate Matter Pollution in the California San Joaquin Valley," Document Number CP045-1-98, 8 September 1998, prepared by: Betty Pun and Christian Seigneur, Atmospheric and Environmental Research, Inc. This paper has conclusions similar to those covered in the Plan sections listed above, although it is based on analysis of data collected during an earlier study, the 1995 Integrated Monitoring Study (or IMS95.

enclosed than the northern end and experiences stagnation during winter and recirculation of polluted air via the Fresno eddy during summer.

The dominant component of $PM_{2.5}$ in the SJV is ammonium nitrate, formed from the abundant ammonia emissions in this agricultural area and NO_x emissions from on-road motor vehicles, other mobile sources, and various fuel-combustion stationary sources. Ammonium nitrate formation is enhanced during the cool, moist winter months. Based on ambient concentrations and on previous modeling work, ammonia appears to be so abundant that formation of ammonium nitrate is limited by the rate of HNO_3 (nitric acid) formation via oxidation of NO_x, rather by the availability of ammonia. In addition to ammonium nitrate, organic carbon (OC) can also be a significant component of $PM_{2.5}$. The main sources of OC are agricultural vegetative burning, residential wood combustion, other direct sources such as vehicles, and a smaller contribution from secondary organic aerosols. During CRPAQS it was found that organic carbon has a strong spatial gradient, being much higher in urban areas, especially during high $PM_{2.5}$ episodes. This gradient was explained as being due to the greater vehicle emissions and residential wood combustion in cities. Ammonium sulfate is a relatively small component of secondary $PM_{2.5}$ in the SJV unlike areas in the eastern part of the United States where it is the dominant component of secondary $PM_{2.5}$.

As discussed at 2008 $PM_{2.5}$ Plan pages 3-32 and F-39, the annual standard is the focus of the modeling analysis because ambient concentrations of $PM_{2.5}$ in the SJV were below the 24-hour $PM_{2.5}$ NAAQS during the development of the Plan. There was thus no 24-hour episodes suitable for speciated rollback in the receptor modeling approaches and little need to focus on the 24-hour standard for the photochemical modeling, although 24-hour modeling was performed.

EPA believes that the conceptual description of the $PM_{2.5}$ problem in SJV provided in the Plan is adequately documented, convincing, and formed an adequate basis for the development of the modeling protocol and the analysis work.

b. Modeling Protocol

A modeling protocol should detail and formalize the procedures for conducting all phases of the modeling study, such as describing the background and objectives for the study, creating a schedule and organizational structure for the study, developing the input data, conducting model performance evaluations, interpreting modeling results, describing procedures for using the model to demonstrate whether proposed strategies are sufficient to attain the NAAQS, and producing documentation to be submitted for EPA Regional Office review and approval. The Guidance at pp. 133-134 describes a minimum list of topics to be addressed in the modeling protocol:

1. Overview of Modeling/Analysis Project
    a. Management structure
    b. Technical committees or other communication procedures to be used
    c. Participating organizations
    d. Schedule for completion of attainment demonstration

e. Description of the conceptual model for the nonattainment area (or Class I area(s))

2. Model and Modeling Inputs
    a. Rationale for the selection of air quality, meteorological, and emissions models
    b. Modeling domain
    c. Horizontal and vertical resolution
    d. Specification of initial and boundary conditions
    e. Episode selection
    f. Description of meteorological model setup
    g. Development of emissions inputs
    h. Geographic area identified for application of the attainment test(s)
    i. Methods used to quality-assure emissions, meteorological, and other model inputs

3. Model Performance Evaluation
    a. Description of the ambient data base
    b. Description of the evaluation procedures
    c. Identification of possible diagnostic testing that could be used to improve model performance

4. Supplemental Analyses
    a. Description of the additional analyses to be completed to corroborate the model attainment test
    b. Outline of the plans for conducting a weight of evidence determination, should it be necessary

5. Procedural Requirements
    a. Identification of how modeling and other analyses will be archived and documented
    b. Identification of specific deliverables to EPA Regional Office

2008 $PM_{2.5}$ Plan's modeling protocol is contained in Appendix F, with descriptions of both the receptor modeling approaches and the photochemical modeling. Many aspects of the photochemical modeling that are suitable for inclusion in a protocol are also covered in Appendix G and the "Regional Model Performance Analysis" appendix.

The protocol covers all of the above topics, with the exception of identification of how modeling and other analyses will be archived. There is no discussion of this topic, nor any description of how modeling data files may be accessed, should EPA or other interested parties wish to replicate the results of the analysis. See Guidance, p. 117.

c. Air Quality Model Selection

A model should meet several general criteria for it to be a candidate for consideration in an attainment demonstration. Guidance, p.136. These general criteria are consistent with requirements in 40 CFR § 51.112 and 40 CFR part 51, Appendix W. EPA does not recommend a specific model for use in attainment demonstrations. At present, there is no single model which has been extensively tested and shown to be clearly superior than its alternatives. Thus, 40 CFR Part 51 Appendix W does not identify a preferred model for use in attainment demonstrations of the $PM_{2.5}$ NAAQS. Based on the language in Appendix W, models used for these purposes should meet requirements in the Appendix for alternative models.

States should use a non-proprietary model, that is, a model whose source code is available for free (or for a reasonable cost) and whose code can be revised by the state in order to perform diagnostic analyses and/or to improve the model's ability to describe observations in a credible manner. A model should meet several additional prerequisites before being used to support an attainment demonstration. It should be:

1. revised in response to a scientific peer review,
2. appropriate for the specific application on a theoretical basis,
3. used with a data base which is adequate to support its application,
4. shown to have performed well in past ozone or PM modeling applications (or if it is the first application, then the state should note why it believes the new model is expected to perform sufficiently); and
5. applied consistently with a protocol on methods and procedures.

2008 $PM_{2.5}$ Plan's model selection is discussed at p. F-80 and p. G-2, with the Community Multiscale Air Quality (CMAQ) model selected. CMAQ is a "state-of-the-science [model that]... has been extensively peer-reviewed, is well-documented, and ... has been applied successfully in a range of environments." The Plan mentions certain California-specific updates to the model , but these are not described other than via a citation.

There is no discussion of any alternative models considered. EPA, however, believes that the choice of the CMAQ model is adequately justified because the EPA-sponsored CMAQ is explicitly mentioned in the Guidance (p. 138) as being a suitable model..

2008 $PM_{2.5}$ Plan's chemical mechanism selection is also discussed at p. F-80 and p. G-2, with SAPRC-99 selected for the gas phase mechanism, and CMAQ's AE4-AQ as the aqueous phase mechanism. These are little described except for a journal paper citation.

There is little discussion of alternative mechanisms considered. EPA, however, believes that the e of SAPRC is adequately justified because SAPRC is a well-known and widely-used mechanism.

d. Episode Selection

We recommend one of two possible approaches for the modeling the 24-hour $PM_{2.5}$ NAAQS (Guidance, p. 147):

1) Model every day for a full year (or multiple years). This is recommended for both dispersion modeling of primary $PM_{2.5}$ components and photochemical modeling of secondary and primary components. Many areas that violate the 24-hour $PM_{2.5}$ NAAQS will also violate the annual $PM_{2.5}$ NAAQS. Therefore, full year modeling may already exist or is being planned for the annual NAAQS attainment test. Modeling at least a full year will also help ensure that a sufficient number of days are included in the relative response factor (RRF) calculations.

2) Model episodes when high $PM_{2.5}$ concentrations occur. Similar to modeling for the ozone NAAQS, episodes should be selected where $PM_{2.5}$ concentrations are greater than the NAAQS (in this case, the 1997 standard of 65 $\mu g/m^3$) and are close to the baseline design value. Also similar to ozone modeling, data analyses can be completed to help select a variety of meteorological episodes which lead to high $PM_{2.5}$ concentrations. In some cases, there may be very limited conditions which lead to high 24-hour average $PM_{2.5}$ concentrations, and in other cases there may be a wide variety of cases. The specific situation in each nonattainment area will determine the number of episodes and the time periods which need to be modeled. For example, if exceedance level $PM_{2.5}$ concentrations in an area only occur in the winter, then a limited number of winter days can be modeled. In other areas, exceedance days may occur in all seasons.

2008 $PM_{2.5}$ Plan's episode selection is not discussed, instead a full year of modeling was performed. As mentioned above, there was little need to focus on the 24-hour standard attainment since ambient concentrations were already consistent with attainment of the NAAQS at the time the Plan was developed. Therefore there was no selection of particular periods or episodes of interest for the 24-hour NAAQS, although 24-hour modeling was in fact performed.

EPA believes this is marginally adequate. Since nonattainment of the annual standard in the SJV is known to be driven by frequent particular episodes in winter, it would have been preferable to choose and examine these particular periods in more detail in order to ensure the model performs well during such periods. However, because the model is used in a relative sense in the attainment demonstration, the design value already attaining the 24-hour standard would have been scaled by a modeled RRF that reflects emissions reductions, and so the predicted 24-hour $PM_{2.5}$ design value would also have attained the standard.

e. Domain, Domain Size, and Spatial Resolution

i. Domain Size

The principal determinants of model domain size are the nature of the $PM_{2.5}$ problem and the scale of the emissions which impact the nonattainment area. Isolated nonattainment areas that are not affected by regional transport of PM and its precursors may be able to use a

relatively small domain. Some areas of the western U.S. may fall into this category. The modeling domain should be designed so that all major upwind source areas that influence the downwind nonattainment area are included in the modeling domain. The influence of boundary conditions should be minimized to the extent possible. Guidance, p. 153.

ii. Horizontal Resolution

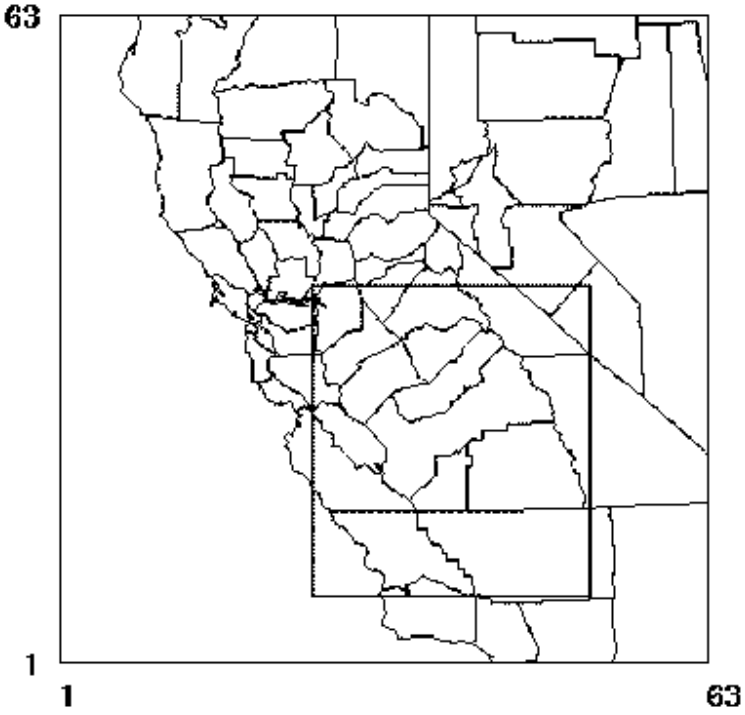
EPA is comfortable recommending that states may use grid cell sizes as large as 12 kilometers (km) for urban scale applications addressing secondary components of particulate matter. We are less sure about an acceptable upper limit for cell size in applications addressing primary components. We believe it is prudent to assume that, in some cases, cells as small as 4 km (or possibly smaller) are needed. A state implementing the modeling/analysis protocol may wish to perform a diagnostic test using a grid model without chemistry to see whether estimated RRF's for primary components are affected if one decreases the grid cell size from 12 km to 4 km. Alternatively, large sources of primary PM can be modeled with a dispersion model or a combination of grid and dispersion models. We expect that modeling analyses for nonattainment areas will use grid cell sizes of 12 km or less. If a regional scale model is applied, most of the domain will likely cover rural/remote areas or locations which are not out of compliance with the NAAQS. For the regional outer nest of the domain, grid cells as large as 36 km may be used. Guidance, p. 157.

iii. Vertical Layers

There is no correct minimum number of vertical layers needed in an attainment demonstration. The vertical resolution will vary depending on the application. Greater resolution allows more precise estimation of mixing heights and avoids unrealistic step increases in mixing; alignment with the layers in the meteorological model can affect accuracy; the lowest layer should generally by no more than 50 meters thick; resolution above the boundary layer can generally be coarser. Recent applications of one atmosphere models (with model tops at 100 millibars (mb) have used anywhere from 12 to 21 vertical layers with 8-15 layers approximately within the boundary layer (below 2500 m) and 4-6 layers above the Planetary Boundary Layer (PBL). Guidance p. 159.

2008 $PM_{2.5}$ Plan's modeling domain is discussed at pp. F-39, F-81, and especially p. G-3, and is shown on a map on page G-18. The domain uses a nested grid, with the inner domain containing the entire SJVAPCD and nonattainment area. The inner domain has a 4 km grid resolution and measures 320 by 356 km (80 by 89 grid cells). This inner domain is nested within an outer domain covering most of California (CCAQS domain), extending from the Pacific Ocean in the west to the deserts in Nevada and southern California in the east, and from the Tehachapi Mountains in the south to the Sacramento Valley in the north. It has a 12 km resolution and measures 756 km (63 grid cells) in both horizontal dimensions. Both domains used 15 vertical layers of varying thickness up to the 100 mb pressure level (the top of the meteorological domain) with the surface layer approximately 30 m thick.

CCAQS modeling domain with the SJV modeling domain inset



Source: 2008 $PM_{2.5}$ Plan, Appendix G, Figure 1, p. G-18

EPA believes the domain is adequate, even though the documentation is sparse on its selection. The Plan has no discussion of any rationale for the particular domain chosen or its horizontal and spatial resolution. Nevertheless, the inner domain meets all of the Guidance modeling domain characteristics listed above for spatial resolution and layer thickness. It also appears adequate for minimizing the influence of boundary conditions, since the east and west boundaries are in areas of sparse population, and the southern boundary is beyond a mountain range. The northern boundary is less satisfactory from this standpoint but is justified on the basis the Sacramento area being a different nonattainment area and all counties exceeding the $PM_{2.5}$ NAAQS being located in the southern end of the San Joaquin Valley, well away from the northern boundary. In addition, this inner domain is nested within an outer one that also meets the Guidance criteria.

f. Initial and Boundary Conditions

If there is no larger regional model application available, then it is recommended that background boundary conditions be used to specify initial and boundary concentrations for the attainment demonstration modeling. However, concentration fields derived from a larger domain regional or global chemistry model (i.e., the nesting approach) is considered more credible than the assumption of static concentrations, since the pollutant concentration fields reflect simulated atmospheric chemical and physical processes driven by assimilated meteorological observations. Therefore, EPA recommends using boundary conditions derived from a regional or global scale model, whenever possible. We also recommend using a ramp-up period by beginning a simulation prior to the period of interest to diminish the importance of

initial conditions. The recommended ramp-up period is at least 5-10 days for $PM_{2.5}$. Diagnostic testing which indicates a large impact on the model results from initial or boundary conditions may indicate that the domain is not large enough or the ramp-up period is too short. In either case, it should generally be assumed that initial and boundary conditions do not change in the future. The use of altered initial or boundary conditions in the future year should be documented and justified. Guidance, p. 153.

Plan initial and boundary conditions are discussed at p. F-81 and p. G-3. Boundary conditions for the outer domain were taken from the global chemical transport Model for Ozone And Related Chemical Tracers (MOZART). Initial conditions were estimated as an average of these conditions. The outer domain's boundary conditions varied monthly, while the inner domain's were computed from modeling of the outer domain and varied hourly. The use of 8-day ramp-up (a.k.a. spin up) periods prior to each model simulation minimized the effect of uncertain initial conditions on the modeling. Page F-73 in the 2008 $PM_{2.5}$ Plan has a table of annual average boundary conditions for the various chemical species; there is no information on the monthly or hourly values. There is no discussion of any diagnostic testing.

EPA believes the initial and boundary conditions are acceptable, although sparsely documented (the preceding summary is essentially the full description in the Plan). Conditions appear to have been based on a reasonable procedure, and the ramp-up period appears adequate.

g. Meteorological Model

i. Meteorological Model Selection

A description of the methods used to generate the meteorological fields should be included in the modeling protocol. In cases in which standard meteorological modeling (e.g. MM5, RAMS, or WRF in a retrospective analysis mode) is not used, EPArecommends that a detailed description of the technique that will be used to generate the three-dimensional meteorological fields be shared with the appropriate EPA regional office(s) prior to conducting the air quality modeling analysis. Guidance, p. 161.

2008 $PM_{2.5}$ Plan's meteorological model selection is discussed at p. F-81 and p. G-4, with MM5 selected. While there is no discussion of alternative meteorological models, since MM5 is well-known and widely used, and explicitly mentioned in the Guidance (p. 160) as being a suitable model, EPA believes the model choice is adequately justified.

ii. Meteorological Model Domain

It is expected that most attainment demonstrations will cover large areas and use nested grids. The outermost grid should capture all upwind areas that can reasonably be expected to influence local concentrations of $PM_{2.5}$. In terms of selecting an appropriate meteorological modeling domain, a state should extend the grid 3 to 6 cells beyond the domains of each air quality modeling grid to avoid boundary effects. For example, if 4 km grid cells are to be used in the fine portion of a nested regional air quality model, then the meteorological fields at this detail would need to extend 12-24 km beyond the bounds of the 4 km grid used for air quality

predictions. In terms of grid resolution, EPA recommends that the dynamic meteorological models use the same grid resolution as desired for the air quality model applications. In some cases, however, this may not always be feasible. One possible reason for modeling with meteorology using a different grid resolution is in the case of unacceptable model performance from the meteorological model at the desired grid resolution. In other instances, the need for finer resolution may be emissions-driven more than meteorologically-driven and the costs do not warrant the generation of additional resolution in the meteorological data. In these specific situations it is recommended that the air quality model application use available results from meteorological models on the next coarser scale (i.e., 36 km for a desired 12 km estimate, 12 km for a desired 4 km estimate). The coarse grid meteorological fields can be mapped to the more finely resolved air quality modeling domain.

iii. Physics Options

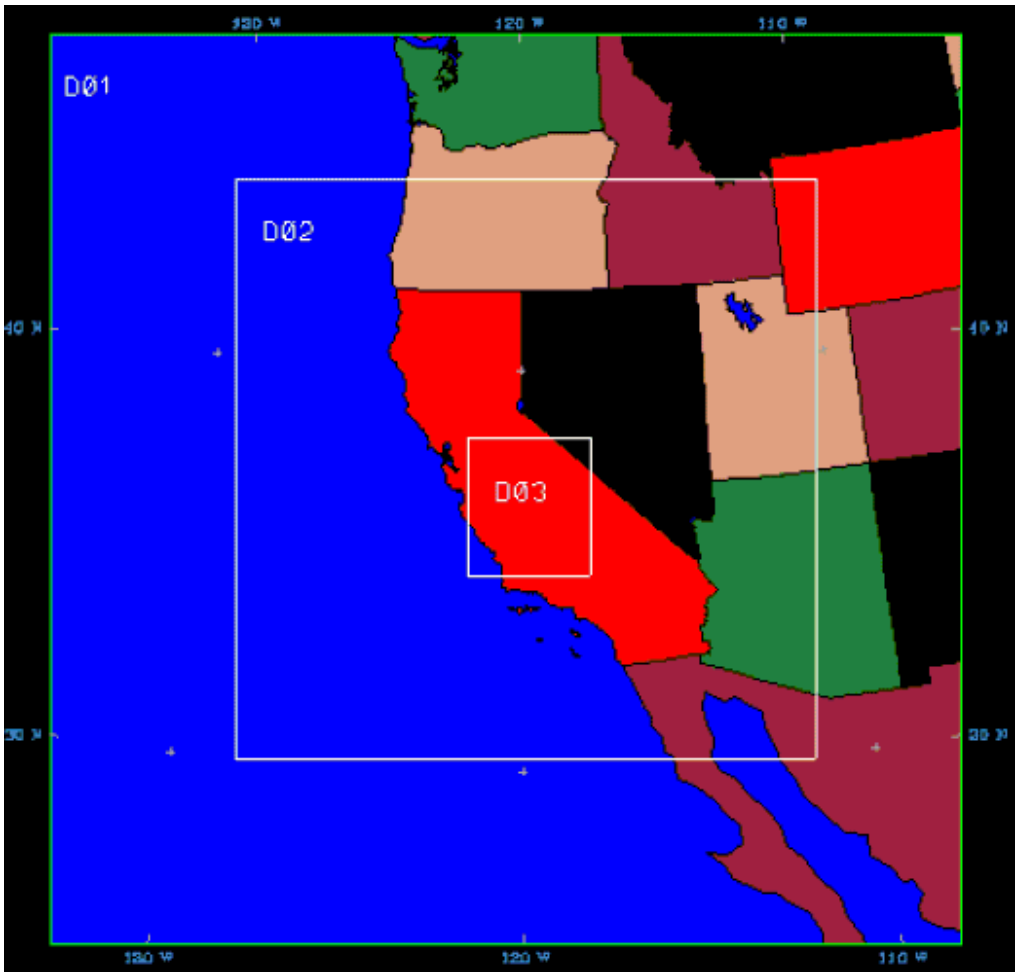
Most meteorological models have a suite of physics options that allow users to select how a given feature will be simulated. For example, there may be several options for specifying the planetary boundary layer scheme or the cumulus parameterization. In many situations, the optimal configuration cannot be determined without performing an initial series of sensitivity tests which consider various combinations of physics options over specific time periods and regions. While these tests may not ultimately conclude that any one configuration is clearly superior at all times and in all areas, it is recommended that these sensitivity tests be completed, as they should lead to a modeling analysis that is best-suited for the domain and period being simulated. Typically, the model configuration which yields predictions that provide the best statistical match with observed data over the most cases (episodes, regions, etc.) is the one that should be chosen, although other more qualitative information can also be considered. Additionally, model configurations should be designed to account for the pollutants and time periods that are of most interest. As an example, a wintertime PM simulation in the Midwest (with high measured nitrate concentrations) may need a meteorological model configuration that employs a land-surface model that properly handles snow cover fields and their effects on boundary layer humidities and temperatures.

2008 $PM_{2.5}$ Plan's meteorological model setup is discussed at p. F-81 and p. G-4 and in the appendix "Meteorological Model Performance Analysis" (hereafter, MMPA). A 14-month simulation was done (the year 2000 plus a month at either end), using three nested grids, having horizontal resolutions of 36 k, 12 km, and 4 km, from outermost to innermost. Maps of the domains appear as Figure 2 on p.G-19 and Figure 1 on p. 2 on of MMPA. (The innermost domain in the two figures does not match; the one on the map in Appendix G appears to be incorrect since it is square, whereas the horizontal dimensions are stated to be 94x85 grid cells in both appendices.)

The meterological model used 30 vertical layers, extending up to the 100 mb pressure level, with the surface layer 30 m deep. The MMPA at pp. 2-3 states that sensitivity testing using 50 layers and a 15 m surface layer to better resolve atmospheric processes for stable winter conditions, but this doubled run times with little improvement in model results. (The context implies that this refers to the meteorological model rather than the air quality model.) The MMPA goes on to state "Many sensitivity studies were conducted using various model options

to gain better agreement with observations." The optimal configuration included various physics options listed, e.g., Grell cumulus parameterization, Blackadar boundary layer scheme, Dudhia ice scheme, Dudhia cloud radiation scheme, and Blackadar soil model. Analysis nudging was used for the outer 36 km and 12 km grids.

The Location of the Three Nested Grids Designed to Study the Meteorology And Air Quality in the SJV Domain



Source: 2008 $PM_{2.5}$ Plan "Meteorological Model Performance Analysis," p. 2.

EPA believes the meteorological domain and model set-up are acceptable although sparsely documented (the preceding summary is majority of the description provided in the Plan). It appears that there was substantial effort to improve the meteorological model performance before an optimal configuration was chosen.

h. Meteorological Model Performance

EPA recommends that states devote appropriate effort to the process of evaluating the meteorological inputs to the air quality model as we believe good meteorological model performance will yield more confidence in the predictions from the air quality model. This evaluation should determine if the meteorological model output fields represent a reasonable approximation of the actual meteorology that occurred during the modeling period. This can be done via an operational evaluation (i.e., quantitative, statistical, and graphical comparisons). A second objective of the evaluation should be to identify and quantify the existing biases and errors in the meteorological predictions in order to allow for a downstream assessment of how the air quality modeling results are affected by issues associated with the meteorological data. This evaluation can be done via a more phenomenological assessment (i.e., generally qualitative comparisons of observed features versus their depiction in the model data). Guidance, p. 163.

Operational Evaluation (Guidance, p. 163): The operational evaluation results should focus on the values and distributions of specific meteorological parameters as paired with and compared to observed data. It is recommended that the observation-model matching be paired as closely as possible in space and time. Typical statistical comparisons of the key meteorological parameters will include: comparisons of the means, mean bias, mean normalized bias, mean absolute error, mean absolute normalized error, root mean square error (systematic and unsystematic), and an index of agreement. For modeling exercises over large domains and entire seasons or years, it is recommended that the operational evaluation be broken down into individual segments such as geographic sub-regions and/or months/seasons to allow for a more comprehensive assessment of the meteorological strengths and weaknesses.

Phenomenological Evaluation (Guidance, p. 167): Within the conceptual description of a particular modeling exercise, EPA recommends that a state identify and qualitatively rank in importance the specific meteorological parameters that influence air quality. . When evaluating meteorological models or any other source of meteorological data, the focus of the phenomenological evaluation should be on those specific meteorological phenomena that are thought to strongly affect air pollution formation and transport within the scope of a specific analysis. It is expected that this event-oriented evaluation will need to summarize model performance in terms of statistical metrics such as probability of detection and false alarm rate. As an example of a potential phenomenological analysis, many regional air quality modeling exercises attempt to assess the effects of transport of emissions from one area to a downwind area with an intent to establish source-receptor relationships. For these types of modeling analyses, accurate transport wind trajectories are needed to properly establish these source-receptor linkages. In this type of model application, a useful event-based meteorological evaluation would be to compare model-derived trajectories versus those based on ambient data to determine what error distance can be associated with the model fields.

2008 SJV Plan's meteorological model performance is discussed in the appendix "Meteorological Model Performance Analysis" (MMPA). There is an operational evaluation using three methods for temperature, relative humidity, and horizontal wind components for the full year and by season. Evaluation Method 1 considers mean and standard deviation, correlation, root mean square error, mean bias, and index of agreement; this information is stated

to be in Attachment A, which is not provided. Results are stated (MMPA p. 6) to be generally well-correlated but less so for wind components. Relative humidity is generally over-predicted. Agreement between predictions and observations varies little seasonally.

Evaluation Method 2 involves examination of frequency histograms for temperature, wind speed, and humidity for 24-hour periods in alternate months. This information is stated to be in Attachment B, which is not provided. The MMPA states (p. 8): "The frequency distribution of air temperature, relative humidity, and mixing ratio for observations and model results show reasonably good agreement. There are only small differences in observed and simulated diurnal wind speed patterns." This appears to be the case for the Fresno examples given.

Finally, Evaluation Method 3 consists of hourly comparisons for wind speed, direction, and temperature over two five-day periods within each modeled month. This information is stated to be in Attachment C, which is not provided, although graphs of a December, 1990 five-day period for Fresno are shown. The MMPA (p. 9) concludes "the model can capture the diurnal evolution of observed wind speed, wind direction and temperature variations reasonably well," despite the fact that "the estimates for the evolution of the wind speed and direction differ somewhat. However, the examination of all figures given in Attachment C indicates that the model does capture the overall evolution."

The overall conclusion in the Plan is that the MM5 simulations "reproduce the overall statistical characteristics of observed meteorological conditions". There is some underestimate of maximum surface temperature, although the model is able to capture the large temperature variations that occur in some periods.

Only the observational evaluation just described was presented in the Plan; there was no discussion of a phenomenological evaluation as described in the Guidance.

EPA believes the meteorological model performance was adequate, although sparsely documented in part due to the accidental omission of several attachments to the Meteorological Model Performance Analysis appendix. It is nevertheless apparent that substantial thought and effort went into the operational evaluation, including for particular periods throughout the year, rather than just overall annual statistics.

EPA is concerned by the lack of a phenomenological evaluation. The Plan includes no assessment of the impact that difficulties encountered in the meteorological modeling would have on the air quality modeling. There is also no discussion of whether phenomena important to $PM_{2.5}$ formation in the SJV are adequately captured in the meteorological modeling, overall or for various locations and times of year. Presumably such considerations were part of the overall development of the air quality modeling application, but they are not documented in the Plan.

i. Emissions Inventory

Air quality modeling requires emissions inputs for base case, baseline, and future modeling years. Preparation of emissions data for air quality models for the base and future

years requires several steps. First, a state needs to compile base-year inventories for its modeling region (e.g., the states and tribes in the modeling grid). For PM model applications, emissions inventories should include emissions of anthropogenic and biogenic VOC (speciated), NO_x, carbon monoxide, SO_2, NH_3, $PM_{2.5}$ (speciated), and PM coarse (PMC). Second, modelers must collect ancillary data associated with the inventories, which prescribes the spatial, temporal, and chemical speciation information about the emissions inventory. Third, modelers use the ancillary data for emissions modeling. Emissions models spatially, temporally, chemically, and vertically allocate emission inventories to the resolution needed by air quality model. Fourth, modelers must collect data on growth rates and existing control programs for use in projecting the base year emission inventories to the future year, and then use an emissions model to prepare that future year inventory data for input to the air quality model. Fifth, emissions inventories that reflect the emissions reductions needed for attainment will have to be prepared for air quality modeling.

2008 $PM_{2.5}$ Plan's emissions inputs are discussed at p. G-3, and references to the need for emissions input to modeling appear at various places in Appendix F. Page G-3 states

> A spatially, temporally, and chemically resolved emissions inventory of combined area, mobile, and point sources was generated using the California Emissions Forecasting System (CEFS) version 1.06 with offline adjustments. The inventory includes emissions estimates for gaseous and particulate species of anthropogenic and biogenic origin. Gridded hourly emissions were developed for the CMAQ modeling domain for the years 2000, 2005, and 2014 (baseline).

The Plan does not include a discussion of the procedures used to spatially or temporally allocate emissions for input to the model, other than the reference to CEFS. Quality assurance methods for emissions inputs are mentioned at p. G-3 but not discussed: "Quality assurance checks of domain emissions totals and spatial distribution were performed at various steps." There are no tables of modeling emissions totals for various pollutants, source groupings, subareas, or seasons. There are no maps of emission density or diurnal time series of emissions, which could illustrate the spatial and temporal allocation, and help in understanding $PM_{2.5}$ concentration variations over space and time.

EPA believes the modeling emissions inventory preparation procedures were adequate but sparsely documented (the preceding excerpts are essentially the full description in the Plan). It is apparent that substantial effort went into preparing emissions inputs in order for the model to have been run, but this effort is little documented in the Plan.

j. Air Quality Model Performance

$PM_{2.5}$ consists of many components and is typically measured with a 24-hour averaging time. The individual components of $PM_{2.5}$ should be evaluated individually. In fact, it is more important to evaluate the components of $PM_{2.5}$ than to evaluate total $PM_{2.5}$ itself. Apparent good performance for total $PM_{2.5}$ does not indicate whether modeled $PM_{2.5}$ is predicted for the right reasons (the proper mix of components). If performance of the major components is good, then performance for total $PM_{2.5}$ should also be good. EPA recommends calculating statistics for

components of $PM_{2.5}$, and PM precursors. Useful metrics include mean fractional bias and mean fractional error, normalized mean bias, and normalized mean error. Formulas for estimating these metrics are given in the Guidance. (Guidance, p. 203-204) Other statistics such as mean bias, mean error, root mean square error, correlation coefficients, etc. should also be calculated to the extent that they provide meaningful information. Since modeling for the $PM_{2.5}$ NAAQS will likely require modeling different times of year, season-specific statistics and graphic displays are helpful for evaluating and diagnosing model performance. Statistics and graphics can be averaged for various time scales. For example, statistical metrics and scatter plots can show daily averaged ambient modeled pairs, monthly averaged pairs, quarterly (or seasonal averaged) pairs, or annual average pairs. Each of these averaging times can provide useful information. EPA recommends a range of different averaging times for annual or seasonal modeling. At a minimum, a state should examine daily averaged pairs and seasonal (or quarterly) averaged pairs. Because statistics and plots tend to look better as the averaging time increases from daily to monthly to quarterly to annual, daily pairs should always be examined to ensure a detailed look at model performance on the time scale of the FRM and STN measurements (24-hour average). Soccer plots provide a convenient way to display a summary of model performance (including bias and error at the same time). Bugle plots[10] have variable bias and error goals, based on ambient concentrations. This allows for a higher percentage error and bias at very low concentrations. This recognizes the fact that models often have difficulty in accurately predicting near background concentrations and may be useful to prioritize examination of model performance within and near the non-attainment area(s) of interest. Additionally, priority may be placed on examination of the days that are potentially used in the attainment test (e.g., the days > 65 $\mu g/m^3$ for 1997 24-hour $PM_{2.5}$).

2008 $PM_{2.5}$ Plan's air quality model performance is discussed in the appendix "Regional Model Performance Analysis" (hereafter RMPA), starting at p. 6.

The Plan does not include a discussion of the database used to evaluate model performance, other than many references to CRPAQS and referrals to the Central California Air Quality Studies' website (http://www.arb.ca.gov/airways). (For example, "The CRPAQS main field program collected extensive data during the period of December 1999 to February 2001" (p. F-32))." It is know from media accounts, CARB's website, the District's website (http://www.valleyair.org/), and study reports and journal articles, that the study involved intensive metrological and air quality measurements, including measurements taken on towers and in aircraft and created a wealth of data useful for developing and evaluating model applications.

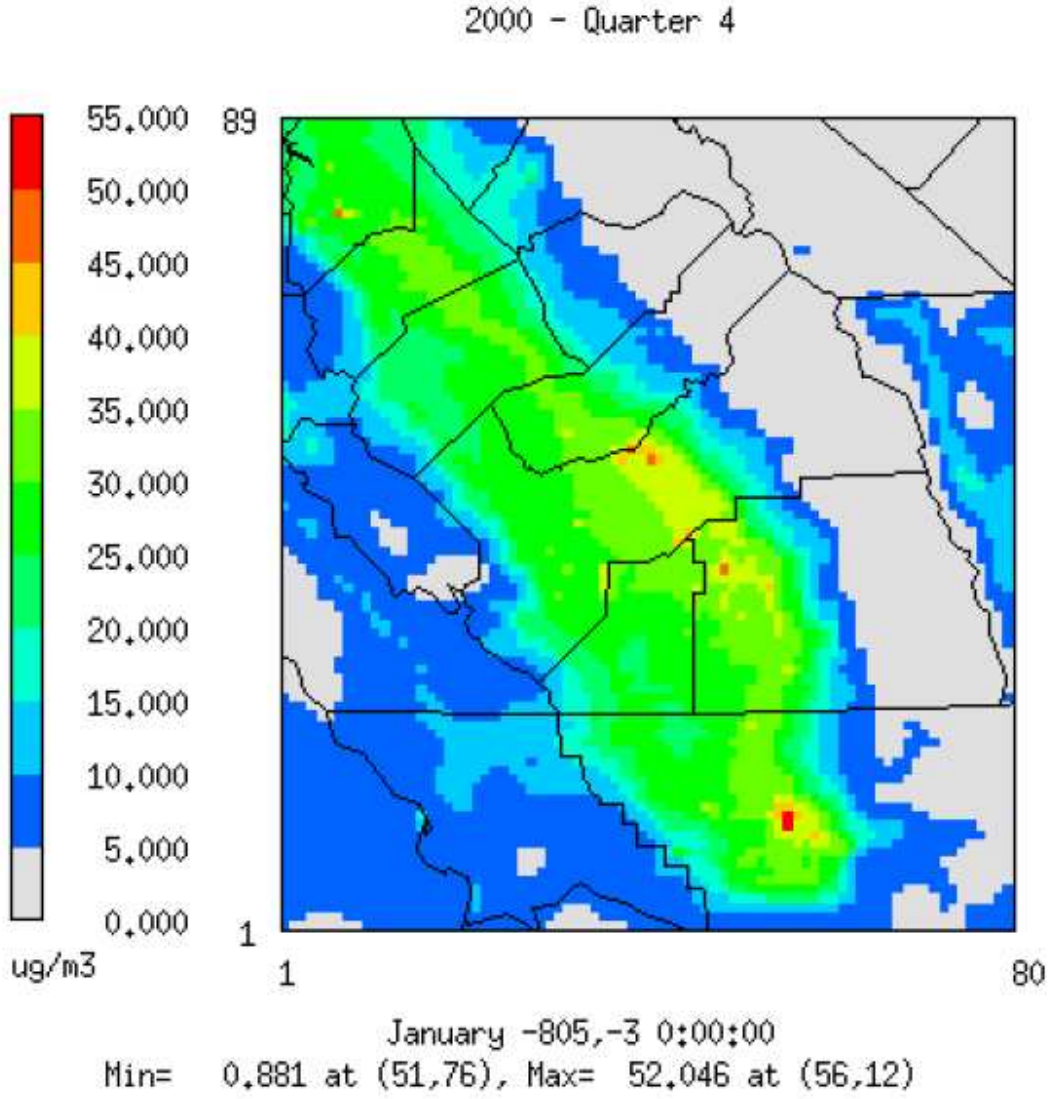
The Plan contains no speciated 24-hour $PM_{2.5}$ data. It contains only annual data and, in one case, monthly data (in Appendix H) are provided.

Three types of information were used to evaluate model performance: maps with $PM_{2.5}$ spatial patterns, performance statistics at individual monitors, and time series plots.

[10] Fractional error and bias tend to be large at small concentrations, since then the uncertainty can be nearly as big as the concentration. Since fractional error varies relatively slowly with concentration, but then grows larger at low concentrations, the shape of the plot resembles a long tube with a flared end at low concentrations, reminiscent of a bugle.

Filled concentration contour plots of the modeling domain are shown in RMPA, pp. 7-11 (figures 3 – 7), for annual $PM_{2.5}$ and four quarterly averages. Each of these has seven plots, one each for total $PM_{2.5}$, nitrate, sulfate, ammonium, organic carbon, elemental carbon, and dust. (An example is included below and shows fourth quarter total $PM_{2.5}$.) A paragraph on RMPA p. 6 summarizes the plots, noting that nitrate formation follows the pattern expected from seasonal temperature and humidity, although third quarter nitrates appear too high. Sulfates are low for all quarters, while organic carbon (OC) and elemental carbon (EC) are higher in the first and fourth quarters, presumably due to enhanced wood burning during these periods. There is no discussion of the spatial variation of $PM_{2.5}$ or its components and how it compares to expectations or to monitored values.

Fourth Quarter Average Concentrations for $PM_{2.5}$



Source: 2008 $PM_{2.5}$ Plan Appendix "Regional Model Performance Analysis," Figure 7, p.11.

Next the RMPA at pp. 12 - 14 discusses statistics for Mean Fractional Error (MFE) and Mean Fractional Bias (MFB), which are shown in the form of bugle plots. Each plot is for annual average $PM_{2.5}$ total or a component, and shows MFE or MFB plotted against concentration. Performance criteria were set at MFE $\leq$ 75% and |MFB| $\leq$ 60%. The RMPA notes that the criteria are met for all species except dust, which is substantially overestimates for reasons that are not understood. Eight other statistics are mentioned in the modeling protocol, at p. F-62, such as Mean Normalized Gross Error, but no values are presented.

Finally, time series plots are examined at RMPA pp. 14-16. Bakersfield and Fresno concentrations of $PM_{2.5}$ total and components are plotted against day of the year-long simulation, with a fluctuating line showing model prediction, and individual dots showing monitored values. The RMPA notes that the over-predicted of nitrate in the third quarter is apparent, as is the overestimation of dust. EPA examination of the plots also suggests that many $PM_{2.5}$ days are missed at both Bakersfield and Fresno, that organic carbon is under predicted (especially at Fresno), and that ammonium is under predicted. Sulfate is also often under predicted, but sulfates contribution to to $PM_{2.5}$ levels in the Valley is small. Since the plots show the entire year, it is hard to judge performance during particular months or seasons.

There are no actual numbers calculated for the performance statistics. There are no seasonal or episode statistics.

There is no discussion of any sensitivity or diagnostic testing of the model, which could check whether it responds to input changes in a physically reasonable way, whether alternative input assumptions could have improved model performance, and whether the predictions are subject to compensating errors in the inputs.

There is no qualitative assessment of whether the model is adequately capturing the various processes leading to high $PM_{2.5}$ concentration and no assessment of spatial variation of model performance.

EPA believes the air quality model performance is likely adequate but sparsely documented (the preceding excerpts are most of the description in the Plan). While it is apparent that substantial effort went into preparing the materials for model evaluation, the Plan has relatively little discussion of the evaluation results and none on sensitivity and diagnostic testing that could enhance confidence in the model. The level of documentation is far short of what would be expected b EPA Guidance.

k. Modeled Attainment Test

A *modeled attainment test* is an exercise in which an air quality model is used to simulate current and future air quality. If future estimates $PM_{2.5}$ concentrations are less than the NAAQS, then this element of the attainment test is satisfied. EPA's recommended test is one in which model estimates are used in a relative rather than absolute sense. That is, we take the ratio of the model's future to current (baseline) predictions at monitors. We call these ratios, *relative response factors*, RRF. Future $PM_{2.5}$ concentrations are estimated at existing monitoring sites by multiplying a modeled relative response factor at locations near each monitor by the observation-

based, monitor-specific, baseline design value. The resulting predicted future concentrations are compared to NAAQS.

The $PM_{2.5}$ attainment test reflects the fact that $PM_{2.5}$ is a mixture. In the test, ambient $PM_{2.5}$ is divided into major species components, so EPA's test is called the Speciated Modeled Attainment Test (SMAT). These are mass associated with sulfates, nitrates, ammonium, organic carbon, elemental carbon, particle bound water, other primary inorganic particulate matter, and passively collected mass. Note that FRM monitors do not measure the same components and do not retain all of the $PM_{2.5}$ that is measured by routine speciation samplers and therefore cannot be directly compared to speciation measurements from the STN. By design, the FRM mass measurement does not retain all ammonium nitrate and other semi-volatile materials (negative sampling artifacts) and includes particle bound water associated with sulfates, nitrates and other hygroscopic species (positive sampling artifacts). This results in concentrations (and percent contributions to $PM_{2.5}$ mass) which may be different than the ambient levels of some $PM_{2.5}$ chemical constituents. Therefore we recommend a SMAT technique which uses an FRM mass construction methodology which results in reduced nitrates (relative to the amount measured by routine speciation networks), higher mass associated with sulfates and nitrates (reflecting water included in gravimetric FRM measurements) and a measure of organic carbonaceous mass which is derived from the difference between measured $PM_{2.5}$ and its non-organic carbon components. This approach is sometimes called SANDWICH, for sulfate, adjusted nitrate, derived water, inferred carbonaceous material balance approach. Guidance, p. 47.

A separate RRF is calculated for each of the $PM_{2.5}$ components (except passive mass). We call each of these site-specific ratios, a component-specific RRF. Future $PM_{2.5}$ design values are estimated at existing monitoring sites by multiplying modeled relative response factors near each monitor times the observed component specific design value. This latter quantity is estimated using measured site-specific design values for $PM_{2.5}$ in concert with available measured composition data. Future site-specific $PM_{2.5}$ design values at a site are estimated by adding the future year values of the seven $PM_{2.5}$ components. If all future site-specific $PM_{2.5}$ design values are less than or equal to the concentration specified in the NAAQS, the test is passed. Guidance, pp. 15-16.

2008 $PM_{2.5}$ Plan's annual $PM_{2.5}$ NAAQS attainment test is discussed in Chapter 3, pages 3-20 and 2-33, and in Appendix G on "Regional Air Quality Modeling".

A variation on EPA's SMAT approach is used, to account for the SJV's abundance of ammonia and the dominance of ammonium nitrate over ammonium sulfate. This variation is to assume that ammonium on the monitor filter is the measured STN NH_4 minus any losses associated with fully neutralized nitrate (as NH_4NO_3) that may have volatilized off the FRM filter. 2008 $PM_{2.5}$ Plan, p. G-10.

The 2006 design values and the results of the SMAT for 2014 baseline conditions and for the result of new emissions controls are shown in Chapter 3, Table 3-3 (p. 3-23) and Appendix G, Table 3 (p. G-21) of the 2008 $PM_{2.5}$ Plan. The 2014 controlled design value is seen to be less than the annual NAAQS level of 15 $\mu g/m^3$ for every monitor, thus demonstrating attainment. The highest 2014 value is 14.7 $\mu g/m^3$ at the Bakersfield Planz Road monitor. The RRFs, and

details of their calculation, are not presented. (However, an RRF for nitrate does appear in the various receptor modeling tables in the appendix "Receptor Modeling Documentation", and corresponding values in Table 3-2, p. 3-22; it is not clear whether these RRFs are from the CMAQ modeling described above or from a different modeling exercise.)

2008 $PM_{2.5}$ Plan's 24-hour $PM_{2.5}$ NAAQS attainment test is discussed in the same place as the attainment test for the annual standard, with results in Appendix G, Table 4, p. G-22.

Appendix G, Table 4 shows the 2006 design values for Bakersfield and Fresno monitors and the projected 2014 design values for the controlled case. Since the 2006 design values are already below the 1997 24-hr NAAQS level of 65 $\mu g/m^3$, the controlled values are, too. The highest 2014 value is 46.2 $\mu g/m^3$ at the Bakersfield California Avenue monitor. The Relative Reduction Factors, and details of their calculation, are not presented.

The attainment tests appear to show attainment of both $PM_{2.5}$ NAAQS. These tests, however, are not well documented. The Plan cites several factors as justifying a variation on EPA's SMAT approach (e.g., the prevalence of ammonia, the dominance of ammonium nitrate, the effect of substantial controls on fugitive dust and direct carbon emissions (p. G-10 and p. 3-20)) but does not provide sufficiently detailed explanations for these deviations. The Plan does not include the Relative Reduction Factors, the key results from the model for use in the attainment test, and details of their calculation.

l. Unmonitored Area Analysis

In addition to a modeled attainment demonstration, EPA recommends use of an unmonitored area analysis. This type of analysis is intended to ensure that a control strategy leads to reductions in ozone or $PM_{2.5}$ at other locations which could have baseline (and future) design values exceeding the NAAQS were a monitor deployed there.

The unmonitored area analysis should identify areas where future year design values are predicted to be greater than the NAAQS. The unmonitored area analysis for a particular nonattainment area is intended to address potential problems within or near that nonattainment area. The analysis should include, at a minimum, all nonattainment counties and counties surrounding the nonattainment area (located within the state). In order to examine unmonitored areas in all portions of the domain, EPA recommends that a state use interpolated spatial fields of ambient data combined with gridded modeled outputs. Guidance, p. 29.

Gradient adjusted spatial fields are first created for the base year. Future year estimates can then be created by applying gridded RRFs to the gradient adjusted spatial fields. The basic steps are as follows (Guidance, p. 30):

1) Interpolate base year ambient data to create a set of spatial fields.

2) Adjust the spatial fields using gridded model output gradients (base year values).

3) Apply gridded model RRFs to the gradient adjusted spatial fields.

4) Determine if any unmonitored areas are predicted to exceed the NAAQS in the future.

2008 $PM_{2.5}$ Plan's unmonitored area analysis is discussed on page G-15. It takes the form of a simple screening analysis, examination of a filled concentration contour plot (Figure 3 on p. G-20), and the observation that "there are no areas with steep gradients that would result in higher design values than those measured at monitors".

The Plan does not contain an Unmonitored Area Analysis in the sense of the Guidance. EPA does not believe that the figure presented is an adequate substitute for an Unmonitored Area Analysis.

m. Weight of Evidence

States should perform complementary analyses of air quality, emissions and meteorological data and consider modeling outputs other than the results of the attainment test. Such analyses are instrumental in guiding the conduct of an air quality modeling application. The results of corroboratory analyses may sometimes be used in a *weight of evidence determination* to show that attainment is likely despite modeled results which may be inconclusive. The further the attainment test is from being passed, the more compelling contrary evidence produced by corroboratory analyses must be to draw a conclusion differing from that implied by the modeled attainment test results. Guidance, p. 17. Supplemental analyses could include additional modeling using alternative models and inputs, modeling apportionment and process analysis tools, alternative metrics (such as change in the number of grid cells above the NAAQS), trends in ambient air quality, trends in emissions, receptor modeling, and indicator species approaches.

2008 $PM_{2.5}$ Plan's weight of evidence determination is discussed in Appendix H. Supplemental analyses used in the weight of evidence determination are described in that Appendix and also in Chapter 3, Appendix F, and the appendix on "Receptor Modeling Documentation" (hereafter RMD).

As mentioned near the start of this TSD section on modeling, the Plan emphasizes a receptor modeling-based approach for the attainment demonstration, with photochemical modeling added later. However, EPA views the receptor modeling mainly as a supplemental analysis to corroborate the photochemical modeling as part of the weight of evidence determination.

Chapter 3 describes three variants of a speciated rollback approach (p. 3-23). Method 1 is based on Chemical Mass Balance (CMB) modeling of PM_{10} speciated measurements from the year 2000; this was converted to 2005 $PM_{2.5}$ values, which are in turn projected to 2014, with some adjustments described below. This method is applied to the Fresno, Kern, Kings, and Tulare County monitors. Method 2 is similar but is based on speciation data from the years 2004-2006. This method is is applied to the Fresno and Kern monitors only. The third method is based on a Positive Matrix Factorization (PMF) using speciated data from the years 2003-2006. This method iss applied to the Fresno and Kern monitors only. Thus Fresno and Kern County monitors have all three methods applied, Kings and Tulare Counties have only Method 1 applied.

Table B-1
Guidelines For Weight of Evidence Determinations

Results of Modeled Attainment Test		**Supplemental Analyses**
Annual $PM_{2.5}$	**24-Hour $PM_{2.5}$**	
Future Design Value < 14.5 $\mu g/m^3$, all monitor sites	Future Design Value < 62 $\mu g/m^3$, all monitor sites	Basic supplemental analyses should be completed to confirm the outcome of the modeled attainment test
Future Design Value 14.5-15.5 $\mu g/m^3$, at one or more sites/grid cells	Future Design Value 62-67 $\mu g/m^3$, at one or more sites/grid cells	A weight of evidence demonstration should be conducted to determine if aggregate supplemental analyses support the modeled attainment test
Future Design Value > 15.5 $\mu g/m^3$, at one or more sites/grid cells	Future Design Value > 68 $\mu g/m^3$, at one or more sites/grid cells	More qualitative results are less likely to support a conclusion differing from the outcome of the modeled attainment test.

All three of these approaches included various adjustments, and projection to 2014 (and in some cases intermediate years). The adjustments included consideration of the emission inventory in order to attribute $PM_{2.5}$ in a more refined way than the CMB and PMF approaches could by themselves, as the latter cannot always distinguish between different sources of a given chemical species. There is little text discussion in the Plan of how this refinement was done. Adjustments are also made considering the area of influence of each monitor in order to further refine which sources were relevant to particular monitors. There is no text definition of area of influence and no discussion of the procedure followed, other than a diagram and formula at RMD, p. 79, though the meaning of this diagram and formula is not clear. Another adjustment involved modeled sensitivity factors from CMAQ nitrate modeling (and linear nitrate projection and IMS95 modeling") were used to estimate the response of the atmosphere to changes in NO_x emissions. This was an attempt to address the inability of straight speciated rollback to handle secondary particulates, as they are not directly associated with emitted species from sources. It is not clear exactly to which modeling exercises these refer. In addition there is discussion of variations on SMAT (p. 3-21), involving "approved alternate linear assumptions" on trapped water bonded to ammonium nitrate and ammonium sulfate and other issues, but it is not clear how this was done. The execution of much of this is in the spreadsheet in RMD; however, there is very little documentation on the spreadsheet and its formulas. The results from all these adjustments are in Table 3-2, p. 3-22, which lists for each county the 2005 design value, "Receptor Modeled SMAT RRF 2005-2014" based on the methods just described, and a projected 2014 design value. For all counties the value is less than 15 $\mu g/m^3$ the level of the annual NAAQS. The highest 2014 value is 14.09 $\mu g/m^3$, for Kern County based on the PMF method.

EPA believes that the ideas used to refine the receptor modeling results are reasonable ways to address shortcomings of receptor modeling, especially for an area for which secondary particulates are so important. The results do support the attainment demonstration, and it is apparent that substantial thought and effort went into applying the methods. However, documentation for the approaches used is confusing, not well organized, and in some cases missing altogether. Without improved documentation, it is difficult to assess the strength of this supplemental analysis.

Appendix H. "Weight of Evidence" describes several other supplemental analyses. These include tables (pp. H-5 - H-4), bar charts (p. H-5), a Theil regression trend test (p. H-5) and time series plots (p. H-6 and p. H-10), all showing a downward trend in 24-hour and annual $PM_{2.5}$ concentrations. Monthly time series (pp. H-7 – H-8) comparing 2001 to 2006 for Bakersfield and Fresno show substantial decline in $PM_{2.5}$ during the winter months (summers remained about the same). Histograms (p. H-9) comparing frequency distributions for various concentration ranges from the years 1999-2001 to those in 2004-2006 for Bakersfield and Fresno show decreases in the frequency of the highest concentrations. This decrease is clearest for Fresno, which also shows increased occurrence of low concentrations. (Mid-range concentrations, between 15 and 40 $\mu g/m^3$ are more of a mixed picture.) Species and total $PM_{2.5}$ trends (pp. H-14 – H-15) also show declines over 2001-2006, principally in carbonaceous aerosols, but also in ammonium nitrate. The increased stringency of the Residential Wood Combustion Rule that was implemented in 2003 is cited as one of the causes of the decline (p. H-14). Further evidence of a downward trend in nitrate during 1987-2005 is shown in additional graphs (p. H-17).

Emissions are also trending down, as seen in a 2001-2005 time series plot for emitted species, especially for NO_x and for reactive organic gases.

An indicator species analysis plots the Angiola and Fresno winter 2000-2001 concentrations of NH_3 (ammonia) against that of HNO_3 (nitric acid). It is the combination of these two that forms ammonium nitrate $PM_{2.5}$. Ammonia concentrations are almost always far higher than those of nitric acid, and also vary over a much larger range than nitric acid. This is evidence that nitric acid is the limiting precursor, with some implications for the advisability of controls of NO_x emissions as opposed to ammonia.

Finally, Appendix H (p. H-25) discusses the receptor modeling and photochemical modeling results already covered above.

EPA believes that the supplemental analyses presented in Appendix H are useful in a weight of evidence, and support the demonstration of attainment.

3. Conclusions

The 2008 $PM_{2.5}$ Plan lacks or fails to adequately document several significant elements of a modeling demonstration including: a provision for access to the underlying modeling data, the sensitivity and diagnostic testing of the air quality model, a discussion of the relative reduction

factors, and the unmonitored area analysis. Significant time, money, and effort by CARB, the District, and many others have gone into preparing the air quality modeling to support the attainment demonstration in SJV $PM_{2.5}$ plan for the San Joaquin Valley, including the multi-million dollar CRPAQS study. While EPA believes that the modeling is essentially sound, the documentation provided in the 2008 $PM_{2.5}$ Plan is not sufficient for us to fully evaluate its adequacy. Although it is not necessary to provide comprehensive documentation on every issue addressed in a modeling analysis, the level of documentation in the Plan falls significantly short of what is necessary for a reliable attainment demonstration, as described in the Guidance. The lack of documentation, combined with the missing unmonitored area analysis, leaves EPA unable to propose to approve the Plan's air quality modeling or to find it adequate to support the Plan's attainment demonstration. We also cannot currently determine that it provides an adequate basis for the reasonably available control measures, reasonable further progress, and attainment demonstrations in the Plan.

C. $PM_{2.5}$ Attainment Plan Precursors

1. Requirements for the Control of $PM_{2.5}$ Precursors

EPA recognizes NO_x, SO_2, VOC, and ammonia as the main precursor gases associated with the formation of secondary $PM_{2.5}$ in the ambient air. These gas-phase precursors undergo chemical reactions in the atmosphere to form secondary particulate matter. Formation of secondary $PM_{2.5}$ depends on numerous factors including the concentrations of precursors; the concentrations of other gaseous reactive species; atmospheric conditions including solar radiation, temperature, and relative humidity; and the interactions of precursors with preexisting particles and with cloud or fog droplets. 72 FR 20586 at 20589.

EPA recognizes NO_x, SO_2, VOC, and ammonia as precursors of $PM_{2.5}$ because these pollutants can contribute to the formation of $PM_{2.5}$ in the ambient air. As discussed previously, states must include each in their submitted emissions inventory in order to assure the information on all pollutants and precursors that contribute to $PM_{2.5}$ concentrations is available. 72 FR 20586 at 20589 and 40 CFR § 51.1008(a)(1). However, the overall contribution of different precursors to $PM_{2.5}$ formation, and the effectiveness of alternative potential control measures will vary by location. Thus the precursors a state should regulate for attaining the $PM_{2.5}$ NAAQS will also vary to some extent from area to area. 72 FR 20586 at 20589.

In the $PM_{2.5}$ implementation rule, EPA did not make a finding that all potential $PM_{2.5}$ precursors must be controlled in each specific nonattainment area. See $PM_{2.5}$ implementation rule at 20589. Instead, for reasons explained in the rule, a state must evaluate control measures for sources of SO_2 in addition to sources of direct $PM_{2.5}$ in all nonattainment areas. 40 CFR § 51.1002(c) and (c)(1). A state must also evaluate control measures for sources of NO_x unless the state and/or EPA determine that control of NO_x emissions would not significantly reduce $PM_{2.5}$ concentrations in the specific nonattainment area. 40 CFR § 51.1002(c)(2). By contrast, EPA has determined in the $PM_{2.5}$ implementation rule that states do not need to address controls for sources of VOC and ammonia unless the state and/or EPA make a technical demonstration that such controls would significantly contribute to reducing $PM_{2.5}$ concentrations in the nonattainment area. 40 CFR § 51.1002(c)(3) and (4). Such a demonstration is required "if the administrative record related to development of its SIP shows that the presumption is not technically justified for that area." 40 CFR § 51.1002(c)(5).

Significant contributor in this context means that a significant reduction in emissions of the precursor from sources in the area would be projected to provide a significant reduction in $PM_{2.5}$ concentrations in the nonattainment area. $PM_{2.5}$ implementation rule at 20590. Although EPA did not establish a quantitative test for determining the significance of such a change, EPA noted that even relatively small reductions in $PM_{2.5}$ levels are estimated to result in worthwhile public health benefits. Id.

EPA further explained that a technical demonstration to reverse the presumption for NO_x, VOC, or NH_3 in any area could consider the emissions inventory, speciation data, modeling information, or other special studies such as such as monitoring of additional compounds, receptor modeling, or special monitoring studies. 72 FR 20586 at 20596-20597. These factors

could indicate that the emissions or ambient concentration contribution of a precursor, or the sensitivity of ambient concentrations to changes in precursor emissions, differs in the specific nonattainment area from the presumption for that precursor in the $PM_{2.5}$ implementation rule.

2. Identification of $PM_{2.5}$ Attainment Plan Precursors in the SJV 2008 $PM_{2.5}$ Plan and EPA's Evaluation

The 2008 $PM_{2.5}$ Plan does not explicitly identify the pollutants that have been selected as $PM_{2.5}$ attainment plan precursors as defined in 40 CFR § 51.1000. The Plan addresses only NO_x and SO_2 in the RFP and attainment demonstrations and the District's RACM/RACT analysis and thereby implicitly identifies NO_x and SO_2, but not VOC and ammonia as attainment plan precursors. It does include supporting documentation for the inclusion of NO_x as an attainment plan precursor and for the exclusion of ammonia. However, as discussed below, it does not fully evaluate the impact of controlling VOC as a precursor for $PM_{2.5}$ attainment, even though other information in the Plan indicates that controlling VOC, in addition to SO_2 and NO_x, may contribute significantly to ambient $PM_{2.5}$ levels in the SJV.

Precursor relationships are discussed in the Plan's "Executive Summary", Chapter 3 "What is Needed to Demonstrate Attainment?", Chapter 7 "Local, State, and Federal Controls", Chapter 8 "Reasonable Further Progress", Appendix F "SJV $PM_{2.5}$ SIP Modeling Protocol", Appendix G "Regional Air Quality Modeling", Appendix J "Comments and Responses", and the additional appendix "2014 Receptor Modeling Documentation" ("RMD"). The most detailed discussion is in Appendix F, p. F-53*ff*, with the main points repeated in Chapter 3, p. 3-8*ff*. The RMD presents additional evidence regarding precursors.

As mentioned above, ambient contribution and ambient sensitivity to emissions changes may both be considered in determining whether the presumption for an attainment plan precursor should be reversed. The 2008 $PM_{2.5}$ Plan contains numerous qualitative statements that San Joaquin Valley's ambient $PM_{2.5}$ is dominated by ammonium nitrate (NH_4NO_3), and that NO_x reductions are more effective at reducing ambient $PM_{2.5}$ than reductions in the other precursors. Most of those statements are in Chapter 3 and Appendix F and are based on excerpts of findings from CRPAQS. Several of the excerpted and cited CRPAQS documents are available at CARB's "Central California Air Quality Studies" web site at http://www.arb.ca.gov/airways.

For ambient contributions of precursors to the 24-hour $PM_{2.5}$ NAAQS, the Plan contains qualitative descriptions but no quantitative data, although it does refer to "CRPAQS data for the year 2000... available at the ARB website http://www.arb.ca.gov/airways". 2008 $PM_{2.5}$ Plan, p. F-59

For the annual and 24-hour $PM_{2.5}$ NAAQS, the Plan contains some qualitative description of precursor ambient contribution. For example, it states on p. 2-8 that annual concentrations are driven by wintertime concentrations, and further, that the highest short term concentrations are driven by ammonium nitrate, as found in the CRPAQS:

> For most of the sites within the SJV, 50–75% of the annual average $PM_{2.5}$ concentration could be attributed to a high $PM_{2.5}$ period occurring from

> November to January. At non-urban sites, the elevated $PM_{2.5}$ was driven by secondary NH_4NO_3.[11]

There is also quantitative data in Appendix G, Table 2. "Percent Composition Ratio Based on 2000 Average CRPAQS Data" (p. G-21,), using measurements from the Speciation Trends Network (STN). The RMD also has projected 2014 species composition in data tables (at RMD pp. 1 - 70).) and pie charts (at RMD pp. 71 -28), based on various adjustments to Chemical Mass Balance (CMB) and Positive Matrix Factorization (PMF) modeling results Ammonium nitrate for 2000 monitored data ranges from 24-36 percent of total $PM_{2.5}$, and if projected to 2014 ranges from 36-51 percent, confirming the importance of NO_x, one source of nitrate, as a precursor that significantly contributes to annual $PM_{2.5}$ levels in the SJV.

In addition to composition data, ambient sensitivity to emissions changes can also be a consideration in determining which species should be regulated in the SIP for an area as attainment plan precursors. For ammonium nitrate $PM_{2.5}$, which is formed from both ammonia and NO_x, a key issue is the effectiveness of emissions reductions of either or both precursors at reducing $PM_{2.5}$ concentrations. Among the findings cited by the Plan that address this issue are:

> Particulate NH_4NO_3 concentrations are limited by the rate of HNO_3 formation, rather than by the availability of NH_3
>
> and
>
> "Comparisons of ammonia and nitric acid concentrations show that ammonia is far more abundant than nitric acid, which indicates that ammonium nitrate formation is limited by the availability of nitric acid, rather than ammonia…. This study's analyses suggest that reductions in NO_x emissions will be more effective in reducing secondary ammonium nitrate aerosol concentrations than reductions in ammonia emissions. Reductions in VOC emissions will reduce secondary organic aerosol concentrations and may reduce ammonium nitrate…. The results indicate ammonium nitrate formation is ultimately controlled by NO_x emission rates and the other species, including VOCs and background ozone, which control the rate of NO_x oxidation in winter, rather than by ammonia emissions.

2008 $PM_{2.5}$ Plan p. 3-10.

These findings are based on the relative amounts of ammonia and nitrate: there is so much ammonia present that even substantial reductions of ammonia emissions would still leave ample ammonia for forming ammonium nitrate. On the other hand, NO_x is scarce (relative to ammonia), so reducing it will reduce ammonium nitrate significantly.

[11] Quote from "Initial Data Analysis of Field Program Measurements," DRI Document No. 2497, July 29, 2005; Judith C. Chow, L..W. Antony Chen, Douglas H. Lowenthal, Prakash Doraiswamy, Kihong Park, Steven D. Kohl, Dana L. Trimble, John G. Watson, Desert Research Institute.

Finally, sensitivity results from photochemical modeling was used in conjunction with the CMB results mentioned above, though it is not clear which particular modeling was used. The 2008 $PM_{2.5}$ Plan states at p. 3-15:

> The first regional assessment used the Urban Airshed Model, modified to address aerosol chemistry (UAM-AERO). This assessment used the IMS-95 dataset (an early component of CRPAQS) to evaluate a monitored event of nitrate particulate formation. Regional modeling was also conducted for the later 2000-2001 CRPAQS data, providing an update to the PM_{10} receptor modeling projections in 2006. A third round of regional modeling with the Community Multiscale Air Quality (CMAQ) model has been completed by CARB.... If this provides a different regional photochemistry analysis for nitrate formation, the receptor modeling estimates for nitrates will be reviewed.

The RMD section on "Review of control strategy effectiveness supported by CMAQ nitrate particulate evaluation" shows the projected result of a 50 percent reduction in NO_x emissions on the annual $PM_{2.5}$ concentration and on $PM_{2.5}$ concentrations in shorter episodes in several seasons. For the annual concentration, the NO_x reduction gave a predicted 5 $\mu g/m^3$ $PM_{2.5}$ reduction, while for the winter episode the predicted reduction was 28 $\mu g/m^3$ for the 24-hour period RMD, p. 80. A similar evaluation is also done for to analyze the effect of a 50 percent reduction in ammonia emissions: the corresponding $PM_{2.5}$ predicted reductions for annual and winter were only 0.1 $\mu g/m^3$ and 0.3 $\mu g/m^3$, respectively. See RMD, p. 81. When compared to the annual and 24-hour NAAQS of 15 and 65 $\mu g/m^3$, respectively, the effect of NO_x reductions appear to be significant while the effect of ammonia reductions do not. Thus the data and modeling results presented in the 2008 $PM_{2.5}$ Plan, as well as the results of the cited studies, support the identification of NO_x as an attainment plan precursor, and the exclusion of ammonia, consistent with the EPA presumption in the $PM_{2.5}$ implementation rule.

As to VOC, EPA presumption in the $PM_{2.5}$ implementation rule is that VOC need not be an attainment plan precursor. See 40 CFR § 51.1002(c)(3). As explained in the preamble to the rule, however, this presumption may not be technically justified for a particular nonattainment area, *i.e.*, this presumption may be incorrect where emissions of VOC significantly contribute to $PM_{2.5}$ concentrations in the nonattainment area. 72 FR 20586 at 20590-93, 20596-97. States or EPA may conduct a technical demonstration to reverse the presumptive exclusion of VOC as a $PM_{2.5}$ attainment plan precursor based on the weight of evidence of available technical and scientific information. *Id.*

The 2008 $PM_{2.5}$ Plan contains substantial information indicating that, for the SJV nonattainment area, VOC should be considered as a potential $PM_{2.5}$ attainment plan precursor. On an annual basis, Table 2 in Appendix G (p. G-21,) gives an organic carbon range of 38-49 percent of the total $PM_{2.5}$. This organic $PM_{2.5}$ can be further divided into vegetative burning (9-19 percent of total annual $PM_{2.5}$), direct VOC $PM_{2.5}$ emissions (also 9-19 percent of total annual $PM_{2.5}$), and secondary organic aerosols (2-5 percent of total annual $PM_{2.5}$). RMD at 19. This SOA contribution to overall $PM_{2.5}$ levels appears to be non-negligible.

The Plan states: "Secondary organic aerosols (SOA) contribute to a significant fraction of $PM_{2.5}$. SOA is organic carbon particulate formed in the photochemical oxidation of anthropogenic and biogenic VOC precursor gases. Aromatic compounds are believed to be efficient SOA producers contributing to this secondary particulate." 2008 $PM_{2.5}$ Plan, p.3-8. On a 24-hour episodic basis, the contribution of SOA could be higher than the annual 2-5 percent, though it is likely lower for the winter episodes of most concern in the SJV, due to decreased photochemical activity when fog and clouds partially block sunlight. The chemistry of SOA is less well understood than the chemistry of other chemical species, so overall these considerations are not enough to overcome the negative presumption for VOC.

But as noted in the preamble to the $PM_{2.5}$ implementation rule at pp. 20592 - 20593, the lightest organic molecules can participate in atmospheric chemistry processes resulting in the formation of ozone and certain free radical compounds (such as the hydroxyl radical [OH]) which in turn participate in oxidation reactions to form secondary organic aerosols, sulfates, and nitrates. That is, VOC may be a $PM_{2.5}$ precursor not just via formation of SOA, but also via its participation in the oxidant chemistry that leads to nitrate formation, a necessary step in the formation of ammonium nitrate $PM_{2.5}$. NO_x emissions must be oxidized to nitric acid (HNO_3) before they form particulate ammonium nitrate. Two pathways for this to occur are 1) daytime oxidation by OH, which VOC radicals help create, and 2) nighttime oxidation by ozone, with N_2O_5 as an intermediary.[12]

The discussion in the 2008 $PM_{2.5}$ Plan regarding ammonium nitrate (at p. 3-10, quoted above) also refers to VOC, which is identified as one of the controlling factors in NO_x oxidation, the key process in the formation of nitrate and then ammonium nitrate $PM_{2.5}$. The Plan also stated: "Relatively low non-methane organic compounds (NMOC)/NO_x ratios indicate the daytime photochemistry is VOC, sunlight, and background-ozone limited in winter." *Id*. If nitrate formation is VOC-limited under some circumstances, then VOC emissions reductions could lead to ambient $PM_{2.5}$ reductions.

Finally, the RMD at page 82 contains sensitivity analyses for VOC, similar to the ones described above for NO_x and ammonia. According to the sensitivity analysis, the effect of a 50 percent reduction in VOC emissions was predicted reductions in $PM_{2.5}$ levels of 1.3 $\mu g/m^3$ for on annual basis, and 8.7 $\mu g/m^3$ for the (24-hour) winter episode. When compared to the annual $PM_{2.5}$ NAAQS of 15 $\mu g/m^3$ and the 1997 24-hour NAAQS of 65 $\mu g/m^3$, these projected reductions appear significant. The RMD concludes with "Finding: VOC reduction is effective for the annual standard and the winter episode for reduction of total carbon secondary particulates." In addition, NO_x and VOC reductions may have a synergistic effect, such that the ambient $PM_{2.5}$ benefit would be more than expected from looking at the pollutants individually. We note that this effect could be explored with the CMAQ model, but the hybrid CMB-CMAQ approach used in the 2008 $PM_{2.5}$ Plan would not be suitable for such evaluations.

In response to comments on the VOC issue made during the District public comment period, the Plan stated: "ARB modeling has shown that VOC reductions are not as effective in reducing secondary $PM_{2.5}$ as NO_x or SO_2 reductions," and "[a]ll of the technical evaluations for CRPAQS and prior assessments of regional particulate models have indicated that NO_x is the

[12] Lurmann, F. *et. al.*, 2006, *op cit.*, p. 1688.

dominant factor and VOC and ammonia are not." 2008 $PM_{2.5}$ Plan, pp.J-9 and p. J-19. These statements about the relative effectiveness of controlling VOC as compared to other precursors may be true, but they do not cite any particular modeling or technical evaluations, and they do not address the substantial information in the 2008 $PM_{2.5}$ Plan indicating that VOC may contribute significantly to ambient $PM_{2.5}$ levels in the SJV.

As explained above, although EPA's presumption in the $PM_{2.5}$ implementation rule is that VOC need not be a $PM_{2.5}$ attainment plan precursor, this presumption may not be technically justified for certain nonattainment areas. Indeed, technical information in the 2008 $PM_{2.5}$ Plan strongly suggests that VOC reductions can significantly reduce ambient $PM_{2.5}$ concentrations and contribute to expeditious attainment of the $PM_{2.5}$ NAAQS in the SJV.

The above statements from the $PM_{2.5}$ Plan indicating VOC is a significant precursor may not constitute a technical demonstration sufficient to reverse the $PM_{2.5}$ implementation rule presumption against VOC. Clearly they were not intended as such by the State, in view of various other statements in the Plan. Nevertheless, they are part of the administrative record related to development of the SIP, constitute evidence showing that the VOC presumption may not be technically justified, and indicate that the State should submit a demonstration to either support or reverse the presumption under the $PM_{2.5}$ implementation rule that VOC is not an attainment plan precursor. 40 CFR §51.1002(c)(5).

In the absence of a technical demonstration by the State, EPA reviewed the results of several modeling and monitoring studies of the San Joaquin Valley. Some of these documents are available on the "Central California Air Quality Studies" web site at www.arb.ca.gov/airways and/or are cited in the Plan and are reports from contractors involved in CRPAQS. Others are papers from peer-reviewed journals and are analyses using CRPAQS data or data from the earlier IMS95 study. Four monitoring studies and six modeling studies were found to be relevant to the VOC precursor issue and are discussed further below. The monitoring studies all contain evidence that the VOC pathway for nitrate creation is important at least some of the time but differ on the how important it is relative to other pathways such as the nighttime ozone pathway, and are not conclusive on the efficacy of VOC controls. Unlike the monitoring studies, most of the modeling studies explicitly assessed the relative effectiveness of precursor controls.

The monitoring studies examined time series of various pollutants annually and during severe winter $PM_{2.5}$ episodes. The monitoring studies were not all aimed at assessing the relative effectiveness of precursor controls, and insofar as they addressed that issue, they focused more on the relative importance of ammonia and NO_x controls, rather than on VOC versus. NO_x controls. They nevertheless do contain some tentative conclusions about VOC. The monitored relative abundances of precursors and other intermediate chemical species can yield information on the chemical processes occurring and their relative importance. For example, nitrate concentrations far below those of ammonia are evidence that the formation of particulate ammonium nitrate is limited by NO_x emissions rather than by ammonia emissions. (Lurmann et. al., 2006) The concentration of nitric acid (HNO_3) relative to peroxides suggests the prevalence of VOC-limited OH and nitrate formation relative to VOC-abundant conditions (Pun, 1998). The correspondence of daytime ozone and nitrate $PM_{2.5}$ peaks for rural sites is evidence that they are driven by a common process, daytime NO_x oxidation via NO_x and VOC-driven oxidant

photochemistry (Pun, 2004). That correspondence though could also be partly explained by ozone transport or by daytime entrainment of nighttime nitrate formed aloft (Lurmann et. al., 2006). The monitoring studies provide evidence that VOC-limited processes contribute to $PM_{2.5}$ formation, but are not conclusive on the efficacy of VOC controls.

By contrast, most of the six relevant modeling studies did explicitly assess the relative effectiveness of precursor controls, though again they tended to emphasize ammonia more than VOC. One study did not directly address the issue, but stated that background ozone was the most important oxidant, implying that VOC control would have little effect (Ying et. al., 2009). The other five studies explicitly evaluated precursor controls, simulating the $PM_{2.5}$ effect of 50 percent reductions in emissions of NO_x, ammonia, and VOC. The two earliest of these studies used photochemical box models; one found VOC control to be ineffective (Stockwell, 2000), while the other found it effective (Pun and Seigneur, 2001). The later three studies used more sophisticated photochemical grid models, and found VOC control to be effective, though generally less so than NO_x control. One study predicted VOC control to be about 2/3 as effective as NO_x control (17.5 percent benefit from VOC vs. 25 percent from NO_x), though VOC disbenefits occurred at some smaller reductions (Kleeman, Ying, and Kaduwela, 2005). A second study predicted VOC control to be effective, though only by a relatively small amount, at most 10%, or just for certain days (Pun, Balmori, and Seigneur, 2009). The third grid modeling study predicted VOC control to give slightly more benefit than NO_x control (23 percent for VOC vs. 21 percent for NOx) (Livingstone et. al., 2009). While the models, assumptions, input data, and results differed between these studies, they provide ample evidence that control of VOC can significantly reduce ambient $PM_{2.5}$ concentrations in the San Joaquin Valley.

Table C-1
San Joaquin Valley Modeling and Monitoring Study Findings on VOC as a Precursor

Study and Basis	Quotes from Study
Pun and Seigneur, 1998 monitored IMS95 data	p. E-3 Since only a small fraction of NO_x is converted to HNO_3... it was possible that the oxidation system was limited by the availability of oxidants. During wintertime, these oxidants may be sensitive to VOC rather than NO_x. However, these inferences need to be confirmed. p. E-4 However, further research is needed to understand the production of oxidants during the fall season and to assess the sensitivity of oxidants and HNO_3 to VOC and NO_x precursors. p. 3-14 Typical concentrations of HNO_3... and H_2O_2... suggest that the oxidant chemistry of the San Joaquin Valley may be in the VOC-sensitive regime during the winter season. This result is preliminary...

Table C-1
San Joaquin Valley Modeling and Monitoring Study Findings
on VOC as a Precursor

Study and Basis	Quotes from Study
Stockwell *et al.*, 2000 box model using 1997 emissions	p. 4715 decreases in the VOC emission rate have little effect
Pun and Seigneur, 2001 box model on 3-day IMS95 episode, 4-6 January 1996	p. 2979 The concentration of particulate matter (PM) nitrate was found to be sensitive to reductions in VOC emissions. ... Oxidant chemistry in wintertime conditions in the San Joaquin Valley was shown to be VOC-sensitive. p. 2984 the production of secondary PM is greatly reduced when the VOC emissions are halved... A 50% reduction of VOC emissions reduces peak OH and O_3 concentrations by as much as 20%. The resulting N2O5 concentrations are more than proportionately reduced, and consequently, the rate of HNO_3 production by this pathway is considerably reduced. p. 2987 Our box model simulations point to the fact that PM formation in the SJV during winter is HNO_3-sensitive, that HNO_3 formation is oxidant-sensitive, and that oxidant formation is sensitive to reductions in VOC emissions.
Pun, 2004 monitored CRPAQS data	p. 2 During winter, high concentrations of $PM_{2.5}$ and O_3 occur together in [rural] Angiola because daily peak concentrations for both species occur during the day on many days with high PM concentrations. The diurnal cycles of winter PM and O_3 at the urban sites [Fresno and Bakersfield] show a phase difference between these two pollutants. In Angiola, nitrate is the dominant component of winter $PM_{2.5}$ and the daytime peaks of $PM_{2.5}$ are caused by daytime peaks in $PM_{2.5}$ nitrate concentrations. Since daytime conditions are comparatively less favorable for nitrate to partition into the particulate phase, peak concentrations during the 1 to 4 p.m. period are strongly indicative of a daytime chemical process occurring at this site. The difference in the nitrate diurnal profiles in Angiola and at the

Table C-1
San Joaquin Valley Modeling and Monitoring Study Findings
on VOC as a Precursor

Study and Basis	Quotes from Study
	urban sites indicates that the dominant processes contributing to the observed surface nitrate concentrations may be different at urban and rural sites. Transport from aloft was assumed by Watson and Chow (2004) to account for a morning increase in nitrate concentrations at the Fresno supersite. p. 31 There is some evidence that chemical production of nitrate occurs at the surface during the day. It is postulated that the daytime chemical process for the production of nitrate involves OH radicals or nitrate radicals, if it persists due to slower photolysis during the wintertime. Reliable measurements of NO_2 and HNO_3 and additional measurements of nitrate radicals may be needed to evaluate the feasibility of the nitrate reaction.
Kleeman, Ying, and Kaduwela, 2005 UCD/CIT model on 3-day IMS95 episode, 4-6 January 1996	p. 5325 A 50% reduction in NO_x emissions applied to sources within the SJV reduced the predicted concentration of total nitrate by approximately 25% during the study episode.... A 50% reduction in VOC emissions lowered predicted concentrations of total nitrate by 17.5%, while a 50% reduction in NH_3 emissions lowered predicted concentrations of total nitrate by only 10%. p. 5332 at Fresno... VOC controls actually increase the amount of particulate nitrate produced by upwind sources under the conditions experienced on 6 January, 1996. p. 5332 at Kern Wildlife Refuge... The total concentration of nitrate increases slightly as VOC is scaled downward and then decreases with greater VOC reduction. ... A 50% reduction in VOC concentrations at Kern Wildlife Refuge leads to a predicted decrease in particulate nitrate concentrations of approximately 25–30% pp.5336-5338 a 50% reduction in NO_x emissions reduces maximum particulate nitrate concentrations by approximately 12 $\mu g/m^3$ ...VOC and NH_3 emissions controls are not as effective as NO_x controls for particulate nitrate... a 50% reduction in VOC emissions reduces ground level particulate nitrate concentrations by only 7 $\mu g/m^3$... a 50% NH_3 emissions reduction reduces ground level particulate

Table C-1
San Joaquin Valley Modeling and Monitoring Study Findings
on VOC as a Precursor

Study and Basis	Quotes from Study
	nitrate concentrations by only 4 µg/m^3
McCarthy, 2005 monitored CRPAQS data	p. 18 Daytime HNO_3 production rates are limited by sunlight, VOCs, and background ozone Nighttime HNO_3 production is limited by background ozone which is abundant aloft but not at the surface
Lurmann *et al.*, 2006 monitored CRPAQS data	p. 1679 ["implications" sidebar] Reductions in VOC emissions will reduce secondary organic aerosol concentrations and most likely contribute to reductions in ammonium nitrate concentrations. p. 1688 The results indicate that ammonium nitrate formation is controlled by the formation of nitric acid and, therefore, ultimately controlled by NO_x and VOC emission rates and background O3 concentrations that control the rate of NO_x oxidation. This analysis is not able to assess the relative benefits of controlling NO_x or VOC emissions for reducing nitric acid levels. p. 1689 The average diurnal pattern of nitrate at Sierra Nevada Foothills is one that could be expected from photochemical activity, yet the afternoon nitrate peak at this site is more likely because of transport of pollution from the SJV than photochemistry. The average diurnal pattern for the three core sites in the SJV (Fresno, Bakersfield, and Angiola) suggests that the daytime nitric acid production is relatively slow. p. 1690 Valley-wide nighttime production of ammonium nitrate aloft followed by daytime entrainment into the surface layer could explain the spatial homogeneity of wintertime ammonium nitrate levels in the SJV p. 1690 Continuous aerosol nitrate data, in conjunction with NO and O_3 data, suggest that both daytime and nighttime nitric acid formation pathways are active in the SJV.

Table C-1
San Joaquin Valley Modeling and Monitoring Study Findings
on VOC as a Precursor

Study and Basis	Quotes from Study
	pp. 1690-1691 The CRPAQS data examined here tend to support the valley-wide nighttime production aloft hypothesis. p. 1692 Estimated secondary organic aerosol concentrations are small compared with concentrations of likely VOC precursors; however, the estimated secondary portion of $PM_{2.5}$ OC and $PM_{2.5}$ mass is significant in several locations.
Pun, Balmori, and Seigneur, 2009 CMAQ–MADRID model on 1-week CRPAQS episode, 25-31 December 2000	p. 402 Nitrate was only weakly sensitive to reductions in anthropogenic VOC emissions. p. 402 A control strategy that focuses on NO_x and PM emissions would be effective on average, but reductions in VOC and NH_3 emissions would also be beneficial for certain times and locations. p.405 Reductions in anthropogenic VOC led to decreased O_3 concentrations at both urban and rural sites. However, there was virtually no effect on OM p. 408 The reduction in NO_x emissions by 50% induced a strong response in nitrate concentrations. At the rural site, nitrate reductions approached 50% on average, and the time series in Fig. 2 shows a consistent decrease throughout the episode. At Bakersfield, reductions were of the order of 30–45% and were less than linear. p. 408 As discussed previously, the reduction of anthropogenic VOC emissions reduced O_3 concentrations in both urban and rural locations. However, nitrate concentrations were less sensitive to anthropogenic VOC emissions than to NO_x emissions on average. Reductions in anthropogenic VOC emissions consistently caused small reductions in nitrate in the urban areas, even when nitrate increases resulted from reductions in NO_x emissions. Rural nitrate concentrations were quite insensitive to anthropogenic VOC

Table C-1
San Joaquin Valley Modeling and Monitoring Study Findings
on VOC as a Precursor

Study and Basis	Quotes from Study
	emissions on some days. [Fig. 2 shows at most 10% reduction in $PM_{2.5}$ peaks at Angiola and Bakersfield.] p. 408 an effective control strategy for $PM_{2.5}$ in the SJV that is comprehensive in time and location may require controls of multiple precursors rather than a single key precursor.
Ying, Lu, and Kleeman, 2009 UCD/CIT model on 3-week CRPAQS episode, 15 December 2000 to 7 January 2001	p. 424 The NO_x is not immediately transformed into nitric acid/NH_3 nitrate due to slow photochemical reactions in the winter. Background ozone is the most important oxidant for reactive nitrogen with gradual conversion of NO_x to particulate nitrate over several days.
Livingstone *et. al.* , 2009 CMAQ model on 3-week CRPAQS episode, 17 December 2000 to 7 January 2001	p. 5971 We found that emission reductions of NO_x and AVOC [anthropogenic VOC] showed similar effects on percentage basis in different areas, and both are more effective than reducing NH_3 for abating elevated concentrations of accumulation mode PM in California Central Valley during the winter episode. p. 5971 [excerpt from] Table 1. Model results for ammonium nitrate at a Bakersfield station. Sensitivity of two-week average (ammonium + nitrate) to precursor reductions [precursor] [response] -50% NO_x -21% $PM_{2.5}$ -50% AVOC -23% $PM_{2.5}$ -50% NH3 -8.8% $PM_{2.5}$ p. 5976 The fine aerosol concentration was more sensitive to AVOC than NO_x in small areas around a Bakersfield station with high concentrations of accumulation mode PM

Notes: CRPAQS and IMS95 are described on the Central California Air Quality Studies web site, http://www.arb.ca.gov/airways/crpaqs/publications.htm
CPAQS is the California Regional Particulate Air Quality Study, a field study conducted from December 1999 through February 2001.
IMS95 is the 1995 Integrated Monitoring Study, a field study that included a four week winter sampling program in December 1995 and early January 1996.

Central California Air Quality Studies web site, CRPAQS Documents and Publications page:
http://www.arb.ca.gov/airways/crpaqs/publications.htm
Studies cited in table are:

Kleeman, M.K., Ying, Q., and Kaduwela, A., 2005, "Control strategies for the reduction of airborne particulate nitrate in California's San Joaquin Valley", Atmospheric Environment, 39: 5325-5341 September 2005. doi:10.1016/j.atmosenv.2005.05.044

Livingstone, P.L., et. al., 2009, "Simulating PM Concentrations During a Winter Episode in a Subtropical Valley and Sensitivity Simulations and Evaluation methods", Atmospheric Environment, 43: 5971-5977. doi:10.1016/j.atmosenv.2009.07.033

Lurmann, F.W., Brown, S.G., McCarthy, M.C., and Roberts P.T., 2006, "Processes Influencing Secondary Aerosol Formation in the San Joaquin Valley During Winter", Journal of the Air & Waste Management Association, 56: 1679-1693.

McCarthy, M., 2005, "The Role of Nighttime Chemistry in Winter Ammonium Nitrate Formation in the San Joaquin Valley", presented at the American Association for Aerosol Research (AAAR), Supersites Conference, February 2005, Atlanta, GA. Available on CRPAQS web page listed above; direct link: http://www.arb.ca.gov/airways/Documents/AAAR/2005/mccarthy_nitrate_present.pdf

Pun, B.K. and Seigneur, C., 1998, "Conceptual Model of Particulate Matter Pollution in the California San Joaquin Valley", prepared by Atmospheric and Environmental Research for Pacific Gas & Electric, Document Number CP045-1-98, 8 September 1998. Available on CRPAQS web page listed above; direct link: http://www.arb.ca.gov/airways/Documents/reports/sjvpmc~1.pdf

Pun, B.K. and Seigneur, C., 2001, "Sensitivity of Particulate Matter Nitrate Formation to Precursor Emissions in the California San Joaquin Valley", Environmental Science and Technology, 35: 2979-2987. doi: 10.1021/es0018973

Pun, B., 2004, "CRPAQS Task 2.7 When and Where Does High O_3 Correspond to High $PM_{2.5}$? How Much $PM_{2.5}$ Corresponds to Photochemical End Products?", prepared by Atmospheric and Environmental Research, Inc. for the San Joaquin Valleywide Air Pollution Study Agency. Available on CRPAQS web page listed above; direct link: http://www.arb.ca.gov/airways/crpaqs/workshop/AER2.pdf

Pun, B.K., Balmori R.T.F, and Seigneur, C., 2009, "Modeling Wintertime Particulate Matter Formation in Central California", Atmospheric Environment, 43: 402-409. doi: doi:10.1016/j.atmosenv.2008.08.040

Stockwell, W.R., Watson, J.G., Robinson, N.F., Steiner, W., and Sylte, W.W., 2000, "The Ammonium Nitrate Particle Equivalent of NOx Emissions for Continental Wintertime Conditions", Atmospheric Environment, 34: 4711-4717. doi:10.1016/S1352-2310(00)00148-5

Ying, Q., Lu, J., and Kleeman, M., 2009, "Modeling air quality during the California Regional PM10/PM2.5 Air Quality Study (CPRAQS) using the UCD/CIT source-oriented air quality model - Part III. Regional source apportionment of secondary and total airborne particulate matter", Atmospheric Environment, 43: 419-430, January 2009. doi:10.1016/j.atmosenv.2008.08.033.

3. Conclusions

EPA proposes to concur with the evaluation in the 2008 $PM_{2.5}$ Plan that, at this time, ammonia does not need to be considered an attainment plan precursor for purposes of attaining the 1997 $PM_{2.5}$ NAAQS. However, because the Plan contains substantial information indicating that VOC significantly contributes to $PM_{2.5}$ concentrations in the SJV, EPA is proposing to find

that VOC is a $PM_{2.5}$ attainment plan precursor under 40 CFR § 51.1002(c)(3) and thus must be evaluated for emissions reductions measures. [13]

It should be noted that EPA's concurrence on excluding ammonia as an attainment plan precursor is limited to the attainment of the 1997 $PM_{2.5}$ NAAQS. EPA revised the 24-hour $PM_{2.5}$ standard in 2006 to lower it to 35 $\mu g/m^3$ and is currently reviewing both the annual and 24-hour standards to determine if they should be further lowered to protect public health. See EPA, Policy Assessment for the Review of the Particulate Matter NAAQS, Second External Review Draft, June 2010. Evaluation of ammonia controls for the attainment of the 2006 standard and any future lower standards may show that such controls would significantly contribute to lower $PM_{2.5}$ levels in the Valley.

[13] In its approval of the SJV 2003 PM_{10} plan, EPA determined that for the purposes of section 189(b)(1)(B) and (e) and in the absence of final data from CRPAQS, VOC does not contribute significantly to PM_{10} levels which exceed the standards in the SJV. See 69 FR 30006, 30011 (May 26, 2004). In that determination, EPA relied on the criteria that VOC control was not shown to be absolutely necessary for PM_{10} attainment and that it had a lower effectiveness than NO_x control in reduction PM_{10}. In addition, EPA noted in its 2004 final rule the District's intention to re-examine the VOC issue when CRPAQS results were available. 69 FR 30010.

Since its 2004 finding, EPA promulgated the $PM_{2.5}$ implementation rule, which has an explicit criterion for determining which $PM_{2.5}$ precursors must be evaluated for controls, namely, that a significant change in emissions of the precursor would be projected to provide a significant change in $PM_{2.5}$ concentrations in the nonattainment area. See 72 FR 20586 at 20590 and 40 CFR § 51.1000. This is a different criterion than the one relied on in the 2004 determination. Data and analyses from CRPAQS have also become available. These developments since 2004 support a finding different from our 2004 one.

We also note that the 2004 finding was made for the PM_{10} standards rather than the $PM_{2.5}$ standards. The levels of the 24-hour and annual $PM_{2.5}$ NAAQS (65 $\mu g/m^3$ and 15 $\mu g/m^3$) are much lower than those for the 24-hour and (revoked) annual PM_{10} standards (150 $\mu g/m^3$ and 50 $\mu g/m^3$). A given concentration change is therefore likely to be more significant for the $PM_{2.5}$ standards than for the PM_{10} standards.

D. Reasonably Available Control Measures/Reasonably Available Control Technology

1. Requirements for RACM/RACT

CAA section 172(c)(1) requires that each attainment plan "provide for the implementation of all reasonably available control measures as expeditiously as practicable (including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonably available control technology [RACT]), and shall provide for attainment of the national primary ambient air quality standards."

We interpret reasonably available control measures (RACM) in these provisions as referring to measures of any type that may be applicable to a wide range of sources, whereas the parenthetical reference to reasonably available control technology (RACT) refers to measures applicable to stationary sources. Thus, RACT is a type of RACM specifically designed for stationary sources. 72 FR 20586 at 20610.

EPA defines RACM as any potential control measure for application to point, area, on-road and non-road emission source categories that meets the following criteria: the control measure is (1) technologically feasible, (2) economically feasible, (3) does not cause "substantial widespread and long-term adverse impacts," (4) is not "absurd, unenforceable, or impracticable," and (5) collectively can advance the attainment date by at least one year. 72 FR 20586 at 20610. We define RACT as the lowest emission limitation that a particular stationary source is capable of meeting by the application of technology (i.e., devices, systems, process modifications, or other apparatus or techniques that reduce air pollution) that is reasonably available considering technological and economic feasibility. 72 FR 20586 at 20610.

For $PM_{2.5}$ attainment plans, EPA is requiring a combined approach to RACM and RACT under subpart 1 of Part D of the CAA. Under this approach, RACM/RACT are measures that a state finds are both reasonably available and contribute to attainment as expeditiously as practicable in its nonattainment area. Thus, what constitutes RACM/RACT in a $PM_{2.5}$ attainment plan is closely tied to that plan's expeditious attainment demonstration. 40 CFR § 51.1010; 74 FR 20586 at 20612. By definition, measures that are neither necessary for meeting the RFP requirement nor helping an area attain the NAAQS as expeditiously as practicable are not required RACM/RACT. A state's attainment plan must include a list of measures considered and information sufficient to show that a state has met all requirements for determination of RACM/RACT. 72 FR 20586 at 20612. A state must evaluate RACM/RACT for each identified $PM_{2.5}$ attainment plan precursor.

Under this combined approach, EPA considers RACT be part of an area's overall RACM obligation. Subpart 1, unlike subparts 2 and 4 of title 1, Part D of the CAA, does not identify specific source categories for which EPA must issue control technology documents or guidelines or identify specific source categories for state evaluation during attainment plan development. 72 FR 20586 at 20610. Because of the variable nature of the $PM_{2.5}$ problem between nonattainment areas, which may require states to develop attainment plans that address widely disparate circumstances, EPA determined that a state should have flexibility with respect to RACT and

RACM controls but also that in areas needing significant emissions reductions to attain the standards, RACT/RACM controls on smaller sources may be necessary to reach attainment as expeditiously as practicable. 72 FR 20586 at 20612, 20615

The determination of RACM/RACT is a three-step process: (1) identifying technologically and economically feasible measures and associated emissions reductions, (2) conducting air-quality modeling and related analyses, and (3) selecting RACM/RACT. 72 FR 20586 at 20613. Any measures that are necessary to meet these requirements which are not already either federally promulgated, part of the state's SIP, or otherwise creditable in SIPs must be submitted in enforceable form as part of a state's attainment plan for the area. 72 FR 20586 at 20614.

The first step, identification of potential measures, should be based on an inventory of emissions of direct $PM_{2.5}$ and $PM_{2.5}$ attainment plan precursors from the range of relevant sources and source categories. 72 FR 20586 at 20613. A state is required to evaluate RACM/RACT for direct $PM_{2.5}$ and SO_2. A state is also required to evaluate RACM/RACT for NO_x sources unless it finds that such sources do not significantly contribute to the $PM_{2.5}$ levels in its area. 72 FR 20586 at 20613. Significantly contribute in this context means that a significant change in emissions of the precursor from sources in the area would be projected to provide a significant change in $PM_{2.5}$ concentrations in the area. 72 FR 20586 at 20590.

In the preamble to the $PM_{2.5}$ implementation rule, EPA provided a recommended list of the types of source categories and control measures that may be appropriate for evaluation given the local source mix and attainment needs of a specific area. 72 FR 20586 at 20621.

Technological feasibility refers to whether there are available measures capable of reducing emissions of $PM_{2.5}$ or $PM_{2.5}$ precursors or both. A number of factors are considered in this analysis, such as process and operating conditions, raw materials, physical plant layout, non-air quality and energy impacts, and the time needed to install and operate controls. 72 FR 20586 at 20618.

Economic feasibility refers to whether the cost of a measure is reasonable for the source or source category. A number of factors are considered in this analysis, such as cost per ton of pollution reduced, capital costs and annualized cost. 72 FR 20586 at 20619.

2. RACM/RACT Analysis in the SJV $PM_{2.5}$ SIP

The 2008 $PM_{2.5}$ Plan and the 2007 State Strategy are the latest in a series of air quality plans that the District and CARB have developed to provide for attainment of the federal air quality standards in the SJV[14]. These planning efforts have resulted in a comprehensive set of rules and programs that address the vast majority of emissions sources in the Valley. Many of these District and State rules are among the most stringent in the nation.

[14] These plans include the 2003 PM_{10} Plan (approved 69 FR 30005 (May 26, 2004)), the 2004 Extreme Ozone Attainment Plan (approved 75 FR 10420 (March 8, 2010)), and 2007 Ozone Plan (submitted November 16, 2007).

For the 2008 $PM_{2.5}$ Plan and the 2007 State Strategy, the District, CARB, and the local agencies (through the SJV's eight metropolitan planning organizations (MPO)) each undertook a process to identify and evaluate potential reasonably available control measures that could contribute to expeditious attainment of the $PM_{2.5}$ standards in the SJV. We describe each agency's efforts below.

a. District RACM/RACT Analysis

The District's RACM/RACT analysis and its results are described in Chapter 6 and Appendix I of the 2008 $PM_{2.5}$ Plan. The analysis focused on controls for the categories of stationary and area sources under the District's direct jurisdiction.

To identify potential RACM/RACT, the District reviewed potential measures from a number of sources including but not limited to:

- EPA's list of potential $PM_{2.5}$ control measures (in the $PM_{2.5}$ implementation rule preamble);
- control strategies and measures from other districts and agencies, including the South Coast AQMD, Sacramento Metropolitan AQMD, Bay Area AQMD, and Ventura County APCD;
- further study measures in the SJV 2007 Ozone Plan;
- measures suggested by the public including those recommended by the International Sustainable Systems Research Center (ISSRC) in its draft document "Clearing the Air: A Path to Clean Air by 2017," dated August 2007;
- recommendations from CARB's 2003 audit of the District; and
- recommendations from the 2007 CARB staff report, "Accelerating Attainment in the San Joaquin Valley" November 6, 2007.

2008 $PM_{2.5}$ Plan, pp. 6-6 to 6-8.

The identified potential measures, as well as existing District measures, are described by emissions inventory category in Appendix I. These measures address emissions of direct $PM_{2.5}$, NO_x and SO_2. See 2008 $PM_{2.5}$ Plan, p. 6-8 and Appendix I. Potential RACM/RACT controls for VOC or ammonia were not specifically identified or evaluated. From this set of potential controls, the District developed a Stationary Source Regulatory Implementation Schedule (2008 $PM_{2.5}$ Plan, Table 6-2) which gives the schedule for regulatory adoption and implementation of the selected RACM/RACT measures. See also Table F-1 of this TSD. The schedule was developed based on a variety of factors, including:

- technological feasibility and practicality of emission controls;
- magnitude of emissions from the source category and likely emissions reductions (where possible to determine);
- cost, financial impacts, and potential for socioeconomic impacts (e.g., employment, profitability);
- District authority and enforceability of emissions reductions;
- rate and timing of emissions reductions;

- public acceptability, including interests and concerns of community members;
- pollutants reduced – NO_x, $PM_{2.5}$, VOC, SO_2, or multiple pollutants;
- any potential adverse environmental impacts; and.
- potential for disparate environmental impacts (environmental justice).

2008 $PM_{2.5}$ Plan, p. 6-7.

The District also identified a number of source categories for which feasibility studies to refine the inventory and evaluate potential controls would be done. These categories and the schedule for studying them are given in Table 6-4 of the 2008 $PM_{2.5}$ Plan and Table F-6 of this TSD.

The Plan also includes descriptions of the District's incentive programs (which target on- and off-road engine replacement with an emphasis on diesel engines), its innovative strategies program including its Fast Track emissions reductions measures, and public education efforts. See 2008 $PM_{2.5}$ Plan, pp. 6-13 to 6-23.

b. Local Jurisdictions' RACM Analysis

The local jurisdictions' RACM/RACT analysis was conducted by the SJV's eight MPOs.[15] This analysis, which focused on potential NO_x emissions reductions from transportation control measures (TCM) and builds on the work done for the SJV 2007 Ozone Plan. TCMs are generally measures designed to reduce emissions from on-road motor vehicles through reductions in vehicle miles traveled or traffic congestion. The results of the MPOs' analysis are described in Chapter 7 of the 2008 $PM_{2.5}$ Plan.

For the SJV 2007 Ozone Plan, the SJV MPOs developed a local RACM strategy which consisted of two parts: (1) evaluation of potential RACM for advancing the 8-hour ozone standard attainment date and (2) the adoption of a Congestion Mitigation and Air Quality (CMAQ) policy to fund cost-effective emissions reductions projects.

For the 2008 $PM_{2.5}$ Plan, the MPOs reviewed and updated the evaluation of potential RACM from the 2007 Ozone Plan following EPA's guidance in the $PM_{2.5}$ implementation rule preamble. The evaluation is documented in the 2008 $PM_{2.5}$ Plan on pp. 7-8 to 7-11 and included the following steps:

Step 1: Identification of potential new measures: The MPOs reviewed the measures in the 2007 Ozone Plan, EPA's draft list of $PM_{2.5}$ measures (see 72 FR 20586 at 20621), and other SIPs including the South Coast 2007 AQMP and the New Jersey 2007 SIP. No new measures were identified that had not already been considered in the 2007 Ozone Plan.

[15] These eight MPOs represent the eight counties in the San Joaquin Valley air basin: the San Joaquin Council of Governments, the Stanislaus Council of Governments, the Merced County Association of Governments, the Madera County Transportation Commission, the Council of Fresno County Governments, Kings County Association of Governments, the Tulare County Association of Governments and the Kern Council of Governments.

Step 2: Calculation of the possible emissions reductions from potential TCM: Given the nature of the $PM_{2.5}$ problem in the SJV, the analysis focused on NO_x to assess whether the reductions from these TCM could advance attainment. It did not look at potential emissions reductions of direct $PM_{2.5}$, SO_2, VOC, or ammonia.

In the 2007 Ozone Plan, emissions reductions estimates were calculated for the list of possible local TCM. The maximum feasible emissions reductions for NO_x estimated from implementing all of these TCMs is approximately 7 tons per day (tpd) in 2020 and 5 tpd in 2023. 2008 $PM_{2.5}$ Plan, p. 7-10. These estimates are based on the maximum travel reductions that could be expected from the applicable measures and the average gram/mile emission rate of light-duty vehicles (i.e., passenger cars and light-duty trucks) operated during the summer.

These summer time estimates for NO_x reductions for 2020 and 2023 needed to be adjusted to reflect 2013/2014. Due to the benefits of fleet turnover and increasingly stringent motor vehicle emission standards, the fleet average emission rates in 2020 and 2023 are projected to be lower than those in 2013/2014. This means the NO_x reductions estimated in 2020 and 2023 underestimate the reductions that could be produced in earlier years. Using a ratio of fleet average NO_x emission rates for light-duty vehicles in 2013 to 2020 (2.07), maximum reductions are estimated to produce a reduction of roughly 14 tpd in 2013 (assuming the same level of travel reductions apply in 2013 as did in 2020 and 2023). Unlike ozone levels which are higher in the summer time, $PM_{2.5}$ levels in the SJV are higher in the winter time. Because mobile source NO_x emissions are higher in the summer than winter, NO_x reductions for summer will be higher than for the winter. Thus, applying the reductions estimated for the summertime to the wintertime to evaluate whether the implementation of TCM would advance attainment in the SJV is conservative (i.e., over estimate the potential emissions reductions). 2008 $PM_{2.5}$ Plan, p. 7-10.

Step 3: The emissions reductions estimates were compared against the attainment demonstration to determine if they collectively advance attainment by a full year. Using Table 9-1 from the draft $PM_{2.5}$ plan, it was estimated that an additional 93.1[16] tons per average annual day of NO_x emissions reductions would be necessary in 2013 to advance attainment of the $PM_{2.5}$ standard by one year which is considerable more than the estimated 14 tpd of potential NO_x reductions from TCM. 2008 $PM_{2.5}$ Plan, p. 7-11.

Based on the above analysis, the MPOs determined that there were no additional local RACM, beyond those measures already adopted, that would advance attainment of the $PM_{2.5}$ NAAQS in the SJV and thus no additional adoption of measures was necessary. 2008 $PM_{2.5}$ Plan, p. 7-11.

The eight MPOs did adopt a CMAQ policy that includes developing a standardized process across the Valley for distributing, beginning in FY2011, 20 percent of the CMAQ funds to projects that meet a minimum cost-effectiveness. This policy focuses on achieving the most

[16] Calculated as the 2013 controlled level of emissions (394.3 tpd) minus the attainment level (291.2 tpd). Values from 2008 $PM_{2.5}$ Plan, Table 9-1.

cost-effective emissions reductions, while maintaining flexibility to meet local needs. 2008 $PM_{2.5}$ Plan, p. 7-8.

c. State's RACM Analysis

CARB describes its proposed strategy to reduce emissions from sources within its jurisdiction – on- and off-road engines and vehicles, fuels, and consumer products –- in Chapter 3 of the 2007 State Strategy. California has unique authority under the CAA to adopt standards for most categories of on- and off-road engines and vehicles, subject in most instances only to a waiver by EPA under CAA section 209.

CARB developed its proposed statewide strategy after an extensive public consultation process to identify potential SIP measures. This process is described in the 2008 $PM_{2.5}$ Plan at p.7-11. It included a SIP Symposium in October 2006 and a workshop in November 2006 to discuss development of potential control concepts for meeting the federal 8-hour ozone and $PM_{2.5}$ standards.[17] CARB made available a draft of the 2007 State Strategy for public review in April 2007 and then conducted a series of public workshops on the draft. On April 26, 2007, CARB staff released a revised draft of the Proposed State Strategy that incorporated changes based on further staff analysis and public comments. CARB Resolution 07-28, p. 3.

From this process, CARB identified and committed to propose 15 new defined measures. 2007 State Strategy, p. 65 and CARB Resolution 7-28, Attachment B, p. 8. These measures focus on cleaning up the in-use (legacy) fleet as well as increasing the stringency of emissions standards for a number of engine categories and further reductions from motor vehicle fuels and consumer products. Many, if not most of these measures, are being proposed and adopted for the first time anywhere in the nation. They build on CARB's already comprehensive program to address emissions of direct $PM_{2.5}$, NO_x, and VOC from all types of mobile sources, through both regulations and incentive programs, as well as from fuels and consumer products. See 2007 State Strategy, p. 38. Table D-1 lists these measures and includes one additional measure each from the California Bureau of Automotive Repair and the California Department of Pesticide Regulation.

[17] More information on this public process including presentations from the workshops and symposium that proceeded adoption of the 2007 State Strategy can be found at www.arb.ca.gov/planning/sip/2007sip/2007sip.htm.

Table D-1
2007 State Strategy Defined Measures Schedule for Consideration

Defined State Measure	Expected Adoption Year
Smog Check Improvements	2007-2008
Expanded Vehicle Retirement	2008-2014
Modification to Reformulated Gasoline Program	2007
Cleaner In-Use Heavy Duty Trucks	2008
Auxiliary Ship Cold Ironing and Clean Technologies	2007-2008
Cleaner Main Ship Engines and Fuels	Fuel: 2007 Engines: 2009
Port Truck Modernization	2007-2008
Accelerated Introduction of Cleaner Line-Haul Locomotives (enforceable agreement)	2007-2008
Clean Up Existing Harbor Crafts	2007
Cleaner In-Use Off-Road Equipment	2007
Clearer In-Use Agricultural Equipment	2009
New Emissions Standards for Recreational Boats	2009-2010
Expanded Off-Road Recreational Vehicle Emissions Standards	By 2010
Enhanced Vapor Recovery for Above Ground Storage Tanks	2007
Additional Evaporative Emissions Standards	By 2010
Consumer Products Program (I & II)	2007-2008 & 2010-2012
Department of Pesticides Pesticide Regulation	2008

3. Evaluation and Conclusions

As described in section II. C. of this TSD, EPA has preliminarily determined that VOC is a $PM_{2.5}$ attainment plan precursor. Under the $PM_{2.5}$ implementation rule, a state must address all $PM_{2.5}$ attainment plan precursors in its RACM/RACT analysis. See 40 CFR § 51.1002(c)(3). Neither the District or the local jurisdictions (through the MPOs) evaluated RACM/RACT for VOC for the 2008 $PM_{2.5}$ Plan.

Under the $PM_{2.5}$ implementation rule, RACM/RACT are the set of measures necessary for expeditious attainment. The measures must address emissions of $PM_{2.5}$ and all $PM_{2.5}$ attainment plan precursors that are necessary for such expeditious attainment. Thus, in order for a $PM_{2.5}$ plan to demonstrate that it provides for RACM/RACT, it must also demonstrate that it provides for expeditious attainment. 72 FR 20586 at 20612-20623.

As discussed in Section II.B. of this TSD, we are proposing to disapprove the air quality modeling in the 2008 $PM_{2.5}$ plan because there is insufficient documentation for us to determine its adequacy. Air quality modeling establishes the level of emissions reductions needed for attainment in an area. Thus, the uncertainties about the adequacy of the air quality modeling result in uncertainties about the emissions reductions needed for attainment. Without a reliable estimate of the emissions reductions needed for attainment, we are unable to determine if the measures selected for the SJV $PM_{2.5}$ Plan are the set of RACM/RACT that will provide for attainment of the $PM_{2.5}$ NAAQS in the San Joaquin Valley as expeditiously as practicable.

Therefore, for this reason and the lack of RACM/RACT analysis for VOC, EPA is proposing to find that the 2008 $PM_{2.5}$ Plan, together with the revised 2007 State Strategy, does not provide for the implementation of RACM/RACT for $PM_{2.5}$ attainment in the San Joaquin Valley as required by CAA section 172(c)(1) and 40 CFR § 51.1010 and to disapprove the SJV $PM_{2.5}$ SIP's RACM/RACT demonstration.

It appears, however, that the State, District, and local jurisdictions have identified and otherwise provided for the implementation of a comprehensive set of measures that are among the most stringent in the nation[18] and should the District and State correct the deficiencies in the attainment demonstration and appropriately address VOC as an attainment plan precursor in its RACM/RACT demonstration in the $PM_{2.5}$ Plan, we would be able to approve the SIP's RACM/RACT demonstration.

As discussed in section I.A.2.b., EPA received a petition for reconsideration of several provisions in the $PM_{2.5}$ implementation rule including three provisions related to RACT. We describe each below and whether the provisions affects our proposed action on the RACM/RACT demonstration in the SJV 2008 $PM_{2.5}$ Plan:

1. The presumption that compliance with the Clean Air Interstate Rule (CAIR) satisfies the NO_x and SO_2 RACT requirements for electric generating units. 72 FR 20586 at 20623-28.

The SJV nonattainment area was not subject to the CAIR which was intended to control the interstate transport of pollutants in the eastern United States. See 70 FR 25162 (May 12, 2005).[19]

[18] SJVAPCD has adopted numerous rules to regulated stationary and area sources of VOC as part of its program to attain the ozone NAAQS. See Appendix B of this TSD.

[19] EPA has recently proposed a replacement rule for CAIR in response to the remand of the rule by the Court of Appeals for the D.C. Circuit. See 75 FR 45210 (August 2, 2010). For more information, please see http://www.epa.gov/airquality/transport/ index.html.

2. The allowance for states to defer establishing emission limits for condensable PM (CPM) until January 1, 2011. 72 FR 20586 at 20652 (codified at 40 CFR § 51.1002(c)).

> SJVAPCD did not explicitly address CPM in its RACT evaluation. The District, however, has addressed CPM in Rule 4352 Glass Melting Furnaces (section 5.4). EPA will evaluate any rule adopted or revised after January 1, 2011 to assure that it appropriately addresses CPM.

3. The revisions to the criteria for analyzing the economic feasibility of RACT from a presumption that a given source must bear a cost similar to other sources to a consideration of whether the cost of a measure is reasonable for the regulated entity to bear, in light of benefits. 72 FR 20586 at 20619-20620.

> While the 2008 $PM_{2.5}$ Plan includes some discussion of criteria for economic feasibility that seem to reflect the revised criteria in the $PM_{2.5}$ implementation rule (see pp. 6-2 and 6-7), we can find no example of where those criteria actually resulted in the rejection of a potential RACT measure.

E. Attainment Date Extension

1. Requirements for Attainment Date Extensions

CAA section 172(a)(2)(A) states that an area's attainment date "shall be the date by which attainment can be achieved as expeditiously as practicable, but no later than 5 years from the date such area was designated nonattainment…, except that the Administrator may extend the attainment date to the extent the Administrator determines appropriate, for a period no greater than 10 years from the date of designation as nonattainment considering the severity of nonattainment and the availability and feasibility of pollution control measures."

Since $PM_{2.5}$ designations have an effective date of April 5, 2005, the initial attainment date for $PM_{2.5}$ areas is no later than April 5, 2010. For any areas that EPA grants the full 5-year attainment date extension under section 172(a), the attainment date is no later than April 5, 2015.

Section 51.1004 of the $PM_{2.5}$ implementation rule addresses the attainment date requirement. Section 51.1004(b) requires a state to submit an attainment demonstration justifying its proposed attainment date and indicates that EPA will approve an attainment date at the same we approve the attainment demonstration. Thus, our approval of an extended attainment date is dependent upon a demonstration showing expeditious attainment.

A state that requests an extension of the attainment date under CAA section 172(a)(2)(A) must provide sufficient information to show that attainment by the initial attainment date of April 5, 2010 is impracticable due the severity of the nonattainment problem in the area and the lack of available control measures. It must also demonstrate that all local control measures that are reasonably available and technologically feasible for the area are being implemented to bring about expeditious attainment of the standard by the alternative attainment date for the area. The state's plan will need to project the emissions reductions expected due to federal and state regulations and local measures such as RACT and RACM, and then conduct modeling to project the level of air quality improvement in accordance with EPA's modeling guidance. EPA will not grant an extension of the attainment date for an area beyond the initial 5 years allowed by section 172(a)(2)(A) if the state has not considered the implementation of all RACM and RACT local control measures for the area. 72 FR 20586 at 20601.

2. Proposed Attainment Date in the SJV 2008 $PM_{2.5}$ Plan

The attainment demonstration and the District's proposed attainment date are found in Chapter 9 of the Plan and summarized in Table E-1 below.

Based on this analysis for the annual standard, the District and CARB requested an attainment date extension to April 5, 2015 for both the annual and 24-hour $PM_{2.5}$ standards. See SJVAPCD Governing Board Resolution, p. 4 and CARB Resolution 08-28, p. 4. However, as discussed in the Plan (pg. 9-3 to 9-4), the District believes that the area may attain prior this date for several reasons:

- The receptor modeling conducted for the Plan may be conservative; that is, it overestimates the reductions needed for attainment.

- The attainment analysis does not include emissions reductions from the District's incentive programs. Under EPA's economic incentive polities, the reductions from the District's programs currently cannot be credited for SIP purposes, including attainment demonstrations.

- While CARB has not committed to pre-2014 emissions reductions, its measures will likely achieve some pre-2014 reductions.

Table E-1
Expeditious Attainment Demonstration for the Annual $PM_{2.5}$ Standard in the San Joaquin Valley
(tons per annual average day)

Year	2009	2010	2011	2012	2013	2014
Baseline annual NO_x inventory	500.9	469.5	443.3	424.4	393.1	376.2
District commitments	-2.43	-3.24	-4.26	-8.56	-8.82	-8.97
ARB commitments	0.0	0.0	0.0	0.0	0.0	-76.0
Controlled inventory	498.5	466.3	439.0	415.8	384.3	291.2
NO_x emissions level needed for $PM_{2.5}$ attainment	291.2	291.2	291.2	291.2	291.2	291.2
At attainment level?	no	no	no	no	no	yes
Baseline annual direct $PM_{2.5}$ inventory	79.8	79.0	77.9	77.0	75.9	75.0
District commitments	-1.60	-2.96	-4.46	-6.69	-6.70	-6.70
ARB commitments	0.0	0.0	0.0	0.0	0.0	-5.0
Controlled inventory	78.2	76.0	73.4	70.3	69.2	63.3
Direct $PM_{2.5}$ emissions level needed for $PM_{2.5}$ attainment	63.3	63.3	63.3	63.3	63.3	63.3
At attainment level?	no	no	no	no	no	yes
Baseline annual SO_2 inventory	26.4	23.0	23.3	23.6	23.8	25.5
District commitments	-0.06	-0.11	-0.16	-0.92	-0.92	-0.92
ARB commitments	0.0	0.0	0.0	0.0	0.0	0.0
Controlled inventory	26.3	22.9	23.1	22.7	22.9	24.6
SO_2 emissions level needed for $PM_{2.5}$ attainment	24.6	24.6	24.6	24.6	24.6	24.6
At attainment level?	no	yes	yes	yes	yes	yes
Overall annual $PM_{2.5}$ standard attainment?	no	no	no	no	no	yes
Projected attainment year						2014

Source: 2008 $PM_{2.5}$ Plan, Table 9-1.

The 2008 $PM_{2.5}$ Plan does not specifically address the most expeditious date for the attaining the 24-hour $PM_{2.5}$ standard. In reference to attainment of the 24-hour standard, the Plan states:

> Attainment of the 24-hour 65 microgram standard is projected to occur prior to 2014 and with fewer reductions required than are needed to attain the annual standard. This means that the annual standard identifies the amount of reductions needed to achieve attainment. CARB used the regional model to evaluate the top 25% of days modeled to provide the annual analysis. Based on design values for 2005, CARB projected a 2014 value of 45 micrograms or less at all sites. Due to concerns that the last two years have experienced slightly higher 24-hour values, the District also performed a screening assessment with estimated design values for 2007 (based on incomplete and uncertified data). Evaluation by the District projected a 2014 value of 53 micrograms. Both of these projections are well below the 65 microgram standard and do not require a weight of evidence evaluation.

2008 $PM_{2.5}$ Plan, p. 3-32.

3. Evaluation and Conclusions

SJV's degree of $PM_{2.5}$ nonattainment can fairly be characterized as severe. The area typically records the highest ambient $PM_{2.5}$ levels in the nation, with 2007-2009 design values for the annual and 24-hour $PM_{2.5}$ levels in urban Bakersfield area of 22.6 $\mu g/m^3$ and 70 $\mu g/m^3$, respectively. See EPA, Air Quality Subsystem, Design Value Report, August 9, 2010. The $PM_{2.5}$ problem in the San Joaquin Valley is complex, caused by both direct and secondary $PM_{2.5}$ and compounded by the area's topographical and meteorological conditions that are particularly conducive to the formation and concentration of $PM_{2.5}$ particles. See 2008 $PM_{2.5}$ plan, Chapter 3.

As discussed in section II.F. below, the District's strategy for attaining the $PM_{2.5}$ standard relies on reductions of direct $PM_{2.5}$ as well as the $PM_{2.5}$ precursor pollutants NO_X and SO_x. The SJV needs significant reductions in $PM_{2.5}$ and $NO_{X,}$ to demonstrate attainment. EPA believes that further reduction of these pollutants is challenging, because the State and local air pollution regulations already in place include most of the readily available $PM_{2.5}$ and $NO_{X,}$ control measures. Moreover, attainment in the SJV depends on emissions reductions that offset the emissions increases associated with the projected increases in population and emissions levels for this high-growth area.

Reductions of direct $PM_{2.5}$ are achieved primarily from open burning, commercial charbroiling, and residential wood combustion control measures. These types of control measures present special implementation challenges (e.g., the large number of individuals subject to regulation and the difficulty of applying conventional technological control solutions). NO_x reductions come largely from District rules for fuel combustion sources and from the State's mobile source rules.

Because of the necessity of obtaining additional emissions reductions from these source categories in the SJV and the need to conduct significant public outreach if applicable control

approaches are to be effective, EPA agrees with the District and CARB that the 2008 $PM_{2.5}$ Plan reflects expeditious implementation of the programs during the 2008-2014 time frame. EPA also agrees that the implementation schedule for enhanced stationary source controls is expeditious, taking into account the time necessary for purchase and installation of the required control technologies. Finally, we believe that it is not feasible at this time to accelerate the emissions reduction schedule for the State and Federal mobile source which must rely on fleet turnover over the years to ultimately deliver the anticipated emissions reductions. The District's control strategies are discussed in greater detail in Chapter 6 of the 2008 $PM_{2.5}$ Plan, and in section II.F. below.

In addition, the State has adopted standards for many categories of on-road and off-road vehicles and engines, and gasoline and diesel fuels, and included commitments to develop rules for Smog Check Improvements, Cleaner In-Use Heavy-Duty Trucks, and Cleaner In-Use Off-Road Equipment.

EPA believes that the District and State are implementing these rules and programs as expeditiously as practicable. We anticipate, however, that the District and CARB will reevaluate this conclusion after completion of the mid-course review of the $PM_{2.5}$ attainment SIP for this area, due in April 2011. EPA also expects that the District and CARB will continue to investigate opportunities to accelerate progress toward attainment as new control opportunities arise, and that the agencies will promptly adopt and expeditiously implement any new measures found to be feasible in the future.

As discussed in section II.B. above, we are proposing to disapprove the air quality modeling in the 2008 $PM_{2.5}$ Plan because it is insufficiently documented for us to evaluate its adequacy. Without adequate air quality modeling, it is not possible to determine the reductions needed to attain the $PM_{2.5}$ NAAQS in the SJV and, in turn, to evaluate the availability and feasibility of controls needed to attain as required by in CAA section 172(a)(2).

As discussed in section II.D. above, we are also proposing to disapprove the RACM/RACT demonstration in the SJV 2008 $PM_{2.5}$ Plan in part because it does not consider RACM for VOC sources. As stated in 72 FR 20586 at 20601, EPA cannot grant an extension of the attainment date beyond the initial five years provided by section 172(a)(2)(A) if the state has not adequately considered and evaluated the implementation of RACM and RACT in the area. By definition, RACM/RACT are those controls that are necessary to demonstrate attainment as expeditiously as practicable and to meet any RFP requirements. 40 CFR § 51.1010(a). Without an adequate evaluation of potential RACM/RACT controls for VOC sources, EPA is unable to determine whether the State's requested attainment date is as expeditious as practicable in accordance with CAA 172(a)(2).

For these reasons, EPA is proposing to not grant California's request for an attainment date extension to April 5, 2015 for the San Joaquin Valley at this time. Given the severity of the $PM_{2.5}$ nonattainment problem in the SJV, an extension of the attainment date would most likely be appropriate and approvable if it were supported by the necessary analysis and part of an attainment plan that meets the applicable statutory and regulatory requirements.

F. Adopted Control Strategy and Enforceable Commitments

1. Requirements for Control Strategies and Enforceable Commitments

CAA section 172(c)(6) requires nonattainment plans to "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 of such standard in such area by the applicable attainment date…." CAA section 110(a)(2)(A), which applies to all SIP, contains virtual identical language. The $PM_{2.5}$ implementation rule requires all control measures needed for attainment be implemented as expeditiously as practicable but no later than the beginning of the year prior to the attainment date. 40 CFR § 51.1007(b).

In most instances, nonattainment plans should include the adopted measures it relies on to demonstrate attainment and RFP and/or meet other CAA requirement or should identify the adopted measures it relies on that are already SIP approved, federally promulgated, or otherwise SIP creditable. EPA, however, recognizes that circumstances exist that warrant the initial use of enforceable state commitments in place of these adopted measures. It believes that the CAA allows approval of such enforceable commitments as elements of a CAA control strategy requirement when they are limited in scope.

The language in CAA sections 110(a)(2)(A) and 172(c)(6), given above, is quite broad, allowing a SIP to contain any "means or techniques" that EPA determines are "necessary or appropriate" to meet CAA requirements, such that the area will attain as expeditiously as practicable, but no later than the designated date. Furthermore, the express allowance for "schedules and timetables" demonstrates that Congress understood that all required controls might not have to be in place before a SIP could be fully approved.

Commitments approved by EPA under CAA section 110(k)(3) are enforceable by EPA and citizens under, respectively, CAA sections 113 and 304. In the past, EPA has approved enforceable commitments and courts have enforced actions against states that failed to comply with them: See, e.g., *American Lung Ass'n of N.J. v. Kean*, 670 F. Supp. 1285 (D.N.J. 1987), aff'd, 871 F.2d 319 (3rd Cir. 1989); *NRDC, Inc. v. N.Y. State Dept. of Env. Cons.*, 668 F. Supp. 848 (S.D.N.Y. 1987); *Citizens for a Better Env't v. Deukmejian*, 731 F. Supp. 1448, recon. granted in par, 746 F. Supp. 976 (N.D. Cal. 1990); *Coalition for Clean Air v. South Coast Air Quality Mgt. Dist.*, No. CV 97-6916-HLH, (C.D. Cal. Aug. 27, 1999). Further, if a state fails to meet its commitments, EPA could make a finding of failure to implement the SIP under CAA section 179(a)(4), which starts an 18-month period for the state to correct the non-implementation before mandatory sanctions are imposed.

Once EPA determines that circumstances warrant use of an enforceable commitment, EPA considers three factors in determining whether to approve the enforceable commitment: (a) does the commitment address a limited portion of the statutorily-required program; (b) is the

state capable of fulfilling its commitment; and (c) is the commitment for a reasonable and appropriate period of time.[20]

2. Control Strategy in the SJV 2008 $PM_{2.5}$ Plan and Revised 2007 State Strategy

For the purposes of evaluating the SJV 2008 $PM_{2.5}$ Plan and revised 2007 State Strategy, we have divided the measures relied on in the attainment and RFP demonstrations and to meet the RACM/RACT and contingency measures requirements into two categories: baseline measures and control strategy measures.

As the term is used here, baseline measures are federal, State, and District rules and regulations adopted prior to December 2006 (i.e., prior to 2008 $PM_{2.5}$ Plan and State Strategy development) that continue to generate emissions reductions through to the attainment year of 2014 and beyond. 2007 State Strategy, Appendix A, p. 1 and 2008 $PM_{2.5}$ Plan, Appendix B, p. B-1. Reductions from these measures are incorporated into the baseline inventory and, for the most part, not individually quantified. These measures provide the majority of emissions reductions needed to attain the $PM_{2.5}$ standards in the SJV. See Table G-1 in this TSD.

Control strategy measures are the new rules, rule revisions, and commitments that provide the additional increment of emissions reductions needed beyond the baseline measures to demonstrate RFP and attainment, meet RACM/RACT, and/or provide for contingency measures.

We evaluate the control strategy measures in this section. Baseline measures are listed in the Appendices A and B to this TSD.

a. District Control Strategy Measures and Commitments

For the 2008 $PM_{2.5}$ Plan, the District identified and committed to adopting and implementing 13 new control measures for direct $PM_{2.5}$, NO_x, and/or SO_2. In Table F-1 below, we list these measures, which mostly involve strengthening existing District rules, along with their anticipated and actual adoption, final compliance, and initial implementation dates. As can be seen from Table F-1, the District has met its rulemaking schedule and has only two rule actions remaining.

In Table F-2 below, we list the expected emissions reductions from each measure; however, we note that the District's commitment is only to the aggregate emissions reductions shown. See 2008 $PM_{2.5}$ Plan, p. 6-9 and SJVUAPCD Governing Board Resolution, p. 5. The reductions listed in Table F-2 are those anticipated to be achievable from each rule at the time the 2008 $PM_{2.5}$ Plan was adopted. Actual reductions from each rule, once adopted, may be greater or less than these anticipated reductions. In Table F-3, we give the current SIP submittal and approval status of the measures in the Plan. In Tables F-4 and F-5, we show the emissions

[20] The U.S. Court of Appeals for the Fifth Circuit upheld EPA's interpretation of CAA sections 110(a)(2)(A) and 172(c)(6) and the Agency's use and application of the three factor test in approving enforceable commitments in the Houston-Galveston ozone SIP. *BCCA Appeal Group et al. v. EPA et al.*, 355 F.3d 817 (5th Cir. 2003).

reductions, as given in the Plan, for the measures that have been approved by EPA and for the measures that have been approved by or submitted to EPA.

For a number of potential measures identified during the District's RACM analysis, insignificant information was available to evaluate the feasibility of implementing them in the San Joaquin Valley. For these measures, the District developed a schedule for performing feasibility studies. See 2008 $PM_{2.5}$ Plan, page 6-13 and Table 6-4. Measures that are identified as being feasible through these studies will be included in future plan updates with schedules and emissions reduction commitments. The list of studies and their anticipated completion date is given in Table F-6.

Table F-1
San Joaquin Valley Air Pollution Control District
2008 $PM_{2.5}$ Plan Specific Rule Commitments

Measure Number & Description	District Rule Number	Rule Making Completion Date	Actual Adoption Date	Compliance Date	Actual Compliance Date	Year Reductions Start	Actual Year Reductions Start
S-AGR-1 Open Burning (Phase IV)	4103	2nd Q – 2010	April 2010	2010	June 2010	2009	2010
S-COM-1 Advanced Emissions Reductions for Boilers, Steam Generators and Process Heaters (> 5 MMBtu/hr)	4320	3rd Q – 2008	October 2008	2012	July 2012 to January 2014	2012	July 2011
S-COM-2 Boilers, Steam Generators and Process Heaters (2 to 5 MMBtu/hr)	4307	3rd Q – 2008	October 2008	2012	July 2010 to January 2016	2012	July 2010
S-COM-3 Boilers, Steam Generators and Process Heaters (0.075 to < 2 MM Btu/hr)	4308	4th Q – 2009	December 2009	2011	January 2011	2011	January 2011
S-COM-5 Stationary Gas Turbines	4703	3rd Q – 2007	September 2007	2012	January 2012	2012	July 2009
S-COM-6 Reciprocating Internal Combustion Engines	4702	4th Q – 2010	In workshop	2012	TBD	2012	TBD
S-COM-7 Glass Melting Furnaces[1]	4354	3rd Q – 2008	October 2008	2009	PM_{10} & SO_x – January 2011 NO_x limits – January 2014-2018	2009	PM_{10} & SO_x – June 2009 NO_x limits – January 2011
S-COM-9 Residential Water Heaters	4902	1st Q – 2009	March 2009	Attrition	Attrition	2011	January 2010
S-COM-10 Natural Gas-Fired, Fan Type Residential Central Furnaces	4905	4th Q – 2014	N/A	Attrition	TBD	2015	TBD
S-COM-14[2] Wood Burning Fireplaces and Wood Burning Heaters	4901	3rd Q – 2009	October 2008	2010	2010	2010	2010

Table F-1
San Joaquin Valley Air Pollution Control District
2008 $PM_{2.5}$ Plan Specific Rule Commitments

Measure Number & Description	District Rule Number	Rule Making Completion Date	Actual Adoption Date	Compliance Date	Actual Compliance Date	Year Reductions Start	Actual Year Reductions Start
S-IND-9 Commercial Charbroiling	4692	2nd Q - 2009	September 2009	2011	January 2011	2011	January 2011
S-IND-21 Flares	4311	2nd Q – 2009	June 2009	2010	July 2011	2010	July 2011
M-TRAN-1 Employer Based Trip Reduction Program	9410	4th Q – 2009	December 2009	2012	January 2012	2012	January 2012

Source: 2008 $PM_{2.5}$ Plan, Table 6-2, revised June 17, 2010. Actual information from specific rules.
[1] Proposed revision would allow flat glass manufacturing facilities to agree to early compliance with the Rule's more stringent Phase IV emission limitations in lieu of compliance with Phase III limits. SJVAPCD, Final Staff Report, Proposed Amendments to Rule 4354 (Glass Melting Furnaces), August 19, 2010.
[2] Listed as S-COM-11 in Table 6-2 but as S-COM-14 elsewhere in the Plan.

Table F-2
San Joaquin Valley Air Pollution Control District
Estimated Emissions Reductions for 2008 $PM_{2.5}$ Plan Specific Rule Commitments
(tons per average annual day)

NO_x Emissions Reductions							
		2009	2010	2011	2012	2013	2014
S-AGR-1	4103 - Open Burning (Phase III & IV)	1.21	1.95	2.68	2.67	2.66	2.65
S-COM-1	Rule 4320 - Advanced Emissions Reductions for Boilers, Steam Generators and Process Heaters (> 5 MMBtu/hr)	0	0	0	1.49	1.50	1.52
S-COM-3	4308 - Boilers, Steam Generators and Process Heaters (0.075 to < 2 MMBtu/hr)	0	0	0.12	0.27	0.39	0.55
S-COM-5	4703 - Stationary Gas Turbines	0	0	0	2.21	2.21	2.21
S-COM-7	4354 - Glass Melting Furnaces	1.22	1.25	1.18	1.60	1.67	1.58

Table F-2
San Joaquin Valley Air Pollution Control District
Estimated Emissions Reductions for 2008 $PM_{2.5}$ Plan Specific Rule Commitments
(tons per average annual day)

S-COM-9	4902 - Residential Water Heaters	0	0	0.20	0.25	0.32	0.40
S-COM-14	4901 - Wood Burning Fireplaces and Wood Burning Heaters	0	0.04	0.08	0.07	0.07	0.06
	Commitment to Total NO_x Reductions	2.43	3.24	4.26	8.56	8.82	8.97
$PM_{2.5}$ Emissions Reductions							
		2009	2010	2011	2012	2013	2014
S-AGR-1	4103 – Open Burning (Phase III & IV)	1.60	2.57	3.53	3.52	3.50	3.49
S-COM-1	Rule 4320 - Advanced Emissions Reductions for Boilers, Steam Generators and Process Heaters (> 5 MMBtu/hr)	0	0	0	0.23	0.24	0.24
S-COM-14	4901 - Wood Burning Fireplaces and Wood Burning Heaters	0	0.39	0.76	0.73	0.71	0.69
S-IND-9	4692 - Commercial Charbroiling	0	0	2.17	2.21	2.25	2.28
	Commitment to Total $PM_{2.5}$ Reductions	1.60	2.96	4.46[1]	6.69	6.70	6.70
SO_2 Emissions Reductions							
		2009	2010	2011	2012	2013	2014
S-AGR-1	4103 – Open Burning (Phase III & IV)	0.06[2]	0.10	0.14	0.14	0.14	0.14
S-COM-1	Rule 4320 - Advanced Emissions Reductions for Boilers, Steam Generators and Process Heaters (> 5 MMBtu/hr	0	0	0	0.76	0.76	0.76
S-COM-14	4901 - Wood Burning Fireplaces and Wood Burning Heaters	0	0.01	0.02	0.02	0.02	0.02
M-TRAN-1	9410 – Employer Based Trip Reduction Programs	TBD	TBD	TBD	TBD	TBD	TBD
	Commitment to Total SO_2 Reductions	0.06	0.11	0.16	0.92	0.92	0.92

Source: 2008 $PM_{2.5}$ Plan, Table 6-3
[1]The value 4.46 is given on Table 6-3b in the 2008 $PM_{2.5}$ Plan. $PM_{2.5}$ reductions expected in 2011, however, sum to 6.46 tpd.
[2] Value given as 0.03 tpd in Appendix I, page I-4.

Table F-3

Approval and Submittal Status of SJVAPCD Rules in the 2008 $PM_{2.5}$ Plan

Rule	Submittal and/or Approval Status	Dates and Citations
Rule 4103 Open Burning (Phase IV)	Not submitted	Most current revision of rule approved (Phase III): May 17, 2007 at 74 FR 57907 (November 10, 2009)
Rule 4307 Boilers, Steam Generators and Process Heaters (2 to 5 MMBtu/hr)	Approved	75 FR 1715 (January 13, 2010)
Rule 4308 Boilers, Steam Generators and Process Heaters (0.075 to < 2 MM Btu/hr)	Submitted	Submittal date: May 17, 2010 Submittal found complete: June 8, 2010 Most current revision of rule approved: October 20, 2005 at 72 FR 29887 (May 30, 2007)
Rule 4320 - Advanced Emissions Reductions for Boilers, Steam Generators and Process Heaters (> 5 MMBtu/hr)	Submitted	Submittal date: March 17, 2009 Submittal found complete: April 20, 2009 New rule.
Rule 4703 Stationary Gas Turbines	Approved	74 FR 53888 (October 21, 2009)
Rule 4702 Reciprocating Internal Combustion Engines (2010 revisions)	Under development, expected adoption December 2010	Most current revision of rule approved: January 18, 2007 at 73 FR 1819 (January 10, 2008)
Rule 4354 Glass Melting Furnaces	Revisions adopted September 2010	Most current revision of rule approved: August 17, 2006 at 72 FR 41894 (August 1, 2007)
Rule 4902 Residential Water Heaters	Approved	75 FR 24408 (May 5, 2010)
Rule 4905 - Natural Gas-Fired, Fan Type Residential Central Furnaces (2014 revisions)	Adoption scheduled for 2014	Most current revision of rule approved: October 20, 2005 at 72 FR 29886 (May 30, 2007)
Rule 4901 Wood Burning Fireplaces and Wood Burning Heaters	Approved	74 FR 57907 (November 10, 2009)
Rule 4692 Commercial Charbroiling	Submitted	Submittal date: May 17, 2010 Submittal found complete: June 8, 2010 Most current revision of rule approved: March 21, 2002 at 68 FR 33005 (June 3, 2003)
Rule 4311 Flares	Submitted	Submittal date: January 10, 2010 Submittal found complete: February 4, 2010 Most current revision of rule approved: June 20, 2002 at 68 FR 8835 (February 26, 2003)
Rule 9410 Employer Based Trip Reduction Program	Submitted	Submittal date: May 17, 2010 Submittal found complete: June 8, 2010 New rule.

Table F-4
San Joaquin Valley Air Pollution Control District
Emissions Reductions for 2008 $PM_{2.5}$ Plan From Approved Measures
Reductions Based on Plan Assumptions
(tons per average annual day)

NO_x Emissions Reductions							
		2009	2010	2011	2012	2013	2014
S-AGR-1	4103 – Open Burning (Phase III)[1]	1.21	1.21	1.20	1.20	1.19	1.19
S-COM-5	4703 - Stationary Gas Turbines	0	0	0	2.21	2.21	2.21
S-COM-7	4354 - Glass Melting Furnaces (2006)[2]	1.22	1.25	1.28	1.31	1.34	1.36
S-COM-9	4902 - Residential Water Heaters	0	0	0.20	0.25	0.32	0.40
S-COM-14	4901 - Wood Burning Fireplaces and Wood Burning Heaters	0	0.04	0.08	0.07	0.07	0.06
	Total NO_x Reductions from Approved Measures	2.43	2.5	2.76	5.04	5.13	5.22
$PM_{2.5}$ Emissions Reductions							
		2009	2010	2011	2012	2013	2014
S-AGR-1	4103 – Open Burning (Phase III)	1.60	1.59	1.59	1.58	1.58	1.57
S-COM-14	4901 - Wood Burning Fireplaces and Wood Burning Heaters	0	0.39	0.76	0.73	0.71	0.69
	Total $PM_{2.5}$ Reductions from Approved Measures	1.60	1.98	2.35	2.31	2.29	2.26
SO_2 Emissions Reductions							
		2009	2010	2011	2012	2013	2014
S-AGR-1	4103 – Open Burning (Phase III)	0.06	0.06	0.06	0.06	0.06	0.06
S-COM-14	4901 - Wood Burning Fireplaces and Wood Burning Heaters	0	0.01	0.02	0.02	0.02	0.02
	Total SO_2 Reductions from Approved Measures	0.06	0.07	0.08	0.08	0.08	0.08

[1] Future year reductions adjusted to reflect expected non-rule related decline in opening burning and to remove reductions from Phase IV of the rule which has not yet been submitted.
[2] Assumes reductions only from the 2006 revision to the Rule and not from either 2008 or pending 2010 revisions of the rule.

Table F-5
San Joaquin Valley Air Pollution Control District
Emissions Reductions for 2008 $PM_{2.5}$ Plan From Approved or Submitted Measures
Reductions Based on Plan Assumptions
(tons per average annual day)

NO_x Emissions Reductions

		2009	2010	2011	2012	2013	2014
S-AGR-1	4103 – Open Burning (Phase III)	1.21	1.21	1.20	1.20	1.19	1.19
S-COM-1	4320 - Advanced Emissions Reductions for Boilers, Steam Generators and Process Heaters (> 5 MMBtu/hr)	0	0	0	1.49	1.50	1.52
S-COM-3	4308 - Boilers, Steam Generators and Process Heaters (0.075 to < 2 MMBtu/hr)	0	0	0.12	0.27	0.39	0.55
S-COM-5	4703 - Stationary Gas Turbines	0	0	0	2.21	2.21	2.21
S-COM-7	4354 - Glass Melting Furnaces (2006)	1.22	1.25	1.28	1.31	1.34	1.36
S-COM-9	4902 - Residential Water Heaters	0	0	0.20	0.25	0.32	0.40
S-COM-14	4901 - Wood Burning Fireplaces and Wood Burning Heaters	0	0.04	0.08	0.07	0.07	0.06
S-IND-9	4692 - Commercial Charbroiling	0	0	0	0	0	0
S-IND-21	4311 - Flares	0	0	0	0	0	0
M-TRAN-1	9410 – Employer Based Trip Reduction Programs	0	0	0	0	0	0
Total NO_x Reductions from Approved or Submitted Measures		2.43	2.50	2.88	6.80	7.02	7.29

$PM_{2.5}$ Emissions Reductions

		2009	2010	2011	2012	2013	2014
S-AGR-1	4103 – Open Burning (Phase III)	1.60	1.59	1.59	1.58	1.58	1.57
S-COM-1	4320 - Advanced Emissions Reductions for Boilers, Steam Generators and Process Heaters (> 5 MMBtu/hr)	0	0	0	0.23	0.24	0.24
S-COM-14	4901 - Wood Burning Fireplaces and Wood Burning Heaters	0	0.39	0.76	0.73	0.71	0.69
S-IND-9	4692 - Commercial Charbroiling	0	0	2.17	2.21	2.25	2.28
M-TRAN-1	9410 – Employer Based Trip Reduction Programs	0	0	0	0	0	0

Table F-5
San Joaquin Valley Air Pollution Control District
Emissions Reductions for 2008 $PM_{2.5}$ Plan From Approved or Submitted Measures
Reductions Based on Plan Assumptions
(tons per average annual day)

Total $PM_{2.5}$ Reductions from Approved or Submitted Measures		1.60	1.98	4.52	4.75	4.78	4.78
SO_2 Emissions Reductions							
		2009	2010	2011	2012	2013	2014
S-AGR-1	4103 – Open Burning (Phase III)	0.06	0.06	0.06	0.06	0.06	0.06
S-COM-1	4320 - Advanced Emissions Reductions for Boilers, Steam Generators and Process Heaters (> 5 MMBtu/hr)	0	0	0	0.76	0.76	0.76
S-COM-14	4901 - Wood Burning Fireplaces and Wood Burning Heaters	0	0.01	0.02	0.02	0.02	0.02
M-TRAN-1	9410 – Employer Based Trip Reduction Programs	0	0	0	0	0	0
Total SO_2 Reductions from Approved or Submitted Measures		0.06	0.07	0.08	0.84	0.84	0.84

Table F-6
San Joaquin Valley Air Pollution Control District
2008 $PM_{2.5}$ Plan Feasibility Studies

Measure Number & Description	District Rule Number	Anticipated Study Completion Date
S-AGR-2 Conservation Management Practices	4550	2010
S-COM- 4 Solid Fuel Boilers, Steam Generators and Process Heaters (> 5 MMBtu/hr)	4352	2009

Table F-6
San Joaquin Valley Air Pollution Control District
2008 $PM_{2.5}$ Plan Feasibility Studies

Measure Number & Description	District Rule Number	Anticipated Study Completion Date
S-COM-6A Small Spark-Ignited Engines and Agricultural Spark-Ignited Engines	4702	2008
S-COM-8 Lime Kilns	4313	2011
S-COM-11 Dryers	4309	2011
S-GOV-6 Prescribed Burning	4106	2008
S-IND-8 Cotton Gins	4204	2009
S-IND-4 Fugitive PM_{10} Prohibitions	Reg. VIII	2009
M-OTH-8 Indirect Source Review Enhancement	9510	2010
M-OTH-10 Fireworks	--	2012

Source: 2008 $PM_{2.5}$ Plan, Table 6-4.

b. CARB Measures and Commitments

The 2007 State Strategy provides a list of State measures adopted from 1994 until 2006. See 2007 State Strategy, p. 38. A fuller list can be found in Appendix A of this TSD.

In addition to the State's baseline measures, the 2007 State Strategy includes enforceable commitments for emissions reductions from mobile source categories that are crucial for attainment of the $PM_{2.5}$ NAAQS in the San Joaquin Valley. For the SJV, the 2007 State Strategy includes State commitments to achieve 5 tpd of direct $PM_{2.5}$, 76 tpd of NO_x, and 23 tpd of VOC reductions. See 2007 State Strategy, p. 63 and CARB Resolution 07-28, Attachment B, p. 6.

The 2007 State Strategy expects to achieve these emissions reductions in the San Joaquin Valley by the attainment year of 2014 from measures such as Smog Check Improvements, Cleaner In-Use Heavy-Duty Trucks, Cleaner In-Use Off-Road Equipment, and accelerated introduction of cleaner line-haul locomotives. These measures are described in more detail in the 2007 State Strategy, Chapter 5 as modified in CARB Resolution 07-28, Attachment B and the 2009 State Strategy Status Report.

In the 2007 State Strategy, CARB provides an estimated emissions reduction for each measure to show that, when considered together, these measures can meet the total commitment. CARB states, however, that its enforceable commitment is to achieve the aggregate emissions reductions for each pollutant by given dates and not for a specific level of reductions from any specific measure. See 2007 State Strategy, as modified in CARB Resolution 07-28, Attachment B, p. 6. A summary of the estimates from the proposed measures is provided in Table F-8 below. In this table, we list only those 2007 State Strategy measures for which CARB estimated an emissions reduction in the SJV.

CARB's commitment is also to propose specific new measures that are identified and defined in the 2007 State Strategy, p. 62 and CARB Resolution 7-28, Attachment B, p. 8. Table F-9 below lists these defined measures. As shown on this table, the State has adopted many of the measures. Table F-10 lists the emissions reductions the State estimates it will achieve from these measures as adopted. Table F-11 lists the emissions reductions that are currently creditable for SIP purposes.

Table F-8
Expected Emissions Reductions from Defined Measures in the Revised 2007 State Strategy for the San Joaquin Valley
(Tons Per Day 2014)

State Measure	$PM_{2.5}$	NO_x	VOC[21]
Smog Check Improvements (BAR)	0.05	3.3	2.9
Expanded Vehicle Retirement	0.01	0.5	0.7
Modifications to Reformulated Gasoline Program	--	--	2.9
Cleaner In-Use Heave-Duty Trucks	3.6	61.4	6.4
Accelerated Intro. Of Cleaner Line-Haul Locomotives	0.2	7.2	0.2
Cleaner In-Use Off-Road Equipment (>25hp)	0.8	3.7	0.9
Cleaner In-Use Agricultural Equipment	NYQ	NYQ	NYQ
New Emission Standards for Recreational Boats	0.1	--	1.3
Expanded Off-Road Recreational Vehicle Emissions Standards	--	--	2.2
Additional Evaporative Emissions Standards	--	--	NYQ
Vapor Recovery for Above Ground Storage Tanks	--	--	NYQ
Consumer Products Program	--	--	3.2
Pesticides: Department of Pesticide Regulation	--	--	2.5
Totals:	5	76	23

Source: 2009 State Strategy Status Report, p. 18. Only defined measures with $PM_{2.5}$, NO_x or VOC reductions in the SJV are shown here.
NYQ = Not yet quantified.

[21] CARB uses the term reactive organic gases (ROG) where we use the term VOC. We will use the term VOC in this notice to refer to both ROG and VOC.

Table F-9
Revised 2007 State Strategy Defined Measures Schedule for Consideration and Current Status

State Measures	Primary Area	Expected Adoption Year	Current Status
Defined Measures in 2007 State Strategy			
Smog Check Improvements	Both	2007-2008	Elements approved 75 FR 38023 (July 1, 2010)
Expanded Vehicle Retirement	Both	2008-2014	Adopted by CARB, June 2009; by BAR, September 2010.
Modification to Reformulated Gasoline Program	Both	2007	Approved, 75 FR 26653 (May 12, 2010)
Cleaner In-use Heavy Duty Trucks	Both	2008	Adopted December 2008; pending revisions
Auxiliary Ship Cold Ironing and Other Clean Technologies	SC	2007-2008	Adopted December 2007.
Cleaner Main Ship Engines and Fuels	SC	Fuel: 2007 Engines: 2009	Adopted July 2007.
Port Truck Modernization	South Coast	2007-2008	Adopted December 2007 and December 2008
Accelerated Introduction of Cleaner Locomotives	Both	2007-2008	In progress
Clean Up Existing Harbor Craft	South Coast	2007	Adopted November 2007, revised June 2010.
Cleaner In-Use Off-Road Engines	Both	2007	Adopted July 2007, pending revisions.
Clearer In-Use Agricultural Equipment	SJV	2009	Incentive program in progress.
New Emissions Standards for Recreational Boats	Both	2009-2010	Partially adopted, July 2008; additional requirements pending.
Expanded Off-Road Recreational Vehicle Emissions Standards	Both	By 2010	Adopted November 2008.

Table F-9
Revised 2007 State Strategy Defined Measures Schedule for Consideration and Current Status

State Measures	Primary Area	Expected Adoption Year	Current Status
Enhanced Vapor Recovery for Above Ground Storage Tanks	Both	2007	Adopted June 2007
Additional Evaporative Emissions Standards	Both	By 2010	Partial adoption: September 2008 (outboard marine tanks)
Consumer Products Program (I & II)	Both	2008 & 2010-2012	Phase I – Approved, 74 FR 57074 (November 4, 2009). Additional revision adopted 2009.
Department of Pesticide Regulation	SJV	2008	Adopted 2008, amended 2009, additional amendments pending. SIP measures.
Additional Measures Adopted Since 2007			
Light Duty Vehicle Catalyst Replacement	Both	N/A	Adopted October 2007.
Greenhouse Gas Emissions from Heavy-duty Vehicles	Both	N/A	Adopted December 2008.
Large Spark Ignition Engines greater than 1 liter, Rule Amendment	Both	N/A	Adopted November 2008.

Both = South Coast and SJV. Source: www.arb.ca.gov.

Table F-10
Achieved Emissions Reductions from Defined Measures in the Revised 2007 State Strategy for the San Joaquin Valley
(Tons Per Day 2014)

State Measure	$PM_{2.5}$	NO_x	VOC
Smog Check Improvements (BAR)	0.0	0.0	0.8
Modification to Reformulated Gasoline Program	0.0	0.0	2.9
Cleaner In-Use Heave-Duty Trucks	4.3	65.6	4.3
Accelerated Intro. Of Cleaner Line-Haul Locomotives	NYQ	NYQ	NYQ
Clean Up Existing Harbor Craft	0.0	0.0	0.0
Cleaner In-Use Off-Road Equipment (>25hp)	0.8	3.7	0.9
Consumer Products Program	--	--	0.5
Department of Pesticide Regulation	--	--	1.5
Totals:	5.1	69.3	10.9

Source: 2009 State Strategy Status Report, p. 6. Only defined measures with $PM_{2.5}$, $NO_{x,}$ or VOC reductions in the SJV are shown here. NYQ = Not yet quantified.

Table F-11
Current Creditable Emissions Reductions from Defined Measures in the Revised 2007 State Strategy for the San Joaquin Valley
(Tons Per Day 2014)

State Measure	$PM_{2.5}$	NO_x	VOC	Status
Smog Check Improvements (BAR)	0.0	0.0	0.8	Approved
Modification to Reformulated Gasoline Program	0.0	0.0	2.9	Approved
Cleaner In-Use Heavy-Duty Trucks	0.0	0.0	0.0	Not submitted
Accelerated Intro. Of Cleaner Line-Haul Locomotives	NYQ	NYQ	NYQ	No reductions claimed
Cleaner In-Use Off-Road Equipment (>25hp)	0.0	0.0		Rule under revision
Consumer Products Program	--	--	0.5	Approved
Department of Pesticide Regulation	--	--	0.0	Submitted, no action. Rule under revision
Totals:	0.0	0.0	4.2	

Source: 2009 State Strategy Status Report, p. 6. Only defined measures with $PM_{2.5}$, NO_x, or VOC reductions in the SJV are shown here.
NYQ = Not yet quantified.

3. Evaluation and Conclusions

a. Baseline Measures

As shown in Table F-12, the majority of the emissions reductions needed to demonstrate attainment come from baseline measures. These reductions come from a combination of District and State measures.[22]

In the past two decades, SJVAPCD has adopted (and in many case revised each several times) almost 40 prohibitory rules that limit emissions of NO_x, SO_2 and/or particulate matter including most of the rule adoptions/revisions it committed to as part of the 2008 $PM_{2.5}$ Plan.[23] See Appendix B and Table F-3. These rules include controls for boilers, fugitive dust sources,

[22] Reductions in the baseline also come from federal measures. These federal measures include EPA's national emissions standards for heavy duty diesel trucks (66 FR 5001 (January 18, 2001)), certain new construction and farm equipment (Tier 2 and 3 non-road engines standards, 63 FR 56968 (October, 23, 1998) and Tier 4 diesel non-road engine standards, 69 FR 38958 (June 29, 2004)), and locomotives (63 FR 18978 (May 16, 1998) and 73 FR 37045 (June 30, 2008)). States are allowed to rely on reductions from federal measures in attainment and RFP demonstrations and for other SIP purposes.

[23] As noted previously, it has also adopted and/or revised numerous prohibitory rules that address VOC emissions from stationary and area sources in the SJV. See Appendix B of this TSD.

engines, woodburning, and open burning. The great majority of these rules and rule revisions are currently SIP approved and as such their emissions reductions are fully creditable in attainment and RFP demonstrations and for other CAA requirements, such as contingency measures.

Table F-12
Summary of Reductions Needed for SJV's $PM_{2.5}$ Attainment Demonstration
(tons per average annual day in 2014)

		$PM_{2.5}$	NO_x	SO_2
A	2005 baseline emissions level	86.0	575.4	26.4
B	2014 attainment target level	63.3	291.2	24.6
C	Total reductions needed from 2005 baseline levels to attain in 2014 (A – B)	22.7	284.2	1.8
D	2014 baseline emissions level	75.0	376.2	25.5
	Reductions from baseline measures (A-D)	11.0	199.2	0.9
	% of reductions needed for attainment from baseline measures	48.5%	70.1%	50%
	Reductions needed from control strategy measures (B - D)	11.7	85.0	0.9
	% of reductions needed for attainment from control strategy measures	51.5%	29.9	50%

California has adopted standards for many categories of on- and off-road vehicles and engines, gasoline and diesel fuels, and numerous categories of consumer products. The State's measures fall within two categories: measures for which the State has obtained or has applied to obtain a waiver of federal pre-emption under CAA section 209 (section 209 waiver measure or waiver measure) and those for which the State is not required to obtain a waiver (non-waiver measures). See EPA's proposed approval and final approval of the SJV 1-Hour Ozone Plan at 74 FR 33933, 33938, (July 14, 2009) and 75 FR 10420, 10424 (March 8, 2010).

i. Section 209 Waiver Measures. A waiver under CAA section 209 is, in general, required for most of California's on- and non-road vehicle or engine standards. Examples of State waiver measures are: low emission vehicle program, heavy duty bus standards, and small off-road engines. A list of California's waiver measures can be found in the Appendix A of this TSD.

Historically, EPA has granted credit for the California's waiver measures without first approving them into the SIP because of special Congressional recognition, in establishing the

waiver process in the first place, of the pioneering California motor vehicle control program and because amendments to the CAA (in 1977) expanded the flexibility granted to California in order "to afford California the broadest possible discretion in selecting the best means to protect the health of its citizens and the public welfare," (H.R. Rep. No. 294, 95th Congr., 1st Sess. 301–2 (1977)). In allowing California to take credit for the waiver measures notwithstanding the fact that the underlying rules are not part of the California SIP, EPA treated the waiver measures similarly to the Federal motor vehicle control requirements, which EPA has always allowed states to credit in their SIPs without submitting the program as a SIP revision.

EPA's historical practice has been to give SIP credit for waiver measures by allowing California to include motor vehicle emissions estimates made by using California's EMFAC (and its predecessors) motor vehicle emissions factor model as part of the baseline emissions inventory. EMFAC was also used to prepare baseline inventory projections into the future, and thus the plans typically showed a decrease in motor vehicle emissions due to the gradual replacement of more polluting vehicles with vehicles manufactured to meet newer, more stringent California vehicle standards. The EMFAC model is based on the motor vehicle emissions standards for which California has received waivers from EPA but accounts for vehicle deterioration and many other factors. The motor vehicle emissions estimates themselves combine EMFAC results with vehicle activity estimates, among other considerations. *See* the 1982 Bay Area Air Quality Plan, and the related EPA rulemakings approving the plan (see 48 FR 5074 (February 3, 1983) for the proposed rule and 48 FR 57130 (December 28, 1983) for the final rule) as an example of how the waiver measures have been treated historically by EPA in California SIP actions.[24]

California's motor vehicle emissions control program predates the first federal statute regulating motor vehicle emissions, the Motor Vehicle Air Pollution Control Act of 1965 (which amended the CAA of 1963). In further CAA amendments, referred to as the Air Quality Act of 1967 (Pub. L. 90-148), Congress allowed the State of California, and only California, a waiver of the Air Quality Act's pre-emption of state emissions standards for new motor vehicles or new motor vehicle engines because of California's pioneering efforts and unique problems. This was not changed when the statute was amended in 1970. The 1977 amendments to the CAA expanded the flexibility granted to California in order "to afford California the broadest possible

[24] EPA's historical practice in allowing California credit for waiver measures notwithstanding the absence of the underlying rules in the SIP is further documented by reference to EPA's review and approval of a May 1979 revision to the California SIP entitled, "Chapter 4, California Air Quality Control Strategies." In our proposed approval of the 1979 revision (44 FR 60758, October 22, 1979), we describe the SIP revision as outlining California's overall control strategy, which the State had divided into vehicular sources and non-vehicular (stationary source) controls. As to the former, the SIP revision discusses vehicular control measures as including technical control measures and transportation control measures. The former refers to the types of measures we refer to herein as waiver measures, as well as fuel content limitations, and a vehicle inspection and maintenance program. The 1979 SIP revision included several appendices, including appendix 4–E, which refers to "ARB vehicle emission controls included in title 13, California Administrative Code, chapter 3 * * *," including the types of vehicle emission standards we refer to herein as waiver measures; however, California did not submit the related portions of the California Administrative Code (CAC) to EPA as part of the 1979 SIP revision submittal. With respect to the CAC, the 1979 SIP revision states: "The following appendices are portions of the California Administrative Code. Persons interested in these appendices should refer directly to the code." Thus, the State was clearly signaling its intention to rely on the California motor vehicle control program but not to submit the underlying rules to EPA as part of the SIP. In 1980, we finalized our approval as proposed. See 45 FR 63843 (September 28, 1980).

discretion in selecting the best means to protect the health of its citizens and the public welfare." (H.R. Rep. No. 294, 95th Congr., 1st Sess. 301-2 (1977). So long as California determines that its motor vehicle standards are "in the aggregate" at least as protective of public health and welfare as applicable federal standards, title II of the CAA requires EPA, unless it makes certain findings, to waive the Act's general prohibition on state adoption and enforcement of standards relating to the control of emissions from new motor vehicles or new motor vehicle engines. See CAA section 209(a) and (b).

In the EPA's review of the California SIP and its many revisions, EPA has historically allowed emissions reduction credit for the motor vehicle emissions standards that are subject to a section 209(b) waiver without requiring California to submit the standards themselves to EPA for approval as part of the California SIP. In this respect EPA treated these rules similarly to the federal motor vehicle control requirements, which EPA has always allowed states to credit in their SIPs without submitting the program as a SIP revision. CAA section 193, enacted as part of the 1990 Amendments to the CAA, is a general savings clause that provides for, among other things, EPA statutory interpretations that predate those amendments to remain in effect so long as not inconsistent with the Act. At the time it enacted section 193, Congress did not insert any language into the statute rendering EPA's treatment of California's motor vehicle standards inconsistent with the Act. Thus, in section 193, Congress effectively ratified EPA's longstanding pre-1990 practice of allowing emissions reduction credit for California standards subject to the waiver process notwithstanding the absence of the standards in the SIP itself.

As part of the 1990 Amendments to the CAA, Congress enacted subsection (e) of section 209. In nearly identical language to subsections (a) and (b) of section 209, subsection (e) sets forth the federal pre-emption of state emissions standards for non-road vehicles or engines but allows the State of California, and only California, a waiver of pre-emption (with certain exceptions) under criteria that mirror the section 209(b) waiver provisions for motor vehicles. Since 1990, EPA has treated such non-road standards in the same manner as California motor vehicle standards, i.e., allowing credit for standards subject to the waiver process without requiring submittal of the standards as part of the SIP. Congress is presumed to be aware of agency interpretations and its subsequent revision of the statute to add subsection (e) without overruling EPA's interpretation with respect to motor vehicle standards is further compelling evidence that the Agency correctly interpreted congressional intent with respect to crediting California requirements subject to a section 209 waiver without requiring California to submit the standards themselves to EPA for approval as part of the California SIP.

We believe that section 193 of the CAA, the general savings clause added by Congress in 1990, effectively ratified our long-standing practice of granting credit for the California waiver rules because Congress did not insert any language into the statute rendering EPA's treatment of California's motor vehicle standards inconsistent with the Act. Rather, Congress extended the California waiver provisions to most types of non-road vehicles and engines, once again reflecting Congressional intent to provide California with the broadest possible discretion in selecting the best means to protect the health of its citizens and the public welfare. Requiring the waiver measures to undergo SIP review in addition to the statutory waiver process is not consistent with providing California with the broadest possible discretion as to on-road and non-road vehicle and engine standards, but rather, would add to the regulatory burden California

faces in establishing and modifying such standards, and thus would not be consistent with Congressional intent. In short, we believe that Congress intended California's mobile source rules to undergo only one EPA review process (i.e., the waiver process), not two.

EPA's waiver review and approval process is analogous to the SIP approval process. First, CARB adopts its emissions standards following notice and comment procedures at the state level, and then submits the rules to EPA as part of its waiver request. When EPA receives new waiver requests from CARB, EPA publishes a notice of opportunity for public hearing and comment and then publishes a decision in the **Federal Register** following the public comment period. Once again, in substance, the process is similar to that for SIP approval and supports the argument that one hurdle (the waiver process) is all Congress intended for California standards, not two (waiver process plus SIP approval process). Moreover, just as SIP revisions are not effective until approved by EPA, changes to CARB's rules (for which a waiver has been granted) are not effective until EPA grants a new waiver, unless the changes are "within the scope" of a prior waiver and no new waiver is needed.

Moreover, to maintain a waiver, CARB's rules can be relaxed only to a level of aggregate equivalence to the Federal Motor Vehicle Control Program (FMVCP). See section 209(b)(1). In this respect, the FMVCP acts as a partial backstop to California's on-road waiver measures (i.e., absent a waiver, the FMVCP would apply in California). Likewise, Federal non-road vehicle and engine standards act as a backstop where there is a corresponding California non-road waiver measure. The constraints of the waiver process thus serve to limit the extent to which CARB can relax the waiver measures for which there are corresponding EPA standards, and thereby serve an anti-backsliding function similar in substance to those established for SIP revisions in CAA sections 110(l) and 193. Meanwhile, the growing convergence between California and EPA mobile source standards diminishes the difference in the emissions reductions reasonably attributed to the two programs and strengthens the role of the Federal program in serving as an effective backstop to the State program. In other words, with the harmonization of EPA mobile source standards with the corresponding State standards, the Federal program is becoming essentially a full backstop to most parts of the California program.

We note that CARB has as long a history of enforcement of vehicle/engine emissions standards as EPA, and CARB's enforcement program is equally as rigorous as the corresponding EPA program. The history and rigor of CARB's enforcement program lends assurance to California SIP revisions that rely on the emissions reductions from CARB's rules in the same manner as EPA's mobile source enforcement program lends assurance to other state's SIPs in their reliance on emissions reductions from the FMVCP.

ii. Non-waiver measures

These measures include improvements to California's inspection and maintenance (I/M) program, SmogCheck; and cleaner burning gasoline and diesel regulations; and. A list of these non-waiver measures, most of which have been SIP approved, can be found Appendix A.

b. Enforceable Commitments

As stated and shown in Table F-13 below, measures already adopted by the District and State (both prior to and pursuant to the 2008 $PM_{2.5}$ Plan) and approved by EPA provide the majority of emissions reductions the State projects are needed to demonstrate attainment. The balance of the needed reductions is in the form of enforceable commitments by the District and CARB.

We believe that, with respect to the 2008 $PM_{2.5}$ Plan and revised 2007 State Strategy, circumstances warrant the consideration of enforceable commitments as part of the attainment demonstration for the SJV. As shown in Table F-12 above, the majority of emissions reductions that the State currently estimates are needed to demonstrate attainment and RFP in the SJV come from rules and regulations that were adopted prior to 2007, i.e., they come from the baseline measures. As a result of these State and District efforts, most sources in the San Joaquin Valley nonattainment area were already subject to stringent rules prior to State Strategy's and the Plan's development, leaving fewer and more technologically challenging opportunities to reduce emissions. In the 2008 $PM_{2.5}$ Plan and the 2007 State Strategy, the SJVAPCD and CARB identified potential control measures that could achieve the additional emissions reductions needed for attainment. See 2008 $PM_{2.5}$ Plan, Appendix I and 2007 State Strategy, Chapter 5. However, the timeline needed to develop, adopt, and implement these measures went well beyond the April 5, 2008[25] deadline to submit the $PM_{2.5}$ attainment plan. As discussed above, the District and State have made progress meeting their commitments but have not completely fulfilled them. Given these circumstances, we consider the District's and CARB's reliance in the 2008 $PM_{2.5}$ Plan and 2007 State Strategy on enforceable commitments to be warranted. We now consider the three factors EPA uses to determine whether the use of enforceable commitments in lieu of adopted measures to meet a CAA planning requirements is approvable.

[25] The 2007 State Strategy was developed to address both the 1997 $PM_{2.5}$ NAAQS and the 1997 8-hour Ozone NAAQS. The 8-hour ozone SIPs were due in November 2007, and the development and adoption of the State Strategy was timed to coordinate with this submittal date. 2007 State Strategy, p. 1.

Table F-13
Reductions Needed for Attainment Remaining as Commitments based on Approved Measures using Plan Assumptions Regarding Emissions Reductions
(tons per average annual day in 2014)

		$PM_{2.5}$	NO_x	SO_2
A	Total reductions needed from baseline and control strategy measures to attain	22.7	284.2	1.8
B	Reductions from baseline measures	11.0	199.2	0.9
C	Total reductions from approved measures (Tables F-4 and F-11)	2.3	5.2	0.1
	Total reductions remaining as commitments (A-B-C)	9.4	79.8	0.8
	% of total reductions needed remaining as commitments	41.4%	28.0%	44.4%
	Total District commitments	6.7	9.0	0.9
	Total reductions from approved District measures[26]	2.3	5.2	0.1
	Total reductions remaining as District commitments	4.4	3.8	0.8
	% of District's commitments remaining as commitments	65.7%	42.2%	88.9%
	Total CARB commitments	5.0	76.0	0
	Total reductions from approved/waived measures	0.0	0.0	0
	Total reductions remaining as CARB commitments	5.0	76.0	0
	% of CARB commitments remaining as commitments	100%	100%	0%

i. Commitments are a Limited Portion of Required Reductions

For the first factor, we look to see if the commitment addresses a limited portion of a statutory requirement, such as the amount of emissions reductions needed for attainment in a nonattainment area.

[26] CARB has submitted five other District rules that if approved would increase the reductions from approved District measures to 4.8 tpd $PM_{2.5}$, 7.3 tpd NO_x, and 0.8 tpd SO_2 based on Plan assumptions. See Table F-5 above. The total reductions then remaining as District commitments would be 1.9 tpd $PM_{2.5}$ (28.4%), 1.7 tpd NO_x (18.9%), and 0.1 tpd SO_2 (11.1%). Overall total of reductions remaining as commitments would be 6.9 tpd $PM_{2.5}$ (30.4%), 77.7 tpd NO_x (27.3%), and 0.1 SO_2 (5.6%).

As shown Table G-3, the remaining portion of the enforceable commitments, after accounting for approved measures, for the 2008 $PM_{2.5}$ Plan and revised 2007 State Strategy are 9.4 tpd $PM_{2.5}$, 79.8 tpd NO_x and 0.8 tpd SO_2. When compared to the total reductions needed by 2014 for $PM_{2.5}$ attainment, the remaining portion of the enforceable commitments represents approximately 41 percent of the needed $PM_{2.5}$, 28 percent of the needed NO_x, and 44 percent of the needed SO_2. Historically, EPA has approved SIPs with enforceable commitments in the range of 10 percent or less. See our approval of the SJV PM_{10} Plan at 69 FR 30005 (May 26, 2004), the SJV 1-hour ozone plan at 75 FR 10420 (March 8, 2010), and the Houston-Galveston 1-hour ozone plan at 66 FR 57160 (November 14, 2001).

We note that there are significant emissions reductions tied to the Cleaner In-Use Heavy-Duty Trucks measure and Cleaner In-Use Off-Road Engines listed in the 2009 State Strategy Status Report, page 6. EPA understands that the State is working on adopting revisions to these rules and submitting them for EPA approval or waiver under CAA section 209 as necessary. It is possible that the reductions from these measures and several outstanding District rules will reduce the percentage of the remaining portion of the enforceable commitments to below 10 percent. However, until these (or other) measures are adopted, submitted, and EPA approved, we believe that the percentages of enforceable commitments for direct $PM_{2.5}$, NO_x, and SO_2 relied upon in the 2008 $PM_{2.5}$ Plan and revised 2007 State Strategy are too high and do not represent a limited portion of the State's current estimate of total emissions reductions needed to meet the statutory requirement for attainment in the SJV.

ii. The State is Capable of Fulfilling Its Commitment

For the second factor, we consider whether the State and District are capable of fulfilling their commitments.

As discussed above, CARB adopted and submitted a 2009 State Strategy Status Report which updates and revises the 2007 State Strategy. This report shows that CARB has made significant progress in meeting its enforceable commitments for the San Joaquin Valley and several other nonattainment areas in California. The 2009 State Strategy Status Report shows that during 2007 and 2008, the State has adopted rules for ten measures identified in the 2007 State Strategy and three rules that were not identified in the Strategy that will contribute to the $PM_{2.5}$ and NO_x reductions needed to attainment the $PM_{2.5}$ NAAQS in the SJV. The 2009 State Strategy Status Report includes a table with estimates of the reductions that may fulfill the CARB's full commitment. See 2009 State Strategy Status Report, p. 18.

EPA believes that the District has also made good progress in meeting its enforceable commitments and that its continued efforts in committing to and adopting measures for sources under its jurisdiction will help them meet its commitments. See Table F-1.

In addition, beyond the rules discussed above, both CARB and the District have well-funded incentive grant programs to reduce emissions from the on- and off-road engine fleets.

While progress has been made by the District and State to achieve their enforceable commitments, there are still significant reductions that must be addressed in order to satisfy the commitments. As discussed above, the remaining portion of the enforceable commitments is 28 to 44 percent for the relevant pollutants. Given the evidence of the State's and District's efforts to date and their continuing efforts to reduce emissions, we believe that the State and District are capable of meeting their enforceable commitments to achieve total reductions of 11.7 tpd direct $PM_{2.5}$, 85 tpd NO_x, and 0.9 tpd SO_2 in the San Joaquin Valley by 2014.

iii. The Commitment is for a Reasonable and Appropriate Timeframe

Finally, for the third factor, we consider whether the commitment is for a reasonable and appropriate period of time. In order to meet the commitments to achieve reductions of achieve 11.7 tpd direct $PM_{2.5}$, 85 tpd NO_x and 0.9 tpd SO_2 by 2014, the 2008 $PM_{2.5}$ Plan and 2007 State Strategy include an ambitious rule development, adoption, and implementation schedule. EPA considers this schedule to provide sufficient time to achieve the committed reductions by 2014. As we noted before, many of the scheduled measures have been adopted. See Tables F-1 and F-9 above. The State and District are continuing to evaluate their adopted measures and the need for additional reductions from new measures

While we believe the State and District have provided a reasonable and appropriate schedule for achieving their commitments by 2014, as discussed above, EPA is not proposing to grant the attainment date extension for the San Joaquin Valley. Thus, we cannot currently conclude that the third factor is satisfied.

G. Attainment Demonstrations

1. Requirement for Attainment Demonstrations

CAA sections 172(b) and (c) require states to submit plans that demonstrates attainment of the applicable standard as expeditiously as practicable but no later than the applicable attainment date. Under the $PM_{2.5}$ implementation rule, this demonstration should consists of four parts:

(1) technical analyses that locate, identify, and quantify sources of emissions that are contributing to violations of the $PM_{2.5}$ NAAQS;

(2) analyses of future year emissions reductions and air quality improvement resulting from already-adopted national and local programs, and from potential new local measures to meet the RACT, RACM, and RFP requirements in the area;

(3) adopted emissions reduction measure with schedules for implementation; and

(4) contingency measures required under section 172(c)(9) of the CAA.

See 72 FR 20586 at 20605.

The requirements for parts 1 and 2 are described in the emissions inventory, air quality modeling, and RACM/RACT sections of this TSD. Requirements for parts 3 and 4 are described in the control strategy and contingency measures sections of this TSD, respectively. In this section, we evaluate how these parts taken together provide or do not provide for attainment of the 1997 $PM_{2.5}$ NAAQS in the San Joaquin Valley as expeditiously as practicable but no later than the attainment date required by the CAA.

2. Attainment Demonstration in the SJV 2008 $PM_{2.5}$ Plan

The attainment demonstration in the 2008 $PM_{2.5}$ Plan is in Section 9.1 "Attainment Outlook." It is summarized in Table G-1 below. Table G-2 shows the contributions by the District and CARB to the control strategy.

Since adoption and submittal of the 2007 State Strategy and the 2008 $PM_{2.5}$ Plan, both CARB and the District have adopted most of the measures in their plans, and many have been approved by or submitted to EPA. See Tables F-3 and F-9. Each approved measure reduces the level of the District's and State's commitments. Table G-3 shows the effect of SIP approvals on the overall level of commitments in the Plan.

Table G-1
Summary of Reductions Needed for SJV's $PM_{2.5}$ Attainment Demonstration
(tons per average annual day in 2014)

		$PM_{2.5}$	NO_x	SO_2
A	2005 baseline emissions level	86.0	575.4	26.4
B	2014 attainment target level	63.3	291.2	24.6
C	Total reductions needed from 2005 baseline levels to attain in 2014 (A – B)	22.7	284.2	1.8
D	2014 baseline emissions level	75.0	376.2	25.5
	Reductions from baseline measures (A-D)	11.0	199.2	0.9
	% of reductions needed for attainment from baseline measures	48.5%	70.1%	50%
	Reductions needed from control strategy measures (B - D)	11.7	85.0	0.9
	% of reductions needed for attainment from control strategy measures	51.5%	29.9	50%

Source: 2008 $PM_{2.5}$ Plan, Tables 8-1 and 9-1.

Table G-2
Summary of Control Strategy Reductions by Agency
(tons per average annual day in 2014)

		$PM_{2.5}$	NO_x	SO_2
	Total reductions needed from baseline and control strategy measures to attain	22.7	284.2	1.8
	Total reductions from control strategy measures	11.7	85.0	0.9
	District commitments	6.7	9.0	0.9
	% of total control strategy reductions from District commitments	57.3%	10.6%	100%
	State commitments	5.0	76.0	0
	% of total control strategy reductions from State commitments	43.7%	89.4%	0%

Source: 2008 $PM_{2.5}$ Plan, Table 8-1.

Table G-3
Reductions Needed for Attainment Remaining as Commitments based on Approved Measures using Plan Assumptions Regarding Emissions Reductions
(tons per average annual day in 2014)

		$PM_{2.5}$	NO_x	SO_2	Combined
A	Total reductions needed from baseline and control strategy measures to attain	22.7	284.2	1.8	308.7
B	Reductions from baseline measures	11.0	199.2	0.9	211.1
C	Total reductions from approved measures (Table F-4)	2.3	5.2	0.1	7.6
	Total reductions remaining as commitments (A-B-C)	9.4	79.8	0.8	90.0
	% of total reductions needed remaining as commitments	41.4%	28.0%	44.4%	29.2%
	Total District commitments	6.7	9.0	0.9	16.6
	Total reductions from approved District measures	2.3	5.2	0.1	7.6
	Total reductions remaining as District commitments	4.4	3.8	0.8	9.0
	% of District's commitments remaining as commitments	65.7%	42.2%	88.9%	54.2%
	Total CARB commitments	5.0	76.0	--	81.0
	Total reductions from approved/waived measures	0.0	0.0	--	0.0
	Total reductions remaining as CARB commitments	5.0	76.0	--	81.0
	% of CARB commitments remaining as commitments	100%	100%	--	100%

3. Evaluation and Conclusions

In order to approve a SIP's attainment demonstration, EPA must make several findings and approve the State's requested attainment date.

First, we must find that the demonstration's technical bases-emissions inventories and air quality modeling-are adequate. As discussed above in sections II.A. and II.B., we are proposing

to approved the emissions inventories but to disapprove the air quality modeling on which the SJV 2008 $PM_{2.5}$ Plan's attainment demonstration is based.

Second, we must find that the SIP provides for expeditious attainment through the implementation of all RACM and RACT. As discussed above in section II.D., we are proposing to disapprove the RACM/RACT demonstration in the SJV $PM_{2.5}$ SIP.

Third, EPA must find that the emissions reductions that are relied on for attainment are creditable. As discussed in section II.F., the 2008 $PM_{2.5}$ Plan relies on enforceable commitments for almost 30 percent of the State's current estimate of the combined emissions reductions needed to attain the 1997 $PM_{2.5}$ NAAQS in the SJV. See Table G-3. While EPA has previously accepted enforceable commitments in lieu of adopted control measures in attainment demonstrations, EPA has done so only when the circumstances warrant it and the commitments meet three criteria. We believe that circumstances here warrant the consideration of enforceable commitments. We also believe that both the State and the District have demonstrated their capability to meet their commitments. However, the commitments do not constitute a limited portion of the required emissions reductions and are not for an appropriate timeframe. The State's and District's unfulfilled commitments currently represent 41 percent of the $PM_{2.5}$ reductions, 28 percent of the NO_x reductions, and 44 percent of the SO_2 emissions reductions currently estimated to be required for attainment of the 1997 $PM_{2.5}$ NAAQS in the SJV. These percentages are well above the 10 percent figure generally accepted by EPA to approve an attainment demonstration that relies in part on enforceable commitments.

Finally, for a $PM_{2.5}$ nonattainment area that cannot attain with five years of its designation as nonattainment, EPA must grant an extension of the attainment date in order to approve the attainment demonstration for the area. As discussed above in section II.E., while we believe that an extension of the attainment date would be appropriate if supported by the necessary analysis, we are proposing to not grant the State's request to extend the attainment date in the SJV to April 5, 2015.

For the foregoing reasons, we are proposing to disapprove the attainment demonstration in the SJV 2008 $PM_{2.5}$ Plan.

H. Reasonable Further Progress Demonstrations

1. Requirements for Reasonable Further Progress Demonstrations

Clean Air Act Section 172(c)(2) requires that plans for nonattainment areas shall provide for reasonable further progress (RFP). RFP is defined in section 171(1) as "such annual incremental reductions in emissions of the relevant air pollutant as are required by [Part D] or may reasonably be required by the Administrator for the purpose of ensuring attainment of the applicable [NAAQS] by the applicable date."

The $PM_{2.5}$ implementation rule requires a state to submit a RFP plan at the same time as its attainment demonstration for any area for which the state requests an extension of the attainment date beyond 2010. The RFP plan must provide emissions reductions such that emissions in 2009 represent generally linear progress from the baseline year to the attainment year. Where a state requests an extension of the attainment deadline to 2014 or 2015, the state must additionally provide emissions reductions such that emissions in 2012 represent generally linear progress from the baseline year to the attainment year. See 40 CFR § 51.1009(c). 72 FR 20586 at 20633.

The RFP plan must describe the control measures that provide for meeting the reasonable further progress milestones for the area, the timing of implementation of those measures, and the expected reductions in emissions of direct $PM_{2.5}$ and all $PM_{2.5}$ attainment plan precursors. See 40 CFR § 51.1009(c).

A state is also required to demonstrate in its RFP plan that in each applicable milestone year (that is, 2009 and 2012), emissions will be at a level consistent with generally linear progress in reducing emissions between the base year and the attainment year. See 40 CFR § 51.1009(d). A state may demonstration this by showing that emissions for each milestone year are either 1) roughly equivalent to benchmark emission levels for direct $PM_{2.5}$ emission and each $PM_{2.5}$ attainment plan precursor addressed in the plan or 2) at levels included in an alternative scenario that is projected to result in a generally equivalent improvement in air quality by the milestone year as would be achieved under the first option. See 40 CFR § 51.1009(g). 72 FR 20586 at 20639.

The steps for determining the benchmark emissions levels are given in the $PM_{2.5}$ implementation rule in 40 CFR § 51.1009(f):

> (1) For direct $PM_{2.5}$ emissions and each $PM_{2.5}$ attainment plan precursor addressed in the attainment strategy, the full implementation reduction is calculated by subtracting the full implementation inventory from the baseline year inventory. The full implementation inventory is the projected RFP emissions inventory for the year preceding the attainment date, representing a level of emissions that demonstrates attainment. The baseline year inventory is the emissions inventory for the year used as the base year for the attainment demonstration (see 40 CFR § 51.1000).

(2) For direct $PM_{2.5}$ emissions and each $PM_{2.5}$ attainment plan precursor addressed in the attainment strategy, a benchmark emissions reduction is calculated by multiplying the full implementation reduction by the milestone date fraction. The milestone date fraction is the ratio of the number of years from the baseline year to the milestone inventory year divided by the number of years from the baseline year to the full implementation year.

(3) The benchmark emissions level in the milestone year is calculated for direct $PM_{2.5}$ emissions and each $PM_{2.5}$ attainment plan precursor by subtracting the benchmark emissions reduction from the baseline year emission level. The benchmark RFP plan is defined as a plan that achieves benchmark emission levels for direct $PM_{2.5}$ emissions and each $PM_{2.5}$ attainment plan precursor addressed in the attainment strategy for the area.

In comparing inventories between baseline and future years for direct $PM_{2.5}$ emissions and each $PM_{2.5}$ attainment plan precursor, the inventories must be derived from the same geographic area. The plan must include emissions estimates for all types of emitting sources and activities in the geographic area from which the emissions inventories for direct $PM_{2.5}$ emissions and each $PM_{2.5}$ attainment plan precursor addressed in the plan are derived. See 40 CFR § 51.1009(f)(5).

The equivalence of an alternative scenario to the corresponding benchmark plan must be determined by comparing the expected air quality changes of the two scenarios at the design value monitor location. This comparison must use the information developed for the attainment plan to assess the relationship between emissions reductions of the direct $PM_{2.5}$ emissions and each $PM_{2.5}$ attainment plan precursor addressed in the attainment strategy and the ambient air quality improvement for the associated ambient species. See 40 CFR § 51.1009(h). The preamble to the proposed $PM_{2.5}$ implementation rule provides an example of an alternative scenario. See 70 FR 65984, 66013 (November 1, 2005).

2. RFP Demonstration in the SJV 2008 $PM_{2.5}$ Plan

The RFP demonstration is in Chapter 8 of the 2008 $PM_{2.5}$ Plan. The demonstration addresses direct $PM_{2.5}$, NO_x, and SO_2 and uses the 2005 annual average day inventory as the baseline year inventory and 2014 as the attainment year.

Table H-1
Full Implementation Reductions
(tons per average annual day)

	$PM_{2.5}$	NO_x	SO_2
2005 Baseline Inventory	86.0	575.4	26.4
2014 Attainment Target Emissions Level (Full Implementation Inventory)	63.3	291.2	24.6
Full Implementation Reductions	22.7	284.2	1.8

Source: 2008 $PM_{2.5}$ Plan, Table 8-1

The 2014 attainment year is 9 years from the 2005 baseline year making the 2009 milestone date fraction 4/9 and the 2012 milestone date fraction 7/9.

Table H-2
Benchmark Calculations
(tons per average annual day)

		$PM_{2.5}$	NO_x	SO_2
A.	Full Implementation Reductions	22.7	284.2	1.8
B.	2009 Milestone Date Fraction (4/9)	0.44	0.44	0.44
C.	2009 Benchmark Emissions Reductions (A * B)	10.1	126.3	0.8
D.	2009 Benchmark Emissions Level (2005 Baseline inventory – C)	75.9	449.1	25.6
E.	2012 Milestone Date Fraction (7/9)	0.78	0.78	0.78
F.	2012 Benchmark Emissions Reductions (A * E)	17.7	221.0	1.3
G.	2009 Benchmark Emissions Level (2005 Baseline inventory – F)	68.3	354.4	25.1
H	Percent annual reductions needed for linear progress ($^1/_9$ *A / 2005 baseline inventory)	2.9%	5.5%	0.8%

Source: 2008 $PM_{2.5}$ Plan, Table 8-2

Table H-3
Baseline Emissions Inventory Adjusted for Plan Control Strategy
(tons per average annual day)

	2005	2009	2012	2014
$PM_{2.5}$				
Baseline Inventory	86.0	79.8	77.0	75.0
District control Measures	0.0	1.6	6.69	6.70
ARB control measures	0.0	0.0	0.0	5.00
Full implementation inventory by milestone year	86.0	78.2	70.3	63.3
NO_x				
Baseline Inventory	575.4	500.9	424.4	376.2
District control Measures	0	2.43	8.56	8.97
ARB control measures	0	0	0	76.0
Full implementation inventory by milestone year	575.4	498.5	415.8	291.2
SO_2				
Baseline Inventory	26.4	26.4	23.6	25.5
District control Measures	0	0.06	0.92	0.92
ARB control measures	0	0	0	0
Full implementation inventory by milestone year	26.4	26.3	22.7	24.6

Source: 2008 $PM_{2.5}$ Plan, Table 8-1

The 2008 $PM_{2.5}$ Plan presents the RFP demonstration in terms of cumulative emissions reductions and percent reductions per year. This demonstration reserved 1 percent of the direct $PM_{2.5}$ baseline (0.8 tpd) and 3 percent of the NO_x baseline (12-15 tpd NO_x) as contingency measures by decreasing the cumulative emissions reductions in each milestone year by these amounts. 2008 $PM_{2.5}$ Plan, p. 8-3. The Plan did not include a contingency reserve for SO_2. 2008 $PM_{2.5}$ Plan, p. 9-9.

Table H-4
Fraction Reductions Achieved in Each Milestone Year
(tons per annual average day)

Milestone Year	Baseline Emissions	Cumulative Emissions Reductions	Percent of Emissions Reductions Needed for Attainment	Percent Per Year (from 2005 to Milestone Year)
$PM_{2.5}$				
2005	86.0			
2009	79.8	7.1	32	2
2012	77.0	15	68	2
2014	75.0	22	100	3
NO_x				
2005	575.4			
2009	500.9	59.6	22	3
2012	424.4	142.3	53	4
2014	376.2	266.9	100	5
SO_2				
2005	26.4			
2009	23.0	3.5	125	3
2012	23.8	3.5	125	2
2014	24.5	2.8	100	1

Source: 2008 $PM_{2.5}$ Plan, Table 8-4.

Based on the information in the above table, the District concluded that the 2008 $PM_{2.5}$ Plan meet the RFP requirement with generally linear progress towards attainment and by providing reductions in direct $PM_{2.5}$ and precursor emissions as quickly as possible. See 2008 $PM_{2.5}$ plan, p. 8-4.

3. Evaluation and Conclusions

Because California has requested an attainment date of 2015 for the SJV, the Plan has addressed RFP for both 2009 and 2012 as required by 40 CFR § 51.1009(c)(2).

The SJV 2008 $PM_{2.5}$ Plan describes in Chapter 6 (tables 6-2 and 6-3) the non-baseline control measures that are relied on to meet the reasonable further progress milestones for the area, the timing of implementation of those measures, and the expected reductions in emissions of direct $PM_{2.5}$ and the $PM_{2.5}$ attainment plan precursors, NO_x and SO_2, as required by 40 CFR § 51.1009(c). It does not address VOC controls or emissions reductions.

The inventories used for comparing the baseline and future years are derived from the same geographic area and include emissions estimates for all types of emitting sources and activities in the geographic area from which the emissions inventories for direct $PM_{2.5}$ and the

$PM_{2.5}$ attainment plan precursors that are addressed in the Plan (i.e., NO_x and SO_2) are derived as required by 40 CFR § 51.1009(f).

In preparing its RFP demonstration, the District followed the procedures in by 40 CFR § 51.1009(f) and correctly calculated its benchmark emissions levels based on the attainment emissions levels given in the Plan.

The RFP demonstration in the 2008 $PM_{2.5}$ Plan is based on the State's current estimate of the emissions levels needed for attainment in the SJV. As discussed in section II.B. of this TSD, EPA is proposing to disapprove the air quality modeling in the Plan because there is insufficient documentation for us to determine its adequacy. Air quality modeling establishes the emissions levels needed for attainment in an area. Thus, uncertainties about the adequacy of the air quality modeling result in uncertainties about the emissions levels needed for attainment. These uncertainties also affect the RFP demonstrations because in order to determine what constitutes generally linear progress towards attainment in an area, we must first know the level of emissions that the area needs meet in order to attain.

As discussed in Section II.C. of this TSD, EPA is proposing to find that VOC should be considered a $PM_{2.5}$ attainment plan precursor in the SJV. The $PM_{2.5}$ implementation rule requires RFP plans to address each attainment plan precursor. The 2008 $PM_{2.5}$ plan does not include an RFP demonstration for VOC.

Using data from the Plan, we have evaluated how close the Plan's projected controlled emissions levels come to the 2009 and 2012 benchmark emissions levels, both with and without the reserve for contingency measures. See Tables H-5 and H-6. As can be seen from these tables, projected emissions levels for direct $PM_{2.5}$ are above and for NO_x significantly above the 2009 and 2012 benchmark emissions levels, both with and without the contingency reserve. Although SO_2 levels are below the benchmarks in both years, the Plan does not provide any equivalency argument that the extra SO_2 reductions will compensate for the excess direct $PM_{2.5}$ and NO_x emissions. Given the comparatively small amount of SO_2 emissions and minimal contribution such emissions make to overall $PM_{2.5}$ levels in the Valley, we do not believe that excess reductions in SO_2 can compensate for shortfall in $PM_{2.5}$ and NO_x reductions. See, for example, Figure 9-1 in the 2008 $PM_{2.5}$ Plan where ammonium sulfate contributes approximately 8 percent to the annual $PM_{2.5}$ concentration compared to 48 percent for ammonium nitrate.

The shortfall in RFP for NO_x is especially problematic given the nature of the $PM_{2.5}$ nonattainment problem in the SJV. Ammonium nitrate contributes 40 percent of the Valley's annual $PM_{2.5}$ levels. 2008 $PM_{2.5}$ Plan, p. H-12. Available information indicates that NO_x is one of the limiting compounds in the reaction that forms ammonium nitrate, making NO_x control an effective approach to reducing ambient $PM_{2.5}$ levels in the SJV. 2008 $PM_{2.5}$ Plan, p. 9-1. Hence, these shortfalls in NO_x emissions reductions in the RFP demonstration are likely to adversely affect progress in reducing ambient $PM_{2.5}$ levels in the SJV.

Table H-5
Benchmark RFP Demonstration using Plan Data
With Contingency Measure Reserve
(tons per annual average day)

	$PM_{2.5}$	NO_x	SO_2
2009			
Benchmark emissions level	75.9	449.1	25.6
Contingency reserve	0.8	15.0	N/A
Projected emissions level	78.2	498.5	26.3
Projected emissions level with contingency reserve	79.0	513.5	26.3
Emissions above benchmark emissions level	3.1	64.4	0.7
Percent above benchmark emissions level	4.0%	14.3%	2.7%
2012			
Benchmark emissions level	68.3	354.4	25.1
Projected emissions level	70.3	415.8	22.7
Contingency reserve	0.8	12.7	N/A
Projected emissions level with contingency reserve	71.1	428.5	22.7
Emissions above benchmark emissions level	2.8	74.1	-2.4
Percent above benchmark emissions level	4.1%	20.9%	-9.6%

Table H-6
Benchmark RFP Demonstration using Plan Data
No Contingency Measure Reserve
(tons per annual average day)

	$PM_{2.5}$	NO_x	SO_2
2009			
Benchmark emissions level	75.9	449.1	25.6
Projected emissions level	78.2	498.5	26.3
Emissions above benchmark emissions level	2.3	49.4	0.7
Percent above benchmark emissions level	3.0%	11.0%	2.7%
2012			
Benchmark emissions level	68.3	354.4	25.1
Projected emissions level	70.3	415.8	22.7
Emissions above benchmark emissions level	2.0	61.5	-2.4
Percent above benchmark emissions level	2.9%	17.3%	-9.6%

Based on our proposed disapproval of the air quality modeling analysis and attainment demonstration, we are proposing to disapprove the RFP demonstration in the SJV $PM_{2.5}$ Plan for failure to meet the requirements of CAA section 172(c)(2) and 40 CFR § 51.1009. We also note the lack of generally linear progress in NO_x emissions reductions, especially in 2012, and the lack of an RFP demonstration for VOC. The District and State should address both these issues in any revisions to the SJV 2008 $PM_{2.5}$ Plan's RFP demonstration.

Earthjustice Petition on the $PM_{2.5}$ Implementation Rule

In June 2007, a petition to the EPA Administrator was filed on behalf of several public health and environmental groups requesting reconsideration of several provisions in the $PM_{2.5}$ implementation rule. See Earthjustice, "Petition for Reconsideration in the Matter of the Final Clean Air Fine Particulate Implementation Rule," June 25, 2007. Among these provisions is allowing states to use emissions reductions from outside of the nonattainment area to demonstration RFP (out-of-area RFP) as discussed in 72 FR 20586 at 20636. On May 13, 2010, EPA granted the petition with respect to this issue. See Letter, Gina McCarthy, Assistant Administrator for Air and Radiation, EPA, to David Baron and Paul Cort, Earthjustice, May 13, 2010. EPA is currently considering the other issues raised in the petition. The District did not rely on out-of-area emissions reductions in its RFP demonstration in the SJV 2008 $PM_{2.5}$ Plan.

I. Mid-Course Review

1. Requirements for a Midcourse Review

Under 40 CFR § 51.1011 of the $PM_{2.5}$ implementation rule,a state with a $PM_{2.5}$ nonattainment area with an projected attainment date in 2014 or 2015 is required to submit a mid-course review (MCR) by April 2011. The MCR is in lieu of RFP milestone reviews or any other form of tracking to ensure reasonable progress in reducing emissions is occurring. See $PM_{2.5}$ implementation rule at 20641.

The specific elements that must be included in MCR are given in 40 CFR § 51.1011(b). These elements are:

(1) a review of emissions reductions and progress made in implementing control measures to reduce emissions of direct $PM_{2.5}$ and $PM_{2.5}$ attainment plan precursors contributing to $PM_{2.5}$ concentrations in the area;

(2) an analysis of changes in ambient air quality data for the area;

(3) revised air quality modeling analysis to demonstrate attainment; and

(4) any new or revised control measures adopted by the state, as necessary to ensure attainment by the attainment date in the SIP.

Neither the CAA nor EPA regulations require a state to address the midcourse review requirement in its attainment and RFP plans due in 2008.

2. MCR Requirement in the SJV $PM_{2.5}$ SIP

In its resolution adopting the 2008 $PM_{2.5}$ Plan, the SJVAPCD's Governing Board acknowledges the requirement to prepare a mid-course review consistent with 40 CFR § 51.1011 by April 2011. See SJVAPCD Governing Board Resolution, page 4. In its resolution adopting the 2008 $PM_{2.5}$ Plan, CARB commits to submitting a MCR in 2011. See CARB Resolution 08-28, May 22, 2008, p. 4.

3. Conclusions

SJVAPCD is already taking the initial steps necessary to prepare its $PM_{2.5}$ MCR. EPA will work closely with the District, CARB, and other interested parties to assure that the MCR addresses the elements required by the $PM_{2.5}$ implementation rule. We encourage both agencies to use the opportunity afforded by the MCR to address the proposed disapprovals of the 2008 $PM_{2.5}$ Plan and SJV portions of the revised 2007 State Strategy.

J. Contingency Measures

1. Requirements for Contingency Measures

Under CAA section 172(c)(9), all $PM_{2.5}$ attainment plans must include contingency measures to be implemented if an area fails to meet RFP (RFP contingency measures) and contingency measures to be implemented if an area fails to attain the $PM_{2.5}$ NAAQS by the applicable attainment date (attainment contingency measures). See 40 CFR § 51.1012. The purpose of contingency measures is to provide a cushion while the SIP is being revised to meet the missed RFP milestone or correct continuing nonattainment.

The principle requirements for contingency measures are:

- Contingency measures must be fully adopted rules or control measures that are ready to be implemented quickly upon failure to meet RFP or failure of the area to meet the standard by its attainment date.

- The SIP should contain trigger mechanisms for the contingency measures, specify a schedule for implementation, and indicate that the measures will be implemented without further action by the state or by EPA In general, EPA will expect all actions needed to affect full implementation of the measures to occur within 60 days after EPA notifies the state of a failure.

- The contingency measures should consist of other control measures for the area that are not included in the control strategy for the SIP.

- The measures should provide for emissions reductions equivalent to about 1 year of reductions needed for RFP calculated as the overall level of reductions needed to demonstrate attainment divided by the number of years from the base year to the attainment year.

See 72 FR 20586 at 20643.

The April 16, 1992 General Preamble for the Implementation of Title I of the Clean Air Act Amendments of 1990 (57 FR 13498, 13512) provides the following guidance on contingency measures which continues to be applicable:

> States must show that their contingency measures can be implemented without further action on their part and with no additional rulemaking actions such as public hearings or legislative review. In general, EPA will expect all actions needed to affect full implementation of the measures to occur within 60 days after EPA notifies the State of its failure.

Contingency measures can include both Federal and local measures already scheduled for implementation or already implemented. The CAA requires contingency measures provide for additional emissions reductions that are not relied on for RFP or attainment and that are not

included in these demonstrations. In other words, contingency measures are intended to achieve reductions over and beyond those relied on in the RFP and attainment demonstrations. Nothing in the Act precludes a state from implementing such measures before they are triggered. EPA has approved numerous SIPs under this interpretation. See, for example, 62 FR 15844 (April 3, 1997) (direct final rule approving Indiana ozone SIP revision); 62 FR 66279 (December 18, 1997) (final rule approving Illinois ozone SIP revision); 66 FR 30811 (June 8, 2001) (direct final rule approving Rhode Island ozone SIP revision); 66 FR 586 (January 3, 2001) (final rule approving District of Columbia, Maryland, and Virginia ozone SIP revisions); and 66 FR 634 (January 3, 2001) (final rule approving Connecticut ozone SIP revision). 72 FR 20586 at 20642. A court has upheld this interpretation. *See LEAN* v. *EPA*, 382 F.3d 575, 5th Circuit, 2004. 72 FR 20586 at 20642.

2. Contingency Measures in the SJV 2008 $PM_{2.5}$ Plan

Contingency measures are described in Section 9.2.2. of the 2008 $PM_{2.5}$ Plan and are composed of two types: a new commitment to an action by the SJVAPCD and surplus reductions from adopted measures. In late 2008, the SJVAPCD adopted a further contingency provision as part of its wood burning rule, Rule 4901.

CARB also discusses the contingency measure provision in Appendix D of the 2007 State Strategy. This discussion is addresses the contingency measure provisions for California's 8-hour ozone plans and not the $PM_{2.5}$ plans.

a. New Commitment

As a contingency measure, the District proposes to request through formal District Governing Board resolution at a regularly scheduled Governing Board hearing within two months after a finding by EPA of a failure to meet an RFP milestone that CARB accelerate the adoption and/or implementation of any remaining CARB control measures that have not yet been adopted or fully implemented, to the extent feasible. Potential emissions reductions from this proposed contingency measure are not quantified. See 2008 $PM_{2.5}$ Plan, p. 9-7.

b. Surplus Reductions from Adopted Measures

Ozone Nonattainment Fee - Rule 3170 (Federally Mandated Ozone Nonattainment Fee) requires major stationary sources in the District to pay an emissions-based fee should the area fail to attain the 1-hour ozone standard by its applicable statutory deadline. As a contingency measure, the District would use the funds collected to implement other pollution control programs. In its discussion on this measure, the District emphasizes that inclusion of Rule 3170 as a contingency measure for $PM_{2.5}$ does not imply it expects the area to fail to timely attain the 1-hour ozone standard. See 2008 $PM_{2.5}$ Plan, p. 9-8. This measure could only be a contingency measure for the RFP milestone year of 2012 (since the Rule would not be implemented prior to 1-hour ozone attainment date of November 15, 2010) and the attainment year. Potential reductions are not quantified.

Incentive Funds -- The District expects to receive and spend significant incentive-based funding to reduce emissions from sources in the SJV. See 2008 $PM_{2.5}$ Plan, Section 6.5. Most of these emissions reductions were not used in RFP or attainment demonstrations in this Plan for various reasons, mainly related to their current SIP creditability.

In April 2007, the District's Governing Board adopted a resolution committing to implement various procedural, record keeping, and reporting requirements to ensure that the all incentive-based reductions achieved by the District meet EPA requirements and guidance for SIP creditability. At the time the Plan was submitted in 2008, the District expected these requirements would be in place in time for the 2009 and 2012 RFP milestone years so that the emissions reductions from its various incentive programs could be used to meet the contingency measure requirement.

The District estimates that there are $90 million per year of incentive funds already available to the SJV and these could provide 3.6 tpd of NO_x emissions each year, accumulating year to year (that is, after five years, for example, the cumulative reduction would be 18 tpd). See 2008 $PM_{2.5}$ Plan, p. 9-9.

Surplus Reductions in the RFP Demonstration -- The methods used in Chapter 8 of the Plan to calculate emissions reductions needed to meet RFP benchmarks withheld a certain percentage of those reductions for contingency purposes: 1% of the baseline $PM_{2.5}$ inventory and 3% of the baseline NO_x inventory. These percentages equate to roughly 1 tpd $PM_{2.5}$ and 17 tpd NO_x reserved for contingency. No reserve was included for SO_2 because SO_2 emissions levels were projected to be below the applicable benchmarks. See 2008 $PM_{2.5}$ Plan, p. 8-4.

Post-2014 Emissions Reductions -- The 2008 $PM_{2.5}$ Plan relies on the incremental emissions reductions that will occur in 2015 from CARB's mobile source program to provide for contingency measures for failure to attain. See p. 9-9. The Plan does not provide an estimate of that these reductions. CARB estimates the NO_x reductions at 21 tpd in 2015. See CARB Staff Report, p. 29.

c. Adopted or Scheduled for Adoption Rules

On October 16, 2008, the SJVAPCD adopted revisions to Rule 4307, Boilers, Steam Generators, and Process Heaters (2 to 5 MMBTU). These revisions lowered NO_x limits, added SO_2 and PM_{10} limits, and removed certain exemptions. While the District included these revisions as part of the 2008 $PM_{2.5}$ Plan's control strategy, it did not estimate or include emissions reductions from this measures in either the RFP or attainment demonstrations. Because of this, the reductions from this measure could be considered excess to these demonstrations.

On October 16, 2008, the SJVAPCD also adopted revisions to its wood burning rule, Rule 4901 Wood Burning Fireplace and Wood Burning Heaters, to incorporate a contingency provision in section 5.6.5. This provision states that:

> On or after sixty days following the effective date of EPA final rulemaking that the San Joaquin Valley Air Basin has failed to attain the 1997 $PM_{2.5}$ National Ambient Air Quality Standards by the applicable deadline, the [air pollution control officer] shall notify the public of an Episodic Curtailment for a geographic region whenever a $PM_{2.5}$ concentration of 20 $\mu g/m^3$ or greater or a PM_{10} concentration of 135 $\mu g/m^3$ is predicted for the geographic region.

This provision lowers the trigger for calling an episodic curtailment from 30 $\mu g/m^3$. During an episodic curtailment, the operation of wood burning fireplaces, wood burning heater, or outdoor wood burning device (except when it is the sole source of heat) is prohibited. See Rule 4901, section 5.6.1. In its supporting documentations for this rule, the District did not quantify the emissions reductions expected should this contingency provision be triggered.

The District is scheduled to adopt revisions to Rule 4702, Internal Combustion (I/C) Engines – Phase 2, in December, 2010. These revisions would lower the applicability threshold of the rule to engines 25 hp and greater (from 50 hp) and lower NO_x, VOC, and carbon monoxide limits for all spark-ignition I/C engines that are used in non-agricultural operations. These limits would be effective January 1, 2014. See SJVAPCD, Draft Staff Report For Draft Amendments To Rule 4702 (Internal Combustion Engines – Phase 2), September 9, 2010. While the District included these revisions as part of the 2008 $PM_{2.5}$ Plan's control strategy, it did not estimate or include emissions reductions from this measures in either the RFP or attainment demonstrations. Because of this, the reductions from this measure could be considered excess to these demonstrations.

3. Evaluation and Conclusions

a. New Commitment

CARB's measures are primarily aimed at reducing emissions from mobile source. Accelerating their implementation to correct shortfalls in RFP and attainment would be appropriate given the contribution of mobile sources to $PM_{2.5}$ standard exceedances in the SJV and the importance of mobile source measures to reducing those violations. However, the process outlined in the 2008 $PM_{2.5}$ Plan would require multiple steps to implement including the adopting of a resolution by the SJVAPCD's governing board and rulemaking by CARB. Such a process would likely take more than a few months to complete.

Under CAA section 172(c)(9) and EPA's long-standing policies interpreting this section, contingency measures must require minimal additional rulemaking by the state and take effect within a few months of a failure to meet an RFP target or to attain. The District's proposed commitment to request accelerated implementation of CARB's measures meets neither of these requirements and thus does not qualify as a contingency measures under the CAA.

b. Surplus Reductions from Adopted Measures

Ozone Nonattainment Area Fees - The CAA's requirement for contingency measure requires that they be triggered if an area fails to make RFP or fails to attain by its statutory deadline. For the

$PM_{2.5}$ plan, contingency measures are required to be triggered by failures to make RFP or to attain the $PM_{2.5}$ NAAQS. The implementation of SJVAPCD's Rule 3170 is triggered solely by a failure to attain the 1-hour ozone standard. See Rule 3170. Should the rule's requirements be implemented and the collected fees used toward reducing emissions, then the District may rely on the resulting reductions to fulfill the contingency measure requirement for the $PM_{2.5}$ Plan to the extent that the reductions meet SIP creditability requirements. Given that the rule is not currently implemented and such implementation cannot be triggered by an RFP/attainment failure related to the $PM_{2.5}$ standards, it cannot be used as a contingency measure for 2008 $PM_{2.5}$ Plan.

Incentive Funds - As noted previously, the District has several incentive programs that have the potential to generate considerable emissions reductions. While neither the CAA nor EPA policy bar the use of emissions reductions from incentive programs to meet all or part of an area's contingency measure obligation, the incentive programs must assure that the reductions are surplus, quantifiable, enforceable, and permanent as required by EPA guidance. See "Improving Air Quality with Economic Incentive Programs," EPA-452/R-01-001 (January 2001). As noted above, while the District has adopted a resolution committing to implement these requirements, it has not yet implemented them. As a result, reduction from these incentives program, to the extent that they are not already SIP-creditable, cannot currently be used for contingency measure purposes.

The 2008 $PM_{2.5}$ Plan does not identify the incentive grant programs expected to generate the emissions reductions programs, nor the quantity of these emissions reductions, that the District intends to use to meet the contingency measure requirement. Therefore, we are unable to determine if they are SIP creditable or sufficient to provide the one-year's worth of RFP needed. For these reasons, this proposed measure does not currently meet the CAA requirements for contingency measures.

One of the incentive program listed in the 2008 $PM_{2.5}$ Plan's contingency measure discussion is the State's Carl Moyer Program. We note that reductions from the Moyer program are already incorporated into the Plan's baseline inventory and thus are already relied on in the RFP and attainment demonstrations and therefore cannot operate as contingency measures. See Table B-2 in the December 4, 2007 Draft of the 2008 $PM_{2.5}$ Plan and State Strategy, Appendix A, pp. 1, 95, and 101.

Surplus Reductions in the RFP Demonstration - As discussed above in section II.E., we are proposing to disapprove the RFP demonstration in part because we are unable to determine if the 2008 $PM_{2.5}$ Plan provides for RFP because of issues with the air quality modeling. We have also identified concerns with the lack of an RFP demonstration for VOC and a shortfall in NO_x emissions reductions needed to show generally linear progress toward attainment. Because of these issues, we cannot determine, at this time, if there are any excess reductions of direct $PM_{2.5}$ and NO_x emissions in the RFP demonstration that can be used for RFP contingency measures.

Post-2014 Emissions Reductions - Additional emissions reductions resulting from fleet turnover in the 2015 and later may be used to meet the contingency measure requirement for failure to attain. CARB provides estimates for NO_x reductions in 2015 from its existing (baseline) mobile

source program but did not provide reductions for $PM_{2.5}$ and SO_x. These estimates do not include any additional incremental reductions expected from the 2007 State Strategy.

c. Adopted or Scheduled for Adoption Rules

We believe the contingency provisions in section 5.6.6 of Rule 4901 fully meet CAA requirements for contingency measures. The provision can be implemented with no additional rulemaking on the part of the District and must be implemented within 60 days of an EPA finding that the area has failed to attain the $PM_{2.5}$ standards. We approved the October 2008 revision of Rule 4901, including the contingency provision, into the California SIP on November 10, 2009, 74 FR 57907.

As discussed above in sections II.E., and II.H., we are proposing to disapprove the RFP and attainment demonstrations in part because we are unable to determine if the 2008 $PM_{2.5}$ Plan provides for RFP and attainment. We have also identified a concern with a shortfall in NO_x emissions reductions needed to show the generally linear progress toward attainments as is required to demonstrate RFP. Because of these issues, we cannot determine if there are any excess NO_x emissions reductions in the RFP and attainment demonstrations that can be used for RFP and/or attainment contingency measures. Although the District did not include reductions from the revisions to Rules 4307 and 4702 in Plan's RFP and attainment demonstrations, we believe that any reductions from these rules (to the extent they occur in or prior to 2014) should first be used to meet the RFP and expeditious attainment requirements.[27]

Under the $PM_{2.5}$ implementation rule, a state must submit contingency measures that meet the requirements of CAA section 172(c)(9) and provide for the equivalent of roughly one year's worth of RFP. One year's worth of RFP is determined by the emissions reductions from the base year baseline inventory (the base year is 2005 for SJV 2008 $PM_{2.5}$ Plan) divided by the number of years between the base year and the attainment year (2014). 72 FR 20586 at 20643. These calculations are is given in Table J-1 below for direct $PM_{2.5}$ and for the $PM_{2.5}$ attainment plan precursors, NO_x and SO_2, and for all pollutants taken together. They are based on the current estimates of the emissions reductions needed for attainment. These estimates are derived from air quality modeling that EPA is proposing to disapprove and thus subject to change. See section II. B.

As can be seen from Table J-2, emissions reductions from a number of the potentially approvable (or approved in the case of Rule 4901) contingency measures were not quantified. Total reductions from the measures that were quantified fall short the level currently estimated to be needed to meet the contingency measure requirement.

[27] Rule 4307 includes emission limits that do not apply until after 2014. Reductions from these post-2014 limits are creditable as contingency measures to the extent these provision provide for additional emissions reductions above those relied on for attainment

Table J-1
Reductions Needed from Contingency Measures
(tons per average annual day)

		$PM_{2.5}$	NO_x	SO_2	Combined
A	2005 baseline	86.0	575.4	26.4	687.8
B	2014 attainment level	63.3	291.2	24.6	378.1
C	Emissions reductions needed for attainment (A-B)	22.7	284.2	1.8	308.7
D	One year's RFP (C/9)	2.5	31.6	0.2	34.3
E	One year's RFP as percent of 2005 baseline	2.9%	5.5%	0.8%	5.0%

The 2008 $PM_{2.5}$ Plan includes suggestions for several potentially approvable contingency measures as well as several measures that do not meet the CAA's minimum requirements (e.g., no additional rulemaking, surplus to attainment and RFP needs). The Plan, however, neither provides sufficient information for us to determine if the emissions reductions from some of the approvable measures are SIP creditable (e.g., those from incentive grant programs) nor quantifies the expected emissions reductions so we can gauge if they provide reductions roughly equivalent to the current estimate of one year's worth of RFP. We, therefore, propose to disapprove the RFP and attainment contingency measures in the 2008 $PM_{2.5}$ Plan pursuant to CAA section 172(c)(9) and 40 CFR § 51.1012.

Table J-2
Summary of Approvability of Contingency Measures from the SJV 2008 $PM_{2.5}$ Plan

Measure	RFP or Attainment Contingency Measure?	Approvable as a Contingency Measure?	Comment	Tons per Average Annual Day				
				Year	$PM_{2.5}$	NO_x	SO_2	Com-bined
Request CARB to expedite implementation of mobile source controls	Both	No	Requires additional rulemaking, no short term reductions		Not quantified			
Ozone Nonattainment Area Fee	2012 RFP milestone/ Attainment	No	Not triggered by failure to make RFP or attain for the $PM_{2.5}$ standards		Not quantified			
Incentives Funds – currently SIP creditable	Both	Yes			Not quantified			
Incentive Funds – currently not SIP creditable	Both	No	Reductions are not SIP creditable		Not quantified			
Excess Reductions in RFP Demonstration	RFP	No	Unknown if there are excess reductions in RFP demonstration.	2009	0	0	2.2	2.2
				2012	0	0	1.3	1.3
"New" Post Attainment Year Reductions	Attainment	Yes		2015	0.7[1]	21[2]	-0.04[1]	21.7
Rule 4307	2012 RFP milestone/ Attainment	No	Unknown if there are excess reductions in RFP and attainment demonstrations	2012	-	--	-	-
				2014	-	--	-	-
Rule 4702	Attainment	No	Unknown if there are excess reductions in the attainment demonstration	2014	-	--	-	-
Rule 4901	Attainment	Yes		2015	1.6[3]	Not quantified		

[1] Calculated as the difference in total emissions in the on-road mobile and other mobile sources categories between 2015 and 2014 on page 100 ($PM_{2.5}$) and page 103 (SO_x). Values are in tons per summer planning day.
[2] From CARB Staff report on the 2008 $PM_{2.5}$ Plan, p. 29.
[3] Phone conversation, Jessi Fierro, SJVAPCD, and Frances Wicher, EPA, August 26, 2010, value is average winter day.

K. Interpollutant Trading among Direct $PM_{2.5}$ and $PM_{2.5}$ Attainment Plan Precursors

EPA has issued an implementation rule establishing the requirements for New Source Review (NSR) programs in $PM_{2.5}$ nonattainment areas. See 73 FR 28321 (May 16, 2008) ($PM_{2.5}$ NSR rule). Under the $PM_{2.5}$ NSR rule, during the interim period after designation of an area as nonattainment but before a state has amended its NSR SIP to address $PM_{2.5,}$ the NSR permitting requirements of 40 CFR part 51, Appendix S apply for $PM_{2.5}$ purposes.[28] 40 CFR 52.24(k); 73 FR 28321 at 28342. These Appendix S requirements currently apply in the SJV area.

The NSR program requires, among other things, that new or modifying major stationary sources offset significant net emission increases with creditable emissions reductions. 40 CFR part 51, Appendix S, section IV.A.3. Under Appendix S, section IV.G.5, these offset requirements may currently be satisfied by offsetting reductions of direct $PM_{2.5}$ emissions. They may also be satisfied by offsetting reductions of emissions of a $PM_{2.5}$ precursor (i.e., by an interpollutant trade) only if such offsets comply with an interprecursor trading hierarchy and ratio approved by the Administrator. That is, a new $PM_{2.5}$ emission source is allowed to offset its direct $PM_{2.5}$ and/or $PM_{2.5}$ precursor emission increases with reductions in other $PM_{2.5}$ precursor emissions only in accordance with a trading ratio approved by EPA.[29]

The $PM_{2.5}$ NSR rule preamble states that precursors that are significant contributors to $PM_{2.5}$ concentrations should be considered regulated NSR pollutants. 73 FR 28321 at 28326. It then describes significant contribution in the same terms as are used in the $PM_{2.5}$ implementation rule, namely that emissions reductions of the precursor would be projected to provide a significant change in $PM_{2.5}$ concentrations in the area. See 72 FR 20586 at 20590 and 73 FR 28321 at 28326. The two rules also have the same presumption, for essentially the same reasons, that SO_2 and NO_x should be considered precursors, whereas ammonia and VOC should not. See 72 FR 20586 at 20590-20596 and 73 FR 28321 at 28326-28331.

In order for precursors to be eligible for NSR interpollutant offset trading in a $PM_{2.5}$ nonattainment area, the area's $PM_{2.5}$ SIP must state which combinations of pollutants are eligible for interpollutant trading. It must also define and provide the basis for the trading ratios between them that will be used for interpollutant offsets. In the 73 FR 28321 at 28339, EPA stated that:

> [T]he final rules allow interpollutant trading [for offset purposes] only based on a trading ratio established in the SIP as part of the attainment demonstration approved for a specific nonattainment area…. [T]he final rules do not allow interpollutant trading on a case-by-case basis as part of an individual [nonattainment area] NSR permitting process. … If States choose to develop

[28] A state with a $PM_{2.5}$ nonattainment area is required to submit NSR SIP revisions in accordance with the requirements of the $PM_{2.5}$ NSR rule by May 16, 2011. 73 FR at 28342.

[29] Note that several provisions of the $PM_{2.5}$ NSR rule are currently under reconsideration, including EPA's preferred interpollutant trading ratios. *See* Letter dated April 24, 2009, from Lisa P. Jackson, Administrator, EPA, to Paul R. Cort, Earthjustice; 74 FR 26098 (June 1, 2009); 74 FR 36427 (July 23, 2009); 74 FR 48153 (September 22, 2009); and 75 FR 6827 (February 11, 2010).

> their own hierarchies/trading ratios, they will have to substantiate by modeling and/or other technical demonstrations of the net air quality benefit for $PM_{2.5}$ ambient concentrations, and such a trading program will have to be approved by EPA.

Hierarchy refers to an identification of which combinations of pollutants are eligible for trading, e.g. SO_2 for primary $PM_{2.5}$, SO_2 for NO_x, etc.

EPA completed a technical assessment to develop preferred interpollutant trading ratios that may be used for the purposes of $PM_{2.5}$ offsets, where appropriate.[30] Based on this assessment, EPA disallowed trading directly between NO_x and SO_2 and set preferred trading ratios at 100:1 for NO_x to primary $PM_{2.5}$ trades and 40:1 for SO_2 to primary $PM_{2.5}$ trades. See 73 FR 28321 at 28339. The $PM_{2.5}$ NSR rule preamble also states at 28340 that:

> th[e] rule allows interpollutant and interprecursor trading of offsets according to a SIP-approved trading program. To be approved, the trading program must either adopt EPA's recommended trading ratios or be supported by regional-scale modeling that demonstrates a net air quality benefit using appropriate overall offset ratios for such trades for a specified nonattainment area, state, or multi-state region.

The 73 FR 28321 at 28339 describes factors that should be considered by a state in developing area-specific ratios.

In summary, interpollutant trades for purposes of meeting the NSR offset requirement for $PM_{2.5}$ emissions are permissible only in accordance with trading ratios established in the SIP as part of the attainment demonstration approved for the nonattainment area. The SIP must explicitly identify which precursors are regulated NSR pollutants, which combinations are eligible for interpollutant trading, and the trading ratios between the pollutants. A states may either adopt EPA's recommended trading ratios (73 FR 28321 at 28339) or seek to establish alternative ratios, using modeling and/or other technical demonstrations showing that the trading ratios provide a net air quality benefit, which must then be approved by EPA. The state must established these ratios as part of an approved attainment demonstration for the area; EPA will not allow case-by-case demonstrations on an individual source permit basis**.**

The SJV 2008 $PM_{2.5}$ Plan does not explicitly identify $PM_{2.5}$ precursors that are subject to NSR permitting. The Plan states, however, that:

> [SJVAPCD] Rule 2201 [New and Modified Stationary Source Review] allows the use of interpollutant trading amongst criteria pollutants and their precursors upon the appropriate scientific demonstration of an adequate trading ratio. These caps [on the use of pre-baseline credits] also apply to the use of VOC, NO_x, and SO_x

[30] These factors are in addition to the overall goal of the NSR permitting to show net air quality benefit and the underlying rationale for offsets to provide progress toward NAAQS attainment while allowing new sources to be constructed and existing sources to expand.

> [emission reduction credits] in their application as offsets for direct emissions and in their use as $PM_{2.5}$ precursor interpollutant offsets.

See 2008 $PM_{2.5}$ Plan, Appendix D, p. D-4.

It appears from this discussion that the District considers VOC, NO_x, and SO_2 to be regulated NSR pollutants for $PM_{2.5}$ NSR purposes and that the District intends to allow for interpollutant trading to satisfy $PM_{2.5}$ permit requirements.[31] The SJV $PM_{2.5}$ Plan does not, however, provide a technical demonstration to support any conclusion as to the precursor combinations that should be eligible for interpollutant trading or the appropriate trading ratio for use in NSR permitting for $PM_{2.5}$. It also appears from the Plan (at Appendix D, p. D-4) that the District intends to allow for interpollutant trades to satisfy $PM_{2.5}$ offset requirements on a case-by-case basis, which is not permissible under the $PM_{2.5}$ NSR rule. If the District intends to seek EPA approval of alternative interpollutant offset ratios for purposes of meeting $PM_{2.5}$ NSR offset requirements, it must submit an adequate technical demonstration to support its proposed ratios, together with an approvable attainment demonstration, consistent with EPA regulatory requirements.

[31] This identification of VOC as an regulated NSR pollutant for $PM_{2.5}$ is contrary to the District's assertions in the Plan that controls on VOC sources are not important for $PM_{2.5}$ attainment but supports EPA's proposal to determine that VOC should be considered a $PM_{2.5}$ attainment plan precursor in addition to NO_x and SO_2. See section II.C. above.

Appendix A – CARB Rules and Measures

A. Complete List of State Measures

Appendix Table A-1 is a list of all measures adopted by CARB from 1990 until the end of 2006. This period covers the 18 years prior to the development of the 2007 State Strategy and the SJV 2008 $PM_{2.5}$ Plan. The table should include any substantive rules that would still be generating emissions reductions in the San Joaquin Valley during the 2005-2014 period covered by the Plan and thus reflected in the baseline for the Plan.

This list does not include the limits on pesticide emissions adopted by the California Department of Pesticide Regulation nor the State's inspection and maintenance program adopted by the California Bureau of Automotive Repair.

Measures that are categorized as Not Applicable are either solely administrative (e.g., permit fees, state ambient air quality standards), do not address particulate matter or a $PM_{2.5}$ attainment plan precursor in the SJV (e.g., asbestos air toxic control measure), or otherwise do not affect emissions in the SJV (e.g., test methods).

Appendix Table A-1
Measures Adopted by the California Air Resource Board
1990 to 2006

Measure	Hearing Date	Category
Antiperspirant/Deodorants. T 17, CCR, 94500-94506	11/09/89	Consumer products
Transported Pollutants (Ozone). T 17, CCR, 70500	12/04/89	Not applicable
Emission Control System Warranty. T 13, CCR, 2035-2041, 1977	12/14/89	On-road
Non-vehicular Test Methods. T 17, CCR, 94002, 94003 17, &26, 94146-94149, 94132, 94135, 94139, 94140	01/11/90	Not applicable
Certification Procedure for Aftermarket Parts. VC 27156 & 38391	02/08/90	On-road
Airborne Toxic Control Measure for Asbestos in Surfacing Applications. T 17, & 26, CCR, 93106	04/12/90	Not applicable
Test Method for Asbestos in Serpentine Aggregate. T 17, & 26, CCR, 94147, Method 435	04/12/90	Not applicable
Air Toxics "Hot Spots" Fee Regulation. T 17, & 26, CCR, 90700-90704, 93300-93347	05/10/90	Not applicable
Airborne Air Toxic Measure for Ethylene Oxide from Sterilizers & Aerators. T 17, CCR, 93108	05/10/90	Not applicable
Permit Fee Regulations for Non-vehicular Sources. T 17, CCR, 90800.1, 90800, 90802-90803	05/10/90	Not applicable

Appendix Table A-1
Measures Adopted by the California Air Resource Board
1990 to 2006

Measure	Hearing Date	Category
Air Toxics "Hot Spots" Emissions Inventory Criteria and Guidelines. T 17, & 26, CCR, 93300-93347	06/14/90	Not applicable
Consumer Products Regulations for the BAAQMD. T 17, CCR, 94520-94526	06/14/90	Consumer products
Criteria for Area Designations for the State Ambient Air Quality Standard. T 17, CCR, 70303 & 70304	06/14/90	Not applicable
Emission Standards for Medium Duty Vehicles. T 13, CCR, 1900, 1956.8, 1960.1, 1968.1, 2061, 2112, 2139	06/14/90	On-road
Wintertime Limits for Sulfur in Diesel Fuel. T 13, CCR, 2255	06/21/90	Fuels
Dioxins Airborne Toxic Control Measure for Medical Waste Incinerators. T 17, CCR, 93104	07/12/90	Not applicable
Emissions Reduction Accounting Procedures for California Clean Air Act. T 17, CCR, 70700-70704	07/12/90	Not applicable
Identification of Inorganic Arsenic as a Toxic Air Contaminant. T 17, & 26, CCR, 93000	07/12/90	Not applicable
Evaporative Emission Standards. T 13, CCR, 1976	08/09/90	On-road
Transport Mitigation Regulations. T 17, CCR, 70600-70601	08/09/90	Not applicable
Air Toxic Fee Schedule & Emissions Inventory Criteria and Guidelines. T 17, & 26, CCR, 90700-90704, 93300-93347	09/13/90	Not applicable
California Reformulated Gasoline (CaRFG), Phase I. T 13, CCR, 2251.5	09/27/90	Fuels
Low Emission Vehicles and Clean Fuels. T 13, CCR, 1900, 1904, 1956.8, 1960.1, 1960.1.5, 1960.5 and 2111, 2112, 2125, and 2139, 2061.	09/28/90	On-road
Identification of Trichloroethylene as a Toxic Air Contaminant. T 17, & 26, CCR, 93000	10/11/90	Not applicable
Phase I - Consumer Products. T 17, CCR, 94507-94517	10/11/90	Consumer products
Controls for Abrasive Blasting. T 17, CCR, 92000, 92200, 92400, 98500, 98510, 92520, 92530	11/08/90	Not applicable
Heavy Duty Diesel Smoke Emission Testing. T 13, CCR, 2180-2187	11/08/90	On-road
Revision to Designation Criteria. T 17, CCR, 60200-60204, 60208	11/08/90	Not applicable

Appendix Table A-1
Measures Adopted by the California Air Resource Board
1990 to 2006

Measure	Hearing Date	Category
Identification of Vinyl Chloride as a Toxic Air Contaminant. T 17, & 26, CCR, 93000	11/13/90	Not applicable
Conflict of Interest Code. T 17, CCR, 95001, et. seq.	12/13/90	Not applicable
Emission Standards for Utility and Lawn and Garden Engines. T 17, CCR, 2400 et. seq.	12/13/90	Off-road
Identification of Chloroform as a Toxic Air Contaminant. T 17, & 26, CCR, 93000	12/13/90	Not applicable
Limit on Aromatic Content of Diesel Fuel. T 13, CCR, 2256	12/13/90	Fuels
Permit Fee Regulations for Non-vehicular Sources. T 17, CCR, 90800.2, 90801, 90803	02/24/91	Not applicable
Acid Deposition Fee Regulations. T 17, CCR, 90621.2, 90620, 90622	04/11/91	Not applicable
Non -Vehicular Test Methods. T 17, CCR, 94131, 94132, 94142	04/11/91	Not applicable
Administrative Hearing Procedures. T 17, CCR, 60075.1, 60075.47	05/09/91	Not applicable
Air Toxics "Hot Spots" Fee Regulation. T 17, & 26, CCR, 90700 - 90705	06/13/91	Not applicable
Agricultural Burning Guidelines. T 17, 80130, 80150, 80250, 80260, 80290	07/11/91	Not applicable
Identification of Metallic & Inorganic Nickel Compounds as a Toxic Air Contaminant. T 17, & 26, 93000	08/08/91	Not applicable
Onboard Diagnostics for Light-Duty Trucks and Light & Medium-Duty Motor Vehicles. T 13, CCR, 1977, 1968.1	09/12/91	On-road
Identification of Perchloroethylene as a Toxic Air Contaminant. T 17, & 26, CCR, 93000	10/10/91	Not applicable
State Ambient Air Quality Standard for SO_2. T 17, CCR, 70100, 70200, 70201	10/10/91	Not applicable
Onboard Diagnostic, Phase II. T 13, CCR, 1968.1, 1977	11/12/91	On-road
Area Designations. T 17, CCR, 60200, 60209	11/14/91	Not applicable
Low Emission Vehicles amendments revising reactivity adjustment factor (RAF) provisions and adopting a RAF for M85 transitional low emission vehicles. T 13, CCR, 1960.1	11/14/91	On-road
California Reformulated Gasoline, Phase II. T 13, CCR, 2250, 2255.1, 2252, 2260 - 2272, 2295	11/21/91	Fuels
Wintertime Gasoline Program. T 13, CCR, 2258, 2298, 2251.5, 2296	11/21/91	Fuels

Appendix Table A-1
Measures Adopted by the California Air Resource Board
1990 to 2006

Measure	Hearing Date	Category
Specifications for Alternative Motor Vehicle Fuel. T 13, & 26, CCR, 2290, 2291, 2292.1, 2292.2, 2292.3, $229_{2.5}$, 2292.6, 2292.7, 1960.1(k), 1956.8(b), 1956.8(d)	12/12/91	Fuels
Heavy Duty Diesel Cycle Engines. T 13, CCR, 2420-2427	01/09/92	Off-road
Phase II - Consumer Products. T 17, CCR, 94501, 94502, 94505, 94514, 94503.5, 94506, 94507 - 94513, 94515	01/09/92	Consumer products
Identification of Formaldehyde as a Toxic Air Contaminant. T 17, & 26, CCR, 93000	03/12/92	Not applicable
Specifications for Alternative Motor Vehicle Fuels. T 13, & 26, CCR, 2290-2292.7, 1960.1(k), 1956.8(b), 1956.8(d)	03/12/92	On-road
Atmospheric Acidity Protection Fees. T 17, CCR, 90621.3	04/09/92	Not applicable
Permit Fee Regulations for Non-vehicular Sources. T 17, CCR, 90800.3, 90803	04/09/92	Not applicable
Criteria for Area Designations. T 17, CCR, 70303, 70304	05/14/92	Not applicable
Standards and Test Procedures for Alternative Fuel Retrofit Systems. T 13, CCR, 2030, 2031	05/14/92	On-road
Transported Air Pollutants. T 17, CCR, 70500	05/28/92	Not applicable
Air Toxics "Hot Spots" Fee Regulation. T 17, & 26, CCR, 90701, 90704, 90705	07/09/92	Not applicable
Identification of 1.3 Butadiene as a Toxic Air Contaminant. T 17, & 26, CCR, 93000	07/09/92	Not applicable
Phase 2 RFG certification fuel specifications. T 13, CCR, 1960.1, 1956.8(d)	08/13/92	On-road
CFC Refrigerants in Air Conditioning Systems. T 13, CCR, 2500	09/10/92	Not applicable
Substitute Fuel or Clean Fuel Incorporated Test Procedures. T 13, CCR, 1960.1(k), 2317	11/12/92	On-road
Notice of General Public Interest for Consumer Products. T 17, CCR, 94507 - 94517	11/30/92	Consumer products
Airborne Toxic Control Measure for Emission of Toxic Metals from Non-Ferrous Metal Melting. T 17, & 26, CCR, 93107	12/10/92	Not applicable
Criteria for Area Designations. T 17, CCR, 70303.5, 60200-60203, 60205, 70303	12/10/92	Not applicable
Smoke Self Inspection Program for Heavy Duty Diesel & Gasoline Engines. T 13, CCR, 2190-2194, 2180-2187, 1956.8(b)	12/10/92	On-road

Appendix Table A-1
Measures Adopted by the California Air Resource Board
1990 to 2006

Measure	Hearing Date	Category
Certification Requirements for Low Emission Passenger Cars, Light-Duty Trucks & Medium Duty Vehicles. T 13, CCR, 1960.1, 1976, 2061, 1900	01/14/93	On-road
Transport Mitigation Regulations. T 17, CCR, 70600, 70601	03/11/93	Not applicable
1-year Implementation Delay in Emission Standards for Utility Engines. T 13, CCR, 2400, 2403-2407	04/08/93	Off-road
Acid Deposition Fee Regulations. T 17, CCR, 90622, 90621.4	04/08/93	Not applicable
Identification of Federal Hazardous Air Pollutants as Toxic Air Contaminants. T 17, & 26, CCR, 93001, 39665, 39666	04/08/93	Not applicable
Permit Fee Regulations for Non-vehicular Sources. T 17, CCR, 90800.4, 90803	04/08/93	Not applicable
Air Toxics "Hot Spots" Emissions Inventory Criteria and Guidelines. T 17, & 26, CCR, 93300-93347	06/10/93	Not applicable
Urban Transit Buses. T 13, CCR, 1956.8, 1965, 2112	06/10/93	On-road
Air Toxics "Hot Spots" Fee Regulation. T 17, & 26, CCR, 90700-90705	07/08/93	Not applicable
Onboard Diagnostic, Phase II. T 13, CCR, 1968.1	07/09/93	On-road
Mitigation Transport Pollutants. T 17, CCR, 70500, 70600	08/12/93	Not applicable
Wintertime Oxygenate Program. T 13, CCR, 2258, 2251.5, 2263(b), 2267, 2298, 2259, 2283, 2293.5	09/09/93	Fuels
Airborne Toxic Control Measure for Perchloroethylene Dry Cleaning. T 17, & 26, CCR, 93109, 93110	10/14/93	Not applicable
Diesel Fuel Regulations - Emergency. T 13, CCR, 2281(h), 2282(1)	10/15/93	Fuels
Conflict of Interest. T 17, CCR, 90500	11/18/93	Not applicable
Criteria for Area Designations. T 17, CCR, 60200-60202, 60204, 60206, 60208, 70300-70306	11/18/93	Not applicable
Off-Highway Recreational Vehicles. T 13, CCR, 2410-2414, 2111-2140	01/03/94	Off-road
Evaporative Emission Standards and Test Procedures. T 13, CCR, 1976	02/10/94	On-road
SCAQMD's Reclaim Consideration	03/10/94	Not applicable

Appendix Table A-1
Measures Adopted by the California Air Resource Board
1990 to 2006

Measure	Hearing Date	Category
Permit Fee Regulations for Non-vehicular Sources. T 17, CCR, 90800.5, 90803	04/14/94	Not applicable
Predictive Model for Phase II CaRFG. T 13, CCR, 2261, 2262-2270	06/09/94	Fuels
Small Refiner Diesel. T 13, CCR, 2282(e)(1)	07/24/94	Fuels
Air Toxics "Hot Spots" Fee Regulation. T 17, & 26, CCR, 90700-90705	07/28/94	Not applicable
Utility and Lawn and Garden Equipment Engines. T 13, CCR, 2403(c), 11(a)(1)(I)(ii), 4(a)(1)(I)(ii)	07/28/94	Off-road
Alternative Control Plan for Consumer Products. T 17, CCR, 94540-94555	09/22/94	Consumer products
Diesel Fuel Certification. T 13, CCR, 1956.8(b)&(d), 1960.1(k), 2292.6	09/22/94	Fuels
Area Designations. T 17, CCR, 60201, 60204	11/09/94	Not applicable
Self Inspection Program for Heavy Duty Diesel & Gasoline Engines. T 13, CCR, 2190-2194, 2180-2187, 1956.8(b)	11/09/94	On-road
Onboard Diagnostics, Phase II. T 13, CCR,1963.1, & Certification Procedures	12/08/94	On-road
Periodic Smoke Inspection Program. T 13, CCR, 2190	12/08/94	On-road
Specification for Alternative Motor Vehicle Fuels (M100). T 13 CCR, 2292.1	12/08/94	Fuels
Aerosol Coating Products and Alternative Control Plan. T 17, CCR, 94520-94528, 94540-94543, 94547...	03/23/95	Consumer products
Permit Fee Regulations for Non-vehicular Sources. T 17, CCR, 90800.6, 90803	04/27/95	Not applicable
Employee-Based Trip Reductions Emission Formula. T 13, CCR, 2330, 2331, 2332	06/29/95	Not applicable
Gasoline Vapor Recovery Systems. T 17, CCR, 94010-94015, 94150-94160, 94000-94004, 94007.	06/29/95	Vapor Recovery
Heavy Duty Vehicle Exhaust Emission Standards. T 13, CCR, 1956.8 and incorporate test procedures.	06/29/95	On-road
Onboard Refueling Vapor Recovery Standards. T 13, CCR, 1976, 1978 and incorporate test procedures	06/29/95	On-road
Test Method for Oxygen in Gasoline. T 13, CCR, 2251.5(c), 2258(c), 2263(b)	06/29/95	Fuels

Appendix Table A-1
Measures Adopted by the California Air Resource Board
1990 to 2006

Measure	Hearing Date	Category
Retrofit Emission Standards. T 13, CCR, 1956.9, 2030, 2031, and incorporate test procedures	07/27/95	On-road
Antiperspirants and Deodorants, Consumer Products, and Aerosol Coating Products. T 17, CCR, 94500-94506, 94508, 94521	09/28/95	Consumer products
Low Emission Vehicle Standards 3 (LEV 3). T 13, CCR, 1956.8, 1960.1, 1965, 2101, 2061, 2062, and incorporate test procedures	09/28/95	On-road
Test Methods for CaRFG 13, CCR, 2263(b)	10/26/95	Fuels
Required Additives in Gasoline (Deposit Control Additives). T 13, CCR, 2257 and incorporates testing procedures.	11/16/95	Fuels
CaRFG Housekeeping & CARBOB. T 13, CCR, 2263.7, 2266.5, 2260, $226_{2.5}$, 2264, 2265, 2272	12/14/95	Fuels
Exemption of Military Tactical Vehicles. T 13, CCR, 1905, 2400, 2420	12/14/95	On Road/Off Road
Air Toxics "Hot Spots" Fee Regulation. T 17, CCR, 90700-90705 and Appendix A	01/25/96	Not applicable
CaRFG Variance Requirements. T 13, CCR, 2271 (Emergency)	01/25/96	Fuels
Relaxation of Carbon Monoxide Emission Standards for Utility Engines. T 13, CCR, 2403 and incorporating test procedures	01/25/96	Off-road
Postpone Zero Emission Vehicle Requirements. T 13, CCR, 1900, 1960.1, 1976	03/28/96	On-road
Permit Fee Regulations for Non-vehicular Sources. T 17, CCR, 90803, 90800.7	04/25/96	Not applicable
Basin Boundaries for Agricultural Burning (Mojave Desert, South Coast & Salton Sea). T 17, CCR, 60104, 60109, 60114, 80280, 80311	05/30/96	Not applicable
Regulation Improvement and Repeal. T 17, CCR, 93301-93355, Appendix A-E (emissions inventory)	05/30/96	Not applicable
Regulation Improvements and Repeals (fuel additives). T 13, CCR, 2201, 2202	05/30/96	Fuels
Emissions Inventory Criteria & Guideline Report. T 17, CCR, 93300.5	07/25/96	Not applicable
Air Toxics "Hot Spots" Fee Regulation. T 17, CCR, 90701-90705 Appendix A to §§ 90700-90705	09/26/96	Not applicable
Stationary Source Test Methods. T 17, CCR, 94105, 94107, 94114, 94135, 94141, 94143, 94161	09/26/96	Not applicable

Appendix Table A-1
Measures Adopted by the California Air Resource Board
1990 to 2006

Measure	Hearing Date	Category
Wintertime Requirements for Utility Engines & Off-Highway Vehicles. T 13, CCR, 2403	09/26/96	Off-road
Diesel Fuel Certification Test Methods . T 13, CCR, 1956.8(b), 1960.1(k), 2281(c), 2282(b), (c) and (g)	10/24/96	Fuels
Diesel Fuel Test Methods. T 13, CCR, 1956.8(b), 1960.1(k), 2281(c), 2282(b), (c) and (g)	10/24/96	Fuels
Antiperspirants and Deodorants, Consumer Products, Aerosol Coating Products (ARB Test Method 310). T 17, CCR, 94506(a), 94515(a), 94526	11/21/96	Consumer products
Area Designations. T 17, CCR, 60201-60209	11/21/96	Not applicable
Consumer Products and Aerosol Coating Products Amendments. T 17, CCR, 94508-94515, 99517, 94321	11/21/96	Consumer products
Transport Pollutants. T 17, CCR, 70500, 70600	11/21/96	Not applicable
Onboard Diagnostics, Phase II, Technical Status. T 13, CCR, 1968.1, 2030, 2031	12/12/96	On-road
Consumer Products (Hair Spray) Amendments. T 17, CCR, 94509, 94513, 94514	03/27/97	Consumer products
Liquefied Petroleum Gas Propane Limit Specification Delay. T 13, CCR, 2292.6	03/27/97	Fuels
Portable Equipment Registration Program. T 13, CCR, 2450-2465	03/27/97	Off-road
Identification of Inorganic Lead as Toxic Air Contaminant (TAC). T 17, CCR, 93000	04/24/97	Not applicable
Interchangeable Emissions Reduction Credits. T 17, CCR, 91500	05/22/97	Not applicable
Postpone Enhanced Evaporative Emission Requirements for Ultra-Small Volume Vehicle Manufacturers. T 13, CCR, 1976 and incorporate test procedures	05/22/97	On-road
Consumer Products (Mid-Term Measures) Amendments. T 17, CCR, 94508, 94509, 94513	07/24/97	Consumer products
Off-Cycle Emissions Supplemental Federal Test Procedures (SFTPs). T 13, CCR, 1960.1, 2101 and incorporate test procedures	07/24/97	On-road
Air Toxics "Hot Spots" Fee Regulation. T 17, CCR 90701-90705 and Appendix A	11/13/97	Not applicable
Area Designations. T 17, CCR, 60201 & 60205	11/13/97	Not applicable

Appendix Table A-1
Measures Adopted by the California Air Resource Board
1990 to 2006

Measure	Hearing Date	Category
Consumer Products (Hairspray Credit Program). T 17, CCR, 94502, 94509, 94522, & 94548	11/13/97	Consumer products
Heavy Duty Vehicle Smoke Inspection Program/Periodic Smoke Inspection Program. T 13, CCR, 2180-2188 and 2190-2194	12/11/97	On-road
Permit Fee Regulations for Non-vehicular Sources. T 17,CCR 90800....	01/29/98	Not applicable
Small Off-Road Engines (SORE). T 13, CCR, 2400,2410-2414	03/26/98	Off-road
Classifying Minor Violations. T 17, CCR, 60090-60095	04/23/98	Not applicable
Heavy Duty Vehicle Regulations: 2004 Standards. T 13, CCR, 1956.8, 1965, 2036, 2112 and test procedures	04/23/98	On-road
Airborne Toxic Control Measure for Chrome Plating. T 17, CCR, 93102	05/21/98	Not applicable
Cleaner Burning Gasoline Model Flexibility. T 13, CCR, Sections 2260, 2262.1, 2262.3, 2262.4, $226_{2.5}$, 2262.6, 2262.7 and 2265	08/27/98	Fuels
Gasoline Vapor Recovery Systems. T 17, CCR, 94010-94015 and 94150, 94156, 94157, 94158, 94159, 94160, 94162	08/27/98	Vapor Recovery
Identification of Diesel Exhaust as a Toxic Air Contaminant. T 17, CCR, 93000	08/27/98	Not applicable
Gasoline Deposit Control Additive Regulation. T 13, CCR, 2257, and incorporating test procedures	09/24/98	Fuels
Air Toxics “Hot Spots” Fee Regulations. T 17, CCR, 90701-90705 and Appendix A	10/22/98	Not applicable
Area Designations and Criteria for the National and State Ambient Air Quality Standards for Ozone. T 17, CCR, 60301, 60202, 60205, 60206, 70300-70306, 70303.1	10/22/98	Not applicable
Large Off-Road Spark-Ignition Engine Regulations. T 13, CCR, 2430 et seq., and 2411-2414	10/22/98	Off-road
Stationary Source Test Methods. T 17, CCR, 94101 - 94104, 94106, 94108 - 94113, 941T 17 - 94124, 94137 and revision of Method 12.	10/22/98	Not applicable

Appendix Table A-1
Measures Adopted by the California Air Resource Board
1990 to 2006

Measure	Hearing Date	Category
Low Emission Vehicles Standards (LEV 2) and Compliance Assurance Program (CAP 2000). T 13, CCR,1961 & 1962 (both new); 1900, 1960.1, 1965, 1968.1, 1976, 1978, 2037, 2038, 2062, 2101, 2106, 2107, 2110, 2112, 2114, 2119, 2130, 2137-2140, 2143-2148	11/05/98	On-road
Aftermarket Parts for Off-Road Engines. T 13, CCR, 2470-2476	11/19/98	Off-road
Consumer Products - LVP-VOC Definitions And Test Methods. T 17, CCR, 94506, 94506.5, 94508(a)(78), 94515 and 94526, and the amendment of ARB Method 310	11/19/98	Consumer products
Consumer Products, Aerosol Coatings & Antiperspirants and Deodorants. T 17, CCR, 94501, 94508, 94521, 94522, and 94524	11/19/98	Consumer products
1997 & Later Model Off-Highway Recreational Vehicles and Engines. T 13, CCR, 2410-2414, 2415	12/10/98	Off-road
Emission Standards and Test Procedures for 2001 Marine Engines. T 13, CCR, 2440 et seq	12/10/98	Off-road
Exhaust Standards for (On-Road) Motorcycles. T 13, CCR, 1958	12/10/98	On-road
Revisions to Statewide Portable Equipment Registration Program. T 13, CCR, 2450-2463	12/10/98	Off-road
Voluntary Accelerated Light Duty Vehicle Retirement Regulations. T 13, CCR, 2600-2610	12/10/98	On-road
Cleaner Burning Gasoline (Increasing the Oxygen Content). T 13, CCR, sections $226_{2.5}$(b) and 2265(a)(2)	12/11/98	Fuels
Specifications for Liquid Petroleum Gas Used as a Motor Vehicle Fuel. T 13, CCR, 2292.6	12/11/98	Fuels
Cleaner Burning Gasoline, Oxygen Requirement for Wintertime In Lake Tahoe Area/Gas Pump Labeling for MTBE. T 13, CCR, $226_{2.5}$, and 2273	06/24/99	Fuels
Gasoline Vapor Recovery Systems. T 17, CCR, 94011, 94153, 94155, and incorporated test procedures, CP-201, TP- 201.4, and TP-201.6	06/24/99	Vapor Recovery
Clean Fuels Regulation Requirements. T 13, CCR, sections 2300-2317, and 2303.5, 2311.5	07/22/99	On-road
Portable Container Spillage Control Measure. T 13, CCR, 2470-2478	09/23/99	Off-road
Administrative Hearing Procedures. T 17, CCR, 60040 and 60075.1-60075.45	10/22/99	Not applicable

Appendix Table A-1
Measures Adopted by the California Air Resource Board
1990 to 2006

Measure	Hearing Date	Category
California Consumer Products Regulation Mid-Term Measures II. T 17, CCR, 94508, 94509, and 94513	10/28/99	Consumer products
Area Designations for State Ambient Air Quality Standards. T 17, CCR, 60201	11/18/99	Not applicable
CaRFG Phase 3 Amendments (Phase out of MTBE, standards, predictive model). T 13, CCR, 2260, 2261, 2262.1, $226_{2.5}$, 2263, 2264, 2264.2, 2265, 2266 etc…	12/09/99	Fuels
Off-Road Compression Ignition Engines. T 13, CCR, 2111, 2112, 2137, 2139, 2140, 2141, 2144, 2400, 2401, 2403, 2420, 2421, 2423-2427, & appendix A to article 2.1.	01/27/00	Off-road
Transit Bus Standards. T 13, CCR, 1956.1, 1956.2, 1956.3, 1956.4, 1956.8, 1965	02/24/00	On-road
Agricultural Burning Guidelines. T 17 Amendments 80145, 80T 179, 80100-80102, 80110, 80120, 80130, 80140, 80150, 80155, 80160, 80T 170, 80180, 80200, 80210, 80230, 80240, 80250, 80260, 80270, 80280, 80290, 80300, 80310, 80311, 80320, 80330	03/23/00	Not applicable
Enhanced Gasoline Vapor Recovery Systems (Emergency Filing CP-201, section 18). T 17, CCR, 94011	03/23/00	Vapor Recovery
Enhanced Gasoline Vapor Recovery Systems (In Station Diagnostics and Onboard Refueling Vapor Recovery). T 17, CCR, 94011	03/23/00	Vapor Recovery
Air Toxic Control Measure for Chlorinated Toxic Air Contaminants from Automotive Maintenance and Repair Facilities. T 17, CCR, 93111	04/27/00	Other
Consumer Products Aerosol Adhesives Control Measure. T 17, CCR, 94508, 94509, 94512, 94513	05/25/00	Consumer products
Aerosol (Paint) Coatings Products. T 17, CCR, 94700, 94701, 94521-94524, 94526	06/22/00	Consumer products
Air Toxic Control Measure for Asbestos Containing Serpentine. T 17, CCR, 93106	07/20/00	Not applicable
Conflict of Interest Code. T 17, CCR, 95001, 95002, 95005, and subchapter 9	09/28/00	Not applicable
Rice Straw Conditional Burn Permit Program. T 17, CCR, 80101, 80156-80158	09/28/00	Not applicable
Air Toxics "Hot Spots" Fee Regulations. T 17, CCR, 90705 tables 1, 2, 3a, 3b, 3c, and 4	10/26/00	Not applicable

Appendix Table A-1
Measures Adopted by the California Air Resource Board
1990 to 2006

Measure	Hearing Date	Category
Antiperspirant and Deodorant Regulations. T 17, CCR, 94502, 94504	10/26/00	Consumer products
Area Designations for the State Ambient Air Quality Standard for Ozone. T 17, CCR, 60201	11/16/00	Not applicable
CaRFG Phase 3 Follow-up Amendments. T 13, CCR, sections 2260, 2261, 2262.3, $226_{2.5}$, 2263, 2264, 2265, 2266, 2266.5, 2270, 2272, 2273, 2282, 2296, 2297, 2262.9 and incorporated test procedures	11/16/00	Fuels
CaRFG Phase 3 Test Methods. T 13, CCR, sections 2263(b)	11/16/00	Fuels
Heavy Duty Diesel Engines "Not-to-Exceed (NTE)" Test Procedures. T 13 CCR, 1956.8, 2065	12/07/00	On-road
Light-and Medium Duty Low Emission Vehicle Alignment with Federal Standards. Exhaust Emission Standards for Heavy Duty Gas Engines. T 13, CCR, 1956.8 &1961	12/07/00	On-road
Zero Emission Vehicle Regulation Update. T 13, CCR, 1900, 1960.1(k), 1961, 1962 & incorporated Test Procedure	01/25/01	On-road
Ozone Transport Assessment. T 17, CCR, 70500 & 70600	04/26/01	Not applicable
Zero Emission Vehicle Infrastructure and Standardization of Electric Vehicle Charging Equipment. T 13, CCR, 1900(b), 1962(b) 1962.1	06/28/01	On-road
Airborne Toxic Control Measure for Asbestos from Construction, Grading, Quarrying, and Surface Mining. T 17, CCR, 93105	07/26/01	Not applicable
Marine Inboard Engines. T 13, CCR, 2111, 2112, 2139, 2140, 2147, 2440-2442, 2443.1-2443.3, 2444, 2445.1, 2445.2, 2446, 2444.2 and incorporation of documents by reference	07/26/01	Off-road
Air Toxic Control Measures for Auto and Mobile Equip Refinishing Coatings containing Hexavalent Chromium and Cadmium Compounds. T 17, CCR, 93112	09/20/01	Not applicable
Air Toxics "Hot Spots" Fee Regulation. T 17, CCR, 90700-90705	10/25/01	Not applicable
Gasoline Vapor Recovery Systems Test Methods and Compliance Procedures. T 17, CCR, 94010, 94011, 94153, 94155, 94163, 94164, 94165 & incorporated procedures	10/25/01	Vapor Recovery

Appendix Table A-1
Measures Adopted by the California Air Resource Board
1990 to 2006

Measure	Hearing Date	Category
Heavy Duty Diesel Engine Standards for 2007 and Later. T 13, CCR, 1956.8 and incorporated test procedures	10/25/01	On-road
Distributed Generation Guidelines and Regulations. T 17, CCR, 94200-94214	11/15/01	Other
Gasoline Vapor Recovery Systems Defects. T 17, CCR, 94006 and incorporated document.	11/15/01	Vapor Recovery
Low Emission Vehicle Regulations. T 13, CCR, 1960.1,1960.5, 1961, 1962 and incorporate test procedures and guidelines	11/15/01	On-road
California Motor Vehicle Service Information Rule. T 13&17, CCR, 1969 & 60060.1 - 60060.7	12/13/01	On-road
Airborne Toxic Control Measure for Outdoor Residential Waste Burning. T 17, CCR, 93113	02/21/02	Other
Voluntary Accelerated Light Duty Vehicle Retirement Regulations. T 13, CCR, 2601-2605, 2606 & appendices C & D, and 2607-2610	02/21/02	On-road
On-Board Diagnostic II Review Amendments. T 13, CCR, 1968.1, 1968.2, 1968.5	04/25/02	On-road
Diesel Retrofit Verification Procedure, Warranty and In-Use Compliance Requirements. T 13, CCR, 2700-2710	05/16/02	On-road
Review of California Ambient Air Quality Standards for Particulate Matter and Sulfates. T 17, CCR, 70100,70200, and 70100.1	06/20/02	Not applicable
CaRFG Phase 3 Amendments. T 13, CCR, 2261, 2262, 2262.4, $226_{2.5}$, 2262.6, 2262.9, 2266.5, 2269, 2271, 2272, 2265, and 2296	07/25/02	Fuels
Revision to Transit Bus Regulations Amendments. T 13, CCR, 1956.1, 1956.2, 1956.4,1956.8, and 2112, & documents incorporated by reference	10/24/02	On-road
Administrative Civil Penalties Program. T 17, CCR, 60065.1 - 60065.45 and 60075.1 - 60075.45	12/12/02	Not applicable
Airborne Toxic Control Measure for Diesel Particulate from School Bus Idling. T13, CCR, 2480	12/12/02	On-road
CaRFG Phase 3 Amendments (specifications for De Minimus Levels of Oxygenates and MTBE Phase Out Issues). T 13, CCR, 2261, 2262.6, 2263, 2266.5, 2272, 2273, 2260, 2273.5	12/12/02	Fuels

Appendix Table A-1
Measures Adopted by the California Air Resource Board
1990 to 2006

Measure	Hearing Date	Category
Gasoline Vapor Recovery Systems Test Procedures. T 17, CCR, 94010, 94011, 94163, 94164, and 94165 and procedures incorporated by reference, and 94166, 94167, and incorporation by reference.	12/12/02	Vapor Recovery
Low Emission Vehicles II. Align Heavy Duty Gas Engine Standards with Federal Standards; minor administrative changes. T 13, CCR, 1961, 1965, 1956.8, 1956.1, 1978, 2065 and documents incorporated by reference	12/12/02	On-road
Zero Emission Vehicle Amendments for 2003. T 13, CCR, 1960.1(k), 1961(a) and (d), 1900, 1962, and documents incorporated by reference	03/25/03	On-road
Ozone Transport Mitigation Regulations. T 17, CCR, 70600 and 70601	05/22/03	Not applicable
Off-Highway Recreation Vehicles. T13, CCR, 2415	07/24/03	Off-road
Permit Fee Regulations for Non-vehicular Sources. T 17, CCR, 90800.75, 90800.9, 90804, 90800.8, 90801, 90802, and 90803	07/24/03	Not applicable
Specifications for Motor Vehicle Diesel Fuel. T 13 & T 17, CCR, 1961, 2281, 2282, 2701, 2284, 2285, 93114, and incorporated test procedure	07/24/03	Fuels
Solid Waste Collection Vehicles. T 13, CCR, 2020, 2021, 2021.1, 2021.2	09/24/03	On-road
Small Off-Road Engines (SORE). T 13, CCR, 2400-2409, 2405.1, 2405.2, 2405.3, 2750-2754, 2754.1, 2754.2, 2755-2767, 2767.1, 2768-2773 and the documents incorporated by reference	09/25/03	Off-road
Revised Tables of Maximum Incremental Reactivity Values. T 1, CCR, 94700.	12/03/03	Consumer products
Airborne Toxic Control Measure for Diesel Particulate for Transport Refrigeration Units. T 13, CCR, 2022 & 2477	12/11/03	On-road
Airborne Toxic Control Measure for Stationary Compression Ignition Engines. T 17, CCR 93115 & documents incorporate by reference	12/11/03	Other
Diesel Retrofit Verification Procedure, Warranty and In-Use Compliance Requirements (Amendments). T 13, CCR, 2701-2707 & 2709	12/11/03	On-road
Area Designation Criteria and Area Designations for State $PM_{2.5}$ and Ozone Ambient Air Quality Standards. T 17, CCR, 60201, 60202, 60205, 60210	01/22/04	Not applicable

Appendix Table A-1
Measures Adopted by the California Air Resource Board
1990 to 2006

Measure	Hearing Date	Category
CA Motor Vehicle Service Information Rule. T 13, CCR, 1969	01/22/04	On-road
Airborne Toxic Control Measure for Diesel-Fueled Portable Engines. T 17, CCR,93116, 93116.1, 93116.2, 93116.3, 93116.4, and 93116.5	02/26/04	Off-road
Modifications to the Statewide Portable Equipment Registration Program (PERP) Regulations . T 13, CCR Amendments to 2450-2465, and repeal of 2466	02/26/04	Off-road
Heavy Duty Diesel Engine-Chip Reflash. T 13, CCR, 2011, 2180.1, 2181, 2184, 2185, 2186, 2192, and 2194	03/27/04	On-road
Engine Manufacturer Diagnostic System Requirements for 2007 and Subsequent Model Heavy Duty Engines. T 13, CCR, 1971	05/20/04	On-road
Consumer Products & Methods 310/ATCM for Para-Dicholorobenzene. T 17, CCR, 94501, 94506, 94507, 94508, 94509, 94510, 94512, 94513, 94515, and 94526, and ARB Method 310, which is incorporated by reference	06/24/04	Consumer products
Urban Bus Engines/Fleet Rule for Transit Agencies. T 13, CCR, 1956.1, 1956.2, 1956.3, and 1956.4,	06/24/04	On-road
Airborne Toxic Control Measure for Diesel Particulate from Diesel Fueled Commercial Vehicle Idling. T 13, CCR, 2485	07/22/04	On-road
Gasoline Vapor Recovery Systems at Dispensing Facilities. Emergency Filing. T 17, CCR, 94011	07/22/04	Vapor Recovery
Unihose Gasoline Vapor Recovery Systems. T17, CCR, 94011	07/22/04	Vapor Recovery
Gasoline Vapor Recovery System Equipment Defects List. T 17, CCR, 94006(b) & incorporated document	08/24/04	Vapor Recovery
Greenhouse Gas. T 13, CCR, 1961.1, 1900, 1961 and Incorporated Test Procedures	09/23/04	On-road
California Reformulated Gasoline, Phase 3. T 13, CCR, 2260, 2262, 2262.4, $226_{2.5}$, 2262.6, 2262.9, 2263, 2265 (and the incorporated "California Procedures"), and 2266.5	11/18/04	Fuels
Diesel Fuel Standards for Harbor Craft & Locomotives. T 13, CCR, 2299, 2281, 2282, and 2284, and T 17, CCR, 93117	11/18/04	Fuels

Appendix Table A-1
Measures Adopted by the California Air Resource Board
1990 to 2006

Measure	Hearing Date	Category
Enhanced Gasoline Vapor Recovery Systems Extension. T 17, CCR, 94011 and certification procedure	11/18/04	Vapor Recovery
Permit Fee Regulations for Non-vehicular Sources. T17, CCR 90805 and 90806; and 90800.8 and 90803	11/18/04	Not applicable
Emergency Regulation for Temporary Delay of Diesel Fuel Lubricity Standard. T 13, CCR, 2284	11/24/04	Fuels
Airborne Toxic Control Measure for Hexavalent Chromium and Nickel from Thermal Spraying. T 17, CCR, $9310_{2.5}$	12/09/04	Not applicable
Off-Road Compression Ignition Engines. T 13, CCR, 2420, 2421, 2423, 2424, 2425, 2427	12/09/04	Off-road
Area Designations. T 17, CCR, 60201, 60202, 60205, 60210	01/20/05	Not applicable
Transit Fleet Rule. T 13, CCR, 2023, 2023.1, 2023.2, 2023.3, 2023.4, 1956.1, 2020, 2021, repeal 1956.2, 1956.3, 1956.4	02/24/05	On-road
State Ambient Air Quality Standard for Ozone. T 17, CCR, 70100, 70100.1, and 70200	04/28/05	Not applicable
Airborne Toxic Control Measure for Stationary Compression Ignition Engines (amendments). T 17, CCR, 93115	05/26/05	Other
Definition of Large Confined Animal Facility. T 17, CCR 86500 and 86501	06/23/05	Not applicable
On-Board Diagnostic System Requirements for 2010 and Subsequent Model-Year Heavy-Duty Engines (HD OBD). T 13, CCR, 1971.1	07/21/05	On-road
Reid Vapor Pressure Limit. Emergency Rule. T 13, CCR, 2262 and 2262.4	08/08/05	Fuels
2007-2009 Model-Year Heavy Duty Urban Bus Engines and the Fleet Rule for Transit Agencies. T 13, CCR, 1956.1, 1956.2, and 1956.8	09/15/05	On-road
Portable Fuel Containers (PFC) [Part 2 of 2]. T 13, CCR 2467.2, 2467.3, 2467.4, 2467.5, 2467.6, 2467.7; repeal of 2467.8, and adoption of new 2467.8 and 2467.9.	09/15/05	Off road
Portable Fuel Containers (PFC) [Part 1 of 2]. T 13, CCR, 2467 and 2467.1	09/15/05	Off road
Requirements to Reduce Idling Emissions from New and In-Use Trucks, Beginning in 2008. T 13, CCR section1956.8 and the incorporated document	10/20/05	On-road

Appendix Table A-1
Measures Adopted by the California Air Resource Board
1990 to 2006

Measure	Hearing Date	Category
Airborne Toxic Control Measure for Cruise Ships Onboard Incineration. T 17, CCR, 93119	11/17/05	Off road
Marine Inboard Sterndrive Engines. T 13 CCR 2111, 2112, 2441, 2442, 2444.2, 2445.1, 2446, 2447, and incorporated document	11/17/05	Off-road
Auxiliary Diesel Engines and Diesel-Electric Engines Operated on Ocean-Going Vessels within California Waters and 24 Nautical Miles of the California Baseline. T 13, CCR, 2299.1 and T 17, CCR, 93118	12/08/05	Off-road
Diesel Particulate Matter Control Measure for On-Road Heavy-Duty Diesel-Fueled Vehicles Owned or Operated by Public Agencies and Utilities. T 13, CCR, 2022 and 2022.1	12/08/05	On-road
Mobile Cargo Handling Equipment at Ports and Intermodal Rail Yards. T 13, CCR, 2479	12/08/05	Off-road
AB1009 Heavy-Duty Vehicle Smoke Inspection Program. T 13, CCR, 2180, 2180.1, 2181, 2182, 2183, 2184, 2185, 2186, 2187, and 2188, 2189	01/26/06	On-road
Identification of Tobacco Smoke as a Toxic Air Contaminant. T 17, CCR, 93000	01/26/06	Not applicable
Diesel Verification Procedure, Warranty & In-Use. T 13, CCR, 2702, 2703, 2704, 2706, 2707, and 2709.	03/23/06	On-road
Technical Amendments to Evaporative Exhaust and Evaporative Emissions Test Procedures. T 13, CCR, 1961,1976 and 1978.	05/25/06	On-road
Fork Lifts and Other Industrial Equipment. (Large Off-Road Spark Ignition Engines > 1 liter) T 13, CCR 2430, 2433, 2434. Adopt 2775, 2775.1, 2775.2, 2780, 2781, 2783, 2784, 2785, 2786, 2787, 2788, and 2789.	05/26/06	Off-road
California Motor Vehicle Service Information Rule. T 13, CCR, 1969 and incorporated documents	06/22/06	On-road
Gasoline Vapor Recovery Systems. T 17 CCR 94011 and incorporated certification	06/22/06	Vapor Recovery
Portable Equipment Registration Program. T 13, CCR, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, and 2465	06/22/06	Off-road
Off-Highway Recreational Vehicles and Engines. T 13, CCR, 2411-2413, 2415 & documents incorporated by reference	07/20/06	Off-road

Appendix Table A-1
Measures Adopted by the California Air Resource Board
1990 to 2006

Measure	Hearing Date	Category
Heavy-Duty In-Use Compliance Regulation. T 13, CCR, 1956.1, 1956.8, and documents incorporated by reference	09/28/06	On-road
On-Board Diagnostic II. T 13, CCR, 1968.2, 1968.5, 2035, 2037 and 2038	09/28/06	On-road
Distributed Generation Guidelines and Regulations. T 17, CCR, 94201, 94201.1, 94203, 94204, & 94207-942142	10/19/06	Other
Zero Emission Bus Regulation. T13, CCR, 2023.1, 2023.3, & 2023.4	10/19/06	On-road
Air Toxics "Hot Spots" Emissions Inventory Criteria and Guidelines. T 17, CCR, 93300.5 and document incorporated by reference	11/16/06	Not applicable
Airborne Toxic Control Measure for Cruise Ships and Ocean-Going Ships Onboard Incineration (amendments). T 17, CCR, 93119	11/16/06	Off-road
Airborne Toxic Control Measure for Stationary Compression Ignition Engines (amendments, Agricultural Eng. Exemption removal). T 17, CCR, 93115.1-93115.15.t.	11/16/06	Other
Area Designations for State Ambient Air Quality Standards. T 17, CCR, 60201, 60202, 60205, & 60210	11/16/06	Not applicable
Consumer Products. T 17, CCR, 94508, 94509, 94510, 94513 & 94523	11/17/06	Consumer products
Emergency Regulation for Portable Equipment Registration Program, Airborne Toxic Control Measures and Portable and Stationary diesel-Fueled Engines. T 13, CCR, 2452, 2455, 2456, 2461; T17 CCR 93115, 93116.2, 93116.3	12/06/06	Off-road
Airborne Toxic Control Measure for Chrome Plating and Chromic Acid Anodizing Operations. T 17, CCR, 93102.1-93102.16	12/07/06	Not applicable
Voluntary Accelerated Retirement Regulation. T 13, CCR, 2601-2610 and appendices A-D	12/07/06	On-road

B. State Rules that Do Not Address direct $PM_{2.5}$ or $PM_{2.5}$ Attainment Plan Precursors in the San Joaquin Valley

A substantial number of the measures adopted by CARB since 1990 do not affect direct $PM_{2.5}$ or a $PM_{2.5}$ attainment plan precursor emissions in the San Joaquin Valley. These types of measures include fee rules, identification of toxic air contaminants, area boundary designations, and controls for pollutants other than direct $PM_{2.5}$ (or PM), NO_x, VOC, or SO_2. Appendix Table A-2 provides a list of these measures.

Appendix Table A-2
Measures Adopted by the California Air Resources Board
That Do Not Address $PM_{2.5}$ in the San Joaquin Valley
1990 to 2006

Measure	Hearing Date	Comments
Transported Pollutants (Ozone). T 17, CCR, 70500	12/04/89	Not an emissions reduction measure
Non-vehicular Test Methods. T 17, CCR, 94002, 94003 17, &26, 94146-94149, 94132, 94135, 94139, 94140	01/11/90	Not an emissions reduction measure
Test Method for Asbestos in Serpentine Aggregate. T 17, & 26, CCR, 94147, Method 435	04/12/90	Not an emissions reduction measure
Airborne Toxic Control Measure for Asbestos in Surfacing Applications. T 17, & 26, CCR, 93106	04/12/90	Not a PM emissions reduction measure
Permit Fee Regulations for Non-vehicular Sources. T 17, CCR, 90800.1, 90800, 90802-90803	05/10/90	Not an emissions reduction measure
Air Toxics "Hot Spots" Fee Regulation. T 17, & 26, CCR, 90700-90704, 93300-93347	05/10/90	Not an emissions reduction measure
Dioxins Airborne Toxic Control Measure for Medical Waste Incinerators. T 17, CCR, 93104	07/12/90	Not a PM emissions reduction measure
Air Toxics "Hot Spots" Emissions Inventory Criteria and Guidelines. T 17, & 26, CCR, 93300-93347	06/14/90	Not an emissions reduction measure
Criteria for Area Designations for the State Ambient Air Quality Standard. T 17, CCR, 70303 & 70304	06/14/90	Not an emissions reduction measure
Emissions Reduction Accounting Procedures for California Clean Air Act. T 17, CCR, 70700-70704	07/12/90	Not an emissions reduction measure
Identification of Inorganic Arsenic as a Toxic Air Contaminant. T 17, & 26, CCR, 93000	07/12/90	Not an emissions reduction measure
Transport Mitigation Regulations. T 17, CCR, 70600-70601	08/09/90	Not an emissions reduction measure
Air Toxic Fee Schedule & Emissions Inventory Criteria and Guidelines. T 17, & 26, CCR, 90700-90704, 93300-93347	09/13/90	Not an emissions reduction measure
Identification of Trichloroethylene as a Toxic Air Contaminant. T 17, & 26, CCR, 93000	10/11/90	Not an emissions reduction measure
Revision to Designation Criteria. T 17, CCR, 60200-60204, 60208	11/08/90	Not an emissions reduction measure

Appendix Table A-2
Measures Adopted by the California Air Resources Board
That Do Not Address $PM_{2.5}$ in the San Joaquin Valley
1990 to 2006

Measure	Hearing Date	Comments
Identification of Vinyl Chloride as a Toxic Air Contaminant. T 17, & 26, CCR, 93000	11/13/90	Not an emissions reduction measure
Identification of Chloroform as a Toxic Air Contaminant. T 17, & 26, CCR, 93000	12/13/90	Not an emissions reduction measure
Conflict of Interest Code. T 17, CCR, 95001, et. seq.	12/13/90	Not an emissions reduction measure
Permit Fee Regulations for Non -Vehicular Sources. T 17, CCR, 90800.2, 90801, 90803	02/24/91	Not an emissions reduction measure
Non - Vehicular Test Methods. T 17, CCR, 94131, 94132, 94142	04/11/91	Not an emissions reduction measure.
Acid Deposition Fee Regulations. T 17, CCR, 90621.2, 90620, 90622	04/11/91	Not an emissions reduction measure. Obsolete.
Administrative Hearing Procedures. T 17, CCR, 60075.1, 60075.47	05/09/91	Not an emissions reduction measure
Air Toxics "Hot Spots" Fee Regulation. T 17, & 26, CCR, 90700 - 90705	06/13/91	Not an emissions reduction measure
Agricultural Burning Guidelines. T 17, 80130, 80150, 80250, 80260, 80290	07/11/91	Not an emissions reduction measure
Identification of Metallic & Inorganic Nickel Compounds as a Toxic Air Contaminant. T 17, & 26, 93000	08/08/91	Not an emissions reduction measure
State Ambient Air Quality Standard for SO_2. T 17, CCR, 70100, 70200, 70201	10/10/91	Not an emissions reduction measure
Identification of Perchloroethylene as a Toxic Air Contaminant. T 17, & 26, CCR, 93000	10/10/91	Not an emissions reduction measure
Area Designations. T 17, CCR, 60200, 60209	11/14/91	Not an emissions reduction measure
Identification of Formaldehyde as a Toxic Air Contaminant. T 17, & 26, CCR, 93000	03/12/92	Not an emissions reduction measure
Atmospheric Acidity Protection Fees. T 17, CCR, 90621.3	04/09/92	Not an emissions reduction measure
Permit Fee Regulations for Non-vehicular Sources. T 17, CCR, 90800.3, 90803	04/09/92	Not an emissions reduction measure
Criteria for Area Designations. T 17, CCR, 70303, 70304	05/14/92	Not an emissions reduction measure
Transported Air Pollutants. T 17, CCR, 70500	05/28/92	Not an emissions reduction measure
Air Toxics "Hot Spots" Fee Regulation. T 17, & 26, CCR, 90701, 90704, 90705	07/09/92	Not an emissions reduction measure
Identification of 1.3 Butadiene as a Toxic Air Contaminant. T 17, & 26, CCR, 93000	07/09/92	Not an emissions reduction measure
CFC Refrigerants in Air Conditioning Systems. T 13, CCR, 2500	09/10/92	Not a PM or $PM_{2.5}$ attainment plan precursors emissions

Appendix Table A-2
Measures Adopted by the California Air Resources Board
That Do Not Address $PM_{2.5}$ in the San Joaquin Valley
1990 to 2006

Measure	Hearing Date	Comments
		reduction measure
Criteria for Area Designations. T 17, CCR, 70303.5, 60200-60203, 60205, 70303	12/10/92	Not an emissions reduction measure
Transport Mitigation Regulations. T 17, CCR, 70600, 70601	03/11/93	Not an emissions reduction measure
Identification of Federal Hazardous Air Pollutants as Toxic Air Contaminants. T 17, & 26, CCR, 93001, 39665, 39666	04/08/93	Not an emissions reduction measure
Acid Deposition Fee Regulations. T 17, CCR, 90622, 90621.4	04/08/93	Not an emissions reduction measure
Permit Fee Regulations for Non-vehicular Sources. T 17, CCR, 90800.4, 90803	04/08/93	Not an emissions reduction measure
Air Toxics "Hot Spots" Emissions Inventory Criteria and Guidelines. T 17, & 26, CCR, 93300-93347	06/10/93	Not an emissions reduction measure
Air Toxics "Hot Spots" Fee Regulation. T 17, & 26, CCR, 90700-90705	07/08/93	Not an emissions reduction measure
Mitigation Transport Pollutants. T 17, CCR, 70500, 70600	08/12/93	Not an emissions reduction measure
Airborne Toxic Control Measure for Perchloroethylene Dry Cleaning. T 17, & 26, CCR, 93109, 93110	10/14/93	Not a PM or ozone control measure (perc is not a VOC)
Conflict of Interest. T 17, CCR, 90500	11/18/93	Not an emissions reduction measure
Criteria for Area Designations. T 17, CCR, 60200-60202, 60204, 60206, 60208, 70300-70306	11/18/93	Not an emissions reduction measure
SCAQMD's Reclaim Consideration	03/10/94	Not a SJV control measure
Permit Fee Regulations for Non-vehicular Sources. T 17, CCR, 90800.5, 90803	04/14/94	Not an emissions reduction measure
Air Toxics "Hot Spots" Fee Regulation. T 17, & 26, CCR, 90700-90705	07/28/94	Not an emissions reduction measure
Area Designations. T 17, CCR, 60201, 60204	11/09/94	Not an emissions reduction measure
Permit Fee Regulations for Non-vehicular Sources. T 17, CCR, 90800.6, 90803	04/27/95	Not an emissions reduction measure
Employee-Based Trip Reductions Emission Formula. T 13, CCR, 2330, 2331, 2332	06/29/95	Not an emissions reduction measure
Air Toxics "Hot Spots" Fee Regulation. T 17, CCR, 90700-90705 and Appendix A	01/25/96	Not an emissions reduction measure
Relaxation of Carbon Monoxide Emission Standards for Utility Engines. T 13, CCR, 2403 and incorporating test procedures	01/25/96	Carbon monoxide requirement

Appendix Table A-2
Measures Adopted by the California Air Resources Board
That Do Not Address $PM_{2.5}$ in the San Joaquin Valley
1990 to 2006

Measure	Hearing Date	Comments
Permit Fee Regulations for Non-vehicular Sources. T 17, CCR, 90803, 90800.7	04/25/96	Not an emissions reduction measure
Basin Boundaries for Agricultural Burning (Mojave Desert, South Coast & Salton Sea). T 17, CCR, 60104, 60109, 60114, 80280, 80311	05/30/96	Not applicable to SJV
Regulation Improvement and Repeal. T 17, CCR, 93301-93355, Appendix A-E (emissions inventory)	05/30/96	Not an emissions reduction measure
Emissions Inventory Criteria & Guideline Report. T 17, CCR, 93300.5	07/25/96	Not an emissions reduction measure
Air Toxics "Hot Spots" Fee Regulation. T 17, CCR, 90701-90705 Appendix A to §§ 90700-90705	09/26/96	Not an emissions reduction measure
Stationary Source Test Methods. T 17, CCR, 94105, 94107, 94114, 94135, 94141, 94143, 94161	09/26/96	Not an emissions reduction measure
Area Designations. T 17, CCR, 60201-60209	11/21/96	Not an emissions reduction measure
Transport Pollutants. T 17, CCR, 70500, 70600	11/21/96	Not an emissions reduction measure
Identification of Inorganic Lead as Toxic Air Contaminant (TAC). T 17, CCR, 93000	04/24/97	Not an emissions reduction measure
Interchangeable Emissions Reduction Credits. T 17, CCR, 91500	05/22/97	Not an emissions reduction measure
Air Toxics "Hot Spots" Fee Regulation. T 17, CCR 90701-90705 and Appendix A §§ 90700-90705	11/13/97	Not an emissions reduction measure
Area Designations '97 . T 17, CCR, §§ 60201 & 60205	11/13/97	Not an emissions reduction measure
Permit Fee Regulations for Non-vehicular Sources. T 17,CCR 90800....	01/29/98	Not an emissions reduction measure
Classifying Minor Violations. T 17, CCR, 60090-60095	04/23/98	Not an emissions reduction measure
Airborne Toxic Control Measure for Chrome Plating. T 17, CCR, 93102	05/21/98	Not an emissions reduction measure
Identification of Diesel Exhaust as a Toxic Air Contaminant. T 17, CCR, 93000	08/27/98	Not an emissions reduction measure
Stationary Source Test Methods. T 17, CCR, 94101 - 94104, 94106, 94108 - 94113, 941T 17 - 94124, 94137 and revision of Method 12.	10/22/98	Not an emissions reduction measure
Administrative Hearing Procedures. T 17, CCR, 60040 and 60075.1-60075.45	10/22/99	Not an emissions reduction measure
Area Designations and Criteria for the National and State Ambient Air Quality Standards for Ozone. T 17, CCR, 60301, 60202, 60205, 60206, 70300-70306, 70303.1	10/22/98	Not an emissions reduction measure

Appendix Table A-2
Measures Adopted by the California Air Resources Board
That Do Not Address $PM_{2.5}$ in the San Joaquin Valley
1990 to 2006

Measure	Hearing Date	Comments
Air Toxics "Hot Spots" Fee Regulations. T 17, CCR, 90701-90705 and Appendix A	10/22/98	Not an emissions reduction measure
Area Designations for State Ambient Air Quality Standards. T 17, CCR, 60201	11/18/99	Not an emissions reduction measure
Agricultural Burning Guidelines. T 17 Amendments 80145, 80T 179, 80100-80102, 80110, 80120, 80130, 80140, 80150, 80155, 80160, 80T 170, 80180, 80200, 80210, 80230, 80240, 80250, 80260, 80270, 80280, 80290, 80300, 80310, 80311, 80320, 80330	03/23/00	Not an emissions reduction measure
Air Toxic Control Measure for Asbestos Containing Serpentine. T 17, CCR, 93106	07/20/00	Not a PM or $PM_{2.5}$ attainment plan precursors emissions reduction measure
Conflict of Interest Code. T 17, CCR, 95001, 95002, 95005, and subchapter 9	09/28/00	Not an emissions reduction measure
Rice Straw Conditional Burn Permit Program. T 17, CCR, 80101, 80156-80158	09/28/00	Not a SJV control measure (Sacramento Valley air basin only)
Air Toxics "Hot Spots" Fee Regulations. T 17, CCR, 90705 tables 1, 2, 3a, 3b, 3c, and 4	10/26/00	Not an emissions reduction measure
Area Designations for the State Ambient Air Quality Standard for Ozone. T 17, CCR, 60201	11/16/00	Not an emissions reduction measure
Ozone Transport Assessment. T 17, CCR, 70500 & 70600	04/26/01	Not an emissions reduction measure
Air Toxics "Hot Spots" Fee Regulation. T 17, CCR, 90700-90705	10/25/01	Not an emissions reduction measure
Review of California Ambient Air Quality Standards for Particulate Matter and Sulfates. T 17, CCR, 70100,70200, and 70100.1	06/20/02	Not an emissions reduction measure
Administrative Civil Penalties Program. T 17, CCR, 60065.1 - 60065.45 and 60075.1 - 60075.45	12/12/02	Not an emissions reduction measure
Ozone Transport Mitigation Regulations. T 17, CCR, 70600 and 70601	05/22/03	Not an emissions reduction measure
Permit Fee Regulations for Non-vehicular Sources. T 17, CCR, 90800.75, 90800.9, 90804, 90800.8, 90801, 90802, and 90803	07/24/03	Not an emissions reduction measure

Appendix Table A-2
Measures Adopted by the California Air Resources Board
That Do Not Address $PM_{2.5}$ in the San Joaquin Valley
1990 to 2006

Measure	Hearing Date	Comments
Area Designation Criteria and Area Designations for State $PM_{2.5}$ and Ozone Ambient Air Quality Standards. T 17, CCR, 60201, 60202, 60205, 60210	01/22/04	Not an emissions reduction measure
Permit Fee Regulations for Non-vehicular Sources. T17, CCR 90805 and 90806; and 90800.8 and 90803	11/18/04	Not an emissions reduction measure
Area Designations. T 17, CCR, 60201, 60202, 60205, 60210	01/20/05	Not an emissions reduction measure
State Ambient Air Quality Standard for Ozone. T 17, CCR, 70100, 70100.1, and 70200	04/28/05	Not an emissions reduction measure
Definition of Large Confined Animal Facility. T 17, CCR 86500 and 86501	06/23/05	Not an emissions reduction measure
Identification of Tobacco Smoke as a Toxic Air Contaminant. T 17, CCR, 93000	01/26/06	Not an emissions reduction measure
Air Toxics "Hot Spots" Emissions Inventory Criteria and Guidelines. T 17, CCR, 93300.5 and document incorporated by reference	11/16/06	Not an emissions reduction measure
Area Designations for State Ambient Air Quality Standards. T 17, CCR, 60201, 60202, 60205, & 60210	11/16/06	Not an emissions reduction measure

C. State Fuel Measures

ARB has adopted a number of revisions to its reformulated gasoline program and clean diesel program since 1990, as well as measures addressing other motor vehicle fuels and fuel standards for off-road sources. Appendix Table A-3 is a list of these revisions.

Appendix Table A-3
Fuel Measures Adopted by the California Air Resources Board
1990 to 2006

Measure	Hearing Date	Comments
Wintertime Limits for Sulfur in Diesel Fuel. T 13, CCR, 2255	06/21/90	Renumbered to section 2281. Approved 60 FR 43379 (8/21/95)
Limit on Aromatic Content of Diesel Fuel. T 13, CCR, 2256	12/13/90	Renumbered to section 2282. Approved 60 FR 43379 (8/21/95) (listed as 4/15/01 adoption in FR)
Diesel Fuel Regulations - Emergency. T 13, CCR, 2281(h), 2282(1)	10/15/93	Approved 60 FR 43379 (8/21/95)
Small Refiner Diesel. T 13, CCR, 2282(e)(1)	07/24/94	Approved 60 FR 43379 (8/21/95)
Diesel Fuel Test Methods. T 13, CCR, 1956.8(b), 1960.1(k), 2281(c), 2282(b), (c) and (g)	10/24/96	Approved 75 FR 26653 (5/12/10)
Specifications for Motor Vehicle Diesel Fuel. T 13 & T 17, CCR, 1961, 2281, 2282, 2701, 2284, 2285, 93114, and incorporated test procedure	07/24/03	Approved 75 FR 26653 (5/12/10)
Emergency Regulation for Temporary Delay of Diesel Fuel Lubricity Standard. T 13, CCR, 2284	11/24/04	Temporary delay of standard. Expired
Diesel Fuel Standards for Harbor Craft & Locomotives. T 13, CCR, 2299, 2281, 2282, and 2284, and T 17, CCR, 93117	11/18/04	NO_x reductions estimated at 0.1 tpd for SJV. See CARB 6/29/09 Letter
California Reformulated Gasoline (CaRFG), Phase I. T 13, CCR, 2251.5	09/27/90	RVP standard for period between 1992 and 1996. Obsolete.
California Reformulated Gasoline, Phase II. T 13, CCR, 2250, 2255.1, 2252, 2260 - 2272, 2295	11/21/91	Approved 60 FR 43379 (8/21/95)
Wintertime Gasoline Program. T 13, CCR, 2258, 2298, 2251.5, 2296	11/21/91	Approved 60 FR 43379 (8/21/95)
Predictive Model for Phase II CaRFG. T 13, CCR, 2261, 2262-2270	06/09/94	Superseded by 11/18/04 & 6/14/07 rules
Test Method for Oxygen in Gasoline. T 13, CCR, 2251.5(c), 2258(c), 2263(b)	06/29/95	Section 2251.5 - obsolete; section 2258 wintertime; section 2263, superseded
Wintertime Oxygenate Program. T 13, CCR, 2258, 2251.5, 2263(b), 2267, 2298, 2259, 2283, 2293.5	09/09/93	Carbon monoxide control measure

Appendix Table A-3
Fuel Measures Adopted by the California Air Resources Board
1990 to 2006

Measure	Hearing Date	Comments
Test Methods for CaRFG 13, CCR, 2263(b)	10/26/95	Superseded by 11/18/04 & 6/14/07 rules
Required Additives in Gasoline (Deposit Control Additives). T 13, CCR, 2257 and incorporates testing procedures.	11/16/95	Superseded by 11/18/04 & 6/14/07 rules
CaRFG Housekeeping & CARBOB. T 13, CCR, 2263.7, 2266.5, 2260, $226_{2.5}$, 2264, 2265, 2272	12/14/95	Superseded by 11/18/04 & 6/14/07 rules
CaRFG Variance Requirements. T 13, CCR, 2271 (Emergency)	01/25/96	Superseded by 11/18/04 & 6/14/07 rules
Regulation Improvements and Repeals (fuel additives). T 13, CCR, 2201, 2202	05/30/96	Repealed sections
Cleaner Burning Gasoline Model Flexibility. T 13, CCR, Sections 2260, 2262.1, 2262.3, 2262.4, $226_{2.5}$, 2262.6, 2262.7 and 2265	08/27/98	Superseded by 11/18/04 & 6/14/07 rules
Gasoline Deposit Control Additive Regulation. T 13, CCR, 2257, and incorporating test procedures	09/24/98	Superseded by 11/18/04 & 6/14/07 rules
Cleaner Burning Gasoline (Increasing the Oxygen Content). T 13, CCR, sections $226_{2.5}$(b) and 2265(a)(2)	12/11/98	Wintertime gasoline for South Coast and Imperial County. Not applicable to the SJV area.
Cleaner Burning Gasoline, Oxygen Requirement for Wintertime In Lake Tahoe Area/Gas Pump Labeling for MTBE. T 13, CCR, $226_{2.5}$, and 2273	06/24/99	Not applicable to the SJV/SC area/Obsolete
CaRFG Phase 3 Amendments (Phase out of MTBE, standards, predictive model). T 13, CCR, 2260, 2261, 2262.1, $226_{2.5}$, 2263, 2264, 2264.2, 2265, 2266 etc…	12/09/99	2262.1 renumber to 2262.4; 2264 (designation of alternative limits) not approved; otherwise superseded by 11/18/04 and 6/14/07 rules
CaRFG Phase 3 Test Methods. T 13, CCR, sections 2263(b)	11/16/00	Superseded by 11/18/04 & 6/14/07 rules
CaRFG Phase 3 Follow-up Amendments. T 13, CCR, sections 2260, 2261, 2262.3, $226_{2.5}$, 2263, 2264, 2265, 2266, 2266.5, 2270, 2272, 2273, 2282, 2296, 2297, 2262.9 and incorporated test procedures	11/16/00	Superseded by 11/18/04 & 6/14/07 rules
CaRFG Phase 3 Amendments. T 13, CCR, 2261, 2262, 2262.4, $226_{2.5}$, 2262.6, 2262.9, 2266.5, 2269, 2271, 2272, 2265, and 2296	07/25/02	Superseded by 11/18/04 & 6/14/07 rules
CaRFG Phase 3 Amendments (specifications for De Minimus Levels of Oxygenates and MTBE Phase Out Issues). T 13, CCR, 2261, 2262.6, 2263, 2266.5, 2272, 2273, 2260, 2273.5	12/12/02	Superseded by 11/18/04 & 6/14/07 rule. Approved 75 FR 26653 (5/12/10) (except for section 2272 (CARFG3 standards for small refineries) and 2273.5 (requirement to

Appendix Table A-3
Fuel Measures Adopted by the California Air Resources Board
1990 to 2006

Measure	Hearing Date	Comments
		identify gasoline containing ethanol when delivered to retail station))
California Reformulated Gasoline, Phase 3. T 13, CCR, 2260, 2262, 2262.4, $226_{2.5}$, 2262.6, 2262.9, 2263, 2265 (and the incorporated "California Procedures"), and 2266.5	11/18/04	Approved 75 FR 26653 (5/12/10)
Reid Vapor Pressure Limit. Emergency Rule. T 13, CCR, 2262 and 2262.4	08/08/05	Operative for September and October 2005 only. Obsolete.
Specifications for Liquid Petroleum Gas Used as a Motor Vehicle Fuel. T 13, CCR, 2292.6	12/11/98	No identifiable emissions reductions
Liquefied Petroleum Gas Propane Limit Specification Delay. T 13, CCR, 2292.6	03/27/97	Expired

D. State On-Road Mobile Sources Measures

Appendix Tables A-4 and A-5 list measures adopted by CARB since 1990 for on-road and off-road sources.

Appendix Table A-4
On-Road Mobile Source Measures Adopted
by the California Air Resources Board
1990 to 2006

Measure	Hearing Date	Comments
Certification Procedure for Aftermarket Parts. VC 27156 & 38391	02/08/90	Compliance provisions
Emission Standards for Medium Duty Vehicles. T 13, CCR, 1900, 1956.8, 1960.1, 1968.1, 2061, 2112, 2139	06/14/90	Waiver granted September 16, 1994 (59 FR 48625 (9/22/94))
Evaporative Emission Standards. T 13, CCR, 1976	08/09/90	Waiver granted August 25, 1994 (59 FR 46979 (9/13/94))
Low Emission Vehicles and Clean Fuels. T 13, CCR, 1900, 1904, 1956.8, 1960.1, 1960.1.5, 1960.5 and 2111, 2112, 2125, and 2139, 2061.	09/28/90	Waivers granted January 7, 1993 & April 6, 1998 (58 FR 4166 (1/13/93) & 63 FR 18403 (4/15/98))
Heavy Duty Diesel Smoke Emission Testing. T 13, CCR, 2180-2187	11/08/90	
Onboard Diagnostics for Light-Duty Trucks and Light & Medium-Duty Motor Vehicles. T 13, CCR, 1977, 1968.1	09/12/91	Waiver granted October 2, 1996 (61 FR 53371 (10/11/96))
Onboard Diagnostic, Phase II. T 13, CCR, 1968.1, 1977	11/12/91	
Low Emission Vehicles amendments revising reactivity adjustment factor (RAF) provisions and adopting a RAF for M85 transitional low emission vehicles. T 13, CCR, 1960.1	11/14/91	Confirm within the scope finding requested February 18, 1993
Alternative Motor Vehicle Fuel Certification Fuel Specification. T 13 & 26, CCR, 2290-2292.7, 1960.1(k), 1956.8(b), 1956.8(d)	3/12/92	Confirm within the scope finding requested February 17, 1994
Standards and Test Procedures for Alternative Fuel Retrofit Systems. T 13, CCR, 2030, 2031	05/14/92	Compliance provisions
Phase 2 RFG certification fuel specifications. T 13, CCR, 1960.1, 1956.8(d)	08/13/92	Confirm within the scope finding requested February 17, 1994
Substitute Fuel or Clean Fuel Incorporated Test Procedures. T 13, CCR, 1960.1(k), 2317	11/12/92	Confirm within the scope finding requested February 17, 1994
Smoke Self Inspection Program for Heavy Duty Diesel & Gasoline Engines. T 13, CCR, 2190-2194, 2180-2187, 1956.8(b)	12/10/92	

Appendix Table A-4
On-Road Mobile Source Measures Adopted
by the California Air Resources Board
1990 to 2006

Measure	Hearing Date	Comments
Certification Requirements for Low Emission Passenger Cars, Light-Duty Trucks & Medium Duty Vehicles. T 13, CCR, 1960.1, 1976, 2061, 1900	01/14/93	Confirm within the scope finding requested February 21, 1994
Onboard Diagnostic, Phase II. T 13, CCR, 1968.1	07/09/93	Waiver granted October 2, 1996 (61 FR 53371 (10/11/96))
Urban Transit Buses. T 13, CCR, 1956.8, 1965, 2112	06/10/93	Found within the scope September 28, 2004 (69 FR 59920 (October 6, 2004))
Evaporative Emission Standards and Test Procedures. T 13, CCR, 1976	02/10/94	Waiver granted July 28, 1999 (64 FR 42689 (8/5/99))
Diesel Fuel Certification. T 13, CCR, 1956.8(b)&(d), 1960.1(k), 2292.6	09/22/94	Confirm within the scope finding requested September 14, 1995
Self Inspection Program for Heavy Duty Diesel Engines. T 13, CCR, 2190-2194, 2180-2187, 1956.8(b)	11/09/94	
Onboard Diagnostics, Phase II. T 13, CCR,1963.1, & Certification Procedures	12/08/94	Waiver granted October 2, 1996 (61 FR 53371 (10/11/96))
Periodic Smoke Inspection Program. T 13, CCR, 2190	12/08/94	
Heavy Duty Vehicle Exhaust Emission Standards. T 13, CCR, 1956.8 and incorporate test procedures.	06/29/95	Found within the scope September 28, 2004 (69 FR 59920 (10/6/04))
Onboard Refueling Vapor Recovery Standards. T 13, CCR, 1976, 1978 and incorporate test procedures	06/29/95	Waiver granted August 13, 2002 (67 FR 54180 (8/21/02))
Retrofit Emission Standards. T 13, CCR, 1956.9, 2030, 2031, and incorporate test procedures	07/27/95	Compliance provision
Low Emission Vehicle Standards 3 (LEV 3). T 13, CCR, 1956.8, 1960.1, 1965, 2101, 2061, 2062, and incorporate test procedures	09/28/95	Confirm within the scope finding requested October 8, 1996.
Postpone Zero Emission Vehicle Requirements. T 13, CCR, 1900, 1960.1, 1976	03/28/96	Found within the scope January 18, 2001 (66 FR 7751 (1/25/01))
Diesel Fuel Certification Test Methods. T 13, CCR, 1956.8(b), 1960.1(k), 2281(c), 2282(b), (c) and (g)	10/24/96	Confirm within the scope finding requested November 24, 1997
Onboard Diagnostics, Phase II, Technical Status. T 13, CCR, 1968.1, 2030, 2031	12/12/96	Initial notice 69 FR 5542 (February 5, 2004)

Appendix Table A-4
On-Road Mobile Source Measures Adopted
by the California Air Resources Board
1990 to 2006

Measure	Hearing Date	Comments
Postpone Enhanced Evaporative Emission Requirements for Ultra-Small Volume Vehicle Manufacturers. T 13, CCR, 1976 and incorporate test procedures	05/22/97	Found within the scope July 28, 1999 (64 FR 42689 (8/5/99))
Off-Cycle Emissions Supplemental Federal Test Procedures (SFTPs). T 13, CCR, 1960.1, 2101 and incorporate test procedures	07/24/97	Waiver granted September 30, 2004 (69 FR 60996 (10/14/04))
Heavy Duty Vehicle Smoke Inspection Program/Periodic Smoke Inspection Program. T 13, CCR, 2180-2188 and 2190-2194	12/11/97	
Heavy Duty Vehicle Regulations: 2004 Standards. T 13, CCR, 1956.8, 1965, 2036, 2112 and test procedures	04/23/98	Confirm within the scope finding requested December 26, 2001
Low Emission Vehicles Standards (LEV 2) and Compliance Assurance Program (CAP 2000). T 13, CCR,1961 & 1962 (both new); 1900, 1960.1, 1965, 1968.1, 1976, 1978, 2037, 2038, 2062, 2101, 2106, 2107, 2110, 2112, 2114, 2119, 2130, 2137-2140, 2143-2148	11/05/98	Waiver granted April 11, 2003 (68 FR 19811 (4/22/03))/found within the scope (1999 ZEV amendments) December 21, 2006 (71 FR 78190 (12/28/06))
Exhaust Standards for (On-Road) Motorcycles. T 13, CCR, 1958	12/10/98	Waiver granted July 27, 2006 (71 FR 44027 (8/3/06))
Voluntary Accelerated Light Duty Vehicle Retirement Regulations. T 13, CCR, 2600-2610	12/10/98	Establishes standards for a voluntary accelerated retirement program. Revised 2/21/06 and 12/7/06
Clean Fuels Regulation Requirements. T 13, CCR, sections 2300-2317, and 2303.5, 2311.5	07/22/99	Removal of obsolete provisions, streamlining and other minor changes to 9/1990 rule.
Transit Bus Standards. T 13, CCR, 1956.1, 1956.2, 1956.3, 1956.4, 1956.8, 1965	02/24/00	Combination of fleet requirements, emission standards, and zero-emission bus standards. Fleet requirements achieve approximately 2 tpd NO_x reductions statewide, so minimal effect in SJV. Federal & state emission standards are the same for 2010 MY buses.
Light-and Medium Duty Low Emission Vehicle Alignment with Federal Standards. Exhaust Emission Standards for Heavy Duty Gas Engines. T 13, CCR, 1956.8 &1961	12/07/00	Waiver granted for LDV & HDV April 11, 2003 (68 FR 19811 (4/22/03)) Initial notice on within-the-scope finding request for HDGE: 72 FR 27114 (May 14, 2007).
Heavy Duty Diesel Engines "Not-to-Exceed (NTE)" Test Procedures. T 13 CCR, 1956.8, 2065	12/07/00	Confirm within the scope finding requested December 26, 2001.

Appendix Table A-4
On-Road Mobile Source Measures Adopted
by the California Air Resources Board
1990 to 2006

Measure	Hearing Date	Comments
Zero Emission Vehicle Regulation Update. T 13, CCR, 1900, 1960.1(k), 1961, 1962 & incorporated Test Procedure	01/25/01	Found within the scope December 21, 2006 (71 FR 78190 (12/28/06))
Zero Emission Vehicle Infrastructure and Standardization of Electric Vehicle Charging Equipment. T 13, CCR, 1900(b), 1962(b) 1962.1	06/28/01	Found within the scope December 21, 2006 (71 FR 78190 (12/28/06))
Heavy Duty Diesel Engine Standards for 2007 and Later. T 13, CCR, 1956.8 and incorporate test procedures	10/25/01	Waiver granted August 19, 2005 (70 FR 50322 (8/26/05))
Low Emission Vehicle Regulations. T 13, CCR, 1960.1,1960.5, 1961, 1962 and incorporate test procedures and guidelines	11/15/01	Found within the scope April 21, 2005 (70 FR 22034 (4/28/05))
California Motor Vehicle Service Information Rule. T 13&17, CCR, 1969 & 60060.1 - 60060.7	12/13/01	Compliance provision. Very similar to EPA regulations at 40 CFR 86.1808.01
Voluntary Accelerated Light Duty Vehicle Retirement Regulations. T 13, CCR, 2601-2605, 2606 & appendices C & D, and 2607-2610	02/21/02	Establishes standards for a voluntary accelerated retirement program. Revised 12/7/06.
On-Board Diagnostic II Review Amendments. T 13, CCR, 1968.1, 1968.2, 1968.5	04/25/02	Initial notice 69 FR 5542 (2/5/04)
Diesel Retrofit Verification Procedure, Warranty and In-Use Compliance Requirements. T 13, CCR, 2700-2710	05/16/02	Procedures to verify diesel retrofit technology.
Revision to Transit Bus Regulations Amendments. T 13, CCR, 1956.1, 1956.2, 1956.4,1956.8, and 2112, & documents incorporated by reference	10/24/02	Slight relaxation in requirements over 2000 rule.
Low Emission Vehicles II. Align Heavy Duty Gas Engine Standards with Federal Standards; minor administrative changes. T 13, CCR, 1961, 1965, 1956.8, 1956.1, 1978, 2065 and documents incorporated by reference	12/12/02	Waiver granted August 19, 2005 (70 FR 50322 (8/26/05)) for all but HDGE. HDGE standards adopted to harmonize with EPA's. Initial notice on within-the-scope finding request for HDGE: 72 FR 27114 (5/14/07).
Airborne Toxic Control Measure for Diesel Particulate from School Bus Idling. T13, CCR, 2480	12/12/02	No emissions reductions claimed.
Zero Emission Vehicle Amendments for 2003. T 13, CCR, 1960.1(k), 1961(a) and (d), 1900, 1962, and documents incorporated by reference	03/25/03	Found within the scope December 21, 2005 (71 FR 78190 (12/28/06))
Solid Waste Collection Vehicles. T 13, CCR, 2020, 2021, 2021.1, 2021.2	09/24/03	
Airborne Toxic Control Measure for Diesel Particulate from Transport Refrigeration Units. T 13, CCR, 2022 and 2477	12/11/03	Waiver granted (non-road) January 9, 2009 (74 FR 3030 (1/16/2009))

Appendix Table A-4
On-Road Mobile Source Measures Adopted
by the California Air Resources Board
1990 to 2006

Measure	Hearing Date	Comments
Diesel Retrofit Verification Procedure, Warranty and In-Use Compliance Requirements (Amendments). T 13, CCR, 2701-2707 & 2709	12/11/03	Procedures to verify diesel retrofit technology.
CA Motor Vehicle Service Information Rule. T 13, CCR, 1969	01/22/04	Compliance provision. Very similar to EPA regulations at 40 CFR 86.1808.01
Heavy Duty Diesel Engine-Chip Reflash. T 13, CCR, 2011, 2180.1, 2181, 2184, 2185, 2186, 2192, and 2194	03/27/04	Compliance provision.
Engine Manufacturer Diagnostic System Requirements for 2007 and Subsequent Model Heavy Duty Engines. T 13, CCR, 1971	05/20/04	Waiver granted December 22, 2005 (71 FR 335 (1/4/06))
Urban Bus Engines/Fleet Rule for Transit Agencies. T 13, CCR, 1956.1, 1956.2, 1956.3, and 1956.4,	06/24/04	Various modifications to urban/transit bus standards.
Airborne Toxic Control Measure for Diesel Particulate from Diesel Fueled Commercial Vehicle Idling. T 13, CCR, 2485	07/22/04	
Greenhouse Gas Standards. T 13, CCR, 1961.1, 1900, 1961 and Incorporated Test Procedures	09/23/04	Waiver granted June 30, 2009 (74 FR 32744 (July 8, 2009)
Transit Fleet Rule. T 13, CCR, 2023, 2023.1, 2023.2, 2023.3, 2023.4, 1956.1, 2020, 2021, repeal 1956.2, 1956.3, 1956.4	02/24/05	
On-Board Diagnostic System Requirements for 2010 and Subsequent Model-Year Heavy-Duty Engines (HD OBD). T 13, CCR, 1971.1	07/21/05	Waiver granted August 13, 2008 (73 FR 52042 (9/8/08))
2007-2009 Model-Year Heavy Duty Urban Bus Engines and the Fleet Rule for Transit Agencies. T 13, CCR, 1956.1, 1956.2, and 1956.8	09/15/05 & 10/20/05	Aligns State emission standards with federal emission standards.
Requirements to Reduce Idling Emissions from New and In-Use Trucks, Beginning in 2008. T 13, CCR section 1956.8 and the incorporated document	10/20/05	Confirm not pre-empted or within the scope finding requested. Initial notice 75 FR 43975 (7/27/2010)
Diesel Particulate Matter Control Measure for On-Road Heavy-Duty Diesel-Fueled Vehicles Owned or Operated by Public Agencies and Utilities. T 13, CCR, 2022 and 2022.1	12/08/05	
AB1009 Heavy-Duty Vehicle Smoke Inspection Program. T 13, CCR, 2180, 2180.1, 2181, 2182, 2183, 2184, 2185, 2186, 2187, and 2188, 2189	01/26/06	Requires trucks have emission control labels.

Appendix Table A-4
On-Road Mobile Source Measures Adopted
by the California Air Resources Board
1990 to 2006

Measure	Hearing Date	Comments
Diesel Verification Procedure, Warranty & In-Use. T 13, CCR, 2702, 2703, 2704, 2706, 2707, and 2709.	03/23/06	Procedures to verify diesel retrofit technology, supporting rule for in-use control measures.
Technical Amendments to Evaporative Exhaust and Evaporative Emissions Test Procedures. T 13, CCR, 1961,1976 and 1978.	05/25/06	Within the scope finding July 22, 2010 (75 FR 44948 (July 27, 2010)).
California Motor Vehicle Service Information Rule. T 13, CCR, 1969 and incorporated documents	06/22/06	Compliance provision. Very similar to EPA regulations at 40 CFR 86.1808.01
On-Board Diagnostic II. T 13, CCR, 1968.2, 1968.5, 2035, 2037 and 2038	09/28/06	Confirm within the scope finding requested.
Heavy-Duty In-Use Compliance Regulation. T 13, CCR, 1956.1, 1956.8, and documents incorporated by reference	09/28/06	Compliance provision. Compliance program "essentially identical to EPA's." See Updated Information Digest for the Rule.
Zero Emission Bus Regulation. T13, CCR, 2023.1, 2023.3, & 2023.4	10/19/06	Delays ZEB requirements due to high bus costs and unproven durability, reliability and ability to produce the number of buses required by the regulation. See Updated Information Digest.
Voluntary Accelerated Retirement Regulation. T 13, CCR, 2601-2610 and appendices A-D	12/07/06	Establishes standards for a voluntary accelerated retirement program.

Appendix Table A-5
Off-Road Mobile Source Measures Adopted
by the California Air Resources Board
1990 to 2006

Measure	Hearing Date	Comments
Emission Standards for Utility and Lawn and Garden Engines. T 17, CCR, 2400 et. seq.	12/13/90	Waiver granted July 5, 1995 (60 FR 37440 (7/20/95))
1-year Implementation Delay in Emission Standards for Utility Engines. T 13, CCR, 2400, 2403-2407	04/08/93	
Utility and Lawn and Garden Equipment Engines. T 13, CCR, 2403(c), 11(a)(1)(I)(ii), 4(a)(1)(I)(ii)	07/28/94	Within the scope finding November 9, 2000 (65 FR 69763 (11/20/00))
Utility and Lawn and Garden Equipment Engines. CO Standards	1/25/96	Within the scope finding November 9, 2000 (65 FR 69763 (11/20/00))

Appendix Table A-5
Off-Road Mobile Source Measures Adopted
by the California Air Resources Board
1990 to 2006

Measure	Hearing Date	Comments
Small Off-Road Engines (SORE). T 13, CCR, 2400, 2410-2414	03/26/98	Within the scope finding November 9, 2000 (65 FR 69767 (11/20/00)), waiver granted (durability requirements), November 10, 2003 (65 FR 65702 (11/21/03)).
Small Off-Road Engines (SORE). T 13, CCR, 2400-2409, 2405.1, 2405.2, 2405.3, 2750-2754, 2754.1, 2754.2, 2755-2767, 2767.1, 2768-2773 and the documents incorporated by reference	09/25/03	Waiver granted, December 11, 2006 (71 FR 75536 (12/15/2006))
Off-Highway Recreational Vehicles. T 13, CCR, 2410-2414, 2111-2140	01/03/94	Waiver granted December 23, 1996 (61 FR 69093 (12/31/1996))
Wintertime Requirements for Utility Engines & Off-Highway Vehicles. T 13, CCR, 2403	09/26/96	Within the scope finding November 9, 2000 (65 FR 69763 (11/20/00))
1997 & Later Model Off-Highway Recreational Vehicles and Engines. T 13, CCR, 2410-2414, 2415	12/10/98	Within the scope finding request March 4, 2000
Off-Highway Recreation Vehicles. T13, CCR, 2415	07/24/03	Addition to March 4, 2000 request November 19, 2004. Made changes to riding season restrictions.
Off-Highway Recreational Vehicles and Engines. T 13, CCR, 2411-2413, 2415 & documents incorporated by reference	07/20/06	Adopted evaporative emission standards identical to EPA's.
Heavy Duty Diesel Cycle Engines. T 13, CCR, 2420-2427	01/09/92	Waiver granted May 15, 1995 (60 FR 48981 (9/21/1995))
Exemption of Military Tactical Vehicles. T 13, CCR, 1905, 2400, 2420	12/14/95	Within the scope finding November 9, 2000 (65 FR 69763 (11/20/00))
Off-Road Compression Ignition Engines. T 13, CCR, 2111, 2112, 2137, 2139, 2140, 2141, 2144, 2400, 2401, 2403, 2420, 2421, 2423-2427, & appendix A to article 2.1.	01/27/00	Waiver granted, February 5, 2010 (75 FR 8056 (2/23/2010)
Off-Road Compression Ignition Engines. T 13, CCR, 2420, 2421, 2423, 2424, 2425, 2427	12/09/04	Waiver granted February 5, 2010 (75 FR 8056 (2/23/2010))

Appendix Table A-5
Off-Road Mobile Source Measures Adopted
by the California Air Resources Board
1990 to 2006

Measure	Hearing Date	Comments
In-Use Off-Road Diesel Vehicles. T 13, CCR, 2449	07/26/07	Notice of opportunity for public hearing and comment (on waiver), 73 FR 58585 (10/7/2008).
Large Off-Road Spark-Ignition Engine Regulations. T 13, CCR, 2430 et seq., and 2411-2414	10/22/98	Waiver granted May 15, 2006 (71 FR 29623 (5/23/2006))
Fork Lifts and Other Industrial Equipment. (Large Off-Road Spark Ignition Engines > 1 liter) T 13, CCR 2430, 2433, 2434. Adopt 2775, 2775.1, 2775.2, 2780, 2781, 2783, 2784, 2785, 2786, 2787, 2788, and 2789.	05/26/06	Adopts EPA's Standards for 2007; adopts more stringent standards for 2010.
Emission Standards and Test Procedures for 2001 Marine Engines. T 13, CCR, 2440 *et seq*	12/10/98	Waiver granted March 22, 2007 (59 FR 14546 (March 28, 2007))
Marine Inboard Engines. T 13, CCR, 2111, 2112, 2139, 2140, 2147, 2440-2442, 2443.1-2443.3, 2444, 2445.1, 2445.2, 2446, 2444.2 and incorporation of documents by reference	07/26/01	Waiver granted in part March 22, 2007 (59 FR 14546 (March 28, 2007)) 2007 standards not waived.
Marine Inboard Sterndrive Engines. T 13 CCR 2111, 2112, 2441, 2442, 2444.2, 2445.1, 2446, 2447, and incorporated document	11/17/05	Revision to year 2007 standards in 7/26/2001 marine inboard engine standards. Waiver requested February 7, 2008.
Portable Equipment Registration Program. T 13, CCR, 2450-2465	03/27/97	
Revisions to Statewide Portable Equipment Registration Program. T 13, CCR, 2450-2463	12/10/98	
Modifications to the Statewide Portable Equipment Registration Program (PERP) Regulations . T 13, CCR Amendments to 2450-2465, and repeal of 2466	02/26/04	
Airborne Toxic Control Measure for Diesel-Fueled Portable Engines. T 17, CCR,93116, 93116.1, 93116.2, 93116.3, 93116.4, and 93116.5	02/26/04	Within-the-scope finding/waiver requested March 28, 2005.
Portable Equipment Registration Program. T 13, CCR, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, and 2465	06/22/06	Within-the-scope finding/waiver requested December 5, 2008.

Appendix Table A-5
Off-Road Mobile Source Measures Adopted
by the California Air Resources Board
1990 to 2006

Measure	Hearing Date	Comments
Emergency Regulation for Portable Equipment Registration Program Airborne Toxic Control Measures and Portable and Stationary diesel-Fueled Engines. T 13, CCR, 2452, 2455, 2456, 2461; T17 CCR 93115, 93116.2, 93116.3	12/06/06	Within-the-scope finding/waiver requested December 5, 2008.
Portable Equipment Registration Program and Airborne Toxic Control Measure for Diesel-Fueled Portable Engines. T 13, CCR, 2451, 2452, 2456, 2458, 2459, 2460, 2461, and 2462, T 17, CCR, 93116.1, 93116.2, 93116.3 , 93116.3.1	03/22/07	Within-the-scope finding/waiver requested December 5, 2008.
Aftermarket Parts for Off-Road Engines. T 13, CCR, 2470-2476	11/19/98	Compliance measure
Portable Container Spillage Control Measure. T 13, CCR, 2470-2478	09/23/99	Similar federal regulation. 40 CFR part 59, subpart F.
Portable Fuel Containers (PFC) [Part 1 of 2]. T 13, CCR, 2467 and 2467.1	09/15/05	Similar federal regulation. 40 CFR part 59, subpart F.
Portable Fuel Containers (PFC) [Part 2 of 2]. T 13, CCR 2467.2, 2467.3, 2467.4, 2467.5, 2467.6, 2467.7; repeal of 2467.8, and adoption of new 2467.8 and 2467.9.	09/15/05	Similar federal regulation. 40 CFR part 59, subpart F.
Airborne Toxic Control Measure for Diesel Particulate for Transport Refrigeration Units. T 13, CCR, 2022 & 2477	12/11/03	Waiver granted (non-road) January 9, 2009 (74 FR 3030 (1/16/2009))
Mobile Cargo Handling Equipment at Ports and Intermodal Rail Yards. T 13, CCR, 2479	12/08/05	Within-the-scope finding and waiver request January 29, 2007
Airborne Toxic Control Measure for Cruise Ships Onboard Incineration. T 17, CCR, 93119	11/17/05	No emissions reductions. No cruise ships subject to rule call at SJV ports. See Initial Statement of Reasons for Rule, p. II-1.
Auxiliary Diesel Engines and Diesel-Electric Engines Operated on Ocean-Going Vessels within California Waters and 24 Nautical Miles of the California Baseline. T 13, CCR, 2299.1 and T 17, CCR, 93118	12/08/05	No emissions reductions claimed for SJV.
Airborne Toxic Control Measure for Cruise Ships and Ocean-Going Ships Onboard Incineration (amendments). T 17, CCR, 93119	11/16/06	No emissions reductions claimed for SJV.

Appendix Table A-5
Off-Road Mobile Source Measures Adopted
by the California Air Resources Board
1990 to 2006

Measure	Hearing Date	Comments
Ocean-Going Vessels At Berth (Shore Power). T 13, CCR, 2299.3 and T 17, CCR, 93118.3 and documents incorporated by reference	12/06/07	No emissions reductions claimed
Commercial Harbor Craft. T 13, CCR, 2222 and incorporated "California Evaluation Procedures for New Aftermarket Catalytic Converters"	11/15/07	No emissions reductions claimed
Cleaner Fuels in Ocean-Going Vessel Main Engines and Auxiliary Boiler. T 13, CCR, 2299.2 and T 17, CCR, section 93118.2	07/24/08	

E. State Consumer Product Measures

California has been regulating the VOC content of consumer products for 20 years and continues to tighten standards and regulate more products. Appendix Table A-6 is a list of CARB's rulemaking actions on consumer products since 1990.

Appendix Table A-6
Consumer Products Measures Adopted by the
California Air Resources Board
1990 to 2006

Measure	Hearing Date	Comments
Antiperspirant/Deodorants. T 17, CCR, 94500-94506	11/09/89	Approved 8/21/95 (60 FR 43379)
Consumer Products BAAQMD. T 17, CCR, 94520-94526	06/14/90	Not applicable to the SJV area
Phase I - Consumer Products. T 17, CCR, 94507-94517	10/11/90	Approved 8/21/95 (60 FR 43379)
Phase II - Consumer Products. T 17, CCR, 94501, 94502, 94505, 94514, 94503.5, 94506, 94507 - 94513, 94515	01/09/92	Approved 8/21/95 (60 FR 43379)
Notice of General Public Interest for Consumer Products. T 17, CCR, 94507 - 94517	11/30/92	Not a control measure
Alternative Control Plan for Consumer Products. T 17, CCR, 94540-94555	09/22/94	Voluntary compliance option. No action.
Aerosol Coating Products and Alternative Control Plan. T 17, CCR, 94520-94528, 94540-94543, 94547.	03/23/95	Superseded by 6/22/00 rule.
Antiperspirants and Deodorants, Consumer Products, and Aerosol Coating Products. T 17, CCR, 94500-94506, 94508, 94521	09/28/95	Superseded by 6/24/04 rule for antiperspirants and deodorants; superseded by 11/17/06 rule for consumer products; superseded by 11/17/06 rule for aerosol coating products.
Antiperspirants and Deodorants, Consumer Products, Aerosol Coating Products (ARB Test Method 310). T 17, CCR, 94506(a), 94515(a), 94526	11/21/96	Superseded by 6/24/04 rule for antiperspirants and deodorants; superseded by 11/17/16 rule for consumer products; superseded by 11/17/06 rule for aerosol coating products.
Consumer Products and Aerosol Coating Products Amendments. T 17, CCR, 94508-94515, 99517, 94321	11/21/96	Superseded by 11/17/06 rule
Consumer Products (Hair Spray) Amendments. T 17, CCR, 94509, 94513, 94514	03/27/97	Voluntary compliance option. No action.

Appendix Table A-6
Consumer Products Measures Adopted by the
California Air Resources Board
1990 to 2006

Measure	Hearing Date	Comments
Consumer Products (Mid-Term Measures) Amendments. T 17, CCR, 94508, 94509, 94513	07/24/97	Superseded by 11/17/06 rule
Consumer Products (Hairspray Credit Program). T 17, CCR, 94502, 94509, 94522, & 94548	11/13/97	Voluntary compliance option. No action.
Consumer Products, Aerosol Coatings & Antiperspirants and Deodorants. T 17, CCR, 94501, 94508, 94521, 94522, and 94524	11/19/98	Superseded by 11/17/06 rule
Consumer Products - LVP-VOC Definitions And Test Methods. T 17, CCR, 94506, 94506.5, 94508(a)(78), 94515 and 94526, and the amendment of CARB Method 310	11/19/98	Superseded by 6/24/04 rule for test method 310 and 11/17/06 rule for rest.
California Consumer Products Regulation Mid-Term Measures II. T 17, CCR, 94508, 94509, and 94513	10/28/99	Superseded by 11/17/06 rule
Consumer Products Aerosol Adhesives Control Measure. T 17, CCR, 94508, 94509, 94512, 94513	05/25/00	Superseded by 11/17/06 rule
Aerosol (Paint) Coatings Products. T 17, CCR, 94700, 94701, 94521-94524, 94526	06/22/00	Approved 9/13/05 70 FR 53920; superseded by 11/17/06 rule
Antiperspirant and Deodorant Regulations. T 17, CCR, 94502, 94504	10/26/00	Superseded by 6/24/04 rule
Revised Tables of Maximum Incremental Reactivity Values. T 1, CCR, 94700.	12/03/03	Approved 9/13/05 70 FR 53920; superseded by 11/17/06 rule
Consumer Products & Methods 310/ATCM for Para-Dicholorobenzene. T 17, CCR, 94501, 94506, 94507, 94508, 94509, 94510, 94512, 94513, 94515, and 94526, and CARB Method 310, which is incorporated by reference	06/24/04	Approved November 4, 2009 (74 FR 57074) (EO order date of 5/6/05)
Consumer Products. T 17, CCR, 94508, 94509, 94510, 94513 & 94523	11/17/06	Approved November 4, 2009 (74 FR 57074) (EO order date 9/16/07)

F. State Vapor Recovery Measures

Under California State law (Health and Safety Code Sections 41954), CARB is required to adopt procedures and performance standards for controlling gasoline emissions from gasoline marketing operations, including transfer and storage operations. State law also authorizes CARB, in cooperation with the districts, to certify vapor recovery systems, identify defective equipment, and develop test methods. The installation and operation of CARB-certified vapor recovery equipment is required and enforced by SJVAPCD Rules 4621 and 4622. Appendix Table A-7 is a list of rulemaking actions taken by CARB since 1990 that address vapor recovery equipment certification, defects, and/or test methods.

Appendix Table A-7
Gasoline Vapor Recovery Measures Adopted
by the California Air Resources Board
1990 to 2006

Measure	Hearing Date	Comments
Gasoline Vapor Recovery Systems. T 17, CCR, 94010-94015, 94150-94160, 94000-94004, 94007.	06/29/95	CARB sets requirements for and certifies vapor recovery equipment. District rules establish requirements for the installation of CARB-certified equipment. See SJVAPCD Rules 4621 & 4622
Gasoline Vapor Recovery Systems. T 17, CCR, 94010-94015 and 94150, 94156, 94157, 94158, 94159, 94160, 94162	08/27/98	
Gasoline Vapor Recovery Systems. T 17, CCR, 94011, 94153, 94155, and incorporated test procedures, CP-201, TP- 201.4, and TP-201.6	06/24/99	
Enhanced Gasoline Vapor Recovery Systems (In Station Diagnostics and Onboard Refueling Vapor Recovery). T 17, CCR, 94011	03/23/00	
Enhanced Gasoline Vapor Recovery Systems (Emergency Filing CP-201, section 18). T 17, CCR, 94011	03/23/00	
Gasoline Vapor Recovery Systems Test Methods and Compliance Procedures. T 17, CCR, 94010, 94011, 94153, 94155, 94163, 94164, 94165 & incorporated procedures	10/25/01	
Gasoline Vapor Recovery Systems Defects. T 17, CCR, 94006 and incorporated document.	11/15/01	
Gasoline Vapor Recovery Systems Test Procedures. T 17, CCR, 94010, 94011, 94163, 94164, and 94165 and procedures incorporated by reference, and 94166, 94167, and incorporation by reference.	12/12/02	

Appendix Table A-7
Gasoline Vapor Recovery Measures Adopted
by the California Air Resources Board
1990 to 2006

Measure	Hearing Date	Comments
Unihose Gasoline Vapor Recovery Systems. T17, CCR, 94011	07/22/04	
Gasoline Vapor Recovery Systems at Dispensing Facilities. Emergency Filing. T 17, CCR, 94011	07/22/04	
Gasoline Vapor Recovery System Equipment Defects List. T 17, CCR, 94006(b) & incorporated document	08/24/04	
Enhanced Gasoline Vapor Recovery Systems Extension. T 17, CCR, 94011 and certification procedure	11/18/04	
Gasoline Vapor Recovery Systems. T 17 CCR 94011 and incorporated certification	06/22/06	
Vapor Recovery Aboveground Storage Tanks (AST). T 17, CCR, 94010, 94011, 94016 and 94168 and incorporated documents	06/21/07	
Gasoline Vapor Recovery System Equipment Defects List. T 17, CCR, 94006	N/A	

G. Other State Measures

A number of CARB measures do not fall into one of the categories of measures listed in Appendix Tables A-2 through A-7. These measures are listed below in Appendix Table A-8.

Appendix Table A-8
Other Not Previously Listed Measures Adopted
by the California Air Resources Board
1990 to 2006

Measure	Hearing Date	Comments
Airborne Air Toxic Measure for Ethylene Oxide from Sterilizers & Aerators. T 17, CCR, 93108	05/10/90	Covered by District Rule 7021. Emissions in category are less than 0.01 tpd VOC
Controls for Abrasive Blasting. T 17, CCR, 92000, 92200, 92400, 98500, 98510, 92520, 92530	11/08/90	Small source category in SJV < 0.1 tpd $PM_{2.5}$
Airborne Toxic Control Measure for Emission of Toxic Metals from Non-Ferrous Metal Melting. T 17 & 26, CCR, 93107	12/10/92	Adopted as District Rule 7060.
Air Toxic Control Measure for Chlorinated Toxic Air Contaminants from Automotive Maintenance and Repair Facilities. T 17, CCR, 93111	04/27/00	Mainly addresses non-VOC
Airborne Toxic Control Measure for Asbestos from Construction, Grading, Quarrying, and Surface Mining. T 17, CCR, 93105	07/26/01	Controls equivalent to SJVAPCD Regulation VIII, approved 71 FR 8461 (2/17/06)
Air Toxic Control Measures for Auto and Mobile Equipment Refinishing Coatings Containing Hexavalent Chromium and Cadmium Compounds. T 17, CCR, 93112	09/20/01	Air toxic control measures prohibits additives with hexavalent chromium. Total emissions CA are less than 300 lb per year. ISOR, p. V-2.
Distributed Generation Guidelines and Regulations. T 17, CCR, 94200-94214	11/15/01	Minimal impact, few units certified. See ISOR for 9/28/06 rule amendment
Airborne Toxic Control Measure for Outdoor Residential Waste Burning. T 17, CCR, 93113	02/21/02	Regulated by Rules 4103 & 4106. Rule 4103 revised 5/17/07, approved 75 FR 74 FR 57907 (11/10/09). Rule 4106 (revised 6/21/01), approved 67 FR 8894 (2/27/02); additional revision in 2010.
Airborne Toxic Control Measure for Stationary Compression Ignition Engines. T 17, CCR 93115 & documents incorporate by reference	2/26/04	PM control measure. NO_x regulated by Rule 4702. (approved 73 FR 1819 (1/10/08)). PM reductions are expected to be achieved primarily by replacement of existing engines as a result of

Appendix Table A-8
Other Not Previously Listed Measures Adopted
by the California Air Resources Board
1990 to 2006

Measure	Hearing Date	Comments
		District rule.
Airborne Toxic Control Measure for Hexavalent Chromium and Nickel from Thermal Spraying. T 17, CCR, 93102.5	12/09/04	Air toxic control measures. Total emissions (chromium & nickel in CA are less than 200 lb per year. ISOR, p. IV-6 to 8.
Airborne Toxic Control Measure for Stationary Compression Ignition Engines (amendments). T 17, CCR, 93115	05/26/053/17/05	Revisions to 2/26/04 rule. PM control measure. NO_x regulated by Rule 4702. (approved 73 FR 1819 (1/10/08)). PM reductions are expected to be achieved primarily by replacement of existing engines as a result of District rule.
Airborne Toxic Control Measure for Stationary Compression Ignition Engines (amendments, In-Use Agricultural Eng. Exemption removal). T 17, CCR, 93115.1-93115.15.t.	11/16/06	PM control measure. NO_x regulated by Rule 4702. (approved 73 FR 1819 (1/10/08)) PM reductions are expected to be achieved primarily by replacement of existing engines as a result of District rule.
Distributed Generation Guidelines and Regulations. T 17, CCR, 94201, 94201.1, 94203, 94204, & 94207-942142	10/19/06	Addition of 2013 standards NO_x and VOC standards for DG units which burn waste gas.
Airborne Toxic Control Measure for Chrome Plating and Chromic Acid Anodizing Operations. T 17, CCR, 93102.1-93102.16	12/07/06	Air toxic control measures. Total emissions in CA are 14.4 lb per year. ISOR, p. 49.

Appendix B – SJVAPCD Rules

Appendix Table B -1
Status of San Joaquin Valley Air Pollution Control District Rules
November 5, 2010

Rule No.	Rule	Date of Most Recent Rule Adopted/ Revised	Date of Most Recent Rule Submitted	Date of Most Recent Rule Approved	Federal Register Cite	Comments
4101	Visible Emissions	2/17/2005	2/17/2005	2/17/2005	70 FR 46770 (8/11/05)	Baseline measure
4103	Open Burning	4/15/2010	5/17/2007	5/17/2007	74 FR 57907 (11/10/09)	Control strategy measure. Submittal of 2010 revisions expected soon.
4104	Reduction of Animal Matter	12/17/1992	12/17/1992	12/17/1992	75 FR 10691 (3/9/10)	Baseline measure
4105	Commercial Offsite Multi-User Hazardous and Non-Hazardous Waste Disposal Facilities	12/17/1992	N/A	N/A	N/A	Odor rule only
4106	Prescribed Burning	6/21/2001	6/21/2001	6/21/2001	67 FR 8894 (2/27/02)	Feasibility study completed in 2008. No additional rulemaking.
4201	Particulate matter concentrations	12/17/1992	12/17/1992	12/17/1992	67 FR 16026 (4/4/02)	Baseline measure
4202	Particulate matter emission rates	12/17/1992	12/17/1992	12/17/1992	65 FR 21347 (4/21/00)	Baseline measure
4203	Particulate Matter Emissions from Incineration of Combustible Refuse	12/17/1992	12/17/1992	N/A	no action	Baseline measure

Appendix Table B -1
Status of San Joaquin Valley Air Pollution Control District Rules
November 5, 2010

Rule No.	Rule	Date of Most Recent Rule Adopted/ Revised	Date of Most Recent Rule Submitted	Date of Most Recent Rule Approved	Federal Register Cite	Comments
4204	Cotton Gin	2/17/2005	2/17/2005	2/17/2005	71 FR 65740 (11/08/06)	Baseline measure Feasibility study measure, $PM_{2.5}$, (2009)
4301	Fuel Burning Equipment	12/17/1992	12/17/1992	12/17/1992	64 FR 26876 (5/18/1999)	Baseline measure
4302	Incinerator Burning	12/16/1993	12/16/1993	12/16/1993	64 FR 45170 (8/19/1999)	Baseline measure
4303	Orchard Heaters	12/16/1993	12/16/1993	12/16/1993	64 FR 45170 (8/19/1999)	Baseline measure
4304	Equipment Turning Procedures for Boilers, Steam Generators, and Process Heaters	10/19/1995	10/19/1995	10/19/1995	66 FR 5766 (11/16/01)	Baseline measure
4305	Boilers, Steam Generators, and Process Heaters - Phase 2	8/21/2003	8/21/2003	8/21/2003	69 FR 28061 (5/18/04)	Baseline measure
4306	Boilers, Steam Generators, and Process Heaters - Phase 3	10/16/2008	10/16/2008	10/16/2008	75 FR 1715 (1/13/10)	Control strategy measure

Appendix Table B -1
Status of San Joaquin Valley Air Pollution Control District Rules
November 5, 2010

Rule No.	Rule	Date of Most Recent Rule Adopted/ Revised	Date of Most Recent Rule Submitted	Date of Most Recent Rule Approved	Federal Register Cite	Comments
4307	Boilers, Steam Generators, and Process Heaters - 2.0 MM BTU/hr to 5.0 MMBTU/hr	10/16/2008	10/16/2008	10/16/2008	75 FR 1715 (1/13/10)	Control strategy measure No emissions reductions claimed in $PM_{2.5}$ Plan
4308	Boilers, Steam Generators, and Process Heaters - 0.75 MM BTU/hr to 2.0 MMBTU/hr	12/17/2009	12/17/2009	10/20/2005	72 FR 29887 (5/30/07)	Control strategy measure. 2009 revisions submitted May 17, 2010 (complete June 8, 2010)
4309	Dryers, Dehydrators and Ovens	12/15/2005	12/15/2005	12/15/2005	72 FR 29887 (5/30/07)	Baseline measure Feasibility study measure, $PM_{2.5}$ & ozone (2011)
4311	Flares	6/18/2009	6/18/2009	6/20/2002 6/15/2006	68 FR 8835 (2/26/03) NPR - 72 FR 65283 (11/20/07)	Control strategy measure. 2009 revisions submitted January 10, 2010 (complete February 4, 2010) No emissions reductions in $PM_{2.5}$ Plan
4313	Lime Kilns	3/27/2003	3/27/2003	3/27/2003	68 FR 52510 (9/4/2003)	Baseline measure Feasibility study measure, $PM_{2.5}$ & ozone (2011)
4320	Advanced Emission Reduction Option for Boilers	10/16/2008	10/16/2008	N/A	N/A	Control strategy measures. Rule submitted March 17, 2009 (complete April 20, 2009)

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4351	Boilers, Steam Generators, and Process Heaters - RACT	8/21/2003	8/21/2003	8/21/2003	69 FR 28061 (5/18/04)	Baseline measure
4352	Solid Fuel Fired Boilers, Steam Generators, and Process Heaters	5/18/2006	5/18/2006	5/18/2006	75 FR 60623 (10/1/10)	Limited approval/disapproval S-COM-4 - Feasibility study measure, ozone & $PM_{2.5}$ (2009)
4354	Glass Melting Furnaces	9/16/2010	8/17/2006	8/17/2006	72 FR 41894 (8/01/07)	Control strategy measure. Submittal of 2010 revisions expected soon.
4401	Steam-Enhanced Crude Oil Production Wells	12/14/2006	12/14/2006	12/14/2006	75 FR 3996 (1/26/10)	VOC measure Limited approval/disapproval Revisions schedule for 2nd Q/2011
4402	Crude Oil Production Sumps	12/17/1992	12/17/1992	N/A	73 FR 48 (1/02/08) withdrawn	VOC measure
4403	Components Serving Light Crude Oil or Gases at Light Crude Oil and Gas Production	4/20/2005	4/20/2005	4/20/2005	71 FR 14652 (3/23/06)	VOC measure

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4404	Heavy Oil Test Station - - Kern	12/17/1992	12/17/1992	12/17/1992	75 FR 10691 (3/9/10)	VOC measure
4405	Oxides of Nitrogen Emissions from Existing Steam Generators (Central and Western Kern County)	12/17/1992	not submitted	N/A	N/A	
4406	Sulfur Compounds from Oilfield Steam Generators - Kern	12/17/1992	not submitted	N/A	N/A	
4407	In-situ Combustion Well Vents	5/19/1994	5/19/1994	5/19/1994	60 FR 12121 (3/6/95)	VOC controls
4408	Glycol Dehydration Systems	12/19/2002	12/19/2002	12/19/2002	68 FR 51187 (8/26/03)	
4409	Components at Light Crude Oil or Gases at Light Crude Oil and Gas Production	4/20/2005	4/20/2005	4/20/2005	71 FR 14653 (3/23/06)	VOC control

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4451	Valves, Pressure Relief Valves, Flanges, Threaded Connections and Process Drains at Petroleum Refineries and Chemical Plants	4/20/2005	4/20/2005	4/20/2005	71 FR 14652 (3/23/06)	VOC measure Rule incorporated into Rule 4455
4452	Pump and Compressor Seals at Petroleum Refiners	4/20/2005	4/20/2005	4/20/2005	71 FR 14653 (3/23/06)	VOC measure Rule incorporated into Rule 4455
4453	Refinery Vacuum Producing Devices or Systems	12/19/1992	12/19/1992	N/A	73 FR 48 (1/02/08) withdrawn	VOC measure
4454	Refinery Process Turnaround	12/19/1992	12/19/1992	N/A	73 FR 48 (1/02/08) withdrawn	VOC measure
4455	Components at Refineries	4/20/2005	4/20/2005	4/20/2005	71 FR 14652 (3/23/06)	VOC measure
4501	Alternate Compliance for BARCT	6/17/1999	6/17/1999	N/A	no action	
4550	Conservation Management Practices	8/19/2004	8/19/2004	8/19/2004	71 FR 7683 (2/14/06)	Baseline measure Feasibility study measure, $PM_{2.5}$ (2012)

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4565	Biosolids, Animal Manure, and Poultry Litter Operations	3/15/2007	3/15/2007	N/A	no action	VOC measure
4566	Organic Waste	N/A	N/A	N/A	N/A	New rule for green waste, scheduled for adoption in December 2010
4570	Confined Animal Facilities	10/21/20101	6/18/5/2009	6/18/2009	75 FR 2079 (1/14/10)	VOC measure Limited approval/disapproval. Submittal of 2010 revisions expected soon.
4601	Architectural Coatings	12/17/2009	12/17/2009	10/31/2001	69 FR 34 (1/02/04)	VOC measure Limited approval/disapproval - no sanction clock (disapproved elements expired)
4602	Motor Vehicle and Mobile Equipment Coating Operations	9/17/2009	9/17/2009	12/20/2001	67 FR 42999 (6/26/02)	VOC measure
4603	Surface Coating of Metal Parts and Products	9/17/2009	9/17/2009	10/16/2008	75 FR 4612 (1/19/10)	VOC measure
4604	Can and Coil Coating Operations	9/20/2007	9/20/2007	9/20/2007	75 FR 4612 (1/19/10)	VOC measure

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4605	Aerospace Assembly and Component Coating	9/20/2007	9/20/2007	9/20/2007	75 FR 3996 (1/26/10)	VOC measure Limited approval/disapproval Revisions schedule for 2nd Q/2011
4606	Wood Products Coating Operations	10/16/2008	10/16/2008	10/16/2008	74 FR 52849 (10/15/09)	VOC measure
4607	Graphic Arts	12/18/2008	12/18/2008	12/18/2008	74 FR 52849 (10/15/09)	VOC measure
4610	Glass Coating Operations	4/17/2003	4/17/2003	4/17/2003	69 FR 60962 (10/14/04)	VOC measure
4612	Motor Vehicle and Mobile Equipment Coating Operations -- Phase 2	10/21/2010	9/20/2007	9/20/2007	75 FR 4612 (1/19/10)	VOC measure. Submittal of 2010 revisions expected soon (administrative changes only).
4621	Gasoline Transfer into Stationary Storage Containers	12/20/2007	12/20/2007	12/20/2007	74 FR 33397 (7/13/09)	VOC measure
4622	Gasoline Transfer into Motor Vehicles	12/20/2007	12/20/2007	12/20/2007	74 FR 33397 (7/13/09)	VOC measure

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4623	Storage of Organic Liquids	5/19/2005	5/19/2005	5/19/2005	70 FR 53937 (9/13/05)	VOC measure
4624	Transfer of Organic Liquids	12/20/2007	12/20/2007	12/20/2007	74 FR 52894 (10/15/09)	VOC measure
4625	Wastewater Separators	12/17/1992	12/17/1992	N/A	73 FR 48 (1/02/08) withdrawn	VOC measure
4641	Cutback, Slow Cure, and Emulsified Asphalt Paving and Maintenance Operations	12/17/1992	12/17/1992	12/17/1992	75 FR 10691 (3/9/10)	VOC measure
4642	Solid Waste Disposal Site	4/16/1998	4/16/1998	4/16/1998	66 FR 38939 (7/26/01)	VOC measure
4651	Soil Decontamination Operations	9/20/2007	9/20/2007	9/20/2007	74 FR 52894 (10/15/09)	VOC measure
4652	Coatings and Ink Manufacturing	12/17/1992	not submitted	N/A	N/A	No sources
4653	Adhesives	9/16/2010	9/17/2009	9/20/2007	74 FR 52894 (10/15/09)	VOC measure. Submittal of 2010 revisions expected soon.

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4661	Organic Solvents	9/20/2007	9/20/2007	9/20/2007	75 FR 24406 (5/5/2010)	VOC measure
4662	Organic Solvent Degreasing Operations	9/20/2007	9/20/2007	9/20/2007	74 FR 37948 (7/30/09)	VOC measure
4663	Organic Solvent Cleaning, Storage, and Disposal	9/20/2007	9/20/2007	9/20/2007	74 FR 37948 (7/30/09)	VOC measure
4672	Petroleum Solvent Dry Cleaning Operations	12/17/1992	12/17/1992	12/17/1992	75 FR 10691 (3/9/10)	VOC measure
4681	Rubber Tire Manufacturing	12/16/1993	12/16/1993	12/16/1993	63 FR 43881 (8/17/98)	VOC measure
4682	Polystyrene, Polyethylene, and Polypropylene Products Manufacturing	9/20/2007	9/20/2007	1994	60 FR 31086 (6/13/95)	VOC measure
4684	Polyester Resin Operations	9/17/2009	9/17/2009	9/20/2007	75 FR 3996 (1/26/10)	VOC measure Limited approval/disapproval Revisions schedule for 2nd Q/2011
4691 (461.02)	Vegetable Oil Processing Operations	12/17/1992	12/17/1992	12/17/1992	59 FR 2535 (1/18/94)	VOC measure

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4692	Commercial Charbroiling	9/17/2009	9/17/2009	3/21/2002	68 FR 33005 (6/03/03)	Control strategy measure. Submitted May 17, 2010 (complete June 8, 2010)
4693	Bakery Ovens	5/16/2002	5/16/2002	5/16/2002	69 FR 22441 (4/26/04)	VOC measure
4694	Wine Fermentation and Storage Tanks	12/15/2005	12/15/2005	N/A	no action	VOC measure
4695	Brandy and Wine Aging	9/17/2009	9/17/2009	N/A	no action	VOC measure
4701	I/C Engines - Phase 1	8/21/2003	8/21/2003	8/21/2003	69 FR 28061 (5/18/04)	Baseline measure
4702	I/C Engines - Phase 2	1/18/2007	1/18/2007	1/18/2007	73 FR 1819 (1/10/08)	Control strategy measure Currently in workshop, scheduled adoption December, 2010
4703	Stationary Gas Turbines	9/20/2007	9/20/2007	9/20/2007	74 FR 53888 (10/21/09)	Control strategy measure
4801	Sulfur Compounds	12/17/1992	12/17/1992	12/17/1992	no action	
4802	Sulfuric Acid Mist	12/17/1992	12/17/1992	12/17/1992	64 FR 30396 (6/08/99)	Baseline measure Limited approval/disapproval No sanction clock

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4901	Wood Burning Fireplaces and Wood Burning Heaters	10/16/2008	10/16/2008	10/16/2008	74 FR 57907 (11/10/09)	Control strategy measure
4902	Residential Water Heaters	3/19/2009	3/19/2009	3/19/2009	75 FR 24408 (5/5/10)	Control strategy measure
4905	Natural Gas-fired, fan-type, residential central furnaces	10/20/2005	10/20/2005	10/20/2005	72 FR 29886 (5/30/07)	Additional revisions scheduled for 2014 per $PM_{2.5}$ plan commitment
8011	Fugitive Dust General Requirements	8/19/2004	8/19/2004	8/19/2004	71 FR 8461 (2/17/06)	Baseline measures
8021	Construction, Demolition, Excavation, Extraction, and other Earthmoving Activities	8/19/2004	8/19/2004	8/19/2004	71 FR 8461 (2/17/06)	Baseline measures
8031	Bulk Materials	8/19/2004	8/19/2004	8/19/2004	71 FR 8461 (2/17/06)	Baseline measures
8041	Carryout and Trackout	8/19/2004	8/19/2004	8/19/2004	71 FR 8461 (2/17/06)	Baseline measures
8051	Open Areas	8/19/2004	8/19/2004	8/19/2004	71 FR 8461 (2/17/06)	Baseline measures
8061	Paved and Unpaved Roads	8/19/2004	8/19/2004	8/19/2004	71 FR 8461 (2/17/06)	Baseline measures

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8071	Unpaved Vehicle/ Equipment Traffic Areas	9/16/2004	9/16/2004	9/16/2004	71 FR 8461 (2/17/06)	Baseline measures
8081	Agricultural Sources	9/16/2004	9/16/2004	9/16/2004	71 FR 8461 (2/17/06)	Baseline measures
9310	School Bus	9/21/2006	9/21/2006	9/21/2006	75 FR 10420 (3/8/2010)	Baseline measure
9410	Employer Based Trip Reduction	12/17/2009	12/17/2009	N/A	no action	Control strategy measure. Submitted May 17, 2010 (complete June 8, 2010)
9510	Indirect Source Review	12/15/2005	12/15/2005	12/15/2005 (proposal)	NPR: 75 FR 28509 (5/21/10)	Proposed approval without credit