Chapter 1

Introduction

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Chapter 1: Introduction

The U.S. Environmental Protection Agency (EPA) periodically reviews and establishes health-based air quality standards (often referred to as National Ambient Air Quality Standards, or NAAQS) for ozone, particulates, and other pollutants. Although the San Joaquin Valley's (Valley) air quality is steadily improving, the Valley experiences unique and significant difficulties in achieving these increasingly stringent standards. Over the past couple of decades, the San Joaquin Valley Air Pollution Control District (District) has implemented several generations of emissions control measures for those stationary and area sources under its jurisdiction. Similarly, the California Air Resources Board (ARB) has adopted regulations for mobile sources. Together, these efforts represent the nation's toughest air pollution emissions controls and have greatly contributed to reduced ozone and particulate matter concentrations in the Valley. Despite the significant progress under these regulations, greatly aided by the efforts of Valley businesses and residents, many air quality challenges remain, including attainment of EPA's most recent standard for particulate matter that is 2.5 microns or less in diameter (PM2.5).

This *2012 PM2.5 Plan* establishes the District's strategy for attaining the 2006 PM2.5 standard as expeditiously as possible, and synthesizes the District's strategies for improving air quality and public health in the Valley. To provide overall strategic direction in developing this *2012 PM2.5 Plan*, the District Governing Board adopted the following Guiding Principles at its February 2012 public hearing:

1. With public health as our number one priority, meet the national ambient air quality standards as expeditiously as practicable.
2. Use sound science as the plan's foundation. This includes efforts to assess public health impacts, predict future air quality, determine the extent of emissions reductions needed, and evaluate the availability, effectiveness, and feasibility of emission control measures.
3. Consider the Valley's unique challenges and develop cost-effective strategies that provide adequate operational flexibility and minimize costs to Valley businesses.
4. Consider all opportunities for timely, innovative, and cost-effective emission reductions. Consider traditional regulations, but look beyond traditional regulations to incorporate monetary incentives, policy initiatives, guidance documents, and outreach, including working with cities and counties to incorporate *2012 PM2.5 Plan* principles into their general plans.
5. Given that 80% of the Valley's NOx emissions originate from mobile sources, provide a balanced approach to reducing mobile and stationary source emissions.
6. Devise and implement reasonable strategies that involve the public in reducing emissions.

7. Prioritize strategies that contribute to the District's Risk-based Strategy by achieving the greatest public health benefits.
8. Prioritize strategies that contribute to attainment of multiple air quality standards.
9. Recognize that there is no "silver bullet" for attainment. In this plan and upcoming attainment plans, every sector—from the public through all levels of government, businesses, and industry—must continue to reduce emissions.
10. Compel state and federal agencies to provide adequate resources and regulatory assistance to reduce emissions from sources under their jurisdiction.
11. Address air pollutant transport issues with air districts neighboring the Valley.
12. Provide ample opportunity for public participation and feedback in the design and implementation of these plans. Utilize the planning process to also inform participants of the Valley's air quality challenges and successes as well as actions that can be taken to improve Valley air quality.
13. Build off of the successes of the District's Technology Advancement Program by identifying further opportunities to continue fostering technology advancement, thus paving the way for new emissions control devices to be increasingly used in the San Joaquin Valley.

1.1 THE VALLEY'S UNIQUE CHALLENGES

The Valley's geography and meteorology exacerbate the formation and retention of high levels of air pollution. Surrounding mountains and consistently stagnant weather patterns prevent the dispersal of pollutants that accumulate within the Valley. The Valley has significant naturally occurring biogenic emissions. The California landscape also allows for air pollutant transport within the Valley, as well as between the Valley and other air basins. These natural factors will continue to impact the Valley's progress toward attainment of air quality standards.

The Valley is also one of the fastest growing regions in the state (see Appendix B for more information). The Population Research Unit of the California Department of Finance (DOF) released interim revised population growth projections in May 2012.[1] Based on these revised DOF data, from 2010 to 2020, the Valley's population is expected to increase by 18% (Table 1-1). In contrast, the total population for the State of California is projected to increase by only 9% over the same time period. Increasing population generally means increases in air pollutant emissions as a result of increased consumer product use and more automobile and truck travel. Between 2010 and 2020, the Valley's total vehicle miles traveled (VMT) will increase about 21%,[2] consistent with

[1] California Department of Finance [DOF]: Interim Population Projects for California and its Counties 2010-2050. (May 2012). Retrieved from http://www.dof.ca.gov/research/demographic/reports/projections/interim/view.php
[2] California Air Resources Board: 2009 Almanac – Population and Vehicle Trends Tool. Retrieved July 2012 from http://www.arb.ca.gov/app/emsinv/trends/ems_trends.php

the Valley's population growth. Also, the Valley is home to the state's major arteries for goods and people movement, which adds to the increases in vehicular traffic.

Table 1-1 Estimated Valley Population by County, 2010-2020 [3]

County	Estimated 2010	Projected 2020
Fresno	932,926	1,083,889
Kern*	841,609	1,041,469
Kings	152,996	179,722
Madera	151,136	183,176
Merced	256,345	301,449
San Joaquin	686,651	795,631
Stanislaus	515,229	582,746
Tulare	443,567	536,429
Total	3,980,459	4,704,511

*Kern County is separated into two air districts: San Joaquin Valley and Eastern Kern. This data is the Valley-portion of Kern only.

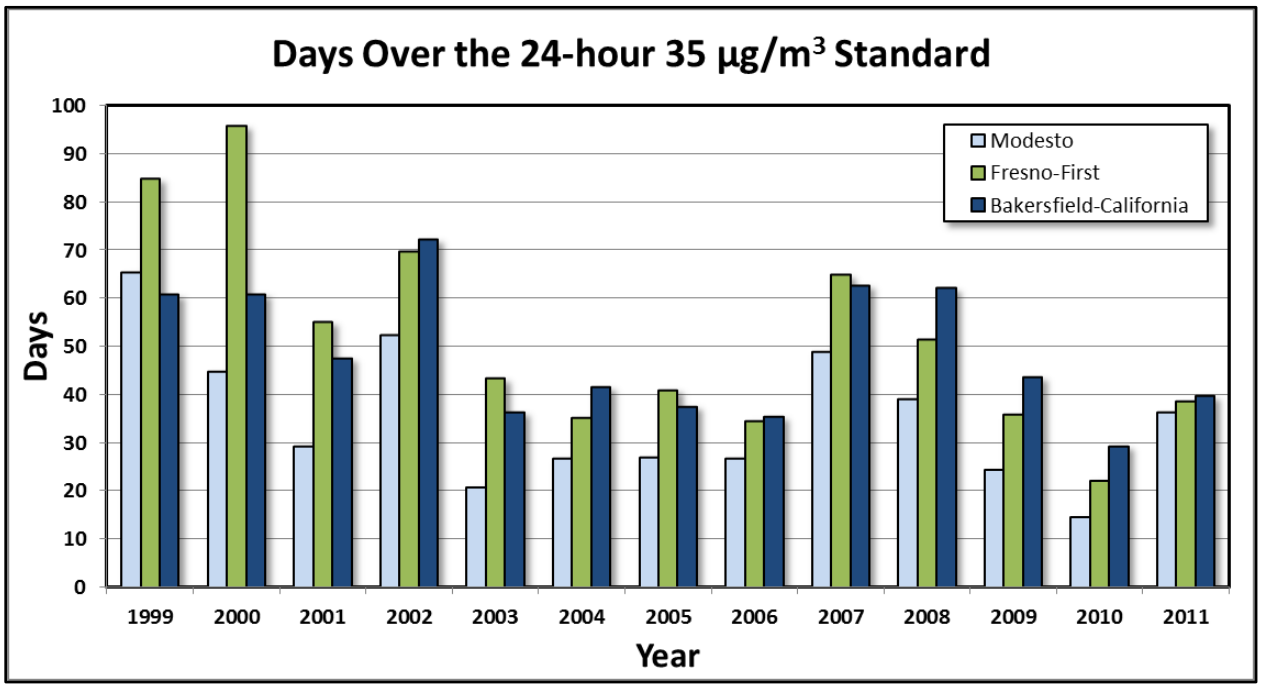
Although reducing mobile source emissions is critical to the Valley's attainment of air quality standards, the District does not have direct regulatory authority to reduce motor vehicle tailpipe emissions, which are regulated by the EPA and ARB. As described in Chapter 6 of this plan and in Appendix C, the District must collaborate with interagency partners and use innovative approaches to reduce mobile source emissions.

As Chapter 3 of this plan details, the formation and composition of PM2.5 can be complex, with some species impacting health more than others. Long-term trends show that PM2.5 concentrations throughout the Valley have declined since monitoring of this pollutant first began and are projected to continue on that trend. In addition to declining PM2.5 concentrations, most emissions inventories of PM2.5 precursors are also projected to decrease despite future population growth.

Figure 1-1 shows the trend in numbers of days that air monitoring sites recorded 24-hour PM2.5 averages over 35 µg/m³ at the Modesto, Fresno-First, and Bakersfield-California air monitoring sites. An overall downward trend is apparent when comparing the early years of 1999 and 2000 to recent years. The current pattern shows generally that the northern Valley has the fewest days over the standard, that the southern Valley has the most days over the standard, and that the central Valley registers somewhere between the two.

[3] Ibid. footnote 1.

Figure 1-1 Trends in Exceedances of the 24-hour PM2.5 Standard



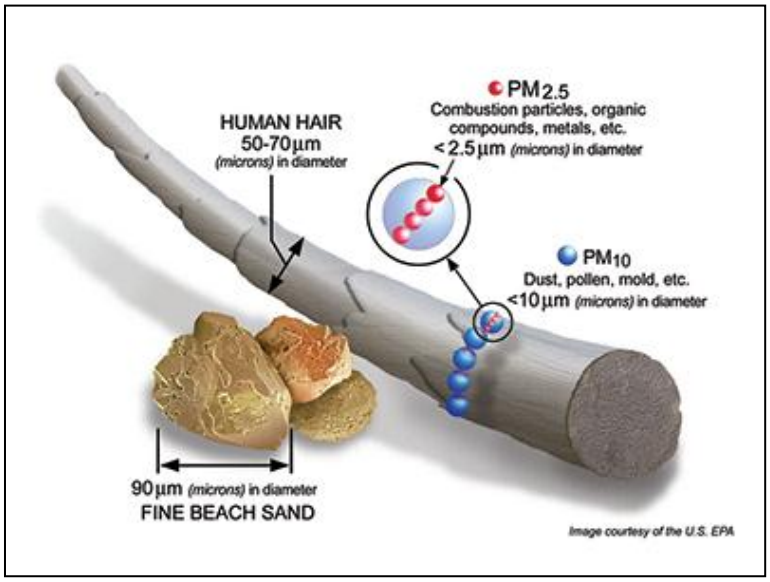
Despite the magnitude of the challenges described above, the Valley has a history of success in reducing emissions and improving air quality. The Valley must continue to reduce air pollutant emissions to improve air quality and to improve public health throughout the Valley.

1.2 PM2.5 AND ASSOCIATED HEALTH IMPACTS

Particulate matter (PM) is a mixture of solid particles and liquid droplets in the air. PM can be emitted directly into the atmosphere (primary PM), or can form as secondary particulates in the atmosphere through the photochemical reactions of precursors (when precursors are energized by sunlight). Thus, PM is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. PM10 is PM that is 10 microns or less in diameter, and the PM2.5 subset includes smaller particles that are 2.5 microns or less in diameter (Figure 1-2).

Any particles 10 microns or less are considered respirable, meaning they can be inhaled into the body through the mouth or nose. PM10 can generally pass through the nose and throat and enter the lungs. PM2.5 can be inhaled more deeply into the gas exchange tissues of the lungs, where it can be absorbed into the bloodstream and carried to other parts of the body.

Figure 1-2 PM10, PM2.5, Human Hair, and Fine Beach Sand



The potential health impacts of particle pollution are linked to the size of the particles, with the smaller particles having larger impacts. Numerous studies link PM2.5 to a variety of health problems, including aggravated asthma, increased respiratory symptoms (irritation of the airways, coughing, difficulty breathing), decreased lung function in children, development of chronic bronchitis, irregular heartbeat, non-fatal heart attacks, increased respiratory and cardiovascular hospitalizations, lung cancer, and premature death. Children, older adults, and individuals with heart or lung diseases are the most likely to be affected by PM2.5. Many studies have quantified and documented the health benefits of attaining EPA's 2006 PM2.5 standard. For example, one 2008 study used the Regional Human Exposure Model (REHEX) to evaluate potential Valley health benefits.[4] As part of developing this *2012 PM2.5 Plan*, the District utilized an EPA-developed model named BenMAP to quantify the health that would be achieved by this plan, as discussed in more detail in Chapter 2 and Appendix E.

Air pollutant health impacts carry economic costs as well. For example, a study conducted in 2008 estimated that the economic benefits of meeting EPA's 2006 PM2.5 standard to be approximately $5.6 billion. Similarly, using the BenMAP model, the District estimated an economic and social benefit of $5.5 billion resulting from implementing this plan and attaining the PM2.5 standard (see Chapter 2 and Appendix E). The applied economic values were based on the cost of treating illness and the expressed value people place on avoiding illness and premature death. The 2008 study recognized that some known effects of pollutant exposure cannot yet be quantified in

[4] Hall, J.V., Brajer, V., Lurmann, F.W. (November 2008). *The Benefits of Meeting Federal Clean Air Act Standards in the South Coast and San Joaquin Valley Air Basins.* Institute for Economic and Environmental Studies, California State University, Fullerton. Retrieved from http://business.fullerton.edu/centers/iees/reports/Benefits_of_Meeting_Clean_Air_Standards_11-13-08.pdf

economic terms, so the actual economic benefits of attainment are likely higher than the study reports.

In addition to particle size, the chemical composition of PM2.5 is a primary factor in the type and severity of health impacts. There are several PM2.5 species, or chemical compounds, summarized in Table 1-2.

Table 1-2 PM2.5 Species

Species	Description
Organic carbon	Directly emitted, primarily from combustion sources (e.g. residential wood combustion). Also, smaller amounts attached to geologic material and road dusts. May also be emitted directly by natural sources (biogenic).
Elemental carbon	Also called soot or black carbon; incomplete combustion (e.g. diesel engines)
Geologic material	Road dust and soil dust that are entrained in the air from activity, such as soil disturbance or airflow from traffic
Trace metals	Identified as components from soil emissions or found in other particulates having been emitted in connection with combustion from engine wear, brake wear, and similar processes. Can also be emitted from fireworks.
Sea salt	Sodium chloride in sea spray where sea air is transported into the Valley
Secondary organic aerosol	Secondary particulates formed from photochemical reactions of organic carbon
Ammonium nitrate	Reaction of ammonia and nitric acid, where the nitric acid is formed from nitrogen oxide emissions, creating nitric acid in photochemical processes or nighttime reactions with ozone
Ammonium sulfate	Reaction of ammonia and sulfuric acid, where the sulfuric acid is formed primarily from sulfur oxide emissions in photochemical processes, with smaller amounts forming from direct emissions of sulfur.
Combined water	A water molecule attached to one of the above molecules

Understanding various PM2.5 species, including how each forms, how much each contributes to the Valley's total PM2.5 concentrations, and how each is linked to different public health impacts, is of the utmost importance for the development of an effective, health-protecting control strategy (see Chapter 2). For example, ammonium nitrate is estimated to comprise about 40% of the Valley's total PM2.5 concentrations, but it is generally regarded as having relatively low toxicity as compared to other types of PM2.5. In contrast, metals have higher health impacts, but are found in relatively low concentrations in the Valley. Bioaerosols, such as mold spores, bacteria, pollen, and endotoxins, carry significant health risks for sensitive individuals. Ultrafine particles, or those particles 0.1 microns or less in diameter (PM0.1), are small enough to effectively deliver harmful chemicals into the lungs, bloodstream, and the brain, but typically comprise a small portion of the Valley's total airborne PM mass.

In addition to affecting human health, air pollution also affects the health of the natural environment. PM2.5 can be transported from sources hundreds of miles away to contribute to visibility problems at remote locations, such as the Sierra Nevada and associated national parks. As PM settles out of the air, it can make lakes and streams acidic, change an ecosystem's nutrient balance, and affect ecosystem diversity. PM can affect vegetation by damaging foliage, disrupting the chemical processes within

plants, reducing light adsorption, and disrupting photosynthesis. This can impact green spaces as well as crops. PM can also stain and damage stone and other materials. As the Valley progresses toward attainment of EPA's human-health-based PM2.5 standards, there will also be less harmful impacts to the surrounding natural environment.

1.3 NATIONAL AMBIENT AIR QUALITY STANDARDS

1.3.1 EPA's Standard-Setting Process

Clean Air Act (CAA) Sections 108 and 109 require EPA to set health-based standards for six criteria pollutants, including PM2.5. EPA periodically reviews existing standards to consider the most recent health studies. These reviews are to be conducted every five years, though in the past, some standard revisions did not meet the 5-year deadline. The review process starts as the Clean Air Scientific Advisory Committee (CASAC) analyzes available science and then, if supported by research, suggests to EPA a range of revised standards that would protect public health from the adverse effects of air pollution. The EPA Administrator appoints CASAC members, who are non-EPA experts in the fields of science, engineering, or the social sciences. The committee is to provide objective, independent advice to EPA on the technical basis for the standard. Thousands of peer-reviewed scientific studies are considered as EPA formulates its proposed standard, which is made available for scientific peer review and public comment. EPA then sets the standard.

In evaluating and setting new standards, federal law prohibits EPA from taking into account economic feasibility. However, economic feasibility issues *can* be considered as EPA promulgates the implementation rules that establish the deadlines for meeting the standards and in devising individual control measures aimed at attaining the standards.

Once a standard is set, EPA designates an area as *attainment* or *nonattainment* based on the most recent three years of air quality data available. For some pollutants, EPA classifies nonattainment areas as *marginal*, *moderate*, *serious*, *severe*, or *extreme*. The classification sets the attainment deadline and other planning requirements. The classification is to be based on certain air quality parameters, though areas can request reclassification with adequate documentation.

EPA also adopts implementation rules to guide states and local air districts as they prepare state implementation plans (SIPs) to bring areas into attainment with the standard. While EPA cannot consider costs or difficulty in setting the standards, costs and difficulty are inescapable for local air districts as they determine the best way to bring areas into attainment. That being said, local air districts must meet planning and attainment requirements to avoid federal sanctions and to improve public health.

There are a number of serious penalties and risks associated with any failure to submit approvable attainment strategies for meeting federal standards. Upon development of an attainment strategy, an area submits the plan to EPA for approval. If EPA finds that

an area fails to submit an approvable plan on time or fails to implement plan commitments after the plan has been approved, then the following sanctions may be applied:

- Two-to-one offset requirement for major sources, leading to a de facto ban on new and expanding business
- Loss of federal highway funds, which would cost the Valley an estimated $250 million per year
- A federal implementation plan (FIP), which would result in a loss of local control

Once EPA approves a SIP, that plan becomes federally enforceable. The plan can then be enforced by the public or EPA through lawsuits. In addition, failure to reach attainment by the deadline would result in the assessment of Section 185 penalty fees.

1.3.2 Federal PM2.5 Standards and Implementation

EPA established the first PM2.5 standard in 1997 and in 2005 designated the Valley as nonattainment for the 1997 standard. The 1997 standard has two limits of attainment: an annual average of 15 micrograms per cubic meter (µg/m³) and a 24-hour average of 65 µg/m³. The District adopted the *2008 PM2.5 Plan* in April 2008 to document its regulatory commitments, to demonstrate the anticipated effectiveness of its PM2.5 strategy to bring the Valley into attainment of the 1997 PM2.5 standard no later than April 2015 (based on 2012-2014 data), and to meet other federal requirements. EPA approved the *2008 PM2.5 Plan* in 2011.

EPA revised the 24-hour average PM2.5 standard to 35 µg/m³ in October 2006.[5] EPA designated the Valley as nonattainment of the 2006 PM2.5 standard in 2009, effective December 14, 2009.[6] The effective date of designation triggered an attainment plan due date of December 14, 2012.

Areas must attain the 2006 standard within five years of the effective date of EPA designations, though up to a five year extension is possible. This sets the Valley's initial attainment date at December 14, 2014, with an extension up to December 14, 2019, if needed. This *2012 PM2.5 Plan* will demonstrate that the Valley will attain the 2006 standard as expeditiously as practicable, with all feasible measures and strategies being considered to accomplish this goal.

Designation under the national PM2.5 standard (unlike the ozone standard) does not use a nonattainment area classification system (i.e., moderate, serious, severe, and extreme). Therefore, attainment planning requirements are the same for all PM2.5

[5] National Ambient Air Quality Standards for Particulate Matter; Final Rule. 71 Fed. Reg. 200, pp. 61144–61233. (2006, October 17). (codified at 40 CFR Part 50) Retrieved from http://www.gpo.gov/fdsys/pkg/FR-2006-10-17/html/06-8477.htm

[6] Air Quality Designations for the 2006 24-Hour Fine Particle (PM2.5) National Ambient Air Quality Standards; Final Rule. 74 Fed. Reg. 218, pp. 58688–58781. (2009, November 13). (codified at 40 CFR Part 81). Retrieved from www.epa.gov/pmdesignations/2006standards/documents/2009-10-08/FR-11-13-2009.pdf

nonattainment areas. EPA finalized the PM2.5 Implementation Rule[7] in April 2007 to provide rules and guidance on the CAA requirements for attainment plans required under the 1997 PM2.5 standard. On March 2, 2012, EPA issued its "Implementation Guidance for the 2006 24-Hour Fine Particle (PM2.5) NAAQS."[8] This memo confirmed the continued appropriateness of the 2007 implementation rule framework for PM2.5 attainment planning and provided additional guidance where needed. Table 1-3 summarizes PM2.5 attainment planning requirements and where those requirements will be met in this plan.

During the compilation and subsequent implementation of this plan for the 2006 PM2.5 standard, EPA's standard-setting process continues. On June 14, 2012, EPA published a proposed new annual PM2.5 standard of 12 or 13 µg/m³, with the new standard projected to be finalized by December 2012. This new standard will require new planning and strategy development, beyond what will be implemented with the *2012 PM2.5 Plan*—such is the nature of complying with overlapping federal standards within the rigors of local planning and regulatory processes. This overlap of planning requirements is shown in Table 1-4.

Despite the overlap, efforts to reduce PM2.5 and PM2.5 precursors under one PM2.5 standard will help the Valley to start progressing toward more stringent PM2.5 standards on the horizon. This is already occurring with the 1997 and 2006 PM2.5 standards—the emissions reductions strategy being implemented under the plan for the 1997 PM2.5 standard will continue to achieve additional emissions reductions as fully implemented over the next couple of years, and these reductions will contribute to improvements in 24-hour average PM2.5 concentrations, bringing the Valley closer to the 2006 standard. Building on the *2007 Ozone Plan* and *2008 PM2.5 Plan*, the District is coordinating emissions reductions strategies whenever possible to address multiple standards, to maximize efficiency for staff as well as stakeholders, and to maximize health benefits.

[7] Clean Air Fine Particle Implementation Rule [PM2.5 Implementation Rule]. 72 Fed. Reg. 79, pp. 20586–20667. (2007, April 25). Retrieved from http://www.gpo.gov/fdsys/pkg/FR-2007-04-25/pdf/E7-6347.pdf#page=1

[8] U.S. Environmental Protection Agency (2012, March 2). Memorandum from the Office of Air Quality Planning and Standards: Implementation Guidance for the 2006 24-Hour Fine Particle (PM2.5) National Ambient Air Quality Standards (NAAQS). Retrieved from http://www.epa.gov/ttn/naaqs/pm/pdfs/20120302_implement_guidance_24-hr_pm2.5_naaqs.pdf

Table 1-3 Federal Requirements for PM2.5 Nonattainment Areas

General Requirements	Federal CAA	PM2.5 Implementation Rule	Description	2012 PM2.5 Plan
Attainment demonstration due date	172(b)	72 *FR* 20599	PM2.5 SIPs are due to EPA by December 14, 2012, three years from the designation date.	NA
Attainment date	172(b)(2)	72 *FR* 20601	Nonattainment areas should reach attainment as expeditiously as practicable, but no later than 5 years from the designation date. EPA may extend the attainment date up to 10 years from the designation date, considering severity of nonattainment and availability and feasibility of control measures.	Chapter 9
RACT/RACM	172(c)(1)	72 *FR* 20609-20633	SIP provisions should provide for the implementation of reasonably available control measures (RACM), including, at a minimum, reasonably available control technologies (RACT).	Chapter 5 and 9
RFP	172(c)(2)	72 *FR* 20633-20642	SIP provisions must provide for reasonable further progress.	Chapter 9
Contingency provisions	172(c)(1)	72 *FR* 20642-20645	The SIP must provide for the implementation of specific measures that would take effect without further action by the State and that would be undertaken if the area fails to make RFP or attainment on time.	Chapter 9
Emissions inventory	172(c)(3)	72 *FR* 20647-20651	The SIP must include a comprehensive, accurate, current inventory of actual emissions from all sources of the relevant pollutants in the area.	Appendix B
NSR	172(c)(4-5)	72 *FR*	The SIP must identify and quantify the emissions of pollutants that will be allowed (in accordance with section 173(a)(1)(B)), from the construction and operation of major new or modified stationary sources in the area. The SIP must require permits for new or modified stationary sources.	Appendix H
Other measures	172(c)(6)	72 *FR* 20599	The SIP must include enforceable emission limitations, other control measures and techniques, and compliance schedules to provide for attainment by the applicable deadline.	Chapters 5 through 8

Table 1-4 Federal Air Quality Standards and Valley Status for PM2.5

	PM2.5 Standards and Timelines		
	1997 PM2.5	**2006 PM2.5**	**2012 PM2.5**
LEVEL OF THE STANDARD	24-hr: 65 µg/m³ annual: 15 µg/m³	24-hr: 35 µg/m³ annual: 15 µg/m³	To be determined
1997	EPA sets standard		
1998–2004			
2005	EPA finalizes attainment designations		
2006		EPA sets standard	
2007	EPA implementation rule		
2008	Attainment plan due (SJV's *2008 PM2.5 Plan*)		
2009		EPA finalizes attainment designations	
2010			
2011	EPA approves SJV plan		
⇨ **2012**		**Attainment plan due (SJV's *2012 PM2.5 Plan*)**	Proposes annual standard of 12 or 13µg/m³: June 2012 Final standard to be issued: December 2012
2014		Initial attainment deadline	EPA attainment designations: December 2014. Attainment plan likely due in early 2018, and attainment deadline to be determined
2015	Final attainment deadline		
2016 & beyond		Final attainment deadline: 2019	

1.3.3 State Standards

California also sets ambient air quality standards for several pollutants, including PM2.5. The California ambient air quality standards are considerably more stringent than the federal standards and are more protective of human health. California's annual average PM2.5 standard is currently 12 µg/m³. There is no California standard for 24-hour average PM2.5 concentrations.

California has no specific attainment date for state air quality standards, nor does it require attainment plans. In fact, California Health and Safety Code (CH&SC) Section 39602 says, "Notwithstanding any other provision of this division, the state implementation plan shall only include those provisions necessary to meet the requirements of the [federal] Clean Air Act." Federal standards thus provide the framework for SIPs, such as this PM2.5 plan. However, progress toward federal standards also brings areas closer to the lower, California standards.

1.4 PUBLIC PROCESS OF PLAN DEVELOPMENT

To ensure that the public has the opportunity for meaningful involvement in reviewing and commenting on the plan, the District has been using the following timeline for the public process (Table 1-5).

Table 1-5 *2012 PM2.5 Plan* Development and Public Workshop Timeline

Ongoing	Outreach on plan process and findings: presentations/discussions with stakeholders at various meetings
April 27th and 30th 2012	Public workshops and commenting period
June 2012	Public workshops and public commenting
October 9, 2012	Public workshops and public commenting
November 2012	Proposed draft of the plan
December 20, 2012	District Governing Board hearing to adopt the plan
January 2013	ARB hearing to adopt the SJV plan and the state strategy

The District has held a number of meetings and workshops throughout development of this plan to seek public input. These meetings have been well-attended by members of the public, and a number of questions have been raised and discussed. The District has discussed the *2012 PM2.5 Plan* at numerous meetings of District Governing Board, Citizens Advisory Committee (CAC), Environmental Justice Advisory Group (EJAG), and other meetings (including an April meeting with the Central Valley Air Quality Coalition).

The comments and questions received during workshops and associated written comment periods have been integral to development of this plan. All significant comments and responses are summarized in Appendix I of this plan. The following summarizes the recent public workshops:

April 27, 2012
***2012 PM2.5 Plan* Technical Symposium**
The District and ARB staff co-hosted a technical symposium on the scientific basis of air quality modeling being conducted for the *2012 PM2.5 Plan*. Attendees included District staff, ARB staff, EPA staff, and members of the public. The meeting, which was hosted in Fresno, could be attended via VTC in the District's Modesto and Bakersfield offices, or attended via webcast. Presenters representing District staff, ARB staff, and UC Davis researchers addressed the scientific basis of modeling for the plan, the nature of PM2.5 species and formation in the Valley, a review of modeling results from CRPAQS (the California Regional Particulate Air Quality Study), modeling for state

implementation plan purposes, and the technical approach for *2012 PM2.5 Plan* modeling. These presentations and the discussions that followed provided a valuable opportunity to improve understanding of how PM2.5 is formed and retained in the Valley, as well as how these processes are analyzed in the plan.

April 30, 2012
***2012 PM2.5 Plan* Workshop**
The District hosted a public workshop on the general direction and first draft components of the *2012 PM2.5 Plan*. Attendees included District staff, ARB staff, and members of the public. District staff presented an overview of federal planning requirements, the District's guiding principles for the plan, draft emissions inventory trends, ambient PM2.5 trends, and the District's approach for analyzing control measure opportunities.

June 27, 2012
***2012 PM2.5 Plan* Workshop**
The District hosted a public workshop on further development of draft *2012 PM2.5 Plan* components. Attendees included District staff, ARB staff, and members of the public. District staff presented an overview of the background for the plan, air quality trends, development of the risk-based strategy as it is to be incorporated into the PM2.5 plan, preliminary control measure findings, and the role of incentives and technology advancement in the Valley's attainment challenges. ARB staff presented an overview of photochemical modeling, emissions inventory improvements, and the Valley's preliminary attainment outlook.

October 9, 2012
Two-session *2012 PM2.5 Plan* Workshop
The District and ARB hosted a two-session workshop on the *2012 PM2.5 Plan* and its technical components. Attendees included District staff, ARB staff, EPA staff, and members of the public. ARB hosted the morning session to present and respond to questions on plan modeling, modeling results, and other analysis. The District hosted the afternoon session to present and respond to questions on the plan control strategy, demonstration of federal plan requirements, and the public health benefits that would be achieved by the PM2.5 Plan. Public comments were heard during the workshop and invited on the draft plan.

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