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 (also referred to as National Ambient Air Quality Standards, or NAAQS) for ozone, particulates, and other pollutants. Although the San Joaquin Valley (Valley) experiences unique and significant difficulties in achieving these increasingly stringent standards, air quality in the Valley has improved considerably. Over the past couple of decades, the San Joaquin Valley Air Pollution Control District (District) has implemented several generations of emissions control measures for 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 (PM) concentrations in the Valley, with the Valley experiencing a record clean ozone summer season in 2015. The significant progress to cleaner air has been greatly aided by the efforts of Valley businesses and residents.

This *2016 Plan for the 2008 8-Hour Ozone Standard* (*2016 Ozone Plan*) satisfies federal Clean Air Act (CAA) requirements under EPA's 2008 8-hour ozone standard. This plan builds upon the District's 1-hour ozone, 8-hour ozone and particulate matter (PM) strategies. Under these combined efforts, the Valley's 8-hour ozone concentrations have significantly improved and will continue to improve as the existing control measure strategy is implemented in the coming years. Furthermore, as the District continues to develop new attainment plans to address the latest federal ozone and PM2.5 standards in the coming years, significant additional emissions reductions are expected, particularly with respect to mobile sources under ARB and EPA jurisdiction that make up over 85% of remaining Valley emissions.

This *2016 Ozone Plan* follows the Governing Board Guiding Principles adopted at the February 2012 Governing Board public hearing. These principles are as follows:

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 attainment 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 Health-Risk Reduction 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 VALLEY'S UNIQUE CHALLENGES IN REDUCING OZONE

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 dispersion 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. The Valley's low precipitation levels, high temperatures, and light winds are conducive to elevated ozone levels. These natural factors will continue to impact the Valley's progress toward attainment of air quality standards.

To further exacerbate current air quality challenges, the Valley is one of the fastest growing regions in the state. Based on the revised 2015 to 2030 data from the California Department of Finance, the Valley's population is expected to increase by 25.3% (Table 1-1). In contrast, the total population for the State of California is projected to increase by only 13.3% 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 vehicle miles traveled (VMT). In addition to

increased VMT resulting from increased Valley population, the Valley will see increased vehicular traffic along the State's major goods and people movement arteries, both of which run the length of the Valley.

Table 1-1 Estimated Valley Population by County, 2015-2030[1]

County	Projected 2015	Projected 2020	Projected 2025	Projected 2030
Fresno	981,681	1,055,106	1,130,406	1,200,666
Kern*	894,492	989,815	1,088,711	1,189,004
Kings	155,122	167,465	180,355	192,562
Madera	157,722	173,146	189,267	204,993
Merced	269,572	288,991	313,082	337,798
San Joaquin	723,506	766,644	822,755	893,354
Stanislaus	538,689	573,794	611,376	648,076
Tulare	467,170	498,559	537,015	578,858
Total	***4,187,954***	***4,513,520***	***4,872,967***	***5,245,311***

** This reflects the population for all of Kern County, not just the portion monitored by the District.*

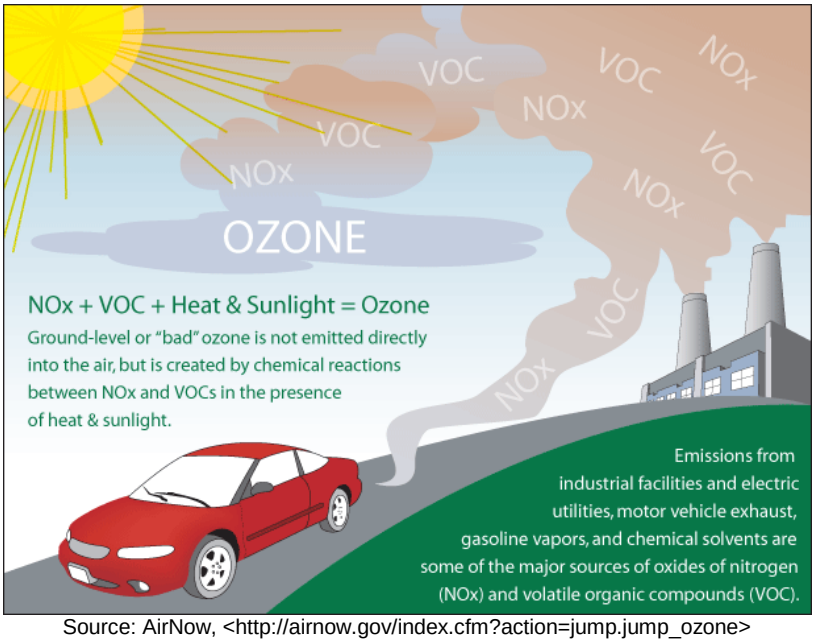
Although reducing mobile source emissions is critical to the Valley's attainment of federal air quality standards, the District does not have direct regulatory authority to reduce motor vehicle tailpipe emissions. Mobile source emissions are regulated by the EPA and ARB. The District collaborates with its interagency partners and uses innovative and non-regulatory approaches to reduce mobile source emissions, or a combination of regulatory and non-regulatory approaches such as District Rule 9610 (State Implementation Plan Credit for Emission Reductions Generated through Incentive Programs) and District Rule 9510 (Indirect Source Review).

1.2 OZONE AND ASSOCIATED HEALTH AND OTHER IMPACTS

Ozone is a gas of three oxygen atoms (O_3). Ground-level ozone is the main component of smog. It is not directly emitted into the atmosphere, but produced by photochemical reactions between oxides of nitrogen (NO_x) and volatile organic compounds (VOCs) in the presence of sunlight (see Figure 1-1). The Valley generally experiences the highest ozone concentrations on hot, sunny summer days with prolonged periods of stagnation.

[1] California Department of Finance. Retrieved on 2015, June 29 from: http://www.dof.ca.gov/research/demographic/reports/projections/view.php

Figure 1 - 1 Ozone Formation



Source: AirNow, <http://airnow.gov/index.cfm?action=jump.jump_ozone>

1.2.1 Health Impacts

Breathing ozone can trigger a variety of health problems, including chest pain, coughing, throat irritation, and congestion. It can reduce lung function and inflame the linings of the lungs. Repeated exposure may permanently scar lung tissue. Children are at a greater risk of experiencing negative health impacts because their lungs are still developing and they are more likely to be active outdoors when ozone levels are high, thus increasing their exposure. Studies have linked rising hospital admissions and emergency room visits to higher ozone levels.

The District has several strategies for reducing public health impacts associated with ozone, including the following:

- **District Air Quality Plans and Related District Regulations**. The District's air quality plans outline comprehensive strategies for emissions reductions to attain increasingly stringent federal air quality standards.

- **Real-Time Air Advisory Network (RAAN).** The District launched RAAN in 2010 to provide the most accurate and timely information about local air quality. RAAN combines real-time, local air quality information with specific health recommendations to help schools, parents, and others make informed decisions about when outdoor activities should be limited and for whom.

- **Air Quality Index (AQI) and Daily Air Quality Forecasting.** An AQI is a color-coded designation for the day that projects the forecasted air quality and recommends corresponding activity modifications based on pollution levels.

- **Health-Risk Reduction Strategy (HRRS).** The District Governing Board adopted the HRRS to maximize public health improvements resulting from the District's attainment strategies and related initiatives. The HRRS works in parallel with the District's other strategies to minimize cumulative population exposure to air pollution and the corresponding regional health risk.

- **Air Alerts.** An Air Alert notifies Valley residents of ongoing conditions that may lead to a federal ozone standard exceedance. When the District calls an Air Alert, Valley residents and businesses are advised to reduce vehicle use to proactively reduce emissions and protect public health.

1.2.2 Additional Effects of Ozone

In addition to public health, ozone affects Valley ecosystems and crops. Ozone damages plant cells and deteriorates leaf tissue, which reduces the plants' ability to photosynthesize and produce their own food. Plants respond by growing more leaves, which depletes carbohydrates stored in roots and stems. This weakens plants and makes them susceptible to disease, pests, cold, and drought. Ozone also reduces agricultural yields for many economically important crops, such as grapes, soybeans and cotton, and damages the leaves of trees and other plants, marring the appearance of cities, national parks, forests, and recreational areas.[2]

Furthermore, ozone can cause substantial damage to a variety of materials such as rubber, plastics, fabrics, paint, and metals. Over time, ozone exposure progressively damages both the functional and aesthetic qualities of these types of materials and products. The resulting increases in maintenance, upkeep, and replacement of materials can accumulate to significant economic losses.

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. 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 for health-based standards starts as the Clean Air Scientific Advisory Committee (CASAC) analyzes available science. CASAC then suggests to EPA a range of revised standards that would protect public health from the adverse

[2] Journal of Experimental Botany. (October 2011). *How is Ozone Pollution Reducing Our Food Supply?* Retrieved from: http://jxb.oxfordjournals.org/content/early/2011/10/17/jxb.err317.full.pdf+html

effects of air pollution. CASAC consists of non-EPA experts in the fields of science, engineering, or the social sciences who are appointed by the EPA Administrator. The objective of the committee is to provide impartial, 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. EPA then proposes a standard and makes it available for public review and comments before promulgating the standard.

In evaluating and setting new air quality standards, federal law prohibits EPA from taking into account economic feasibility. However, economic feasibility issues may be considered as EPA promulgates its implementation rules.

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 ozone, 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. On May 21, 2012, EPA designated the Valley as an Extreme nonattainment area for the federal 2008 8-hour ozone standard, effective July 20, 2012.[3]

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
- 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 CAA §185 penalty fees.

[3]Air Quality Designations for the 2008 Ozone National Ambient Air Quality Standards, 77 Fed. Reg. 98, pp. 30088-30160. (2012, May 21). (to be codified 40 CFR Parts 50, 51, and 81) http://www.gpo.gov/fdsys/pkg/FR-2012-05-21/pdf/2012-11618.pdf

1.3.2 Federal Ozone Standards and Implementation

Table 1-2 summarizes EPA's ozone standards and the timing of attainment plans under those standards consistent with CAA requirements.

Table 1-2 Federal Air Quality Standards and Valley Status for Ozone

Federal Standard	Ozone Standards and Timelines			
	1979 1-hour	**1997 8-hour**	**2008 8-hour**	**2015 8-hour**
	124 ppb (1-hour average)	**84 ppb (8-hour average)**	**75 ppb (8-hour average)**	**70 ppb (8-hour average)**
1979–2003	EPA sets standard (1979)	EPA sets standard (1997)		
2004	SJV adopts attainment plan	EPA finalizes attainment designations and classifications		
2005	**EPA revokes standard**	EPA issues implementation rule		
2006	*Litigation reinstates portions of implementation requirements under the revoked standard*			
2007		SJV adopts *2007 Ozone Plan*		
2008			EPA sets standard	
2009				
2010	EPA approves SJV 2004 plan	Midcourse review		EPA proposes to revise standard to 60 or 70 ppb
2011	Ninth Circuit remands plan approval to EPA; EPA finds SJV failed to attain			EPA announces it will not revise the standard
2012	EPA finalizes withdrawal of approval of 2004 1-hour ozone plan. SJV plan withdrawn	EPA approves SJV's *2007 Ozone Plan*	EPA designates SJV as an Extreme nonattainment area	
2013	SJV adopts new 1-hour ozone plan		EPA proposes Implementation Rule	
2014	SJV submits attainment demonstration request based on 2011 – 2013 data	District/ARB revisits *2007 Ozone Plan*	RACT demonstration & Emission Inventory due to EPA	EPA proposes standard at 65-70ppm
2015	SJV submits second attainment demonstration request based on 2012 – 2014 data	**EPA revokes standard**	EPA finalizes Implementation Rule	EPA sets standard at 70ppm
2016	EPA proposes to approve 2013 1-hr Plan		SJV to adopt 8-hour ozone plan	*attainment plan timing tbd*
2017–2040		Final attainment deadline: 2024	Final attainment deadline: 2031	Estimated attainment deadline: 2037

EPA established the first ozone standard in 1979, setting this standard at 0.12 parts per million (ppm) over a 1-hour exposure or 124 parts per billion (ppb) when accounting for the adopted rounding conventions. An area meets the 1-hour ozone standard when, for each monitoring station, the 1-hour ozone levels do not exceed 124 ppb more than one day per year over any three-year period.[4] The CAA Amendments of 1990 established attainment planning requirements and attainment deadlines for the 1979 1-hour ozone standard, and the District subsequently adopted various 1-hour ozone plans and plan amendments. EPA revoked the 1-hour standard effective June 15, 2005,[5] maintaining that the 84 ppb 8-hour ozone standard adopted in 1997 was more health protective. In response, the District and other agencies nationwide shifted their ozone efforts to 8-hour ozone.

The District's *2007 Ozone Plan* demonstrates attainment of the 1997 8-hour ozone standard no later than the 2024 attainment deadline. EPA revoked the 1997 ozone standard for all purposes effective April 5, 2015.[6] However, because the District was designated nonattainment for the 1997 ozone standard at the time of revocation, the District is subject to an array of anti-backsliding requirements. As such, the District remains obligated to continue to implement the emissions controls as adopted in the *2007 Ozone Plan* in order to ensure that air quality does not get worse once the NAAQS is revoked.

In 2008, EPA revised its 8-hour ozone standard, lowering the standard to 75 ppb. EPA considered lowering the standard once again in 2010, but ultimately retained the 75 ppb standard. EPA designated the Valley as Extreme nonattainment of the 2008 8-hour ozone standard in 2012. This *2016 Ozone Plan*, for the 2008 standard is due on July 20, 2016, and the attainment date is December 31, 2031 using data from calendar years 2029, 2030, and 2031.

In 2015, EPA revised the 8-hour ozone standard again, lowering it from 75 ppb to 70 ppb. The estimated attainment deadline year is 2037 using data from calendar years 2035, 2036, and 2037.

Building on the District's *2007 Ozone Plan, 2008 PM2.5 Plan*, *2012 PM2.5 Plan, 2013 Plan for the Revoked 1-Hour Ozone Standard*, and *2015 PM2.5 Plan,* the District will continue to coordinate emission reduction strategies whenever possible to address multiple standards, to maximize efficiency for staff and stakeholders, and to maximize health benefits. Despite the complexity of overlapping standards and plans, efforts to reduce ozone precursors under one standard and plan will also help to meet ever-tightening ozone and particulate standards.

[4] National 1-Hour Primary and Secondary Ambient Air Quality Standards for Ozone, 40 C.F.R. §50.9 (2012)
[5] Air Quality Designations and Classifications for the 8-Hour Ozone National Ambient Air Quality Standards; Early Action Compact Areas with Deferred Effective Dates, 69 Fed. Reg. 84, pp. 23858–23951. (2004, April 30). (to be codified at 40 C.F.R. Part 81)
[6] Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements; Final Rule. 80 Fed. Reg. 44. pp. 12264-12319. (2015, March 6), (to be codified at 40 CFR Parts 50, 51, 52, et al.) (see p. 12287) http://www.gpo.gov/fdsys/pkg/FR-2015-03-06/pdf/2015-04012.pdf

The control measures adopted by the District and ARB in previous attainment plans are achieving significant reductions of ozone precursors. These measures and strategies will continue to achieve intended emissions reductions as they are implemented. These reductions have decreased both 1-hour ozone and 8-hour ozone concentrations. As a result, in 2015 the Valley experienced a record-setting clean ozone season, with the lowest number of exceedances of the 8-hr ozone standard of 75 ppb, lowest 8-hr ozone design value, and the third consecutive year with no violations of the 1-hr ozone standard. As a part of the positive trend in ozone air quality, the Valley is also on track to meet the federal 8-hour ozone standard of 84 ppb ahead of the projected 2023 attainment date included in the *2007 Ozone Plan*. With the ongoing improving trend in ozone air quality, EPA also recently approved the District's request for the 1-hour ozone clean data finding and has officially proposed to grant the San Joaquin Valley as attainment for the 1-hour ozone standard.

Furthermore, as the District continues to develop new attainment plans to address the latest federal ozone and PM2.5 standards in the coming year, significant additional emissions reductions are expected, particularly with respect to mobile sources under ARB and EPA jurisdiction that make up over 85% of remaining Valley emissions.

1.3.2.1 Implementation of the 2008 8-hour Ozone Standard

Once the federal government sets a standard, nonattainment areas are required to develop and adopt air quality attainment plans with commitments to reduce emissions and bring the area into attainment of the standard pursuant to CAA and EPA guidance documents. To develop a plan, these areas evaluate air quality data, emissions inventory data, and computer modeling results to determine the control measures (in the form of rules and non-regulatory programs) that are needed to meet the federal standards by the deadlines specified in the CAA. Control measure commitments in the plan are then implemented over a specified time to reduce emissions and improve public health.

During the plan development process, ARB conducts and funds air quality research; develops air quality models, emissions inventories, and statewide emission control measures and provides other plan development assistance to local air districts. Once nonattainment areas adopt their plans, ARB is responsible for preparing and submitting the California SIP to EPA. Following adoption, periodic plan revisions may be necessary to ensure reasonable further progress and to reflect the latest science and technology advancements. After an area's ambient air quality data meets the federal standard for three consecutive years, the area will request a finding of attainment.

This *2016 Ozone Plan* demonstrates that the Valley will attain the standard as expeditiously as practicable, no later than December 31, 2031. This requires another 207.7 tons per day in NOx reductions from stationary and mobile sources throughout the Valley. The measures identified in this plan do achieve the necessary reductions. The District could show expeditious attainment without the need to rely on "Black Box" provisions afforded under CAA §182(e)(5). Unfortunately, compliance with the contingency requirements under the federal Clean Air Act requires that the District hold

back on 1.6 tons per day of NOx reductions. To ensure that the plan is approvable with the necessary contingencies, the plan needs to include a "Black Box". The District however hopes that the state Air Resources Board or federal EPA can adopt and implement necessary strategies relating to mobile sources resulting in further reductions in emissions that could satisfy contingency requirements and avoid delays in attaining the standard expeditiously.

The attainment demonstration must be submitted by July 20, 2032, using the three year average data from calendar years 2029, 2030, and 2031.

1.4 CALIFORNIA STATE STANDARDS

California sets ambient air quality standards for several pollutants, including ozone. The California ambient air quality standards are considerably more stringent than the federal standards and are more protective of human health. California's 1-hour ozone standard is 90 ppb, and its 8-hour ozone standard has been established at 70 ppb since 2005.

Despite the more stringent California standards, California Health and Safety Code §39602 states, "Notwithstanding any other provision of this division, the state implementation plan shall only include those provisions necessary to meet the requirements of the [federal] CAA." Therefore, this *2016 Ozone Plan* focuses on demonstrating attainment with the federal NAAQS. While the federal standards provide the framework for SIPs, including this ozone plan, progress toward federal standards also brings areas closer to attainment of the lower, California standards.

1.5 PUBLIC PROCESS OF PLAN DEVELOPMENT

This *2016 Ozone Plan* was prepared through an involved public process that provided multiple opportunities for the public and interested stakeholders to offer suggestions and comments for improving and strengthening the plan (Table 1-3). The District initiated the public process for the *2016 Ozone Plan* in mid-2014. The public process included providing monthly updates at District Governing Board meetings, CAC meetings, and EJAG meetings. Each of these updates was accompanied by an opportunity for the public to provide comment, ask questions, or request additional information.

In addition, the District's Governing Board approved a public engagement initiative that outlined an extensive public process for the development of the *2016 Ozone Plan*. The public engagement initiative was designed in adherence with the following guiding principles:

1. Utilize effective means to get input from all affected stakeholders and subject matter experts in the design of the plan.
2. Provide for public engagement before each plan preparation milestone.
3. Provide routine updates to the public at large about the plan as it is developed.

4. Ensure efficiency and effectiveness by using existing infrastructure for public engagement.
5. Ensure process does not impede the District's ability to meet legally mandated deadlines and timeliness.

Under the guidance of the District Governing Board, the Executive Director/Air Pollution Control Officer (APCO) formed the Public Advisory Workgroup (PAW) ad hoc committee. The PAW committee members consisted of representatives from regulated entities (industry, farms, dairy families and municipalities), community advocates, and advisors from EPA and ARB. The PAW committee held numerous meetings which were also open to the public.

As part of the public process for developing this plan, the District also hosted a public workshop in May 2014 and two additional workshops in March 2016. These meetings provided opportunities for the public to provide verbal comments, and written comments have also been encouraged throughout development of this plan. These comments have been integral to the development of this plan, and have been incorporated as appropriate.

Table 1-3 *2016 Ozone Plan* Meetings

Date	Meeting Summary
5/23/2014	Public workshop to present and receive comments on the development of the upcoming plan for the 2008 8-hour ozone standard and public commenting
Mid-2014 through 2016	Monthly updates to the District's Governing Board, Citizen's Advisory Committee, and Environmental Justice Advisory Committee meetings
8/25/2015	PAW: Kick-off meeting – Discussed potential topics to be covered at PAW meetings throughout the plan development process, potential future meeting dates, expectations from both the District and the committee members moving forward.
9/30/2015	PAW: Emission Inventory Development in California – Discussed the emissions inventory development process, forecasting methodology, and spatial allocation including emissions gridding and model inventory development.
2/11/2015	PAW: Ozone SIP Modeling in the San Joaquin Valley – Discussed ozone SIP modeling process and the current San Joaquin Valley 8-hour ozone SIP.
3/22/2016	Public workshops (one workshop during business hours and one workshop in the evening) to present and receive comments on draft documents for the 2008 8-hour ozone standard
5/17/2016	Publication of the *Proposed 2016 Ozone Plan* on the District website and paper copies made available upon request for public review and comment, with an associated two week commenting period
6/16/2016	Public hearing for the adoption of the *Proposed 2016 Ozone Plan* with opportunities for public comment

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