Staff Report

ARB Review of San Joaquin Valley PM2.5 State Implementation Plan

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EXECUTIVE SUMMARY

This report provides ARB staff's assessment of the San Joaquin Valley Air Pollution Control District's (District) 2015 PM2.5 State Implementation Plan (2015 PM2.5 SIP) revision. The SIP revision was developed to address increased PM2.5 concentrations that occurred due to weather conditions associated with California's historic drought. These drought conditions have increased the challenge of meeting federal PM2.5 standards in the Valley, a region that already experiences the highest PM2.5 concentrations in the nation. While the Valley had attained the 24-hour standard and been nearing attainment of the annual standard[1] set in 1997, the impacts of the drought have increased PM2.5 levels to an extent that the Valley can no longer attain by the 2015 statutory deadline.

In 2008, the San Joaquin Valley adopted a SIP to meet the 1997 PM2.5 standards. The U.S Environmental Protection Agency (U.S. EPA) approved the SIP in 2011. The SIP control strategy focused on reducing directly emitted PM2.5, oxides of nitrogen (NOx), and oxides of sulfur (SOx). Through ongoing implementation of this control strategy, PM2.5 air quality in the Valley had been improving, with annual PM2.5 levels decreasing over 30 percent between 2001 and 2012. The Valley had met the 24-hour standard of 65 $\mu g/m^3$ in 2010, and by 2012 only a few sites remained above the annual standard of 15 $\mu g/m^3$. However, the stagnant weather conditions and persistent lack of rainfall associated with the drought substantially increased PM2.5 levels in 2013, impacting both 24-hour and annual average concentrations. These conditions pushed most sites in the central and southern Valley back over the annual standard, and increased 24-hour concentrations in several locations to at or near the 65 $\mu g/m^3$ standard.

Because the Valley can no longer feasibly attain the standards by 2015, the District has prepared an updated plan to demonstrate attainment by the most expeditious timeframe possible. This plan is designed to account for the potential that these adverse meteorological conditions may occur again in the future. The new attainment demonstration uses the approved modeling contained in the 2008 PM2.5 SIP, coupled with air quality data reflecting the impacts of the drought in 2013, and emission reductions expected through 2020, which will put the Valley on a path to meet these standards over the next five years.

The attainment demonstration includes the benefits of ARB and District control programs that provide significant ongoing emission reductions. Continued implementation of these control programs provides new emission reductions each year, resulting in a 38 percent decrease in NO_x emissions and an eight percent decrease in PM2.5 emissions between 2012 and 2020. NO_x reductions result from ongoing implementation of both new vehicle standards for passenger and heavy-duty diesel vehicles and equipment, rules accelerating the turnover of legacy diesel fleets, and District rules addressing stationary source NO_x emissions. PM2.5 emission reductions

[1] To protect against the adverse health impacts of exposure to PM2.5, U.S. EPA first set PM2.5 air quality standards in 1997, adopting an annual standard of 15 $\mu g/m^3$, and a 24-hour PM2.5 standard of 65 $\mu g/m^3$

are the result of ongoing implementation of diesel on- and off-road equipment measures as well as the District's recently strengthened rule for wood-burning fireplaces and heaters. These measures, along with additional reductions from enhancements to the District's commercial charbroiling rule slated for adoption in 2016 provide the necessary control strategy. As a result, the modeling demonstrates the Valley will be below the 24-hour standard by 2018, and attain the annual standard at all sites by 2020.

The 2015 PM2.5 SIP addresses the planning requirements specified under Subpart 4 of the Clean Air Act (Act) that allows for an attainment date extension to 2020. Under these provisions, the 2015 SIP includes a demonstration that most stringent measures are in place and that all commitments included in the 2008 SIP have been fulfilled. Additional Act requirements addressed in the 2015 SIP include reasonable further progress with corresponding milestones, transportation conformity and contingency measures.

In addition, because of the request for an attainment date extension, the SIP revision identifies a number of efforts to achieve further near-term emission reductions beyond those from the existing control programs. These efforts include a District commitment to provide targeted incentive funding for the purchase of cleaner heavy-duty trucks and woodstove replacements, and ARB actions for heavy-duty trucks that focus on cleaner combustion technologies, as well as introduction of zero and near-zero emission equipment. The District has also committed to evaluate the potential for further emission reductions from rules that address agricultural conservation management practices, flares, and hot mix asphalt.

Finally, under the Act, U.S. EPA is also required to periodically review air quality standards and the latest health science. Based on this assessment, U.S. EPA has further strengthened the PM2.5 standards, lowering the 24-hour standard to 35 $\mu g/m^3$ in 2006, and the annual standard to 12 $\mu g/m^3$ in 2012. New SIPs for these standards will be developed in 2016. The 2015 PM2.5 SIP revision lays out a course to provide for expeditious attainment of the 1997 standards by 2018 and 2020, and serves as a foundation for development of the 2016 SIP. The 2016 SIP will include a comprehensive assessment of the emission reductions and timeframe needed for attainment, and will identify further control measures. As part of this effort, ARB and District staff will also continue to closely monitor the ongoing drought, and its potential impacts on meeting the PM2.5 standards in the Valley.

I. OVERVIEW

Exposure to fine particulate matter (PM2.5) is associated with increased risk of hospitalization for lung and heart-related illnesses and premature mortality, especially in children, the elderly, and people with existing health problems. The Clean Air Act (Act) requires the U.S. Environmental Protection Agency (U.S. EPA) to establish national ambient air quality standards to protect public health and regularly update them to reflect new health information. U.S. EPA first established a PM2.5 standard in 1997, a 24-hour PM2.5 standard of 65 micrograms per cubic meter ($\mu g/m^3$) and an annual standard of 15 $\mu g/m^3$. Based on an extensive assessment and scientific review of the health impacts of PM2.5 pollution, the 24-hour PM2.5 standard was strengthened to 35 $\mu g/m^3$ in 2006 and the annual standard was strengthened to 12 $\mu g/m^3$ in 2012. Meeting these standards provides critical public health protection, especially in the San Joaquin Valley which experiences the highest PM2.5 levels in the nation.

In April 2008, the District adopted a State Implementation Plan (2008 PM2.5 SIP) that set out a strategy to attain the 1997 standards by April 2015. This SIP was approved by U.S. EPA in 2011. A SIP to meet the revised 24-hour standard of 35 $\mu g/m^3$ was adopted in late 2012, and the SIP for the revised annual standard of 12 $\mu g/m^3$ will be developed in 2016. Each SIP serves as a building block to ensure incremental progress toward successively more stringent standards over time.

Through ongoing implementation of the control strategy in the 2008 PM2.5 SIP, the Valley had met the 24-hour PM2.5 standard, and was nearing attainment of the annual standard. However, due to adverse weather conditions associated with California's severe drought, PM2.5 levels increased substantially in 2013, affecting both 24-hour and annual average concentrations. As a result, the San Joaquin Valley will not meet the 2015 attainment deadline approved by U.S. EPA. The District has therefore adopted a SIP revision that demonstrates that the emission reductions that will occur over the next five years will place the Valley on a path towards expeditious attainment of the 1997 standards by 2020. The following sections provide an overview of the nature of the PM2.5 challenge in the San Joaquin Valley, the impacts of the drought, and the planning requirements associated with development of a new SIP to address these challenges.

A. Nature of PM2.5 Air Quality in the Valley

PM2.5 is a complex mixture of many different species generated from a wide array of emission sources. PM2.5 may be emitted directly into the air in the form of soot, smoke, or dust, or can be formed in the atmosphere as secondary particles from the reactions of precursor gases, including NOx, SOx, volatile organic compounds (VOC), and ammonia. The relative mixture of these constituents in a region drives the nature of the needed control strategy.

The San Joaquin Valley, encompassing 25,000 square miles in the central portion of California, is characterized by unique topography and meteorology. Together with the

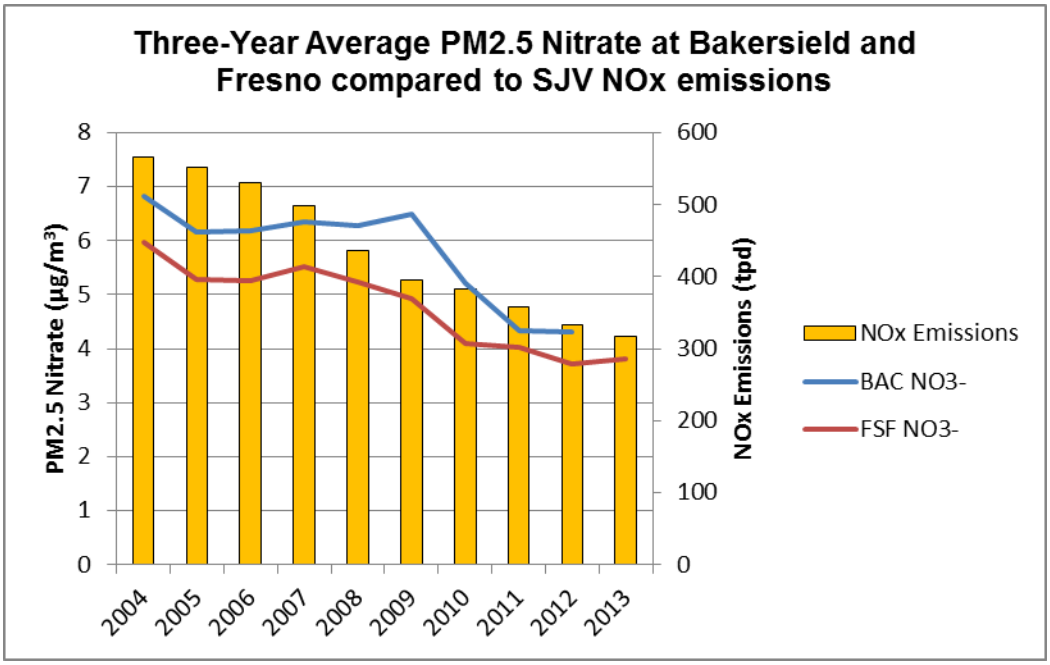
Valley's topography, the inversion-prone meteorology of the region restricts airflow and favors the accumulation of pollutants. Valley weather patterns are typically characterized by dry summers with moist winter months, which often include periods of heavy fog.

PM2.5 concentrations in the Valley exhibit a strong seasonal pattern, with the highest concentrations between November and February during extended periods of stagnant weather. These conditions are conducive to the buildup of PM2.5 over multiple days, as well as the formation of secondary ammonium nitrate. Episodic activities such as seasonal wood burning also add to the pollution burden during the winter. These elevated wintertime concentrations in turn drive annual average levels. PM2.5 concentrations are higher in the central and southern portions of the Valley, with highest values recorded in the urban areas of Fresno and Bakersfield.

The results of extensive research studies and comprehensive air quality modeling have been used to understand the types of sources contributing to PM2.5 and quantify the relative effectiveness of reducing each PM2.5 precursor. Organic and elemental carbon and ammonium nitrate are the largest contributors to both 24-hour and annual average concentrations in the Valley, accounting for approximately 70 to 90 percent of the total mass. The major sources of organic and elemental carbon in the Valley are mobile sources, residential wood burning, and commercial cooking. Modeling efforts have demonstrated directly emitted PM2.5 emission reductions provide significant benefit in reducing ambient PM2.5 concentrations, with organic and elemental carbon concentrations decreasing between 15 and 30 percent between 2004 and 2012.

Ammonium nitrate is formed in the atmosphere from chemical reactions of NOx, VOCs, and ammonia. It is therefore important to understand which precursor controls are most effective in reducing ammonium nitrate concentrations. Evaluation of both emissions inventory and monitoring data suggest that in the Valley's ammonia-rich conditions, NOx, rather than ammonia controls are more effective in reducing PM2.5 concentrations. This strong linkage between NOx emission reductions and decreases in ammonium nitrate concentrations is illustrated in Figure 1 for the Bakersfield and Fresno monitoring sites. Between 2004 and 2012, Valleywide NOx emissions were reduced approximately 40 percent, with a commensurate reduction in ammonium nitrate concentrations.

Figure 1. NOx Emissions vs Ammonium Nitrate Trends at Bakersfield and Fresno



In addition, air quality modeling has shown that while large reductions in NOx lead to similar reductions in ammonium nitrate, comparable reductions in ammonia are much less effective. During the winter months, reductions in NOx are approximately an order of magnitude more effective than reductions in ammonia on a per ton basis, with an even greater differential on an annual average basis. Finally, air quality modeling has indicated that VOC emission reductions produce no PM2.5 benefit.

Based on this understanding of the nature of PM2.5 in the Valley, the SIP control strategy has focused on reducing directly emitted PM2.5, NOx, and SOx emissions. Through ongoing implementation of this multi-pollutant control approach, the Valley was making substantial progress towards attainment of the 1997 standards. Between 2001 and 2012, 24-hour concentrations had decreased almost 40 percent, and annual concentrations had decreased over 30 percent. As a result, the Valley had attained the 24-hour standard of 65 µg/m^3 in 2010, and by 2012, only a few sites remained over the annual standard of 15 µg/m^3. Further discussion of the nature of PM2.5 air quality in the Valley, precursor effectiveness, and air quality progress is provided in Appendix A.

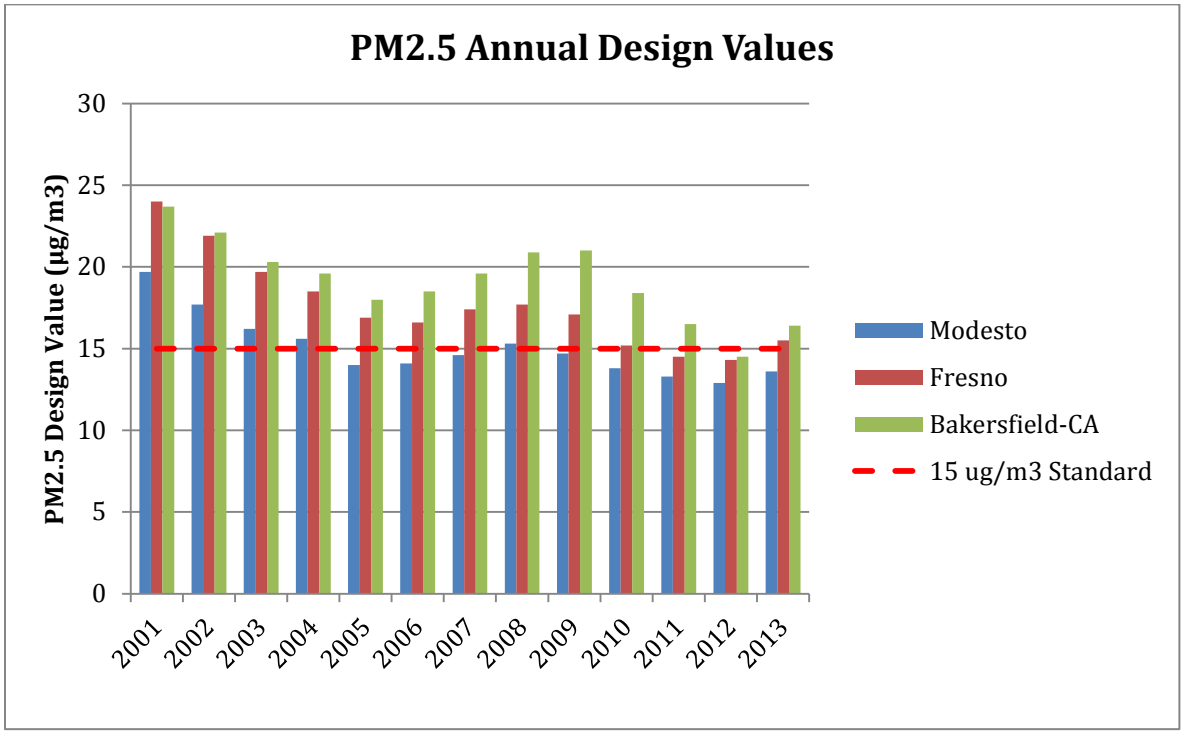
B. Impact of Drought on PM2.5 Attainment

Beginning in 2013, persistently high atmospheric pressure over the northeastern Pacific Ocean prevented winter storms from reaching the west coast, resulting in severe drought conditions in California. The stagnant weather conditions and lack of rainfall during the winter of 2013/14 drove an increase in PM2.5 levels in all three regions of the Valley. Due to nearly two months without rainfall, a majority of days during December 2013 and January 2014 recorded PM2.5 concentrations greater than the 35 µg/m^3 24-

hour standard, a nearly threefold increase over the prior winter. These elevated wintertime concentrations affected both 24-hour and annual average design values, especially in the central and southern Valley.

Figure 2 illustrates the trend in annual PM2.5 design values at three sites representing the northern, central, and southern portions of the Valley. Design values are used for SIP planning purposes, and are calculated as a three-year average. While annual PM2.5 concentrations have been decreasing over time, Figure 2 highlights the considerable year-to-year variability that occurs in the Valley. Catastrophic wildfires that occurred throughout northern California in 2008 for example affected design values for 2008-2010.

Figure 2. Valley PM2.5 Annual Design Value Trends



Due to the weather conditions associated with the drought, from 2012 to 2013, design values increased up to 15 percent at Valley locations. While sites in the northern Valley remained below the standard, most sites in the central and southern Valley were pushed back over the annual standard, and 24-hour design values at several locations increased to at or near the 65 µg/m^3 standard. The impact of large-scale events such as wildfires and the drought underscore the challenge of meeting PM2.5 standards in the Valley.

C. New Planning Process Requirements

In light of a recent court decision, U.S. EPA has begun implementing PM2.5 standards under the particulate matter specific provisions of Subpart 4 of the Act. Subpart 4 establishes a step wise process for PM2.5 planning. All PM2.5 nonattainment areas are initially classified as moderate. Nonattainment areas that cannot demonstrate attainment by the moderate area attainment deadline can request a reclassification to serious. Finally, if needed, a serious area can request a five year extension if they have met all of their moderate and serious SIP obligations, along with a demonstration the SIP includes the most stringent measures available or in practice in any other state.

In light of the new classification requirements under Subpart 4, as a first step U.S. EPA classified all areas as moderate on June 2, 2014. However, as a result of the increase in PM2.5 concentrations in 2013, the San Joaquin Valley will be unable to attain the 1997 PM2.5 standards by the initial moderate area attainment deadline of April 5, 2015. On September 25, 2014, the District requested a serious area classification with a December 31, 2015 attainment date. On March 27, 2015, U.S. EPA formally classified the Valley as a serious nonattainment area and provided the option to request a further attainment date extension of up to five years.

The District has developed the 2015 PM2.5 SIP for the 1997 standards to address the serious area SIP requirements along with a request for the further attainment date extension. The 2015 PM2.5 SIP addresses the following SIP requirements associated with serious area requirements and the further attainment date extension:

- Demonstrate the impracticability of the Valley attaining by the serious area deadline of December 31, 2015;
- Request a serious area attainment deadline extension to December 31, 2020;
- Attain the PM2.5 standards as expeditiously as practicable;
- Include Best Available Control Measures/Best Available Control Technology (BACM/BACT) for serious areas;
- Include Most Stringent Measures (MSM) associated with an attainment deadline extension request;

II. ATTAINMENT DEMONSTRATION

ARB and District staff have prepared an updated attainment demonstration that provides for expeditious attainment of the standards and which is designed to account for adverse meteorological conditions associated with the drought should they occur again in the future. The new attainment demonstration uses the fundamental chemistry and associated response of different PM2.5 constituents to emission controls reflected in the approved modeling in the 2008 PM2.5 SIP. This modeling science is coupled

with 2013 design values and PM2.5 chemical composition reflecting drought impacts, along with emission reductions expected through 2018 (attainment for the 24-hour standard) and 2020 (attainment for the annual standard).

The attainment demonstration includes the benefits of ARB and District control programs that provide ongoing emission reductions. Continued implementation of these control programs provides new emission reductions each year, resulting in a forecasted 38 percent decrease in NOx emissions and an eight percent decrease in PM2.5 emissions between 2012 and 2020. These measures, along with additional reductions from enhancements to the District's commercial charbroiling rule slated for adoption in 2016 provide the necessary control strategy. As a result, the modeling demonstrates the Valley will be well below the 24-hour standard by 2018, and attain the annual standard at all sites by 2020.

A. Modeling Methodology

The attainment demonstration approach for the current SIP is based on modeling conducted for the 2008 PM2.5 SIP, which addressed both the annual and 24-hour PM2.5 standards. The atmospheric dynamics and associated response to emission reductions represented in this modeling, coupled with 2013 design values and chemical composition, was used to project future (2020 for the annual standard and 2018 for the 24-hour standard) design values. Photochemical modeling for the 2008 PM2.5 SIP was conducted following the U.S. EPA guidance (2007 U.S. EPA)[2] and was approved by U.S. EPA in 2011 (76 FR 69896, 76 FR 41338).

To assess the representativeness of the 2008 PM2.5 SIP modeling in relationship to the 2013/2014 meteorological conditions, ARB staff evaluated both the meteorological characteristics, as well as the chemical composition used in the modeling effort. The types of meteorological conditions conducive to PM2.5 formation in 2013/14 were similar to the 2000/01 meteorological conditions simulated in the 2008 PM2.5 SIP. In addition, the PM2.5 chemical composition used in the 2008 PM2.5 SIP modeling was very similar to 2013, indicating common atmospheric chemistry regimes. Therefore, the 2008 PM2.5 SIP modeling response to emission reductions, applied to 2013 design values reflecting the enhanced frequency of PM2.5 conducive conditions that occurred in 2013, provides a suitable basis for the updated attainment demonstration. Additional information on the modeling methodology is provided in Appendix F of the 2015 PM2.5 SIP.

[2] U.S. EPA, 2007, Guidance on the Use of Models and Other Analyses for Demonstrating Attainment of Air Quality Goals for Ozone, PM2.5, and Regional Haze, EPA-454/B07-002.

B. Attainment Emission Levels

Tables 1 and 2 list the Valley-wide emissions levels used in the annual and 24-hour PM2.5 attainment demonstrations, respectively. Baseline emission levels reflect the implementation of adopted ARB and District control measures. Three additional District rules that were adopted subsequent to the preparation of the baseline inventory plus one new commitment provide the remaining emissions reductions needed to reach the attainment targets.

Table 1. Annual Average Attainment Level Emissions in tons per day (tpd)

Emission Inventory	**2020 Annual Average Emissions (tpd)**		
	PM2.5	**NOx**	**SOx**
Baseline Emissions	62.8	206.9	7.8
Emission Reductions from District Control Measures			
• Rule 4901 Wood Burning Fireplaces and Wood Burning Heaters (Adopted)	1.6	0.0	0.0
• Rule 4905 Natural Gas-Fired, Fan-Type Residential Central Furnaces (Adopted)	0.0	0.4	0.0
• Rule 4308 Boilers, Steam Generators, and Process Heaters 0.075 to <2 MMBtu/hr (Adopted)	0.0	0.0011	0.0
• Rule 4692 Commercial Charbroiling (Commitment)	0.4	0.0	0.0
Attainment Emission Levels	60.8	206.5	7.8

Table 2. Winter Average Attainment Level Emissions in tpd

Emission Inventory	**2018 Winter Average Emissions (tpd)**		
	PM2.5	**NOx**	**SOx**
Baseline Emissions	57.7	213.9	7.6
Emission Reductions from District Control Measures			
• Rule 4901 Wood Burning Fireplaces and Wood Burning Heaters (Adopted)	2.9	0.0	0.0
• Rule 4905 Natural Gas-Fired, Fan-Type Residential Central Furnaces (Adopted)	0.0	0.2	0.0
• Rule 4308 Boilers, Steam Generators, and Process Heaters 0.075 to <2 MMBtu/hr (Adopted)	0.0	0.0007	0.0
• Rule 4692 Commercial Charbroiling (Commitment)	0.4	0.0	0.0
Attainment Emission Levels	54.4	213.7	7.6

C. Results

Results of the attainment demonstration modeling are provided in Tables 3 and 4. All sites in the SJV recorded 2013 design values at or below the 24-hour standard of 65 µg/m^3. Eight of the fifteen sites in the SJV recorded 2013 design values over the annual PM2.5 standard of 15 µg/m^3. The higher design values occurred in the Valley's southern region (including the Bakersfield and Visalia) and the central region (around the Fresno urban area and Madera). Only one site in the northern region (Turlock) measured a 2013 annual design value over the standard.

The attainment demonstration modeling indicates that 2018 24-hour design values will range between 24 µg/m^3 and 52 µg/m^3, well below the 65 µg/m^3 standard. Further, by 2020 all sites in the Valley are projected to attain the annual standard. For those sites that exceeded the standard in 2013, the projected 2020 annual design values range from 12.5 µg/m^3 to 15.0 µg/m^3.

Table 3. Modeled 2018 24-hour PM2.5 Design Values

Monitoring Site	2013 24-hour Design Value (µg/m^3)	2018 24-hour Design Value (µg/m^3)
Bakersfield - California Street	64.6	51.6
Bakersfield - 410 E Planz	55.8	44.9
Clovis - N Villa Avenue	57.6	45.3
Fresno - 1st Street/Garland	62.0	49.3
Fresno - Hamilton and Winer	63.5	50.3
Hanford-S Irwin Street (Visalia)	60.2	45.8
Madera	52.3	41.4
Manteca-530 Fishback Rd	36.7	32.1
Merced - 2334 M Street	49.2	40.3
Merced – S Coffee Ave	41.8	34.8
Modesto - 14th Street	50.6	42.2
Stockton - Hazelton Street	45.0	39.0
Tranquility	30.0	23.9
Turlock-S Minaret Street	52.7	43.8
Visalia - N Church Street	55.7	42.5

Table 4. Modeled 2020 Annual PM2.5 Design Values

Monitoring Site	2013 Annual Design Value (μg/m^3)	2020 Annual Design Value (μg/m^3)
Bakersfield - California Street	16.4	13.7
Bakersfield - 410 E Planz	17.0	14.3
Clovis - N Villa Avenue	16.4	13.3
Fresno - 1st Street/Garland	15.4	12.5
Fresno - Hamilton and Winery	14.7	12.0
Hanford-S Irwin Street (Visalia)	17.0	13.9
Madera	18.1	15.0
Manteca-530 Fishback Rd	10.2	8.7
Merced - 2334 M Street	11.1	9.2
Merced – S Coffee Ave	13.3	11.0
Modesto - 14th Street	13.6	11.5
Stockton - Hazelton Street	13.8	12.0
Tranquility	7.9	6.6
Turlock-S Minaret Street	15.7	13.2
Visalia - N Church Street	16.6	13.5

D. Weight of Evidence Analysis

U.S. EPA's modeling guidance requires that the modeled attainment demonstration be accompanied by a weight of evidence analysis to provide a set of complementary analyses. Examining an air quality problem in a variety of ways provides a more informed basis for the attainment strategy as well as a better understanding of the overall problem and the level and mix of emissions controls needed for attainment. Appendix A provides the weight of evidence analysis prepared by ARB staff.

Following U.S. EPA guidance, this includes assessment of trends in air quality and emissions, source-receptor models and other diagnostic analyses, additional modeling evaluations, and description of a conceptual model of PM2.5 in the Valley. The weight of evidence analysis draws upon the wealth of data collected in the Valley over the years, both from the routine monitoring network, as well as special studies. This assessment demonstrated the ongoing effectiveness of reductions in NOx and directly emitted PM2.5 in reducing PM2.5 in the Valley. The substantial continuing reductions that will result from implementation of the ongoing control program are consistent with past progress, and the results predicted in the modeled attainment demonstration.

E. Consideration of 2014 Air Quality

The drought-related meteorological conditions that affected PM2.5 concentrations in the San Joaquin Valley during 2013 continued into 2014. Although complete data for 2014 is not yet available, this section provides a preliminary assessment of 2014 air quality data in relation to the attainment demonstration.

Despite the ongoing persistence of the drought, air quality conditions in 2014 generally improved at most locations, particularly in the northern and central portions of the Valley. This is an indication that although drought conditions are continuing, progress is resuming as a result of ongoing emission reductions. However, because 2014 design values will reflect the impact of multiple years of drought, a comparison to the 2013 design values used in the attainment demonstration is expected to be mixed, with some locations recording design values that are slightly lower, and other locations recording design values that are slightly higher. Based on an assessment of the PM2.5 levels predicted for 2020 as well as ongoing trends and analyses, consideration of 2014 design values is expected to remain consistent with the current attainment demonstration. However, ARB and the District will continue to monitor the impacts of the drought and its relationship to future PM2.5 attainment needs.

III. CONTROL STRATEGY

Attainment of the PM2.5 standard in the Valley will require the combined efforts of ARB, federal, and District control programs. The following sections highlight ARB's ongoing control programs and District control measures that provide the emission reductions included in the attainment demonstration.

A. State Mobile Source Control Program

California has a long history of developing and implementing regulations to reduce emissions from on-road and off-road sources, which has resulted in the strongest mobile source control program in the nation. Several key recent regulatory efforts include the Advanced Clean Cars (ACC) program, the Cleaner In-Use Heavy-Duty Truck Regulation, and the Off-Road Regulation. Together, these programs are providing significant reductions in NOx and diesel particulate matter through 2020 and beyond.

The ACC program, approved in January 2012, is a suite of regulations that addresses both ambient air quality needs and climate change goals. The ACC program combines the control of smog and PM2.5 causing pollutants, and greenhouse gas emissions, into a package of requirements for passenger car model years 2015 through 2025. In 2025, cars under the ACC program will emit 75 percent less smog-forming pollution than the average new car sold in 2012.

The Truck and Bus Regulation addresses the need to reduce emissions from older, high-emitting, heavy-duty trucks with long service lives. The regulation represents a multi-year effort to turn over the legacy fleet of engines and replace them with the cleanest technology available. Starting in 2012, the Truck and Bus Regulation phases in requirements so that by 2014, nearly all vehicles operating in California will have PM emission controls, and by 2023 nearly all vehicles will meet 2010 model year engine emissions levels.

The Off-Road Regulation is designed to accelerate the penetration of the cleanest equipment into California's fleets and significantly reduce emissions of diesel particulate matter and NOx from the over 150,000 in-use off-road diesel vehicles that operate in California by requiring their owners to modernize their fleets and install exhaust retrofits. The regulation affects dozens of vehicle types used in thousands of fleets by requiring owners to modernize their fleets by replacing older engines or vehicles with newer, cleaner models, retiring older vehicles or using them less often, or by applying retrofit exhaust controls.

B. District Control Program

Comprehensive stationary and area source controls adopted by the District provide additional emission reductions that are an important element of the attainment strategy. Recent District rules are highlighted in Table 5. Compliance dates for these measures are intended to provide early emission reductions.

In 2014, the District strengthened the residential wood burning curtailment program under Rule 4901. Per rule requirements, the District prohibits use of wood-burning heaters and wood burning fireplaces when PM2.5 air quality is forecast to be above 20 $\mu g/m^3$. The District Burn Cleaner incentive program combined with the tiered compliance threshold in the rule allows additional burn days for District registered U.S. EPA certified devices (up to forecasted PM2.5 level of 65 $\mu g/m^3$) to encourage the change-out of high-polluting devices and open-hearth fireplaces to cleaner devices.

Other District rules reduce NOx emissions from residential central furnaces; boilers, steam generators and process heaters; glass melting furnaces; internal combustion engines; stationary gas turbines; residential water heaters; school bus fleets; and employer-based trip reduction. The glass melting furnaces rule also reduces SOx and PM2.5.

Finally, in 2016 the District is scheduled to expand the scope of Rule 4692 for commercial charbroiling to include under-fired charbroilers, with an expected 2017 compliance date. Research and demonstration projects evaluating the applicability of control technologies are currently underway.

C. Incentive Programs

In addition to these regulatory efforts, ARB and the District implement incentive programs that invest significant amounts of funding to accelerate the purchase of cleaner technologies beyond those achieved by regulations alone. Combined, California's incentive programs have provided hundreds of millions of dollars dedicated to reducing emissions from both on- and off-road vehicles and equipment. Two of the largest programs are the Proposition 1B (Prop 1B): Goods Movement Emission Reduction Program, and the Carl Moyer Memorial Air Quality Standards Attainment Program (Moyer). Eligible projects span the mobile source sector, and include cleaner on-road and off-road vehicles and equipment, marine, locomotive, lawn and garden, light-duty passenger vehicles, and agricultural equipment. The District also derives

additional funding for incentive programs from Motor Vehicle Surcharge Fees, the District's Indirect Source Rule, and Voluntary Emission Reduction Agreements. In the 2014/2015 fiscal year budget, the District authorized $156 million in incentive funding from local, State, and federal funding sources.

Table 5. Recently Adopted District Rules.

Rule #	Adopted District Rule	Adoption/ Amendment Date	Compliance Date
4707	Boilers, Steam Generators, and Process Heaters - 2.0 MMBtu/hr to 5.0 MMBtu/hr	5/19/11	Final 2015
4308	Boilers, Steam Generators, and Process Heaters – 0.075 MMBtu/hr to less than 2.0 MMBtu/hr	11/14/13	Initial 2015
4311	Flares	6/18/09	Full 2017
4320	Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters Greater than 5.0 MMBtu/hr	10/16/08	Final 2014
4354	Glass Melting Furnaces	5/19/11	Final 2014
4702	Internal Combustion Engines	8/18/11	
4703	Stationary Gas Turbines	9/20/07	Full 2012
4901	Wood Burning Fireplaces and Woodburning Heaters	9/18/14	Start 2014
4902	Residential Water Heaters	3/19/09	2010-2012
4905	Natural Gas-Fired, Fan-Type Central Furnaces	1/22/15	2015 – 2018 Full 2036
9310	School Bus Fleets (Diesel -- meet ARB and EPA emission standards)	9/21/06	2016
9410	Employer-based Trip Reduction	12/17/09	2010-2015

D. Further Near-Term Emission Reductions

As discussed in the Overview section, in response to the increasing body of evidence regarding the adverse impacts of exposure to PM2.5, U.S. EPA has further strengthened the PM2.5 standards, lowering the 24-hour standard to 35 $\mu g/m^3$ in 2006, and the annual standard to 12 $\mu g/m^3$ in 2012. New SIPs for these standards will be developed in 2016, as well as for the revised 8-hour ozone standard of 75 parts per billion. These SIPs will include a comprehensive assessment of the reductions and timeframe necessary for attainment of the more health protective standards. However, in light of the request for an attainment date extension, as well as the need to continue

to accelerate progress towards attainment of all of the standards, the 2015 PM2.5 SIP identifies a number of efforts to achieve further near-term emission reductions.

1. District Commitments for Further Emission Reductions

As part of the 2015 PM2.5 SIP, the District has committed to providing targeted incentive funding for two key categories - heavy-duty trucks and woodstoves. This includes a commitment to allocate $10 million between 2016 and 2020 for the replacement of heavy-duty trucks in the Valley, achieving additional NOx and PM2.5 emission reductions. The District also commits to allocating $7.5 million for the replacement of old high polluting wood burning devices between 2016 and 2020 to achieve additional PM2.5 emission reductions. In addition, the District has committed to evaluate the potential for further emission reductions from rules that address conservation management practices, flares, and hot mix asphalt. The District commits to conduct the evaluations described below and to include any identified additional actions for reducing emissions and implementation schedules in the 2016 SIP for the revised annual PM2.5 standard.

a) Rule 4311—Flares

The District commits to undertaking a comprehensive review of flare minimization plans submitted under Rule 4311. The District intends to conduct the evaluation and have a draft report available for public review and comment by December 01, 2015. After addressing public comments, the District commits to finalize this report by March 31, 2016.

b) Warm Mix Asphalt

The District commits to a number of actions to evaluate and promote the use of warm mix asphalt in the Valley. The District intends to conduct the evaluation and have a draft report available for public review and comment by December 01, 2015. After addressing public comments, the District commits to finalize this report by March 31, 2016.

c) Rule 4550—Conservation Management Practices

The District commits to conduct an evaluation of Rule 4550 and have a draft report available for public review and comment by May 31, 2016. After addressing public comments, the District commits to finalize this report by October 31, 2016.

2. ARB Actions for Emission Reductions from the Truck Sector

Ongoing NOx and diesel PM reductions from mobile sources are a key focus of the control strategy to bring the San Joaquin Valley into attainment of federal PM2.5 standards. Within the mobile source sector, heavy-duty trucks represent the largest source of both NOx and diesel PM emissions in the Valley. Recognizing the critical need to continue to clean up the heavy-duty diesel fleet, ARB is taking a number of

additional actions to further reduce emissions and provide ongoing benefits in the Valley. These efforts are outlined in the recently released sustainable freight report which sets out ARB's vision for a clean freight system, together with the immediate and near-term steps that ARB will take to support use of zero and near-zero emission technology. These ARB actions related to the heavy-duty truck sector provide additional emission reductions in the Valley and ensure progress towards attainment of the PM2.5 standards. Further description of the proposed actions is provided below.

California's Truck and Bus Regulation targeting emission reductions from the nearly one million existing diesel trucks and buses that operate on California roads each year is one of the most important components of ARB's program to reduce emissions from diesel vehicles. This comprehensive program is intended to significantly reduce emissions from existing diesel vehicles throughout the State through a mix of exhaust and vehicle retrofits and vehicle turnover to the cleanest technologies. Over the next five years implementation of the Truck and Bus Regulation will reduce NOx emissions by 34 percent, and diesel PM emissions by 78 percent, with 2020 emission reductions of 17.6 tpd of NOx and 1.7 tpd of PM2.5.

As part of ARB's sustainable freight report, ARB has identified a number of immediate actions to continue to reduce emissions and health risk from heavy-duty trucks. These include focused enforcement efforts related to compliance with the Truck and Bus Regulation, as well as opportunities to leverage resources by utilizing agreements with local air districts. Other near-term efforts proposed focus on cleaner combustion technologies, as well as introduction of zero and near-zero emission equipment. These include development of strategies to ensure durability and in-use performance. These efforts will focus on enhanced truck inspection and maintenance programs, new certification and warranty requirements, and provisions to ensure proper repairs are conducted. Strategies will also be developed to increase the flexibility for manufacturers to certify advanced truck engines and vehicle systems to provide for accelerated introduction of cleaner new technologies into the market.

Incentive programs also play an important role in achieving additional emission reductions from the current on-road fleet beyond current regulatory requirements, as well as transitioning from current technologies to zero and near-zero technologies. Because trucks used in the agricultural industry are an important sector in the Valley, ARB proposes to partner with the Valley Air District to focus investments for agricultural trucks to accelerate turn over to cleaner engines. ARB's Air Quality Improvement Program (AQIP) and Low Carbon Transportation Investments are additional incentive programs that are designed to support the development and commercialization of advanced technologies. Statewide, more than $220 million has been allocated for fiscal years 2014/2015 and 2015/2016 projects. As part of these programs ARB will pursue opportunities to focus Valley funding on projects related to traditional Hybrid and Zero-Emission Truck and Bus Voucher Incentive Projects, zero-emission truck and bus pilot projects, and advanced technology freight demonstration projects.

IV. CLEAN AIR ACT REQUIREMENTS

In addition to the elements related to the attainment demonstration, the Act also requires SIPs for serious PM2.5 nonattainment areas requesting an attainment date extension to address the following requirements:

- Demonstration that the State complied with all requirements and commitments pertaining to the area in the SIP;

- Provisions to assure that the best available control measures/best available control technology (BACM/BACT) for the control of PM2.5 and PM2.5 precursors be implemented no later than four years after area reclassification to serious;

- The SIP includes the most stringent measures (MSM) that are included in the implementation plan of any state or are achieved in practice in any state, and can feasibly be implemented in the area;

- Base year emission inventories and future year forecasts for manmade sources of PM2.5 and PM2.5 precursors;

- Plan provisions that require reasonable further progress (RFP) and quantitative milestones;

- Provisions for sufficient contingency measures for RFP and attainment; and

- Transportation conformity emission budgets to ensure transportation plans and projects are consistent with the SIP.

A. Demonstration SIP Commitments have been Met

The 2008 PM2.5 SIP contained an overarching enforceable commitment to reach the level of emissions specified in the attainment demonstration. The attainment emission targets specified in this commitment are achieved through the following elements of the ARB and District control strategy:

- Ongoing emission reductions that occur each year as the result of implementation of already adopted measures;
- A commitment to propose a specified list of new measures by specified deadlines; and
- A commitment to achieve an aggregate tonnage of emission reductions from new ARB and District measures necessary to reach the attainment targets.

These three elements are not independent of each other, but rather are the combination of integrated actions required to meet the attainment emission targets. Further, the aggregate reductions can be achieved by new measures as described in the SIP, alternative measures identified by ARB and the District, and incentive program emission

reductions from the replacement or retrofit of aging, higher polluting pieces of equipment.

Subsequent to the adoption of the 2008 PM2.5 SIP, both ARB and the District engaged in comprehensive rulemaking efforts to implement the SIP commitments. These rulemaking efforts are developed through a public process that involve public notices, public comment opportunities, and with proposed and final rules published on agency web sites. Once regulations are submitted to U.S. EPA, they act on the measure through notice-and-comment rulemakings.

By the time U.S. EPA approved the 2008 PM2.5 SIP in 2011, both ARB and the District had acted on the majority of measures included in the SIP, and U.S. EPA had approved many of these regulations and programs and credited the emission reductions toward meeting the aggregate commitment. Table 6 summarizes the ARB and District emission reduction commitments, as well as the reductions that U.S. EPA had already credited at the time of SIP approval. As can be seen in the table, the District had already exceeded the amount of NOx and SOx reductions needed, and ARB had achieved almost all of the needed PM2.5 reductions. U.S. EPA approval of these emission reductions is documented in the Federal Register notice and associated Technical Support Document (76 FR 41338; 76 FR 69896).

Table 6. 2011 U.S. EPA SIP Approval of ARB and District Commitments

	NOx	PM2.5	SOx
District Commitment	9.0	6.7	0.9
EPA Credited	11.1	4.2	3.6
ARB Commitment	17.1	2.3	0.0
EPA Credited	2.1	1.8	0.0

Subsequent to approval of the SIP in 2011, ARB and the District have continued to achieve further enforceable emission reductions that are creditable towards meeting the aggregate commitment. As a result, both ARB and the District have taken action on all of the control measures proposals contained in the 2008 PM2.5 SIP, and have achieved the aggregate emission reductions necessary to reach the attainment emission targets.

Tables 7 and 8 document the actions taken for each of the ARB and District measures along with the original expected action dates committed in the 2008 PM2.5 SIP . In addition to new ARB control measures, State actions also include measures from the Bureau of Automotive Repair (BAR) and the Department of Pesticide Regulation (DPR).

Table 7. 2008 PM2.5 SIP District Control Measures

Proposed New Control Measure	Expected Action	District Action
4103 – Open Burning	2010	April 2010
4320 – Advanced Emission Reductions for Boilers, Steam Generators and Process Heaters (> 5 MMBtu/hr)	2008	October 2008
4307 – Boilers, Steam Generators and Process Heaters (2 to 5 MMBtu/hr)	2008	October 2008 and May 2011
4308 – Boilers, Steam Generators and Process Heaters (0.075 to < 2 MMBtu/hr)	2009	December 2009
4703 – Stationary Gas Turbines	2007	September 2007
4702 – Reciprocating Internal Combustion Engines	2010	August 2011
4354 – Glass Melting Furnaces	2008	October 2008 and May 2011
4902 – Residential Water Heaters	2009	March 2009
4905 – Natural gas-Fired, Fan Type Residential Central Furnaces	2014	January 2015
4901 – Wood Burning Fireplaces and Wood Burning Heaters	2009	October 2008, and September 2014
4692 – Commercial Charbroiling	2009	September 2009
4311 –Flares	2009	June 2009
9410 – Employer Based Trip Reduction Program	2009	December 2009
Further Action		
4352 – Solid Fired Boilers, Steam Generators and Process Heaters	--	December 2011

Table 8. 2008 PM2.5 SIP State Control Measures

Proposed New Control Measure	Expected Action	Agency Action
Smog Check Improvements (BAR)	2007-2009	May 28, 2009 – adopted amendments
		August 23, 2012 – adopted amendments
Expanded Vehicle Retirement (AB 118) (ARB/BAR)	2007	June 26, 2009 – adopted regulation
Modifications to Reformulated Gasoline Program (ARB)	2007	June 14, 2007 – adopted amendments
		October 21, 2011 – adopted amendments
Cleaner In-Use Heavy-Duty Trucks (ARB)	2007, 2008, 2010	December 12, 2008 – adopted regulation
		December 17, 2010 – adopted amendments
Auxiliary Ship Engine Cold Ironing & Other Clean Tech (EPA/ARB/BAR)	2007-2008	December 2007 – approved regulation
Cleaner Main Ship Engines and Fuel (EPA/ARB/BAR)	Fuel: 2007	July 24, 2008 – adopted regulation
	Engines: 2009	March to July 2012 – provided funds
Port Truck Modernization (ARB/Local)	2007-2008	December 17, 2010 – adopted amendments
Accelerated Intro. Of Cleaner Line-Haul Locomotives (EPA/ARB)	2008	September 25, 2008 – provided funds
Clean Up Existing Harbor Craft (ARB)	2007	November 15, 2007 – approved regulation
		June 24, 2010 – adopted amendments
Cleaner In-Use Off-Road Equipment (ARB)	2007, 2010	July 26, 2007 – adopted regulation
		December 17, 2010 – adopted amendments
Cleaner In-Use Agricultural Equipment (ARB)	2013	October 2013 – adopted regulation
New Emission Standards for Recreational Boats (ARB)	2013	February 19, 2015 – adopted regulation
Expanded Off-Road Recreational Vehicle Emissions Standards (ARB)	2013	July 25, 2013 – adopted regulation
Enhanced Vapor Recovery for Above-Ground Storage Tanks (ARB)	2008	May 2, 2008 – approved certification procedure
Additional Evaporative Emissions Standards (Portable Outboard Marine Tanks, Refueling Gasoline Tanks, Gas Station Refueling Hoses) (ARB)	2013	September 25, 2008 – adopted regulation
Consumer Products Program (ARB)	2008, 2009, 2011	June 26, 2008 – adopted amendments
		September 24, 2009 – adopted amendments
		November 18, 2010 – adopted amendments
		October 18, 2012 – adopted amendments
Pesticide Regulation (DPR)	2008, 2009	January 28, 2008 – submitted regulation to U.S. EPA

In addition to these actions, both the District (Table 9) and ARB (Table 10) have achieved further emission reductions through implementation of additional controls measures, as well as SIP-creditable incentive funded projects. Table 11 documents how the reductions from these additional enforceable emission reduction measures, coupled with the reductions U.S. EPA had already provided SIP credit for meet the aggregate emission reduction commitment in the 2008 PM2.5 SIP.

Table 9. 2008 PM2.5 SIP Aggregate Commitment**:** District Measures

District Measures (Annual average tpd)			
	NOx	**PM2.5**	**SOx**
Reductions Previously Credited by U.S. EPA	11.1	4.2	3.6
Additional Reductions:			
4320 AERO Rule	1.8	0.0	0.0
9510 Indirect Source Review On-Site Compliance	1.0	0.1	0.0
Woodstove Replacements	0.0	0.1	0.0
District funded Incentive-Based Emission Reduction Measures	1.8	0.1	0.0
9410 Employer Based Trip Reduction	0.3	0.0	0.0
Actual Compliance with Rule 4901	0.0	1.3	0.0
Total from District Measures	**16.0**	**5.8**	**3.6**

Table 10. 2008 PM2.5 SIP Aggregate Commitment: ARB Measures

ARB Measures (Annual average tpd)			
	NOx	**PM2.5**	**SOx**
Reductions Previously Credited by U.S. EPA	2.1	1.8	0.0
Additional Reductions:			
State funded Incentive-based Emission Reduction Measures	7.8	0.2	0.0
Actual Compliance with Truck and Bus Rule	11.5	0.1	0.0
2012 PERP and Portable Engine ATCM	2.6	0.2	0.0
Total from ARB Measures	**24.0**	**2.3**	**0.0**

Table 11. 2008 PM2.5 SIP Aggregate Commitment

Combined Measures (Annual average (tpd))			
	NOx	**PM2.5**	**SOx**
District Reductions	16.0	5.9	3.6
ARB Reductions	24.0	2.3	0.0
Total ARB and District Reductions	**40.0**	**8.1**	**3.6**
Total Reductions Required	**26.1**	**9.0**	**0.9**
PM2.5 to NOx Emissions Equivalence (1:9)	-8.1	0.9	0.0
Total Reductions Achieved	**31.9**	**9.0**	**3.6**
Commitment Met	**YES**	**YES**	**YES**

The additional District emission reductions were achieved from measures that had not yet been approved at the time of U.S. EPA's 2011 SIP approval, incentive-based reduction programs, and enhanced implementation of the District's residential wood burning rule. Further ARB emission reductions were achieved from incentive-based reductions that were approved by the Board in October 2014, implementation of the ARB's Portable Equipment Registration Program/Portable Engine ATCM, and assessment of actual fleet compliance with ARB's Truck and Bus regulation. Further documentation of the emission reductions from these programs is included in Appendix B.

As a result of these measures, the District exceeded their NOx commitment by 7.0 tpd, their SOx commitment by 2.7 tpd, and achieved all but 0.9 tpd of the required PM2.5 reductions (Table 9). Similarly, ARB reductions exceeded the NOx commitment by 6.9 tpd and achieved all of the PM2.5 reductions (Table 10).

Because PM2.5 is comprised of many different constituents, multiple combinations of emission levels of different precursors can all provide for attainment. In addition, relationships have been established that compare the benefits of achieving reductions in different PM2.5 precursors. Modeling conducted as part of the 2008 PM2.5 SIP demonstrated that a reduction of 9 tpd of NOx emissions provides equivalent air quality improvement as a 1 tpd reduction in directly emitted PM2.5 emissions. This emissions benefit ratio was approved by U.S. EPA for demonstrating contingency reductions in the 2008 PM2.5 SIP (79 FR 29327). As shown in Table 11, the 13.9 tpd of surplus NOx reductions achieved through implementation of the ARB and District measures, together with the PM2.5 reductions achieved result in emission levels that in aggregate are sufficient for attainment based on the 2008 PM2.5 SIP modeling. The additional surplus SOx emission reductions provide further assurance that overall emission levels have been met.

B. Best Available Control Measures and Most Stringent Measures

The particulate matter provisions in the Act specify a step-wise process for the required level of emission control in a SIP, depending upon the severity of the air quality problem and amount of time a nonattainment area needs to meet the PM2.5 standard. For a serious nonattainment area, Best Available Control Measures (BACM) are the required level of control. BACM is required for those sources with emissions that are a significant contributor to the nonattainment problem. U.S. EPA defines BACM to be the maximum degree of emission reductions achievable from a source or source category determined on a case-by-case basis considering energy, economic, and environmental impacts. Serious areas that cannot achieve the standard by the serious area attainment date are allowed to request a five-year extension if they have BACM in place and the SIP demonstrates it includes most stringent measures (MSM). The Act specifies that MSM is the maximum degree of emission reduction that has been required or achieved from a source or source category in other SIPs or in practice in other states and can feasibly be implemented in the area.

The following sections summarize the BACM/MSM demonstrations conducted by ARB and the District. These analyses are further described in Chapter 5 and Appendix C and D of the 2015 PM2.5 SIP.

1. ARB Assessment

ARB's comprehensive mobile source control program relies on four fundamental approaches:

- stringent emissions standards that minimize emissions from new vehicles and equipment;
- in-use programs that target the existing fleet and require the use of the cleanest vehicles and emissions control technologies;
- cleaner fuels that minimize emissions during combustion; and,
- incentive programs that remove older, dirtier vehicles and equipment and pay for early adoption of the cleanest available technologies.

This multi-faceted approach has spurred the development of increasingly cleaner technologies and fuels and achieved significant emission reductions across all mobile source sectors that go far beyond national programs or programs in other states. These efforts extend back to the first mobile source regulations adopted in the 1960s, and pre-date the Act of 1970, which established the basic national framework for controlling air pollution. In recognition of the pioneering nature of ARB's efforts, the Act provides California unique authority to regulate mobile sources more stringently than the federal government by providing a waiver of preemption for its new vehicle emission standards under Section 209(b). This waiver provision preserves a pivotal role for California in the control of emissions from new motor vehicles, recognizing that California serves as a

laboratory for setting motor vehicle emission standards. Since then, the ARB has consistently sought and obtained waivers and authorizations for its new motor vehicle regulations. ARB's history of progressively strengthening standards as technology advances, coupled with the waiver process requirements, ensures that California's regulations remain the most stringent in the nation.

ARB's BACM/MSM assessment for the mobile source categories under ARB's regulatory authority included:

- Documentation of California waivers and authorizations granted to California to enforce its own standards for new vehicles and engines;
- Description of the scope and stringency of California's regulations and comparison to programs implemented at the federal level or in other states;
- Documentation of states that have been granted waivers to adopt California rules; and,
- Discussion of incentive programs and other initiatives that go beyond regulatory requirements to provide an enhanced level of emission reductions.

This assessment demonstrates that ARB has continued to enhance and accelerate reductions from our mobile source control programs through the implementation of more stringent engine emissions standards, in-use requirements, incentive funding, and other policies and initiatives. These efforts not only ensure that all source sectors continue to achieve maximum emission reductions through implementation of the cleanest current technologies, but also promote the ongoing development of more advanced zero and near-zero technologies. As a result, California's mobile source control programs reflect the most stringent and feasible level of emissions control in the nation and fully meet the requirements for BACM and MSM.

2. District Assessment

Through multiple planning processes to meet federal ozone and PM2.5 standards, the District has adopted a comprehensive suite of control measures. These rules address a wide range of sources, from residential wood burning and sources of fugitive dust, to industrial facilities and stationary engines. The District followed a multi-step process outlined in U.S. EPA's guidance to identify BACM and MSM for each of these sources and determine whether District programs met these requirements. Although ammonia is not considered a significant PM2.5 plan precursor, the District also included an assessment of rules addressing confined animal facilities, organic material composting, and biosolids, animal manure, and poultry litter operations. The District's review of its rules followed the five steps below:

1. Developed a detailed inventory (provided in the 2015 PM2.5 SIP Appendix B).

2. Based on the attainment demonstration information in the Plan and the 2012 baseline inventory determined which sources are significant.

3. From a list of 40 source categories, the District identified six source categories that have emissions over the significance (de minimis) level for PM2.5, NOx or SOx. These include open burning, glass melting furnaces, conservation management practices, commercial charbroiling, wood burning fireplaces and woodburning heaters, and paved and unpaved roads.

4. Identified potential BACM and MSM from significant sources in other implementation plans or used in practice for each significant source category evaluating technological and economic feasibility. Further, the District also conducted control measure evaluations for the remaining de minimis source categories.

5. Compared potential BACM and MSM for each source category to the corresponding adopted District rule. District rules and source categories were compared to federal and state regulations and standards and other air district rules and standards.

Based on the results of this analysis, the District determined that District rules meet the requirements for BACM and MSM in consideration of the feasibility and cost effectiveness criteria defined in the Act. Nevertheless, as part of the 2015 PM2.5 SIP control strategy, the District has committed to strengthen the commercial charbroiling Rule 4692. The District has also committed to evaluate the potential for further emission reductions from rules addressing agricultural conservation management practices, flares, and hot mix asphalt.

C. Emissions Inventory

SIPs must contain base-year inventories for PM2.5 and all precursor emissions as well as future year forecasts for all pollutants identified as PM2.5 attainment plan precursors. An emission inventory consists of a systematic listing of the sources of air pollutants with an estimate of the amount of pollutants from each source or source category over a given period of time.

ARB and District staff worked jointly to prepare an updated emission inventory (annual average and winter) for the 2015 PM2.5 SIP. The inventory includes a category-by-category review and update using the most recent information available on emissions-generating activities and anticipated population and economic growth in the region. Additional information on the emission inventory methodologies and resulting base and future year emissions can be found in Appendix B of the 2015 PM2.5 SIP.

D. Reasonable Further Progress and Quantitative Milestones

The Act requires SIPs to provide steady air quality progress by reducing emissions during the years leading to attainment. This is known as Reasonable Further Progress (RFP). As part of this requirement, a SIP must include quantitative milestones to be achieved every three years until the area is redesignated to attainment and which

demonstrates RFP. The 2015 PM2.5 SIP identifies RFP emission levels for NOx, SOx, and PM2.5 for 2014 and 2017 that show generally linear progress in emission reductions towards attainment of the annual standard in 2020. These emission levels for 2017 along with the 2020 attainment emission levels serve as the quantitative milestones required under the Act.

Targeting the most effective precursors is essential to ensuring air quality progress. Ammonium nitrate comprises a large fraction of PM2.5 concentrations and therefore reducing ammonium nitrate concentrations is a necessary element of the control strategy. As discussed earlier, while both NOx and ammonia participate in the formation of ammonium nitrate, NOx reductions are at least an order of magnitude more effective than ammonia reductions, and therefore the 2015 PM2.5 SIP control strategy focuses on NOx reductions. As shown in Table 12, NOx emission levels are projected to be well below the level required for linear progress in 2014 and 2017, including reductions required for contingency. Although ammonia is not considered a significant precursor and therefore RFP is not required, ammonia emissions are also provided in the table. While ammonia emissions are increasing slightly over the progress period, given the atmospheric response to NOx and ammonia emissions, the combined emission levels of NOx and ammonia that are projected to occur through the 2020 attainment year provide for the required generally linear air quality progress. The NOx Equivalent emission levels are projected to be below the level required for linear progress in 2014 and 2017.

Table 12. NOx and Ammonia Emissions Levels Between 2012 and 2017 and NOx Equivalence (tpd).

	2012	2014	2017
NOx Emissions	332.2	284.2	235.7
Ammonia Emissions	329.5	336.2	347.0
NOx Equivalent Emissions		284.9	237.5
NOx RFP Linear Level		300.9	253.9

Additional documentation for NOx, PM2.5 and SOx RFP is provided in Chapter 6 of the 2015 PM2.5 SIP. For the future 2017 and 2020 quantitative milestones, ARB further commits to provide U.S. EPA with a letter reporting that the emission inventory milestones have been met and the status of any emission reduction commitments. The letter for the respective 2017 and 2020 milestones will be provided by March 31, 2018 and March 31, 2021, as specified in the Act.

E. Contingency Measures

Contingency measures provide additional emission reductions in the event a nonattainment area fails to achieve RFP targets or attain the PM2.5 standard by its attainment date. These contingency measures are to take effect without further ARB or District action and consist of reductions that are not required as part of demonstrating attainment. Early reductions from the control strategy beyond those needed for RFP provide for 2017 contingency. In addition, reductions that accrue between 2020 and

2021 from implementation of new rule requirements provide the majority of the attainment contingency reductions. Additional reductions achieved through incentive programs complement the attainment contingency reductions. The breakdown of the 2020 attainment year contingency reductions is provided in Table 13. For the interim 24-hour 2018 attainment deadline, additional reductions in 2019 provide for 0.2 tpd of PM2.5 and 10 tpd of NOx reductions. Further discussion of contingency measures is provided in Chapter 6 of the 2015 PM2.5 SIP.

Table 13. 2021 Annual Attainment Year Contingency Reductions

	PM2.5 (tpd)	NOx (tpd)
ARB Mobile Source Reductions	0.3	11.9
PERP Regulation/ATCM	0.1	1.7
ISR On-Site Mitigation	0.0	1.0
AERO Rule	0.0	1.8
Total	**0.4**	**16.4**
Contingency Reductions Required	**0.4**	**15.7**
Contingency Met	**YES**	**YES**

F. Transportation Conformity Budgets

Under section 176(c) of the Act, transportation activities that receive federal funding or approval must be fully consistent with the SIP. U.S. EPA's transportation conformity rule[3] details requirements for establishing motor vehicle emission budgets (budgets) in SIPs for the purpose of ensuring the conformity of transportation plans and programs with the SIP.

The 2015 PM2.5 SIP establishes county-level on-road motor vehicle emission budgets for each RFP milestone year, as well as for the attainment year. Emission budgets for direct PM2.5 and NOx were calculated using EMFAC2014 and reflect annual average emissions. The emission budgets established in the 2015 PM2.5 SIP fulfill the requirements of the Act and U.S. EPA regulations to ensure that transportation projects will not interfere with progress and attainment of the annual PM2.5 standard. Additional detail on the on-road motor vehicle emission budgets can be found in Chapter 6 of the 2015 PM2.5 SIP.

[3] U.S. EPA maintains online information on its transportation conformity program, including access to relevant rulemakings, policy guidance, and reports at: http://www.epa.gov/otaq/transp/traqconf.htm

V. ENVIRONMENTAL IMPACT

A. Introduction

ARB has determined that the 2015 PM2.5 SIP is exempt from the requirements of CEQA. A brief explanation of this determination is provided in section B below. ARB's regulatory program, which involves the adoption, approval, amendment, or repeal of standards, rules, regulations, or plans for the protection and enhancement of the State's ambient air quality, has been certified by the California Secretary for Natural Resources under Public Resources Code section 21080.5 of the California Environmental Quality Act (CEQA) (14 CCR 15251(d)). Public agencies with certified regulatory programs are exempt from certain CEQA requirements, including but not limited to, preparing environmental impact reports, negative declarations, and initial studies. ARB, as a lead agency, prepares a substitute environmental document (referred to as an "Environmental Analysis" or "EA") as part of the Staff Report prepared for a proposed action to comply with CEQA (17 CCR 60000-60008). If the Board approves the 2015 PM2.5 SIP, a Notice of Exemption will be filed with the Office of the Secretary for the Natural Resources Agency and the State Clearinghouse for public inspection.

B. Analysis

ARB has determined that the 2015 PM2.5 SIP is exempt from CEQA under the general rule or "common sense" exemption (14 CCR 15061(b)(3)). CEQA Guidelines states "the activity is covered by the general rule that CEQA applies only to projects which have the potential for causing a significant effect on the environment. Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA". The proposal is also categorically exempt from CEQA under the "Class 8" exemption (14 CCR 15308) because it is an action taken by a regulatory agency for the protection of the environment. The 2015 PM2.5 SIP efforts include a District commitment to provide targeted incentive funding for the purchase of cleaner heavy-duty trucks and woodstove replacements, and proposed ARB actions for heavy-duty trucks that focus on cleaner combustion technologies, as well as introduction of zero and near-zero emission equipment. In addition, the District has committed to evaluate the potential for further emission reductions from rules that address agricultural conservation management practices, flares, and hot mix asphalt. The intent of these efforts is to decrease the PM2.5 emissions within the San Joaquin Valley in order to meet the attainment goal set by the U.S. EPA. Based on ARB's review it can be seen with certainty that there is no possibility that the 2015 PM2.5 SIP may result in a significant adverse impact on the environment. Further, the action is designed to protect the environment and ARB found no substantial evidence indicating the proposal could adversely affect air quality or any other environmental resource area, or that any of the exceptions to the exemption applies (14 CCR 15300.2). Therefore, this activity is exempt from CEQA.

VI. SUMMARY AND RECOMMENDATION

Meeting federal PM2.5 standards in the Valley is a continuing challenge that has been further exacerbated by the weather conditions associated with the ongoing drought. The 2015 PM2.5 SIP lays out a course for expeditious attainment of the 1997 standards by 2018 and 2020, and serves as a foundation for development of the 2016 SIP to meet the more stringent 24-hour and annual PM2.5 standards adopted in 2006 and 2012. ARB staff has determined that the 2015 PM2.5 SIP meets the requirement of the Act and therefore recommends that the Board approve the SJV 2015 PM2.5 SIP as a revision to the California SIP.

However, the need for continuing action is essential. In order to continue to pursue further near-term emission reductions, the District has committed to provide targeted incentive funding for heavy-duty trucks and wood stove replacements, as well as committed to evaluate the potential for additional emission reductions from a number of sources currently regulated under District rules. ARB has also identified a number of actions related to achieving a cleaner heavy-duty truck fleet as part of the sustainable freight strategy, along with continued incentive funding.

As the drought continues, ARB and District staff will continue to closely monitor PM2.5 air quality conditions and potential impacts on attainment of the standards. Finally, because atmospheric chemistry can change over time, and as new scientific information becomes available, ARB will also continue to evaluate the role of ammonia as part of the 2016 SIP.