CALIFORNIA
AIR RESOURCES BOARD

Mary D. Nichols, Chair
Matthew Rodriquez, CalEPA Secretary
Edmund G. Brown Jr., Governor

December 20, 2018

Mr. Mike Stoker
Regional Administrator
Region 9
U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, California 94105

Dear Mr. Stoker:

The California Air Resources Board (CARB) is submitting to the U.S. Environmental Protection Agency (U.S. EPA) the San Joaquin Valley Air Pollution Control District's (District) *2017 Quantitative Milestone Report for the 1997 and 2006 NAAQS* (2017 Report).

The San Joaquin Valley Air Basin (Basin) is currently designated as a nonattainment area for the 65 microgram per cubic meter ($\mu g/m^3$) and 35 $\mu g/m^3$ 24-hour standards and the 15 $\mu g/m^3$ and 12 $\mu g/m^3$ annual standards. The District addressed the Clean Air Act (Act) requirements for these standards in the *2018 Plan for the 1997, 2006, and 2012 PM2.5 Standards* (2018 Plan), including reasonable further progress (RFP) emissions targets and quantitative milestones for 2017. Further, the Act requires PM2.5 nonattainment areas to submit a quantitative milestone report within 90 days of each RFP milestone year.

The enclosed 2017 Report documents implementation of CARB and District rules that provided the emissions reductions needed between 2012 and 2017 to meet the 2017 RFP emissions targets. The 2017 Report also demonstrates that the 2017 quantitative milestones have been met.

If you have any questions, please contact Dr. Michael Benjamin, Chief, Air Quality Planning and Science Division, at (916) 201-8968, or by email at michael.benjamin@arb.ca.gov.

Sincerely,

Richard W. Corey
Executive Officer

Enclosure

cc: See next page.

cc: (with enclosure)

Mr. Samir Sheikh
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Ms. Elizabeth Adams
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Dr. Michael T. Benjamin, Chief
Air Quality Planning and Science Division
California Air Resources Board

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

November 20, 2018

Dr. Michael Benjamin
Chief, Air Quality Planning and Science Division
California Air Resources Board
1001 "I" Street
P.O. Box 2815
Sacramento, CA 95812

Dr. Benjamin:

Enclosed is the 2017 Quantitative Milestone Report for the 1997 and 2006 PM2.5 National Ambient Air Quality Standards (NAAQS). The Clean Air Act requires states to identify quantitative milestones to be achieved every three years which demonstrate reasonable further progress, and provide a report after the milestone due date. Quantitative milestones are a mechanism to provide an objective means to track progress towards attainment.

The attached quantitative milestone report satisfies the reporting requirement and demonstrates that reasonable further progress has been achieved for the 1997 and 2006 PM2.5 NAAQS. We request that the California Air Resources Board transmit this report and the appropriate documentation to the United States Environmental Protection Agency.

If you have any questions regarding this report, please contact Chay Thao at chay.thao@valleyair.org or (559) 230-5800. The District thanks you and your staff for your assistance and collaboration during the preparation of this report.

Sincerely,

Jonathan Klassen
Director of Strategies and Incentives

Attachments

cc: Sylvia Vanderspek

Samir Sheikh
Executive Director/Air Pollution Control Officer

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San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

2017 Quantitative Milestone Report for the 1997 and 2006 NAAQS

2017 QUANTITATIVE MILESTONE REPORT FOR THE 1997 AND 2006 PM2.5 NAAQS

Consistent with CAA section 189(c)(1), the state must submit in each attainment plan for a PM2.5 nonattainment area specific quantitative milestones that demonstrate Reasonable Further Progress (RFP) toward attainment of the applicable PM2.5 National Ambient Air Quality Standards (NAAQS). A quantitative milestone report must be submitted following each quantitative milestone period.

Each attainment plan submission for an area designated nonattainment for the 1997 and/or 2006 PM2.5 NAAQS before January 15, 2015, must contain quantitative milestones to be achieved no later than 3 years after December 31, 2014, and every 3 years thereafter until the milestone date that falls within 3 years after the applicable attainment date[1]. The Valley was designated nonattainment for the 1997 and 2006 PM2.5 standards effective April 5, 2015 and December 14, 2009, respectively. As such, the first quantitative milestone date for these two standards is December 31, 2017, and is addressed by this quantitative milestone report.

As demonstrated by this report, each quantitative milestone report submitted by a state must include, at minimum[2]:

- A certification by the Governor or Governor's designee that the SIP control strategy is being implemented consistent with the RFP plan, as described in the applicable attainment plan;

- Technical support, including calculations, sufficient to document completion statistics for appropriate milestones and to demonstrate that the quantitative milestones have been satisfied and how the emissions reduction achieved to date compare to those required or scheduled to meet RFP;

- A discussion of whether the area will attain the applicable PM2.5 NAAQS by the projected attainment date for the area.

EPA requires that the RFP demonstration for milestone years includes direct PM2.5, as well as PM precursors that have been determined to be significant. As demonstrated in Appendices G and K of the District's *2018 Plan for the 1997, 2006, and 2012 PM2.5 Standards* (*2018 PM2.5 Plan*), CARB modeling determined ammonia, VOCs, and SOx do not contribute significantly to PM2.5 levels that exceed the 1997, 2006, or 2012 NAAQS in the Valley. As such, this report appropriately only addresses direct PM2.5 and NOx emissions.

[1] 40 CFR 51.1013(a)(4). The Valley was designated nonattainment for the 1997 and 2006 PM2.5 standards effective April 5, 2015 and December 14, 2009, respectively.
[2] 40 CFR 51.1013(b)

1. CONTROL MEASURE IMPLEMENTATION

1.1 STATIONARY SOURCE RULES AND REGULATIONS

The District has one of the most stringent regulatory programs that have set benchmarks for California and the nation for a wide variety of sources, including boilers, steam generators, internal combustion engines, refineries, residential fireplaces, glass manufacturing, and agricultural burning. Only states and the federal government can directly regulate tailpipe emissions from mobile sources. However, the District has also adopted innovative regulations such as Indirect Source Review and Employer-based Trip Reduction to reduce emissions from mobile sources within the District's limited jurisdiction over these sources. Additionally, the District has an extremely successful incentive program that has achieved significant emissions reductions.

From 2013 to 2017, PM2.5 and NOx emissions in the Valley have been reduced by 3.6 tpd and 83.9 tpd, respectively. Significant emissions reductions were achieved through the implementation of control measures in previous attainment plans, including the 2008 and 2015 PM2.5 plans for the 1997 NAAQS and the 2012 PM2.5 plan for the 2006 NAAQS that are now replaced by the *2018 PM2.5 Plan*. The following 2017 quantitative milestones for the 1997 and 2006 PM2.5 standards contributed to these significant emission reductions:

Milestone 1. Rule 4901 (Wood Burning Fireplaces and Wood Burning Heaters) Regulation Requirements from 2014 through 2017

District Rule 4901 was amended on September 18, 2014 and lowered the No Burn threshold for high polluting wood burning heaters and fireplaces from 30 $\mu g/m^3$ to 20 $\mu g/m^3$. The amendments doubled the number of No Burn days for high polluting units that are the source of over 95% of the wintertime residential wood smoke emissions. Enhancements to the District's Burn Cleaner Program also contributed to additional emissions reductions. As a result, PM2.5 emissions from wood burning heaters and fireplaces have been reduced by 14% between 2013 and 2017.

The District has implemented all of the Rule 4901 requirements through 2017 and has met Milestone 1.

Milestone 2. Rule 4308 Boilers, Steam Generators, and Process Heaters (0.075 to <2 MMBtu/hr) Regulation Requirements from 2015 through 2017

Rule 4308 is a point-of-sale rule that applies to new boilers, steam generators, and process heaters with a rated heat input of 0.075 to less than 2 million British thermal units per hour (MMBtu/hr). The rule was amended on November 14, 2013 and lowered the NOx emission limit from 55 parts per million by volume (ppmv) to 20 ppmv for instantaneous water heaters with a rated heat input of 0.075 to 0.4 MMBtu/hr. Instantaneous units have an estimated lifetime of 20 years. Therefore, as a point-of-sale rule, emission reductions will occur over 20 years, from 2015 through 2034.

The District has implemented all of the Rule 4308 requirements through 2017 and has met Milestone 2.

Milestone 3. Rule 4905 (Reduction of NOx Emissions from Natural-Gas-Fired, Fan-Type Central Furnaces) Regulation Requirements from 2015 through 2017

This rule was amended in January 22, 2015 to lower the NOx emission limit for residential units from 40 nanograms of NOx per joule of heat output (ng/J) to 14 ng/J, expand the applicability to include commercial units with a NOx emission limit of 14 ng/J, expand the applicability to include units installed in manufactured homes with an initial NOx emission limit of 40 ng/J which would then be lowered to 14 ng/J in 2018, and allow the sale of non-compliant units during the initial implementation period (36-months) in exchange for the payment of an emissions fee for each non-compliant unit sold. The amended NOx emission limits were effective February 1, 2015 for units installed in manufactured homes, April 1, 2015 for condensing units (residential and commercial), October 1, 2015 for non-condensing units (residential and commercial), and October 1, 2016 for weatherized units (residential and commercial).

The District has implemented all of the Rule 4905 requirements through 2017 and has met Milestone 3.

Milestone 4. Rule 4354 (Glass Melting Furnaces) Regulation Requirements from 2013 through 2017

Rule 4354 applies to container glass, flat glass, and fiberglass manufacturing. It was amended in 2008, 2010, and 2011. Those amendments lowered emission limits for NOx, SOx, and PM10. Between 2013 and 2017, NOx emissions from glass melting furnaces were reduced by 48%, SOx by 17%, and PM10 by 52%.

The District has implemented all of the Rule 4354 requirements through 2017 and has met Milestone 4.

Milestone 5. Rule 4702 (Internal Combustion Engines) Regulation Requirements from 2013 through 2017

Rule 4702 applies to any internal combustion engine rate at 25 brake horsepower or greater. The rule was amended on November 14, 2013 and lowered the NOx and SOx emission limits for various types of engines. As a result, NOx emissions from internal combustion engines have been reduced by 47%, and SOx by 28%, between 2013 and 2017.

The District has implemented all of the Rule 4702 requirements through 2017 and has met Milestone 5.

Milestone 6. Rule 4902 (Residential Water Heaters) Regulation Requirements from 2013 through 2017

Rule 4902 is a point-of-sale rule that applies to new residential natural gas fired water heaters. The rule was amended on March 19, 2009 and lowered the NOx emission limit from 40 nanograms (calculated as NO_2) per joule of heat output (93 lb per billion Btu of heat output) to the following:

- 10 nanograms (calculated as NO_2) per joule of heat output for all water heaters excluding mobile home water heaters, instantaneous water heaters, and pool heaters effective on and after January 1, 2010.
- 14 nanograms (calculated as NO_2) per joule of heat output for instantaneous water heaters effective on and after January 1, 2012.

Residential water heaters have an estimated lifetime of 12 years. Therefore, as a point-of-sale rule, emission reductions will occur over 12 years, from 2013 through 2025.

The District has implemented all of the Rule 4902 requirements through 2017 and has met Milestone 6.

Stationary Source Program Conclusion

The District has met the 2017 quantitative milestones. These milestones ensure emissions were reduced by 2017. The District's stationary source program will continue to provide emission reductions beyond 2017.

1.2 Mobile Source Rules and Regulations

[This section is provided by the California Air Resources Board]

The RFP demonstrations in the *2018 PM2.5 Plan* relied, in part, on reductions from California mobile source regulations that reduce NOx and direct PM2.5 emissions. State mobile source milestones focus on those CARB regulations that provide the most significant benefit to meeting RFP targets – mobile source regulations and their NOx and PM2.5 benefits.

The mobile source emissions control program in California is the most stringent in the nation due to the severity of California's air quality challenges, the need for ongoing emission reductions, and the unique authority given to California as allowed by the CAA. California'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 evaporative and combustion emissions; and,
- incentive programs that remove older, dirtier vehicles and equipment and pay for early adoption of the cleanest available technologies.

This multifaceted approach has spurred the development of increasingly cleaner technologies and fuels and achieved emission reductions across all mobile source sectors that go far beyond national programs or programs in other states. Since California mobile source programs account for a significant part of the emissions reductions in the RFP demonstration, it is appropriate to include milestones for implementation of mobile source regulations.

For the 35 µg/m^3 24-hour, 65 µg/m^3 24-hour, and 15 µg/m^3 annual PM2.5 2017 qualitative milestones, CARB is reporting on the following three milestones:

1. Implementation of the *On-Road Heavy-Duty Diesel Vehicles (In-Use) Regulation* (the Truck and Bus Regulation) between 2012 and 2017 that required particulate filters and cleaner engine standards on existing California heavy-duty diesel truck and buses;
2. Implementation of the *Advanced Clean Cars Program* (the ACC Program) between 2014 and 2017 that required manufacturers of new light-duty passenger vehicles sold in California to limit emissions; and
3. Implementation of *In-Use Off-Road Diesel-Fueled Fleets Regulation* (the Off-Road Regulation) that began in 2014 for large fleets and in 2017 for medium fleets and limited emissions from existing off-road diesel vehicles operated in California.

Milestone 1. On-Road Heavy-Duty Diesel Vehicles (In-Use) Regulation Requirements from 2012 through 2017

The Truck and Bus Regulation provides substantial reductions in the years 2012 to 2017. The Truck and Bus Regulation was first adopted in 2008 and was amended in 2011; it represents a multi-year effort to turn over the legacy fleet of truck and bus engines and replace them with the cleanest technology available. The Truck and Bus Regulation includes phase-in requirements that begin in 2012 and become applicable to a larger percentage of the truck and bus fleet over time; by 2023 nearly all pre-2010 vehicles must be upgraded to have exhaust emissions meeting 2010 model year engine emissions levels. The Truck and Bus Regulation applies to nearly all diesel-fueled trucks and buses with a gross vehicle weight rating (GVWR) greater than 14,000 pounds, including school buses and some off-road agricultural yard trucks.

CARB implementation of the Truck and Bus Regulation provided PM2.5 emission benefits beginning in 2012. By 2016, the particulate filter requirement for heavier trucks (greater than 26,001 lbs. GVWR) was fully implemented in the San Joaquin Valley. The 2010 model-year engine requirement in the Truck and Bus Regulation also provided NOx reductions beginning in 2015 when heavier vehicles with 1993 model year and older engines had to be replaced with 2010 model year engines. By 2016, all heavier trucks with 1995 and older model year engines were required to have a 2010 engine installed or replaced by a truck with a 2010 model year engine (Table 1).

Table 1
Truck and Bus Regulation Implementation through 2017
for Heavier Trucks and Buses*

Implementation Deadline	Vehicle Engine Year	Implementation Requirement
January 1, 2012	1996-1999	Particulate Filter
January 1, 2013	2000-2004	Particulate Filter
January 1, 2014	2005 or newer	Particulate Filter
January 1, 2015	Pre-1994	2010 Engine
January 1, 2016	1994-1995	2010 Engine

**https://www.arb.ca.gov/regact/2014/truckbus14/tb14appa.pdf, page A-18*

In lieu of complying with the particulate filter schedule set forth in Table 1, heavier truck and bus fleets may alternatively comply with a phase-in schedule. Fleets electing this option must retrofit or replace with cleaner new vehicles to meet an annual PM filter percentage requirement (Table 2).

Table 2
Truck and Bus Regulation Particulate Filter Phase-In Implementation
Schedule through 2017 for Heavier Trucks and Buses*

Implementation Deadline	Percent of Fleet with Filters
January 1, 2012	30
January 1, 2013	60
January 1, 2014	90
January 1, 2016	100

**https://www.arb.ca.gov/regact/2014/truckbus14/tb14appa.pdf, page A-21*

While lighter (14,000 to 26,000 lbs. GVWR) trucks and buses did not have a particulate filter requirement, they were required to replace 1995 and older engines with a 2010 model year engine by 2015. A 2010 model year engine includes a particulate filter so these new engines provide both PM2.5 and NOx benefits. By 2017, all lighter trucks with 1997 model year engines and older were required to have a 2010 engine installed or have been replaced by a new truck with a 2010 model year engine (Table 3).

Table 3
Truck and Bus Regulation Implementation through 2017
for Lighter Trucks and Buses*

2010 Engine Requirement	Engine Year
January 1, 2015	1995 and older
January 1, 2016	1996
January 1, 2017	1997

**https://www.arb.ca.gov/regact/2014/truckbus14/tb14appa.pdf, page A-17*

Accounting for both primary and secondary PM2.5, the contribution of heavy-duty diesel vehicle emissions to ambient PM2.5 levels have decreased 36 percent between 2012 and 2017. The Truck and Bus Regulation provided a significant portion of these reductions.

CARB has implemented all of the Truck and Bus Regulation requirements through 2017 and has met Milestone 1.

Milestone 2. Advanced Clean Cars Program Requirements from 2014 through 2017

NOx emissions from light-duty vehicles in the San Joaquin Valley have been reduced significantly since 1990 and will continue to decrease through 2022 due to the benefits of California's longstanding light-duty mobile source program. Since setting the nation's first motor vehicle exhaust emission standards in 1966 that led to development of pollution controls like the three-way catalyst, California has dramatically tightened emission standards for light-duty vehicles. Today's new cars pollute 99 percent less than their predecessors did thirty years ago.

A key program responsible for the most recent emission reductions from light-duty vehicles is the ACC Program approved by CARB in January 2012. The ACC Program implements a package of regulations that provide ambient air quality and climate change benefits. One of the regulations, the Low Emission Vehicle III (LEV III) Program, includes criteria pollutant emission limits to be phased-in starting in 2014.

CARB implementation of the LEV III Program set an increasingly stringent combined Non-Methane Organic Gas (NMOG) plus NOx fleet average requirement to reduce these emissions each year beginning in 2014 (Table 4). For particulate matter emission limits, the LEV II program set a limit of ten milligrams per mile (mg/mi) by model year 2016 and the LEV III Program lowers this limit to three mg/mi to be phased in starting in 2017.

Table 4
LEV III Program Implementation through 2017 for Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles*

Model Year	Fleet Average NMOG + NOx (grams per mile)	
	All Passenger Cars; Light-Duty Trucks 0-3750 lbs. loaded vehicle weight	**Light-Duty Trucks 3751 lbs. loaded vehicle weight to 8500 lbs. gross vehicle weight rating; All Medium-Duty Passenger Vehicles**
2014[1]	0.107	0.128
2015	0.100	0.119
2016	0.093	0.110
2017	0.086	0.101

**https://www.arb.ca.gov/regact/2012/leviiighg2012/levfrorev.pdf, page 59.*
[1]2014 model year is equivalent to the LEV II 2014 NMOG fleet average.

All automobile manufacturers selling cars in California are required to meet the LEV III fleet average requirements by 2017. Benefits from the ACC Program will increase over time as new, cleaner vehicles enter the fleet displacing older and dirtier vehicles. Medium- duty vehicles in the LEV III Program follow a similar schedule lowering NOx and NMOG emissions through 2022. All together, the contribution of light-duty vehicle

emissions to ambient PM2.5 levels have decreased 38 percent between 2012 and 2017. The LEV III Program was responsible for a significant portion of these reductions.

CARB has implemented all of the LEV III Regulation requirements through 2017 and has met Milestone 2.

Milestone 3. In-Use Off-Road Diesel-Fueled Fleets Regulation Requirements from 2014 through 2017

On July 26, 2007, CARB adopted the Off-Road Regulation to reduce PM2.5 and NOx emissions from in-use off-road, heavy-duty diesel vehicles in California used in such applications as construction, mining, and industrial operations. The Off-Road Regulation requires 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. The Off-Road Regulation also imposes idling limits on off-road diesel vehicles in addition to reporting and labeling requirements.

Beginning on July 1, 2014 for large fleets and on January 1, 2017 for medium fleets, the Off-Road Regulation required increasingly stringent fleet average indices for Off-Road diesel-fueled fleets. A fleet average index is an indicator of a fleet's overall emissions rate of diesel particulates and NOx based on the horsepower and model year of each engine in the fleet. All fleets were required to meet, or be below, their average target in each year (Table 5) or demonstrate Best Available Control Technology (BACT) requirements by turning over or installing Verified Diesel Emissions Control Strategies (VDECS) on a percentage of the total fleet horsepower (hp) that was subject to BACT requirements (Table 6).

Table 5
Off-Road Regulation Implemented through 2017*

Implementation Deadline	Fleet Size (total fleet hp)	Implementation Requirement
2014 to 2017	Large (> 5000)	Met Fleet Average Target
2017	Medium (> 2500)	Met Fleet Average Target

**https://www.arb.ca.gov/msprog/ordiesel/faq/fleetaverage.pdf*

Table 6
Off-Road Regulation Optional BACT Requirement*

Implementation Deadline	Fleet Size (total fleet hp)	Percent Fleet Turnover or VDECS Installation
2014	Large (> 5000)	4.8
2015 to 2017		8
2017	Medium (> 2500)	8

**https://www.arb.ca.gov/msprog/ordiesel/faq/bactfaq.pdf*

CARB implemented other requirements including a ban on fleets adding off-road vehicles with Tier 0 engines effective January 1, 2014. And, effective January 1, 2014 for large and medium fleets and January 1, 2016 for small fleets, a fleet could not add any vehicle with a Tier 1 engine. All together, the contribution of off-road diesel vehicle

emissions to ambient PM2.5 levels have decreased 17 percent between 2012 and 2017. The Off-Road Regulation provided a significant portion of these reductions.

CARB has implemented all of the Off-Road Regulation requirements through 2017 and has met Milestone 3.

Mobile Source Program Conclusion

CARB has met the 2017 quantitative milestones. These milestones ensure emissions were reduced by 2017. CARB's mobile source program will continue to provide emission reductions beyond 2017

2. DEMONSTRATION OF REASONABLE FURTHER PROGRESS

RFP means such annual incremental reductions in emissions of the relevant air pollutant as are required or may reasonably be required by EPA for the purpose of ensuring attainment of the applicable national ambient air quality standard by the applicable date. The table below demonstrates that the RFP target emissions level, calculated in Appendix H of the *2018 PM2.5 Plan*, have been satisfied through the emission reductions that have been achieved up to the year 2017, as reflected in the latest emissions inventory (CEPAM v1.05).

Table 7
RFP Target Analysis

	2017 RFP Target Emissions Level (tpd)	2017 Emissions Inventory (tpd)	RFP satisfied?
1997 PM2.5 Standard			
Direct PM2.5	60.51	58.93	Yes
NOx	252.14	233.31	Yes
2006 PM2.5 Standard			
Direct PM2.5	60.52	58.93	Yes
NOx	255.93	233.31	Yes

3. SUMMARY AND CONCLUSIONS

This quantitative milestone report demonstrates that the emission reductions needed for RFP have been achieved, that the 2017 quantitative milestones have been met, and thus that ongoing progress is being made to attain the 1997 PM2.5 Standard by 2020 and 2006 PM2.5 Standard by 2024, as determined in the District's *2018 PM2.5 Plan*.