

DRAFT 2015 Plan for the 1997 PM2.5 Standard

March 4, 2015
webcast@valleyair.org



HEALTHY AIR LIVING

Purpose of Today's Workshop

- Present information on the development of the draft plan to address the 1997 PM2.5 standard, including:
 - Plan Foundation and Strategy
 - PM2.5 challenges and health impacts
 - PM2.5 standards
 - Planning process
 - Attainment Demonstration and modeling
 - Control measure evaluation process
- Receive comments from the public

Background



HEALTHY AIR LIVING

2015 Plan Builds on Foundation of Effective Clean Air Strategies

- District has adopted numerous attainment plans:
 - Toughest air regulations in the nation
 - Adopted over 600 stringent rules and regulations
 - Groundbreaking rules serve as model for others
 - Over 80% reduction in stationary source emissions
- Strong incentive programs (\$1 billion in public and private investment reducing 100,000+ tons of emissions)
- Public education and participation:
 - Build public support for tough measures adopted
 - Urge air friendly behavior by the public

4

HEALTHY AIR LIVING

Foundation Includes Multiple Plans Already in Place

- *2007 PM10 Maintenance Plan* (1987 PM10 standard)
- *2007 Ozone Plan* (1997 8-hour ozone standard)
- *2008 PM2.5 Plan* (1997 PM2.5 standard)
- *2012 PM2.5 Plan* (2006 PM2.5 standard)
- *2013 Plan for the Revoked 1-hour Ozone Standard* (1979 1-hour ozone standard)

5

HEALTHY AIR LIVING

No Stone Left Unturned

Regulations

- *Require businesses to reduce emissions, and enforce through permits and other mechanisms
- *Must require at least BACM/MSM – District rules extend well beyond these requirements

Incentives

- *Reduce emissions through voluntary incentive programs
- *Most cost-effective emissions reductions available
- *Critical to continue securing additional funding

Health Risk Reduction Strategy

Technology Advancement

- *New technology needed to meet increasingly difficult federal air quality standards
- *Promote advancement of new technologies through incentives and other efforts

Outreach and Policy Efforts

- *Outreach to residents and businesses to assist with rule compliance and encourage voluntary efforts to reduce emissions
- *Adopt and pursue policy positions through legislative and other avenues

6

HEALTHY AIR LIVING

Control Measures in Place

- Mobile Source Regulations (ARB)
 - Truck and Bus Regulation
 - Off-Road Regulation
 - Advanced Clean Cars
 - Expanded Passenger Vehicle Retirement
 - Smog Check Improvements
 - And more...
- Stationary/Area Source Regulations (District)
 - Combustion Devices
 - Industrial Processes
 - Coatings and Solvents
 - Oil and Gas
 - Managed Burning
 - Agricultural Processes
 - Residential and Commercial Sources
 - Waste Management
 - And more...

7



Success of District Incentive Programs

- Highly respected and acclaimed program
- \$156 million in 2014/15 Budget
- Accelerate adoption of cleaner technologies
 - Address sources outside District authority
 - Reduce emissions ahead or beyond regulations
- Wide variety of incentive strategies
 - Heavy duty equipment (ag equipment, trucks)
 - Community incentives (vanpools, vehicle rebates, woodstove changeout, electric lawn mowers)
- Incentive programs and need for additional funding critical for attainment strategy

8



Importance of NOx and PM2.5 Emission Reductions to Reach Attainment

- Given the significant contribution of ammonium nitrate to the Valley's PM2.5 concentrations, reductions in NOx are especially important for attainment
 - District has implemented most stringent NOx controls for stationary and area sources
 - ARB has adopted regulations that will significantly reduce NOx emissions from various mobile sources
- ARB and District control programs result in a forecasted 38% decrease in NOx and a 5% decrease in PM2.5 by 2020
 - NOx reductions: implementation of new vehicle standards for passenger and heavy-duty diesel vehicles and equipment, and rules accelerating the turnover of legacy diesel fleets
 - PM2.5 reductions: implementation of diesel on- and off-road equipment measures and recently strengthened rule for wood-burning fireplaces and heaters

9



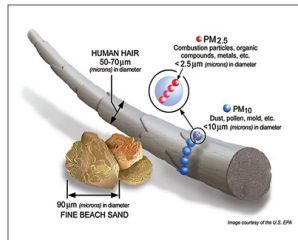
PM2.5 Defined, Challenges, and Health Impacts

10

HEALTHY AIR LIVING

PM2.5: Solid Particles and Liquid Droplets

- Emitted directly or formed indirectly through chemical reactions
- Types, or species:
 - Ammonium nitrate
 - Ammonium sulfate
 - Organic carbon
 - Elemental carbon
 - Trace metals
 - Geologic materials
 - Sea salt

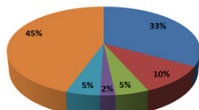


11

HEALTHY AIR LIVING

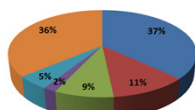
Comparison of 2004-2012 Average Annual PM2.5 Chemical Composition

Comparison of 2004-2012 Average Annual PM2.5 Chemical Composition
Fresno



Ammonium Nitrate Ammonium Sulfate
Geological Elements
Elemental Carbon Organic Carbon

Comparison of 2004-2012 Average Annual PM2.5 Chemical Composition
Bakersfield



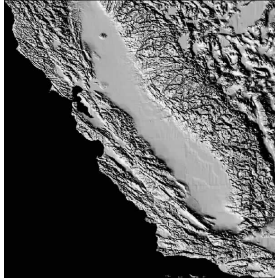
Ammonium Nitrate Ammonium Sulfate
Geological Elements
Elemental Carbon Organic Carbon

12

HEALTHY AIR LIVING

Valley PM2.5 Challenges

- Geography and meteorology
- Temperature inversions
- Biogenic emissions
- Air pollution transport
- Population increases



13

HEALTHY AIR LIVING

Overview of PM2.5 Health Effects

- Potential health impacts related to the size, chemical composition, surface area
 - Organic carbon species most health impactful, others relatively less
- Health effects include aggravated asthma, increased cardiovascular/respiratory disease, decreased lung function in children, lung cancer, & premature death

14

HEALTHY AIR LIVING

Health Risk Reduction Strategy

- Attaining federal PM2.5 standards will result in clear and significant health benefits
- Within this strategy, we measures that will achieve the greatest health benefits can be prioritized
- Five-factor exposure assessment methodology
 - Relevance to attainment
 - Toxicity of chemical species
 - Particle size and deposition
 - Proximity to PM 0.1 (ultra fine particulates)
 - Population intake fraction

15

HEALTHY AIR LIVING

PM2.5 Air Quality and Emissions Trends

16

HEALTHY AIR LIVING
Join a Healthy Air Day

Historical PM2.5 Annual Trends

Year	Design Value (ug/m³)
1999	24
2000	23
2001	22
2002	21
2003	20
2004	19
2005	19
2006	20
2007	21
2008	22
2009	21
2010	18
2011	16
2012	16
2013	18

17

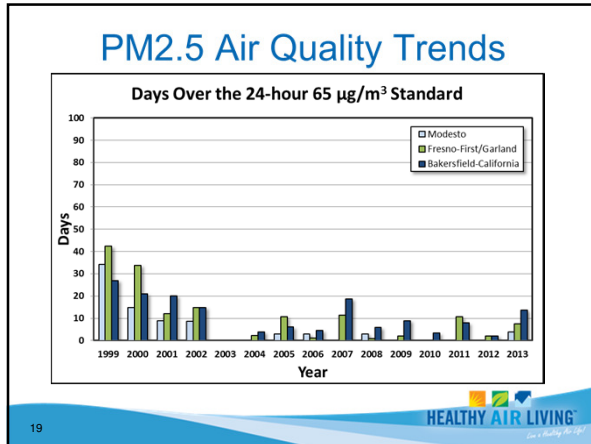
HEALTHY AIR LIVING
Join a Healthy Air Day

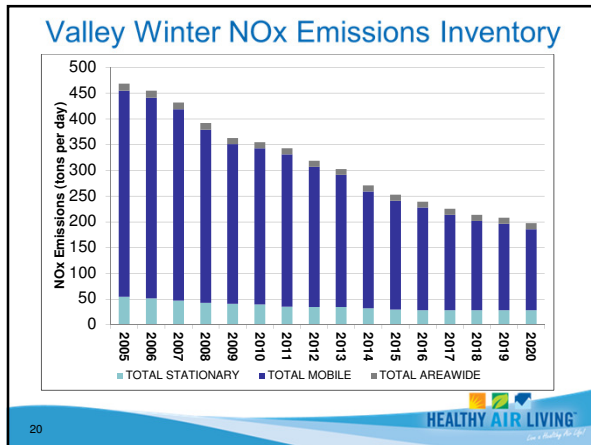
Historical PM2.5 24-hour Trends

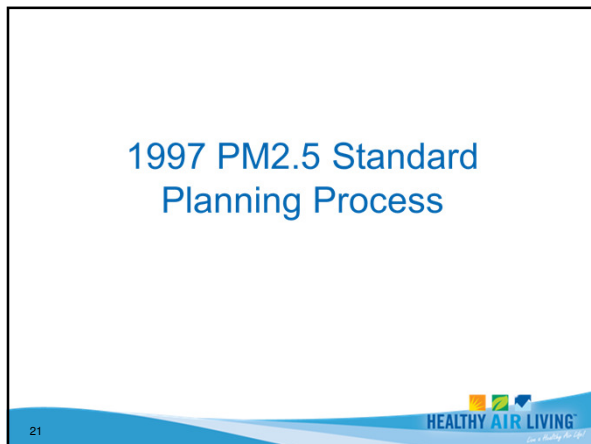
Year	Design Value (ug/m³)
1999	105
2000	90
2001	75
2002	65
2003	60
2004	60
2005	65
2006	65
2007	65
2008	65
2009	65
2010	65
2011	65
2012	65
2013	65

18

HEALTHY AIR LIVING
Join a Healthy Air Day







1997 PM2.5 Standard Timeline

1997 EPA sets 1st national standard for PM2.5

2005 EPA designates Valley as “nonattainment”

2007 EPA directs states to adopt attainment plans under CAA Subpart 1

2008 District adopts *2008 PM2.5 Plan* per EPA guidance

2011 EPA approves *2008 PM2.5 Plan* (except contingencies, later approved in 2014), extends attainment date to April 5, 2015

2013

- Court rules EPA erred by not using Subpart 4
- Valley was on track to attain 1997 annual PM2.5 standard
- Exceptional weather conditions due to drought delay attainment

22



1997 PM2.5 Standard Timeline cont'd

2014

- EPA classifies Valley as “Moderate nonattainment” under Subpart 4 with attainment date of 4/5/2015
- District requests reclassification to “Serious nonattainment” with demonstration that Valley cannot attain the 1997 annual PM2.5 standard by the 4/5/2015 attainment date

2015

- EPA proposes to reclassify Valley as “Serious nonattainment” with attainment date of 12/31/2015
- District to submit new attainment plan satisfying Subparts 1 and 4 with demonstration that attainment by 2015 is impracticable, and a request for an attainment deadline extension to no later than 2020

2020 Proposed attainment date (after extension) 12/31/2020

23



Clean Air Act Subpart 1 Requirements for “Serious Nonattainment”

- Demonstration of reasonable further progress (RFP)
- A comprehensive, accurate, current inventory of actual emissions from all sources of PM2.5 and PM2.5 precursors in the area
- Contingency measures to be implemented if the area fails to meet RFP or to attain by the applicable attainment date

24



Clean Air Act Subpart 4 Requirements for "Serious Nonattainment"

- Provisions to assure implementation of BACM at stationary sources for the control of direct PM2.5 and PM2.5 precursors
- Quantitative milestones which are to be achieved every three years until the area is redesignated attainment and which demonstrate RFP
- A demonstration that the plan provides for attainment as expeditiously as practicable
- Provisions to assure control requirements applicable to major PM2.5 stationary sources also apply to major sources of PM2.5 precursors, except where State demonstrates that sources do not contribute significantly to PM2.5 levels that exceed the standard
- Revisions to the nonattainment new source review program to lower the applicable thresholds from 100 to 70 tons per year

25


Request for Extension and Necessary Steps for Extension to be Granted

- As a serious nonattainment area, the Valley has until 12/31/2015 to attain the 1997 PM2.5 standard
- Under Subpart 4, EPA may grant one extension of up to five years for a Serious nonattainment area
 - Apply for an extension beyond the statutory attainment date
 - Demonstrate that attainment by the statutory date is impracticable
 - Demonstrate that the State has complied with all requirements and commitments
 - Demonstrate that the plan includes the most stringent measures that can feasibly be implemented in the area
 - Submit a demonstration of attainment by the most expeditious date practicable

26


Extreme Weather in 2013-2014 Cause for Delay in Attainment

- Meteorology during winter of 2013-14 very conducive to high PM2.5 concentrations
- Strongest average atmospheric stability over history of PM2.5 record (15 years)
- Unprecedented and record breaking drought conditions
- Very high PM2.5 concentrations recorded throughout the Valley as a result

27


Extreme Drought Conditions in 2013 Precipitation Totals

City	1981-2010 Average (inches)	2013 Total (inches)	Previous Record Low (inches)	Previous Record Year
Modesto	13.11	4.70	5.70	1929
Merced	12.50	3.79	6.00	2007
Fresno	11.50	3.01	3.55	1947
Visalia	10.93	3.47	4.10	1910
Bakersfield	6.47	3.43	1.87	1959
Sacramento	18.52	5.81	6.67	1976
San Francisco	23.65	5.59	9.00	1917
San Jose	14.90	3.80	6.04	1929
Los Angeles	12.82	3.65	4.08	1953
San Diego	10.34	5.57	3.41	1953

28

HEALTHY AIR LIVING
Join a Healthy Air Day

Attainment Demonstration for the San Joaquin Valley

Air Quality Planning and Science Division
California Air Resources Board

29

Background

- The SJV 2008 PM_{2.5} Plan addressed the 15 µg/m³ annual and 65 µg/m³ 24-hour standards
- Plan projected 2015 attainment
- SJV met the 24-hour standard in 2010
- In 2012, most sites attained the annual standard
- Current drought resulted in unusually high PM_{2.5} levels during the winter of 2013/2014
- As a result, SJV will not attain the annual standard in 2015

30

Photochemical Modeling

- 2008 PM_{2.5} Plan modeling
 - Modeling was conducted for an entire year
 - PM_{2.5} chemical composition used in 2008 Plan is very similar to 2013, indicating common atmospheric chemical regimes
 - Types of meteorological conditions conducive to PM_{2.5} formation in 2013/2014 are similar to 2000/2001 conditions simulated in the 2008 Plan

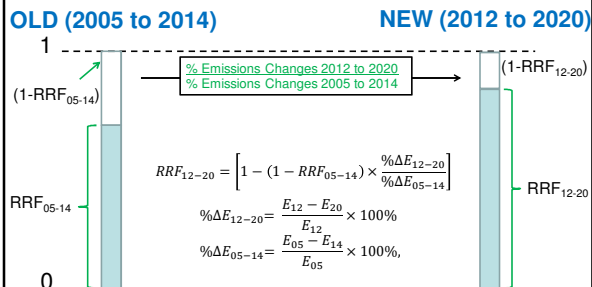
31

Attainment Demonstration

- Uses scaled Relative Response Factors (RRFs) of the 2008 PM_{2.5} Plan
- Coupled with
 - 2013 PM_{2.5} design values
 - 2011-2013 chemical composition
 - Expected emission reductions
- To project future design values
 - 2020 for annual PM_{2.5}
 - 2018 for 24-hour PM_{2.5}

32

Scaling Relative Response Factors



33

Draft Attainment Results

Monitoring Site	2013 Ann. DV	2020 Ann. DV	2013 24-hr DV	2018 24-hr DV
Bakersfield - California Street	16.4	13.7	64.6	51.6
Bakersfield - 410 E Planz	17.0	14.3	55.8	44.9
Clovis - N Villa Avenue	16.4	13.3	57.6	45.3
Fresno - 1st Street/Garland	15.4	12.5	62.0	49.3
Fresno - Hamilton & Winery	14.7	12.0	63.5	50.3
Hanford-S Irwin Street	17.0	13.9	60.2	45.8
Madera	18.1	15.0	52.3	41.4
Manteca-530 Fishback Rd	10.2	8.7	36.7	32.1
Merced - 2334 M Street	11.1	9.2	49.2	40.3
Merced - S Coffee Ave	13.3	11.0	41.8	34.8
Modesto - 14 th Street	13.6	11.5	50.6	42.2
Stockton - Hazelton Street	13.8	12.0	45.0	39.0
Tranquility	7.9	6.6	30.0	23.9
Turlock-S Minaret Street	15.7	13.2	52.7	43.8
Visalia - N Church Street	16.6	13.5	55.7	42.5

34

BACM & MSM Control Measure Evaluation & Strategy

35



BACM Defined

- Under Subpart 4 Serious SIPs must implement best available control measures (BACM), defined as:
 - Maximum degree of emissions reductions achievable from a source or source category, considering energy, economic and environmental impacts.
 - More stringent than RACM, but less stringent than LAER.
 - More extensive implementation of RACM (e.g. paving more unpaved roads)
 - Inclusive of BACT, which is at least as stringent as NSPS and NESHAP guidelines.
- BACM must be implemented within 4 years after reclassification to Serious, except for “de minimis” source categories.

36



MSM Defined

- Since Valley will not attain the 1997 PM2.5 NAAQS by Dec. 2015, District is requesting 5-year extension.
- Certain criteria must be fulfilled to receive the extension; one criterion is a demonstration that the plan includes the most stringent measures (MSM).
- Similar to BACM, MSM defined as:
 - 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 be feasibly implemented in the area.
- Implementation deadline for MSM is, “as expeditiously as practicable.”

37



BACM / MSM Process

MSM evaluation process is the same as BACM process, but with one additional step; processes summarized as follows:

1. Develop a detailed emissions inventory of PM2.5 sources and source categories. (App. B)
2. Model to determine which sources are significant and which are de minimis (less than significant) for PM2.5. (Ch. 5)
3. Identify potential BACM and MSM in other implementation plans or used in practice in other states for each significant source category, and for each measure evaluate the technological and economic feasibility. (App. C)
4. Compare potential BACM/MSM for each significant source category against control measures already adopted. (App. C)
5. Provide for the adoption of any BACM/MSM more stringent than existing measures or provide justification for rejecting the potential BACM/MSM. (App. C)

38



Comprehensive Control Measure Evaluation and Strategy

- Evaluate all sources for BACM/MSM – “No stone left unturned”
 - Direct PM2.5 and PM2.5 precursors (NOx/SOx)
- Key factors for evaluating opportunities:
 - Technological Feasibility
 - Cost Effectiveness
- Must continue to consider new control measure opportunities to ensure expeditious attainment

39



Control Measure Source Categories

- Stationary and Area Sources:
 - Includes industrial/manufacturing, lawn care, commercial cooking, residential wood burning, agricultural sources, etc.
 - Account for 15% of NOx emissions in the Valley
- Mobile Sources:
 - Account for over 85% of NOx emissions in the Valley
 - District lacks regulatory authority (under ARB and EPA authority)

40


HEALTHY AIR LIVING
Let's Breathe Better

Adopted Control Measures

- Sources under District's regulatory authority have already been required to significantly reduce emissions
 - Stationary source NOx emissions reduced by 80%
 - EPA found rules meet or exceed RACT
 - ARB found rules demonstrate "all feasible measures"
- ARB has adopted numerous regulations to reduce emissions from mobile sources
- Measures adopted by District and ARB significantly reduce emissions during 2012-2020 timeframe

41


HEALTHY AIR LIVING
Let's Breathe Better

Adopted Control Measures Continue to Reduce Emissions

District Rule	Last Adoption/ Amendment Date
Rule 4307 Boilers, Steam Generators, and Process Heaters 2 to 5 MMBtu/hr	05/19/2011
Rule 4308 Boilers, Steam Generators, and Process Heaters 0.075 to <2 MMBtu/hr	11/14/2013
Rule 4311 Flares	06/18/2009
Rules 4306 & 4320 Boilers, Steam Generators, and Process Heaters >5 MMBtu/hr	10/16/2008
Rule 4354 Glass Melting Furnaces	5/19/2011
Rule 4702 Internal Combustion Engines	08/18/2011
Rule 4703 Stationary Gas Turbines	09/20/2007
Rule 4901 Wood Burning Fireplaces and Wood Burning Heaters	09/18/2014
Rule 4902 Residential Water Heaters	03/19/2009
Rule 4905 Natural Gas-Fired, Fan-Type Central Furnaces	01/22/2015
Rule 9310 School Bus Fleets	09/21/2006
Rule 9410 Employer-based Trip Reduction	12/17/2009

42


HEALTHY AIR LIVING
Let's Breathe Better

Comprehensive Control Measure Evaluation and Strategy

- **Complete BACM/MSM analysis for all sources**
- **Amend Rule 4692 (Commercial Charbroiling)**
 - Reduce under-fired charbroiler emissions
 - Amend in 2016; Anticipated compliance date in 2017
 - Critical for reaching attainment
- **Review Rule 4550 (Conservation Management Practices)**
 - Evaluate PM_{2.5} impact of windblown fugitive dust from ag operations and potential CMPs to reduce these emissions, beginning 3Q 2015
 - Identify new technologies that reduce emissions from on-field ag activities through District's Technology Advancement Program
 - Additional outreach and education efforts to encourage adoption of conservation tillage; evaluate possibility of incentivizing the adoption of conservation tillage beginning 3Q 2015

43


 HEALTHY AIR LIVING
San Joaquin Hills

Comprehensive Control Measure Evaluation and Strategy (cont'd)

- **Review Rule 4311 (Flares) Flare Minimization Plans**
 - Review FMPs to identify most effective flare minimization practices by Q1 2016
 - Evaluate technological and economic feasibility of implementing new/additional minimization practices or technologies at affected facilities for potential inclusion as control measures by mid-2016
- **Promote Use of Warm Mix Asphalt in the Valley**
 - Evaluate opportunities to encourage transportation and county agencies to mandate transition from hot mix to warm mix asphalt (WMA) by mid-2016
 - Explore potential of granting mitigation credits for WMA usage through District's Indirect Source Review (ISR) program
 - Conduct additional outreach and education efforts to encourage increased adoption and implementation of WMA by Q1 2016

44


 HEALTHY AIR LIVING
San Joaquin Hills

Comprehensive Control Measure Evaluation and Strategy (cont'd)

- **Replace Heavy Duty Trucks**
 - Amount of Funding: \$10MM under AB 2522 for 2016-2020
 - Number of Trucks Replaced: 152-200 heavy duty trucks
 - Surplus Emission Reductions: 0.25-0.33 tons NOx/day
- **Replace Residential Woodburning Devices**
 - Amount of Funding: \$7.5MM of local funds for 2016-2020
 - Number of Devices Replaced: 4,000-7,500
 - Surplus Emission Reductions: 0.10-0.40 tons PM_{2.5}/day
- **Replace Agricultural Heavy Duty Trucks (ARB)**
 - ARB will provide funding in this plan towards the replacement of heavy duty trucks used in agricultural activities, achieving reductions surplus to the State Truck and Bus Regulation.

45


 HEALTHY AIR LIVING
San Joaquin Hills

Summary

- Multi-faceted strategy includes traditional regulatory control measures, incentive programs, technology demonstration projects, public outreach and education, policy initiatives
 - Plan ensures implementation of best available control measures and that most stringent measures are in place
- Plan meets statutory requirements
- Plan achieves significant health benefits
- Plan attains 1997 federal PM2.5 standard as expeditiously as practicable
 - Annual standard: 2020
 - 24-hour standard: 2018



46

Timeline and Next Steps

August 2014 – Ongoing	Outreach on plan process and findings: presentations/discussions at various meetings including Governing Board meetings, Citizen Advisory Group meetings, Environmental Justice Advisory Group meetings
February 2015	Draft plan documents made available for public review and comment
March 4, 2015	Public workshop to present and receive comments on the draft plan documents with an associated comment period
March 17, 2015	Make the Proposed Plan available for public review and comment 30-days prior to the Governing Board public hearing
April 16, 2015	District Governing Board public hearing to hear and potentially adopt the Proposed Plan



47

Public Comments

airqualityplans@valleyair.org
 Chelsea Gonzales at SJVUAPCD
 1990 E. Gettysburg Avenue
 Fresno, CA 93726

The public is invited to continue providing feedback throughout the plan development process. To ensure consideration prior to March posting of the Proposed Plan, comments due by 5:00 PM on March 13, 2015.



48

Email Notifications

- PM Plans email sign up available at <http://www.valleyair.org/lists/list.htm>
- Receive email updates on the development of this plan and future air quality attainment plans

49



Open Discussion

webcast@valleyair.org

50