



DRAFT REGULATION 11, RULE 18 REDUCTION OF RISK FROM AIR TOXIC EMISSIONS AT EXISTING FACILITIES

**Stationary Source
Committee Meeting
April 17, 2017**

Sanjeev Kamboj
Manager, Engineering Division

REGULATION 11, RULE 18 OVERVIEW

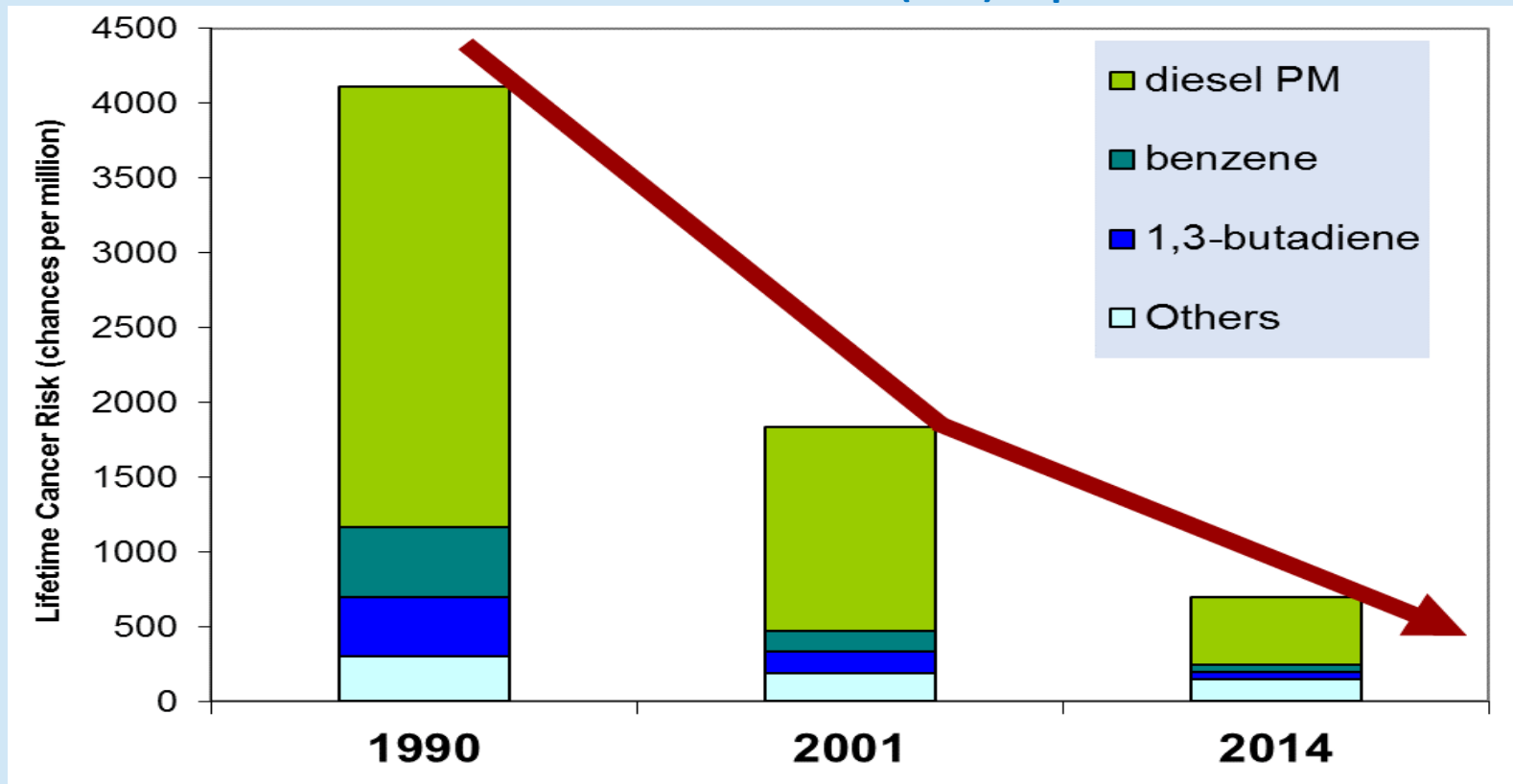
- **The most comprehensive and health protective regulation in the Nation to address community health impacts risks from toxics air contaminants emitted by stationary sources**
- **Utilizes air toxics modeling and incorporates latest science from the Office of Environmental Health Hazard Assessment (OEHHA) to establish health risks to nearby communities**
- **Requires facilities to reduce their risk below the most stringent threshold (10/Million) in the Nation or implement the best available control technologies**

OUTLINE

- **Background**
- **Overview of Proposed Rule 11-18**
- **Implementation**
- **Public Outreach**
- **Forecast**
- **Next Steps**

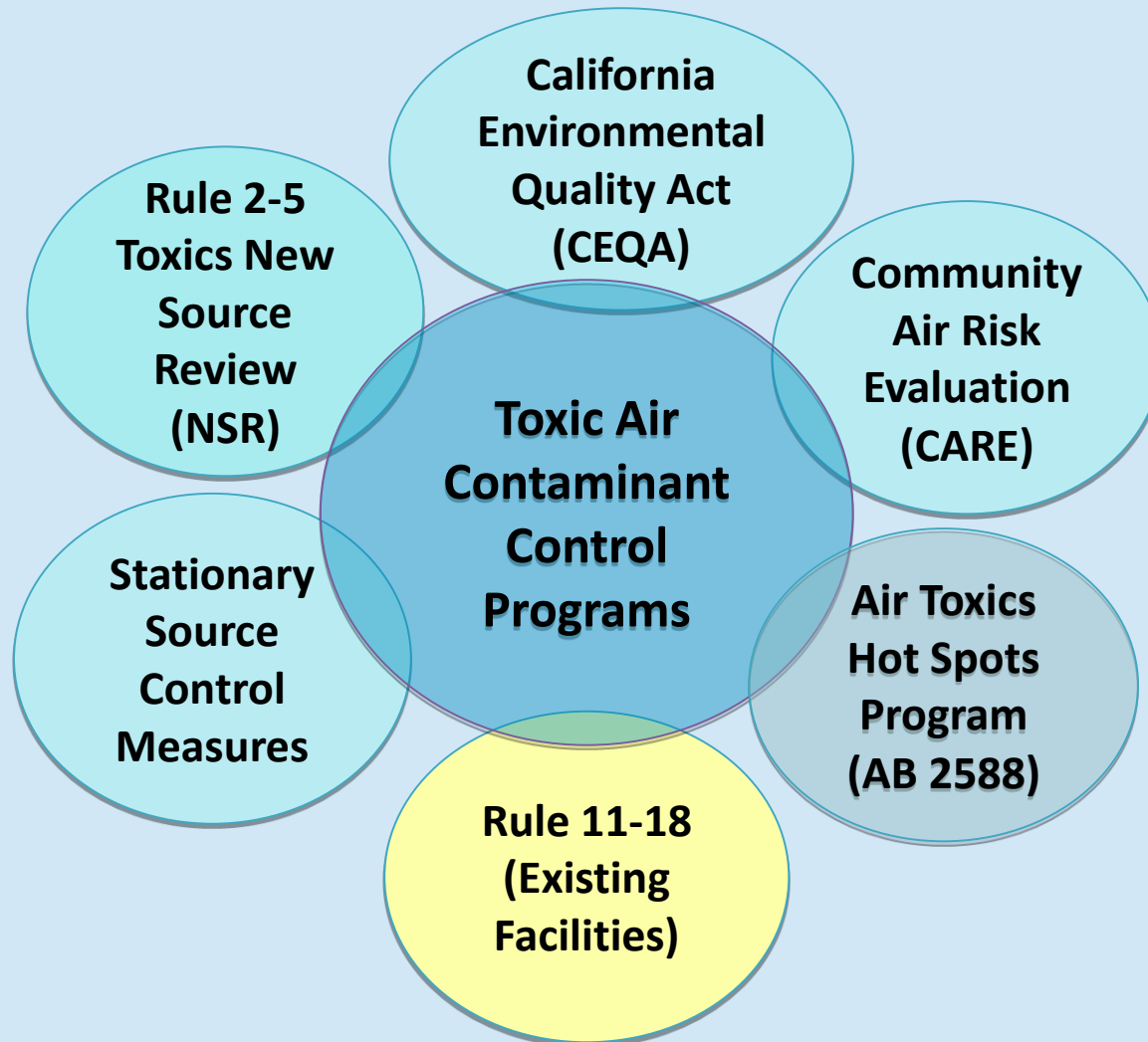
EFFECTIVENESS OF CONTROL PROGRAMS

Bay Area Lifetime Residential Cancer Risk* from Toxic Air Contaminant (TAC) Exposure



* Cancer risk is based on average ambient air monitoring data and the population wide risk assessment methodology presented in OEHHA's 2015 HRA Guidelines.

STATIONARY SOURCE PROGRAMS



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- **Reduces facility-wide health risks from existing sources**
- **Establishes a low risk action level**
 - 100 in a million → 10 in a million
- **About 1100 Facilities Potentially Affected**
 - Refineries • Power Plants • Gas Stations • Hospitals • Foundries
Military Facilities • Landfills • Chemical Plants • Data Centers
Schools/Universities • Crematoria • Sewage Treatment
- **Health Risk Assessments (HRAs) conducted by Air District staff using latest statewide guidelines**

DRAFT REGULATION 11, RULE 18 REQUIREMENTS

Facilities above risk action level (10 in a million) must

- Develop a **risk reduction plan** for Air District approval
- Execute plan according to plan schedule

Potential Risk Reduction Measures

- Installation of Best Available Retrofit Control Technologies for Toxics (TBARCT)
- Modification of operating hours and activity levels
- Modification of emissions point characteristics

DRAFT REGULATION 11, RULE 18 IMPLEMENTATION APPROACH

1. Prioritize Facilities
2. Conduct Health Risk Assessment (HRA)
3. Public Comment on HRA
4. Publish HRA Results to BAAQMD Website & Email Subscription List
5. Risk Reduction Plan
 - Publish Requirement, Submission and Implementation Status to BAAQMD Website & Email Subscription List
 - 3-year implementation timeline

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IMPLEMENTATION PHASES

- **Phase 1 (Prioritization Score > 250)** (*approx. 80 facilities affected*)
 - Health Risk Assessments (2017-2018) - 1 Year to complete
 - Risk Reduction Plan Development and Approval (2018-2019) ~ 9 months
 - Risk Reduction Plan Implementation (2019-2022) – 3 years
- **Phase 2 (Prioritization Score > 10)** (*approx. 350 facilities affected*)
 - Mixed Source Facilities (2019-2025)
- **Phase 3** (*approx. 600 facilities affected*)
 - Diesel Internal Combustion Engines (2021-2027)
- **Phase 4** (*approx. 100 facilities with the largest throughput affected*)
 - Retail Gas Stations (2023-2028)

PUBLIC OUTREACH

- **Open Houses/Workshops:**
 - March 27, 2017 Cupertino
 - March 28, 2017 Benicia
 - March 29, 2017 Hayward
 - March 30, 2017 Richmond
 - November 2016 Richmond, Oakland, San Francisco,
San Jose, Martinez and Fremont
- **Technical Working Group Meetings:**
 - Refineries
 - Bay Area Clean Water Agencies
 - Metal Coalition
- **Public Comments Accepted:**
 - October 11, 2016 through December 2, 2016
 - March 2, 2017 through April 30, 2017

FORECASTING POTENTIAL CHANGES

- Provide flexibility in risk reduction implementation timelines to account for public agency capital improvement planning (i.e. Publicly-Owned Treatment Works)
- Carve off source category specific phases (diesel engines and retail gas stations) and address through industry-wide regulations to further reduce toxics health risk
- Address localized health impacts from Particulate Matter 2.5 ($PM_{2.5}$) through:
 - Direct source regulation (e.g. Regulation 6, Rule 5: PM Emissions from Refinery FCCUs)
 - Working with OEHHA, CAPCOA and CARB to incorporate $PM_{2.5}$ into health risk assessments

NEXT STEPS

- **Publish Final Hearing Package**
 - Public Hearing Notice
 - Proposed Rule
 - Staff Report
 - Socioeconomic Analysis
 - CEQA Analysis
- **Board Hearing for Adoption**



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

AGENDA: 5

Update on Regulation 6: Particulate Matter Rule Update Stationary Source Committee

Guy Gimlen
Rule Development
April 17, 2017



Outline

- Particulate Matter (PM) Basics
- PM Health Impacts
- PM Sources
- Air Quality Trends
- Rulemaking
- Next steps for PM



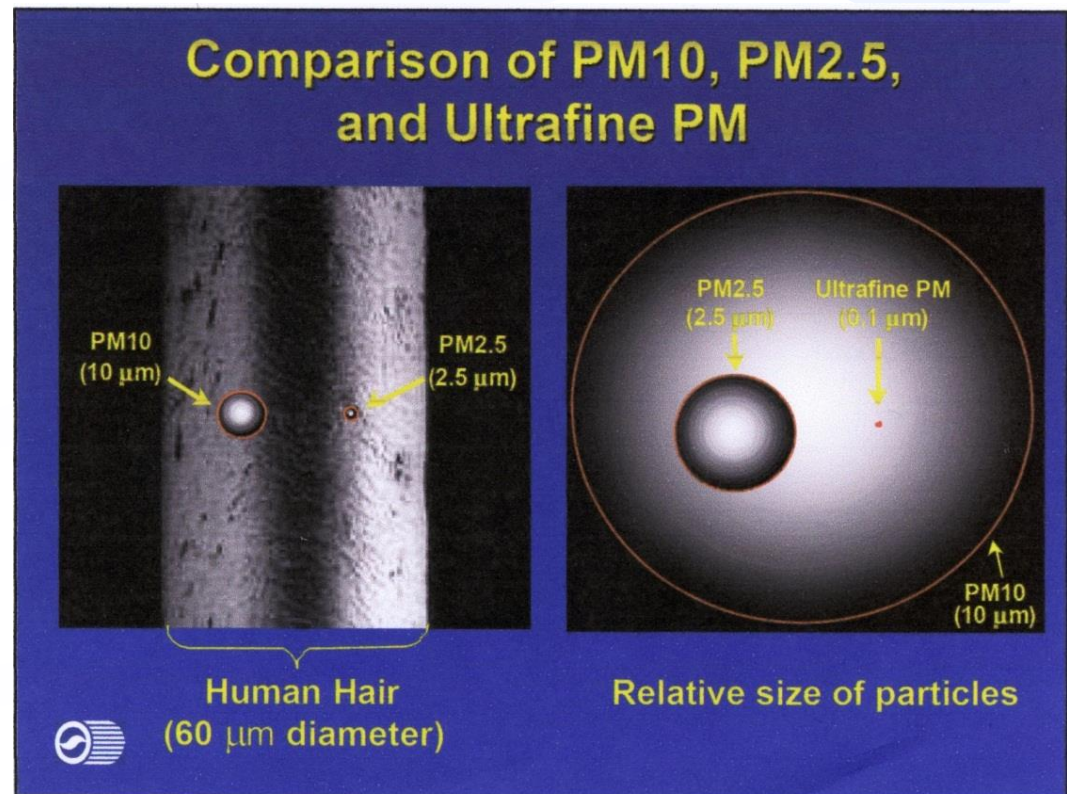
PM Basics

Particulate Matter is a diverse mix of airborne solid particles and liquid droplets that differ in size, mass, toxicity, chemical properties & how they behave in the atmosphere

- **Total Suspended Solids (TSP):**
~50 microns or less
- **PM₁₀:** 10 microns or less
- **PM_{2.5}:** “Fine” PM
2.5 microns or less
- **Ultrafine PM:** 0.1 microns
or less*

Smallest particles have the greatest health impacts!

* One million microns = one meter



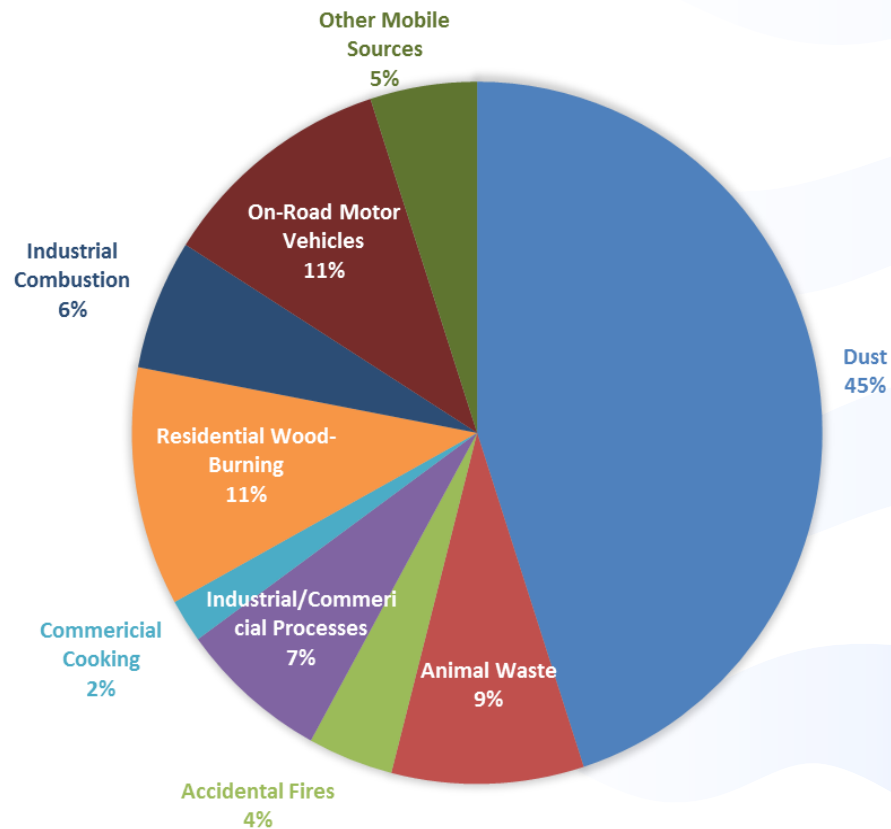
PM Health Impacts

- **Premature mortality**
 - Higher PM_{2.5} levels → higher death rates
 - PM_{2.5} accounts for 2,000-3,000 premature deaths each year in the Bay Area
- **Respiratory problems**
 - asthma, bronchitis, impaired lung development
- **Cardiovascular problems**
 - atherosclerosis, heart attacks, strokes
- **Cancer**
 - diesel soot contains carcinogens
- **Adverse health impacts even at moderate levels**
 - from both short-term & long-term exposure
 - children & elderly are most at risk
 - small particles penetrate deep into lungs, bloodstream, organs, and cells



Sources of PM₁₀

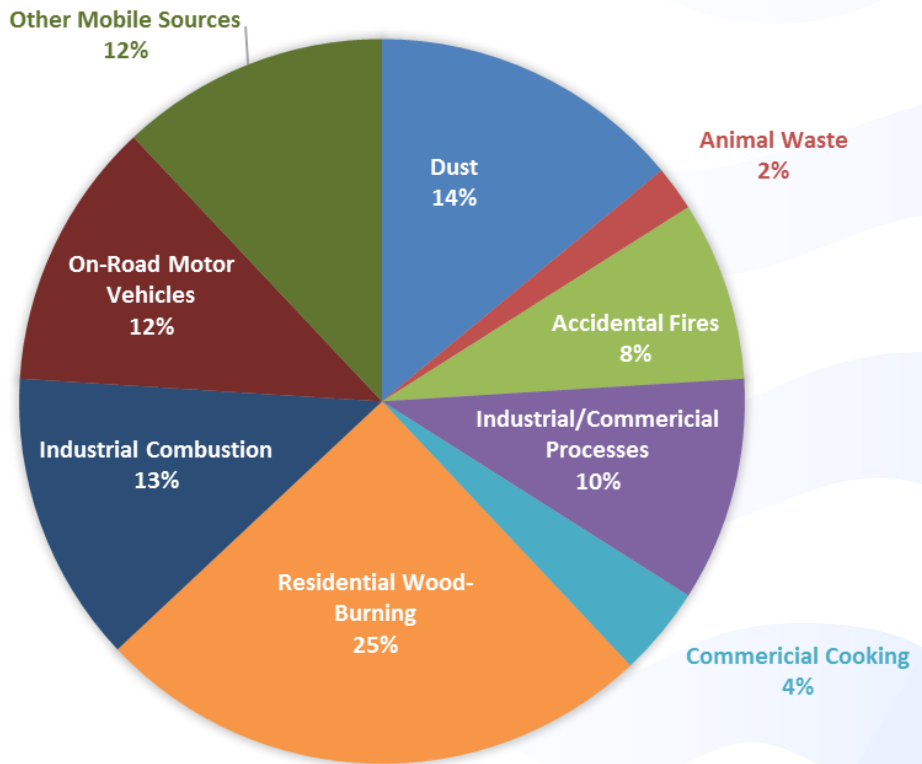
2017 Clean Air Plan Figure 2-7: Direct PM₁₀ Emissions by Source, Annual Average, 2015 (109 tons/day)





Sources of PM_{2.5}

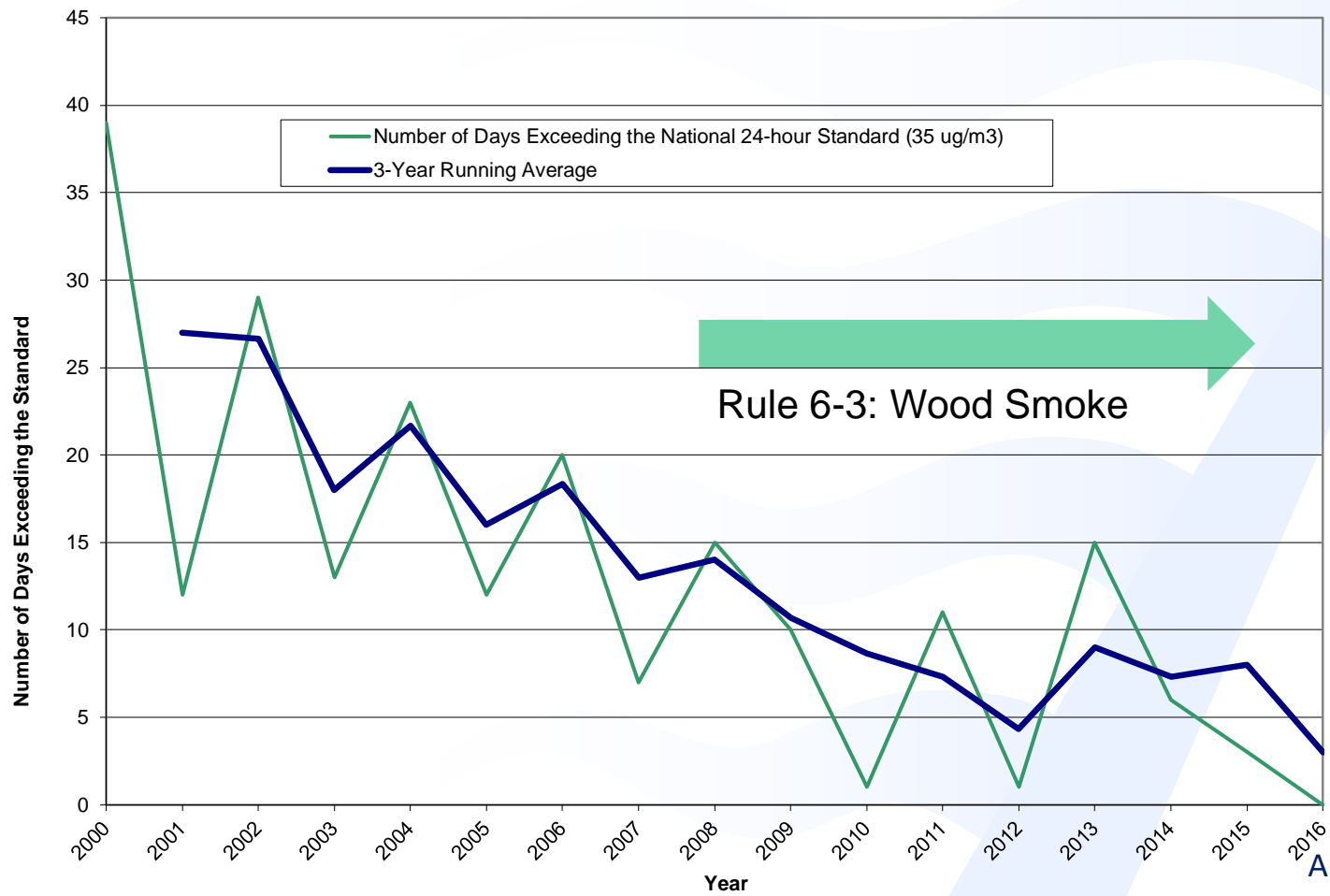
2017 Clean Air Plan Figure 2-6: Direct PM_{2.5} Emissions by Source, Annual Average, 2015 (47 tons/day)





Air Quality Trends

24-hr PM_{2.5} Exceedances each Winter



Stationary Source PM Control Measures in 2010

Stationary Source Measures (SSM) in Clean Air Plan

- SSM 1: **Metal-Melting Facilities** - New Reg 12-13 & 12-14 to reduce PM from foundries & scrap recyclers - **Complete**
- SSM 6: **General PM** - Amend Regulation 6-1 to reduce allowable PM emissions rate from a variety of sources - **This project**
- SSM 7: **Open Burning** - Amend Regulation 5 to limit amount that can be burned on permitted burn days - **Complete**
- SSM 9: **Cement Kilns** - Reduce PM, NOx, toxics - **Complete**
- SSM 16: **New Source Review** - Amendments for PM_{2.5} - **Complete**
- FSM 12: **Wood Smoke** - Further study resulted in amendments to Regulation 6-3 - **Complete**
- SSM 8: **Coke Calcining** - will reduce SOx - **Complete**



The background of the slide features a scenic view of the Golden Gate Bridge in San Francisco, California. The bridge's iconic orange-red towers and suspension cables are visible against a clear blue sky. In the foreground, the water of the bay is calm, and a small building is situated on the left side of the frame.

Control Methods

Bulk Materials & Construction Dust:

- Wind Erosion
 - Wind screens effective for stockpiles, conveyors, and disturbed surfaces
 - Wind screens not effective at construction sites
 - Water is frequently used to reduce dust
- Truck traffic is a significant source of dust on unpaved roads within facilities
 - Water is used to reduce dust (water mist is more efficient than water spray)
- Trackout & Carryout Control
 - Trackout = mud and dirt on vehicles deposited on roads leaving the facility
 - Carryout = spills from the vehicles, or carried off the vehicle onto roads





Control Methods

Industrial / Commercial Processes:

- Dust control required where solids and solids handling are exposed to wind
- Truck traffic is often the largest source of dust emissions
- When solids handling and processing are contained and vented through a stack
 - Wet mechanical scrubbers and/or cyclones: 50 – 70% effective
 - Baghouses, or Electrostatic precipitators: 90+% effective

Road Dust:

- Mud and other solids on roads are entrained into the air traffic



Draft Structure for Regulation 6

- Recommend new umbrella regulation – Regulation 6
 - to provide common and consistent definitions and test methods that apply to all current and future PM rules.
- Amendments to Regulation 6, Rule 1: General Requirements
- New Regulation 6, Rule 6: Prohibition of Trackout
- New Regulation 6, Rule 8: Bulk Material Handling
- Anticipate other source specific rules going forward



Regulation 6, Rule 1: General Requirements

Rule 6-1 is currently a Total Suspended Particulates (TSP) rule (includes PM_{10} and $PM_{2.5}$)

Proposed changes to Rule 6-1

- Tighten general particulate matter emissions limits
 - concentration and mass limits to match the most stringent requirements in California
 - translation of TSP to PM_{10} and/or $PM_{2.5}$ requirements is dependent on the specific solids
- Specify test methods for determining compliance
- Require periodic compliance testing
- Future rulemaking will need to be source-specific





Prohibition of Trackout

New Regulation 6, Rule 6: Prohibition of Trackout

- Currently required by many city / county ordinances, Storm Water Pollution Prevention Plans and California Motor Vehicle Code, but enforcement seems inadequate.
- Road dust from trackout has high PM_{2.5} content
- Staff observed that more than 50% of construction sites had trackout issues.
- Requirements
 - No “significant” visible emissions
 - No “significant” visible roadway material on adjacent paved roadway
 - Immediate cleanup required (with no visible emissions) and no material at end of work day
 - Regular monitoring





Bulk Material Handling

New Regulation 6, Rule 8: Bulk Material Handling

- Addresses fugitive dust from all bulk materials, including petroleum coke and coal.
- Best Available Control Technology: cover transportation vehicles, and enclosures around handling, loading, and unloading – ducted to a baghouse.
- Requirements
 - No Visible Emissions
 - Wind screens and water-mist systems for existing facilities
 - Load using telescoping chutes, limit drop height and freeboard to no more than 5 feet





Rule Making Schedule

Workshops:

- Eight workshops in late January / early February
 - Cupertino
 - San Rafael
 - Walnut Creek
 - San Jose
 - San Francisco
 - Yountville
 - Dublin
 - Oakland
- Comments received by March 10

Public Hearing:

- Incorporate changes in April - June
- CEQA and Socio-economic analyses by August 1
- Public Hearing(s?) in Fall, 2017



Next Steps to Address PM

- Follow through on Combustion Strategy in 2017 CAP to minimize carbon intensity / reduce fuel consumption
- Reduce refinery Fluidized Catalytic Cracking Unit PM_{2.5} emissions
 - Possible amendments to Rule 6-5
- Address PM_{2.5} emissions from cement kiln
- Evaluate PM risk as part of proposed Rule 11-18 Health Risk Assessment (HRA's)
- Future source specific, or risk-based rulemaking





Questions?

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Reference Slides





PM Sources

Wide range of emissions sources: natural and human-made

- Primary PM: emitted directly from tailpipes, stacks, windblown dust, etc.
 - Both solids and small liquid droplets (called aerosols)
- Some pollutants emitted as a gas, then condense (called condensable PM)
- Secondary PM formed in the atmosphere: Precursor pollutants are ROG, NO_x, SO_x, NH₃

PM levels vary both geographically and with the weather

- Highest Bay Area PM₁₀ + PM_{2.5} levels occur during fall – from wild fires
- Highest Bay Area PM_{2.5} levels occur during winter – from wood burning

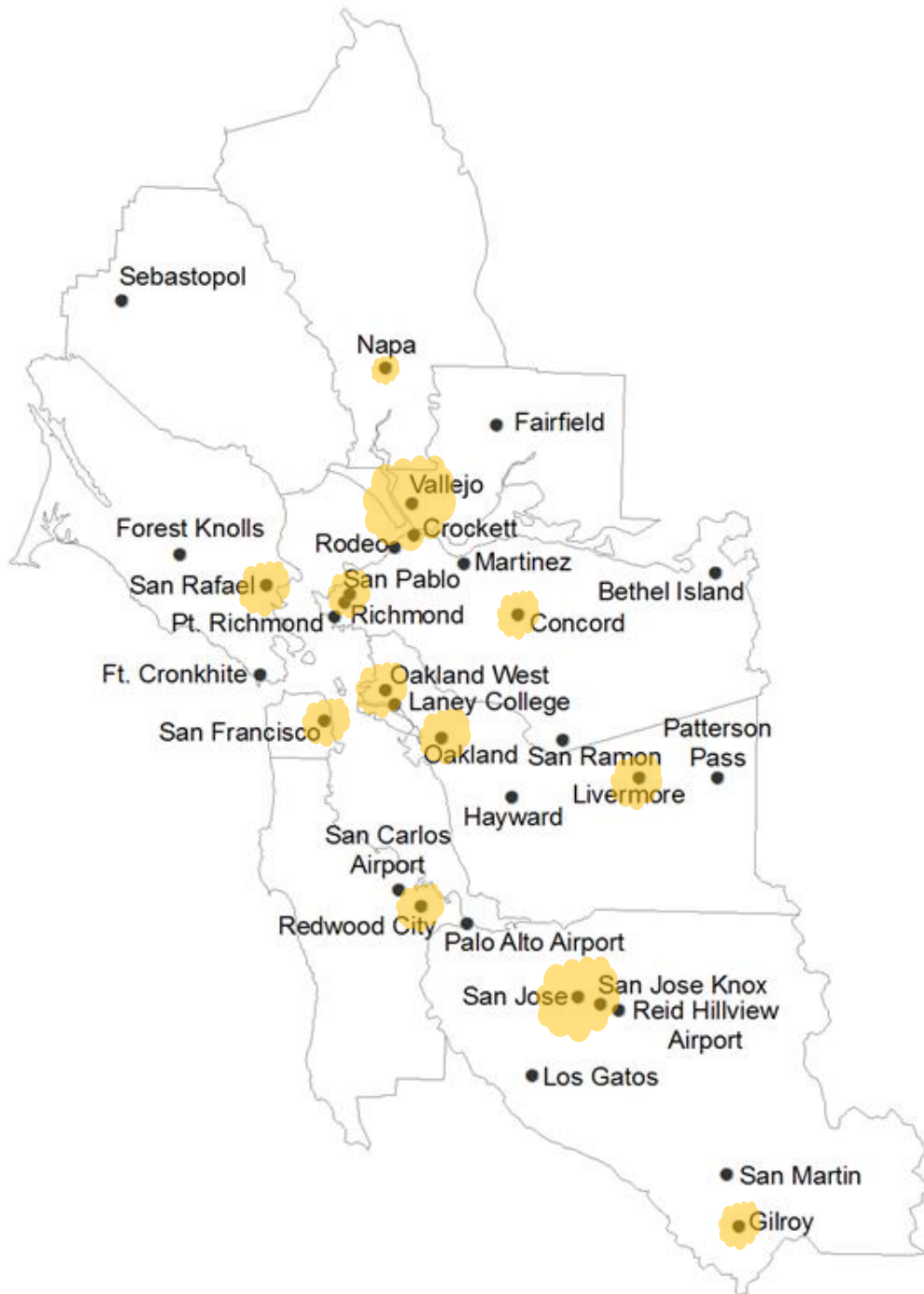
Information on condensable particulates still improving

- Test method to quantify condensable particulates was finalized December 2010
- Using this test method on sources with high potential for condensable PM
 - refinery FCC's and cement kilns

Emissions Inventory does not include secondary particulates at all facilities



High PM_{2.5} Locations



2011 - 2016

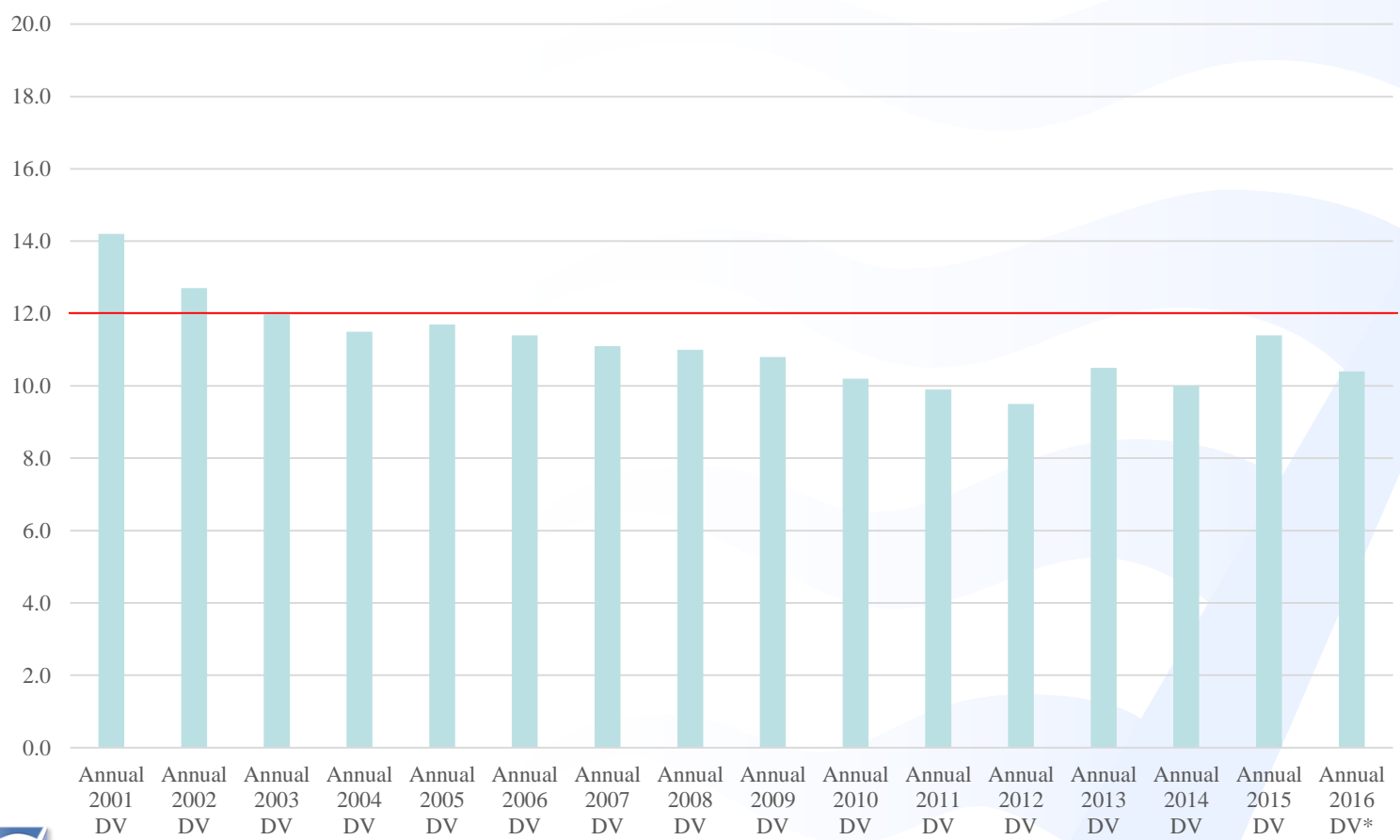
PM_{2.5} Exceedances

Vallejo	17
San Jose	15
Livermore	7
Oakland East	7
Oakland West	6
San Rafael	6
San Francisco	5
Redwood City	4
Concord	3
San Pablo	3
Gilroy	3
Napa	2
Total	80
Winter	73
Wildfires	7



Air Quality Trends

Annual PM_{2.5} Average (Design Value)



PM Attainment Status

National Ambient Air Quality Standards for PM:

- 24-hour PM_{10} standard = $150 \mu\text{g}/\text{m}^3$.
- 24-hour $PM_{2.5}$ standard = $35 \mu\text{g}/\text{m}^3$.
- Annual 3-Year Average $PM_{2.5}$ standard = $12 \mu\text{g}/\text{m}^3$.

Bay Area Peak = 54 - 61 $\mu\text{g}/\text{m}^3$

Bay Area Peak = 36 - 49 $\mu\text{g}/\text{m}^3$

Bay Area Peak = 10.4 $\mu\text{g}/\text{m}^3$

Meeting national requirements

- Need to submit Maintenance Plan to be redesignated as Attainment

Currently no standards for ultrafine PM

California Ambient Air Quality Standards for PM:

- 24-hour PM_{10} standard = $50 \mu\text{g}/\text{m}^3$.
- Annual Average PM_{10} standard = $20 \mu\text{g}/\text{m}^3$.
- Annual Average 3-Year Maximum $PM_{2.5}$ standard = $12 \mu\text{g}/\text{m}^3$.

Bay Area Peak = 54 - 61 $\mu\text{g}/\text{m}^3$

Bay Area Peak = 22.3 $\mu\text{g}/\text{m}^3$

Bay Area Peak = 12.8 $\mu\text{g}/\text{m}^3$

NOT meeting the state requirements - six year period from 2011 through 2016:

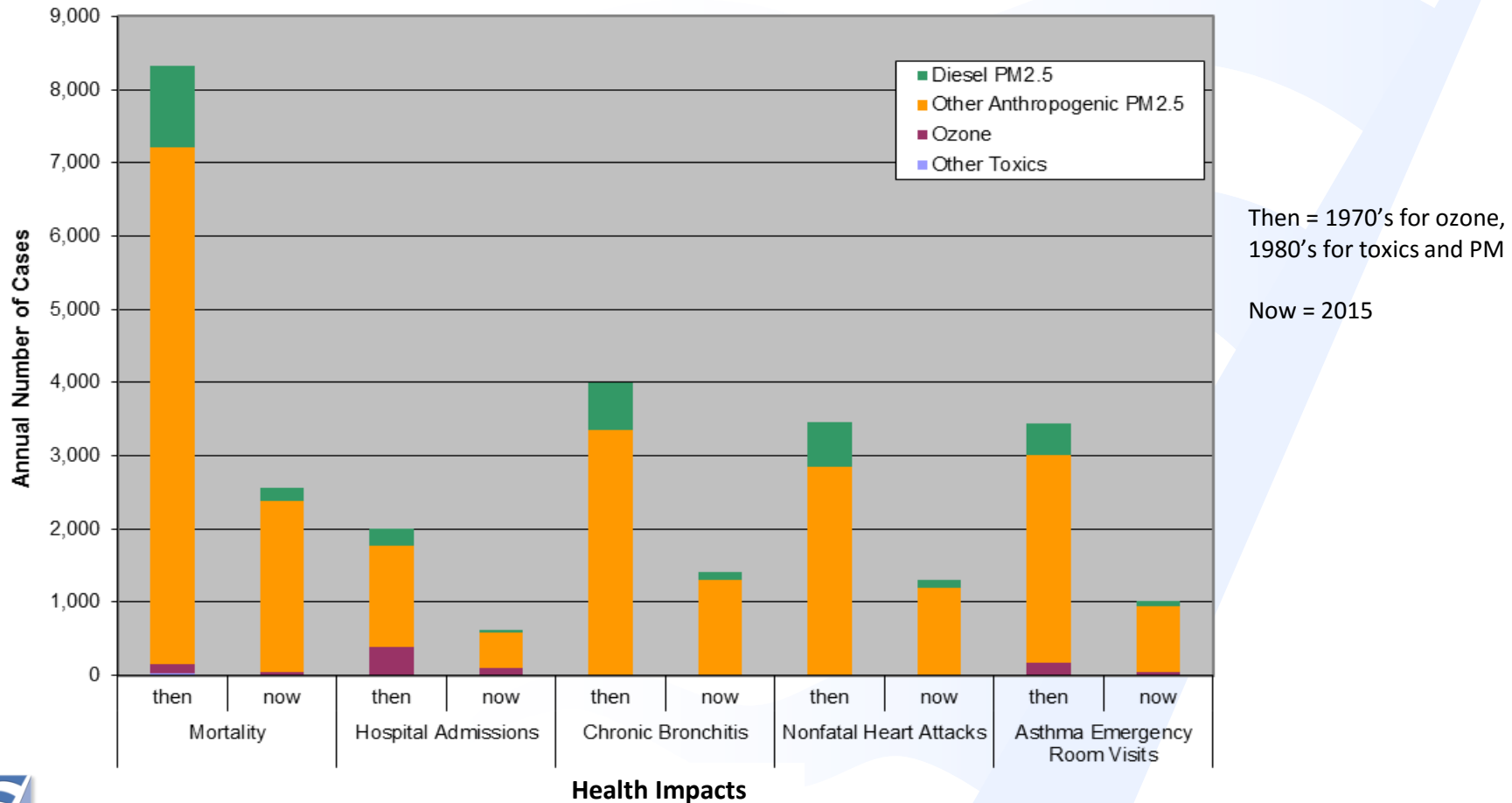
- exceeded State annual average PM_{10} standard ($20 \mu\text{g}/\text{m}^3$) in 2011, 2013 and 2015
- exceeded State 24 hour average PM_{10} standard ($50 \mu\text{g}/\text{m}^3$) 18 times / locations
- exceeded State annual average $PM_{2.5}$ standard ($12 \mu\text{g}/\text{m}^3$) in two different locations in 2013

Exceedances almost always occur during winter Spare the Air season, or from wildfires



Estimated PM Health Burden in Bay Area

Health Burden: Past and Present



Source: Figure C-1, 2017 Plan Appendix C – Air Pollution Health Burden: Past & Present

April 17, 2017
Slide 23



Regulatory Control Programs

Industrial Sources

- Regulations & permit conditions
- Control measures to reduce PM emissions in 2010 & draft 2017 Clean Air Plan
- Rule 6-5 addresses condensable PM from refinery Fluid Catalytic Cracking Units

Area Sources

- Rule 6-3 addresses wood-burning rule & Winter Spare The Air program

Mobile Sources

- ARB regs reduce PM from shipping, heavy-duty & light-duty vehicles & equipment
- Mobile Source Compliance Plan: District enforces ARB regs in Bay Area
- Grants & Incentive programs to complement regulations
- Transportation & Mobile control measures in 2010 Clean Air Plan and draft 2017 Clean Air Plan

Multi-pollutant control strategy in 2010 CAP and draft 2017 CAP is backbone of current program to reduce PM





Current PM Regulations

- **Regulation 2, Permits, Rule 2: New Source Review**
- **Regulation 5, Open Burning**
- **Regulation 6, Particulate Matter, Rule 1: General Requirements**
- **Regulation 6, Particulate Matter, Rule 2: Commercial Cooking Equipment**
- **Regulation 6, Particulate Matter, Rule 3: Wood Burning Devices**
- **Regulation 6, Particulate Matter, Rule 4: Metal Recycling and Shredding Operations**
- **Regulation 6, Particulate Matter, Rule 5: Particulate Emissions from Refinery Fluidized Catalytic Cracking Units**
- **Regulation 9, Inorganic Gaseous Pollutants, Rule 13: Nitrogen Oxides, Particulate Matter, and Toxic Air Contaminants from Portland Cement Manufacturing**
- **Regulation 10: Standards of Performance for New Stationary Sources**
- **Regulation 12, Miscellaneous Standards of Performance, Rule 4: Sand Blasting**
- **Regulation 12, Rule 13: Foundry and Forging Operations**
- **Federal New Source Performance Standards (40 C.F.R. Part 60)**
- **Federal National Emission Standards for Hazardous Air Pollutants (NESHAPs) (40 C.F.R. Part 63)**





Targeted Sources

Source Categories

Road Dust – 6 subcategories

Construction Dust – 5 subcategories

Industrial Combustion

- Petroleum Refinery Combustion

Industrial/Commercial Processes

- Petroleum Refinery Processing
- Chemical Manufacturing
- Food & Agricultural Processes
- Wood Products
- Asphalt
- Concrete
- Glass
- Stone, Sand & Gravel
- Landfills & Waste Management
- Other

PM₁₀

28.1 tpd

11.5

5.2

2.5

0.3

0.4

0.4

0.1

0.2

1.1

0.7

0.4

1.9

0.8

PM_{2.5}

4.0 tpd

1.1

5.1

2.5

0.2

0.4

0.3

0.1

0.2

0.8

0.7

0.1

0.5

0.5



Examples of Road Dust - Trackout



From trucks



Soil Erosion



Examples of Trackout Controls

Grizzlies



Truck wash system



Examples of Bulk Material Dust



Quarry



Petroleum Coke



Bulk Material Dust Controls

Wind Screens



Mist Systems





Asphalt

- New Regulation 6, Rule 7: Asphalt Operations

- Hot mix paving asphalt (particularly rubberized paving asphalt) smokes (known as “blue smoke”) when delivered from a asphalt plant hopper into a delivery truck. This is very likely condensed asphalt, PM_{2.5}.
- Hot Chip Seal asphalt is sprayed as a liquid onto roads to repair cracks. This material creates significant “blue smoke”.
- Controlled by “blue smoke” abatement – vacuum system & filter.
- Roofing Asphalt creates odors, and smoke from the Asphalt Kettle

- Controls are not cost effective

- Blue smoke abatement facilities collect very little material
- Low Fuming Roofing Asphalt available for only 1 supplier, and increases cost by 30%

- Affected Facilities

- ~ 2 Chip Seal Asphalt jobs - 0.02 tpd PM₁₀ - 0.02 tpd PM_{2.5}
- ~100+ Roofing Asphalt jobs - 0.06 tpd PM₁₀ - 0.06 tpd PM_{2.5}
- ~ 10 Paving Asphalt Plants ?

