



BAY AREA
AIR QUALITY
MANAGEMENT
DISTRICT

Refinery Strategy

Stationary Source Committee
September 21, 2015

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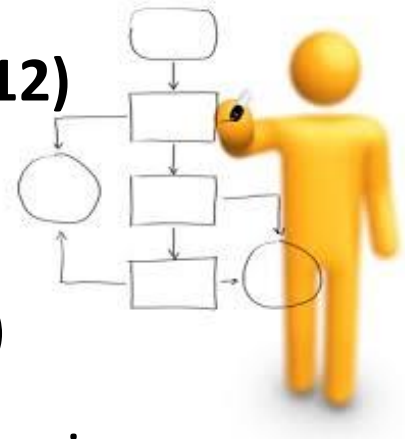
Overview

- Development of Overall Refinery Strategy
- Goals
- Elements
 - Reduce harmful emissions
 - Continuous monitoring
 - Limit pollution & protect health
 - Ensure Best Practices
- Goals Achieved and Comments addressed
- Next steps



Development of the Overall Refinery Strategy

- Regulatory Concept paper **(2012)**
- Industrial Facility Accidental Releases Work Plan **(2012)**
- Reg. 12, Rule 15 development **(2013 to the present)**
- Reg. 12, Rule 16 development **(Oct. 2014 to present)**
- Resolution Addressing Emissions from Bay Area Refineries **(Oct. 2014)**
- Refinery Emission Reduction Strategy **(Dec. 2014 to present)**
- Changes to permitting requirements **(mid 2016)**



Goals of the Refinery Strategy

- Reduce harmful emissions both regionally and within nearby communities
- Perform monitoring to measure impacts and identify potential opportunities to reduce emissions
- Limit emissions and protect health
- Ensure refinery operation changes will not increase health burden and ensure best practices over time



BAY AREA AIR QUALITY MANAGEMENT DISTRICT REFINERY STRATEGY

REDUCE
HARMFUL
EMISSIONS

CONTINUOUS
MONITORING

LIMIT
POLLUTION
& PROTECT
HEALTH

ENSURE BEST
PRACTICES

Reduce Harmful Emissions: The Air District staff is developing a suite of regulations to reduce emissions of criteria pollutants from Bay Area refineries by 20 percent (or as much as feasible) by 2020. The first phase of these regulations will be considered by the Board in December 2015 and will:

- Reduce sulfur dioxide (SO₂) from coke-calcining
- Reduce organic compound and toxic emissions from equipment leaks and cooling towers
- Limit ammonia emissions from fluid catalytic cracking (FCC) units, which will reduce associated formation and emission of fine particulate matter (PM_{2.5})

In mid-2016, the second phase of the strategy will further reduce:

- SO₂ from FCC units and other refinery sources
- PM_{2.5} emissions from FCC units
- Nitrogen oxide (NO_x) emissions from turbines

Continuous Monitoring: Draft Regulation 12, Rule 15, Petroleum Refining Emissions Tracking, will require:

- Continuously updated, state-of-the-art methods be used to calculate and report the total pollution from the refineries every year
- Extensive air quality monitoring to validate those pollution calculations and ensure surrounding communities are not subjected to unhealthy levels of pollution
- Requirements that will use emission inventories and monitoring data to identify potential reductions
- An energy audit identifying potential improvements to reduce GHGs
- New, more protective, Health Risk Assessments be performed to determine the health risk from toxic air pollutants

Limit Pollution & Protect Health: Draft Regulation 12, Rule 16, Petroleum Refining Emissions Limits and Risk Thresholds, will:

- Limit refinery criteria pollutant and toxic emissions to levels that minimize the health burden for the surrounding communities
- Require Health Risk Assessments have updated information every year as new emissions data are received

Ensure Best Practices:

Air District staff is developing changes to the Air District permitting regulations to ensure that when refineries modernize or make significant changes to the type of crude oil they use, they will be required to use the best available control technology to reduce smog-forming, toxic, and climate pollutants. Over time, these changes to the permitting regulations will ensure the refineries use best practices and operate as efficiently and cleanly as possible.



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Reduce Harmful Emissions

- 20% criteria pollutant reductions by 2020
 - Includes four specific refinery emission reduction regulations
 - Additional rulemaking is underway
- 20% reduction in risk by 2020
 - 12-16 sets total risk at 25 in 1 million
 - 12-15 HRA and additional monitoring requirements will aid in identifying sources for further reductions





Reduce Harmful Emissions - Phase I

Title	Pollutant(s)	Amount Reduced	Projected Completion
Rule 9-14: Petroleum Coke Calcining	SO ₂	645 tons/year (tpy)	Winter 2015
Rule 6-5: Fluid Catalytic Cracking Units	Ammonia, PM	TBD	Winter 2015
Rule 8-18: Equipment Leaks	VOC, toxics, methane	1,227 tpy	Winter 2015
Rule 11-10: Cooling Towers	VOC, toxics, methane	514 tpy	Winter 2015

Total Reductions for 2015: **2,386 tons per year or 15%** of total refinery criteria pollutant emissions.

Phase II rulemaking planned for 2016 likely to exceed goal of 20% reductions by 2020.



Reduce Harmful Emissions – Phase II

Title	Pollutant(s)	Amount Reduced	Projected Completion
Rule 6-5: Fluid Catalytic Cracking Units (Part 2)	SO ₂ PM _{2.5}	600 tpy* 200 tpy*	Spring 2016
Rule 9-1: Refinery Fuel Gas, Sulfur Plant, Acid Plants	SO ₂	800 tpy	Spring 2016
Rule 9-9: Stationary Gas Turbines	NO _X	250 tpy	Spring 2016

*Estimated – Additional testing and evaluation need to confirm emission reductions

Total Reductions for Phase II: **1,850 tons per year or 12%** of total refinery criteria pollutant emissions.

Combined emission reductions estimated to be **27%** of refinery criteria pollutant emissions.

Continuous Monitoring

Regulation 12, Rule 15 Elements

- Annual emissions inventories to determine emissions and identify potential areas of improvement
- Fence line and community monitoring systems to measure air quality
- Crude oil composition characteristics
- Health Risk Assessments (HRAs)
- Energy audits



Regulation 12, Rule 15

Tie-ins to Future Actions

- Additional crude oil composition characteristics ties into permitting actions
- Energy efficiency audit to investigate additional GHG reductions



Limit Pollution and Protect Health

Regulation 12, Rule 16

- Risk limit - 25 in 1 million using HRA required in 12-15
 - Future rule changes will likely incorporate this limit for all Bay Area facilities
 - Update information yearly to ensure changes don't negatively impact health
- Implement criteria pollutant limits based on Potential To Emit (PTE) and National Ambient Air Quality Standards (NAAQS)



Ensure Best Practices

- Crude slate modifications trigger permitting review
 - Engineering review of criteria pollutants, GHG and TACs
- Best Available Control Technology (BACT) for criteria pollutants, GHG and TACs
 - New Source Review for all affected systems



Precedent Setting Actions

- Fence-line and community monitoring required
- Updated HRA using latest methods
- Limits and reduces criteria pollutants
- Limits overall risk
- Identifies energy efficiency improvement opportunities
- Requires for engineering review for crude slate changes
- Reduces methane emissions from refineries
- Addresses GHG in permit review





Goals Achieved

- Risk and criteria pollutants limits set and emissions information collected
- Systems set in place to measure progress and identify areas for possible improvement
- Emissions will be reduced by 15% in Phase I
- Phase II will further reduce emissions to achieve 20% reduction goal





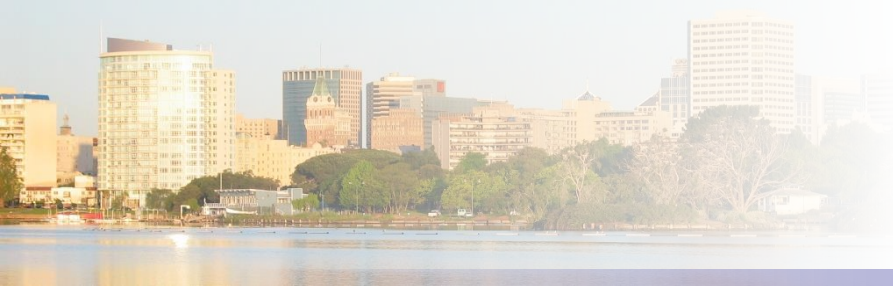
Goals Achieved (continued)

- Address impacts “looking forward”
 - Changes to crude slate require permit review
 - Increases in criteria pollutant, GHG and/or TAC emissions trigger BACT
 - Incorporate best practices through permitting process
 - Use energy efficiency information to identify potential GHG reductions



Issue Submitted by CBE and other Groups

“Direct Air District Staff to develop, for Board consideration in proposed Rule 12-16, enforceable numeric limits on criteria, toxic, and greenhouse gas air pollutant emissions.”



Addressing Issues: Criteria Pollutants

Issue: Cap criteria pollutants at actual emissions with a defined buffer

Staff Approach:

- Limit refineries emissions at permitted capacity.
- Refineries will be required to demonstrate compliance with applicable federal health standards for $PM_{2.5}$ and SO_2 .
- Refineries will be required to reduce allowable emissions if they cannot show compliance with federal air quality standards.



Addressing Issues: Toxic Air Contaminants

Issue: Cap each toxic pollutant at current levels

Staff Approach:

- Propose to take risk based approach and lower limits using latest science on risk.
- Consider the relative toxicity of the contaminants and the distance between emission point and neighboring community.
- Based on proven regulatory approach utilized throughout California.



Addressing Issues: GHG

Issue: Establish Local GHG Caps

Staff Approach:

- Refinery sector GHG emissions are already capped and required to decline under AB 32.
- Staff recommends addressing GHG emissions through Air District permitting rules to ensure best practices.
- Staff recommends tracking refinery GHG emissions and energy efficiency in preparation for future rulemaking



ARB Perspective on Local GHG Cap

“...a local cap on Bay Area refinery emissions, which are already regulated by California’s Cap-and-Trade Program, would not provide any additional GHG emissions reductions beyond the statewide cap.”

- Additional potential consequences of Bay Area GHG cap:
 - Will not provide statewide GHG emission reductions
 - Increase GHG emissions outside the Bay Area
 - Increase the cost of statewide GHG emission reductions
 - Shift business activity outside the Bay Area

Regulatory Program to Reduce GHG from Stationary Sources

- Expand GHG evaluation in permitting program
- Require BACT in New Source Review to limit GHG increases
- Develop regulatory proposals to limit short-lived climate pollutants
- Investigate and pursue areas for additional action to reduce GHG





Next Steps

- Open house workshops underway in Martinez, Benicia and Richmond
- Bring 12-15 and 12-16 to the Board for consideration in December
- Bring new and modified regulations in the Phase I of the 20% reduction by 2020 package to the Board for consideration in December
- Continue rule development and enact changes to permitting regulations and additional items in Phase II of the 20% by 2020 package
- Bring Phase II and permitting rules to Board for consideration in early 2016