AGENDA : 11

Bay Area Refinery Emissions Reduction Strategy

BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Board of Directors

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Background

Board Direction

October 15, 2014 Board Resolution 2014-17 directed staff to:

- Continue the development of Rule 12-15, Refinery Emissions Tracking;
- Prepare companion Rule 12-16, to set emissions thresholds and mitigate potential increases;
- **Develop a strategy to reduce emissions from refineries by 20% or as much as feasible.**

Overview

Refinery Emission Reduction Approaches Evaluated

- Bay Area RECLAIM (Market-based system as used in South Coast)
- Community-Worker Proposal
- Western States Petroleum Association (WSPA) Proposal
- Periodic Technology Review (staff approach)
- Best Available Retrofit Control Technology (BARCT)/Focused Toxics (staff approach)

Evaluation Criteria

- Health and Safety Code (H&SC) compliance
- Reduction of health risk from toxics
- Reduction of criteria pollutants
- Process transparency/regulatory certainty
- Implementation speed/complexity
- Reduced impact on neighboring communities
- Net reduction of greenhouse gases (GHGs)

Proposed Approach

Evaluation Criteria

Health and Safety Code (H&SC) Compliance

1. Necessity – A need exists for the regulation;
2. Cost Effectiveness - The regulation must consider cost effectiveness including an analysis of the incremental cost effectiveness of progressively more stringent possible controls;
3. Non-duplication - The regulation does not impose the same requirements as an existing state or federal.

Reduction of Health Risks from Toxics

Includes consideration of relative toxicity, off-site concentrations, ages and sensitivities of exposed individuals

Reduction of Criteria Pollutants

Includes particulate matter (PM), oxides of nitrogen (NO_X), reactive organic gases (ROG), and sulfur dioxide (SO_2)

Evaluation Criteria cont.

Process Transparency/Regulatory Certainty
Ensures that all stakeholders can fully participate in the rule development process, understand how the rule will be implemented and be able to determine if the rule is working as expected.

Technology Forcing
Will the strategy encourage the development of new control technologies?

Implementation Speed/Complexity
Can the strategy be implemented quickly? Will the implementation require a significant, long-term resource commitment by the Air District?

Reduced Impact on Neighboring Communities
Will the neighborhoods around the refineries benefit from the strategy?

Net Reduction of GHGs
Will this result in an overall reduction in greenhouse gas (GHG) emissions considering all of the GHG regulations in place in California?

Bay Area RECLAIM

South Coast AQMD has a program in place to control NO_X and SO_X from large sources. The program has the following components:

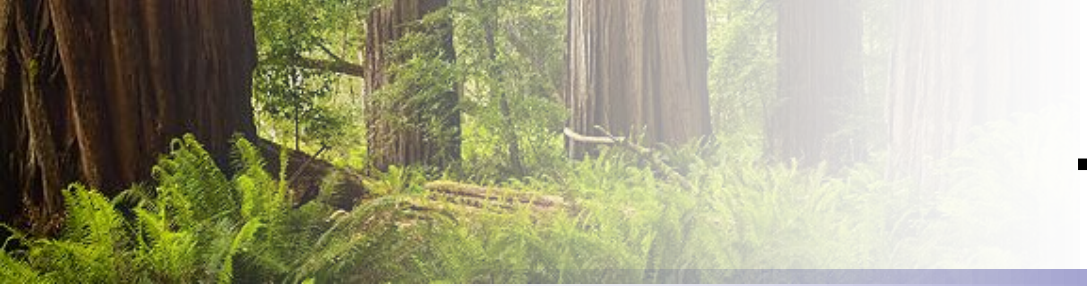
- Market-based system allowing trading of emission credits.
- Multi-sector program including refineries
- 273 active sources in the program
- Sets overall emissions of these pollutants on a declining path.
- Emission credit availability is adjusted periodically to reflect new BARCT determinations.
- Requires extensive monitoring, reporting, recordkeeping.

Community/ Worker

- Identifies pollutants contributing to environmental health hazards PM2.5, NO_X, SO_X, hydrogen sulfide, GHGs, benzene, toluene, xylene, lead, mercury, chromium, arsenic, nickel, vanadium, polycyclic aromatic hydrocarbons
- Defines baseline as three-year average for each pollutant *excluding* exceedances over regulatory/permitted limits
- Requires each refinery to decrease facility-wide emissions of each pollutant by 20% from baseline by 2020.
- If such progress is infeasible, Best Available Control Technology must be applied to all implicated sources

Western States Petroleum Association (WSPA)

- No specific controls proposed
- Regulatory certainty needed for planning investments
- Follow traditional rulemaking process:
  - Identify control strategies in Clean Air Plan
  - Develop source-category-specific rules through usual rulemaking process (BARCT process)



Periodic Control Technology Review

- Review all high emitting sources for appropriate control technology on a standard schedule.
- Begin with sources not subject to either Best Available Control Technology (BACT) Requirements or recent BARCT rules.
- Applies to all high emitting sources, not just refinery sources.

BARCT/ Focused Toxics

Best Available Retrofit Control Technology (BARCT)

- Identify specific source categories that are significant polluters.
- Investigate existing controls for these categories and the potential for additional control.
- Evaluate the feasibility of controls considering technical feasibility, emission reductions, and compliance costs.
- The development of the upcoming Clean Air Plan has resulted in the identification of a series of source-category-specific control measures (e.g. NO_X from turbines, condensable PM from catalytic cracking units).

Focused Toxics

- Adoption of rules identified in EPA Refinery Risk and Technology Review.
- Maximize risk reductions by requiring additional controls on key sources identified in refinery health risk assessments.

"Grandfathered" Sources and High Emitters

"Grandfathered" sources have little to no emission controls.

- Not subject to Best Available Control Technology (BACT) requirements because they pre-date permitting requirements.
- Not subject to the Air District's Best Available Retrofit Control Technology (BARCT) requirements.

High Emitting sources account for most of the pollution.

- At Chevron, for example, the top 15% of the emitters (such as the Fluid Catalytic Cracking Unit) account for 82% of the emissions

High emitting sources are rarely "grandfathered."

- For example, of the high emitting sources of organic gases, less than 3% are not subject to either BARCT or BACT.

Most stationary source emissions in the Air District are subject to BACT and/or BARCT controls.

Identifying Emission Reduction Opportunities for Clean Air Plans

Step 1: Identify highest emitting sources

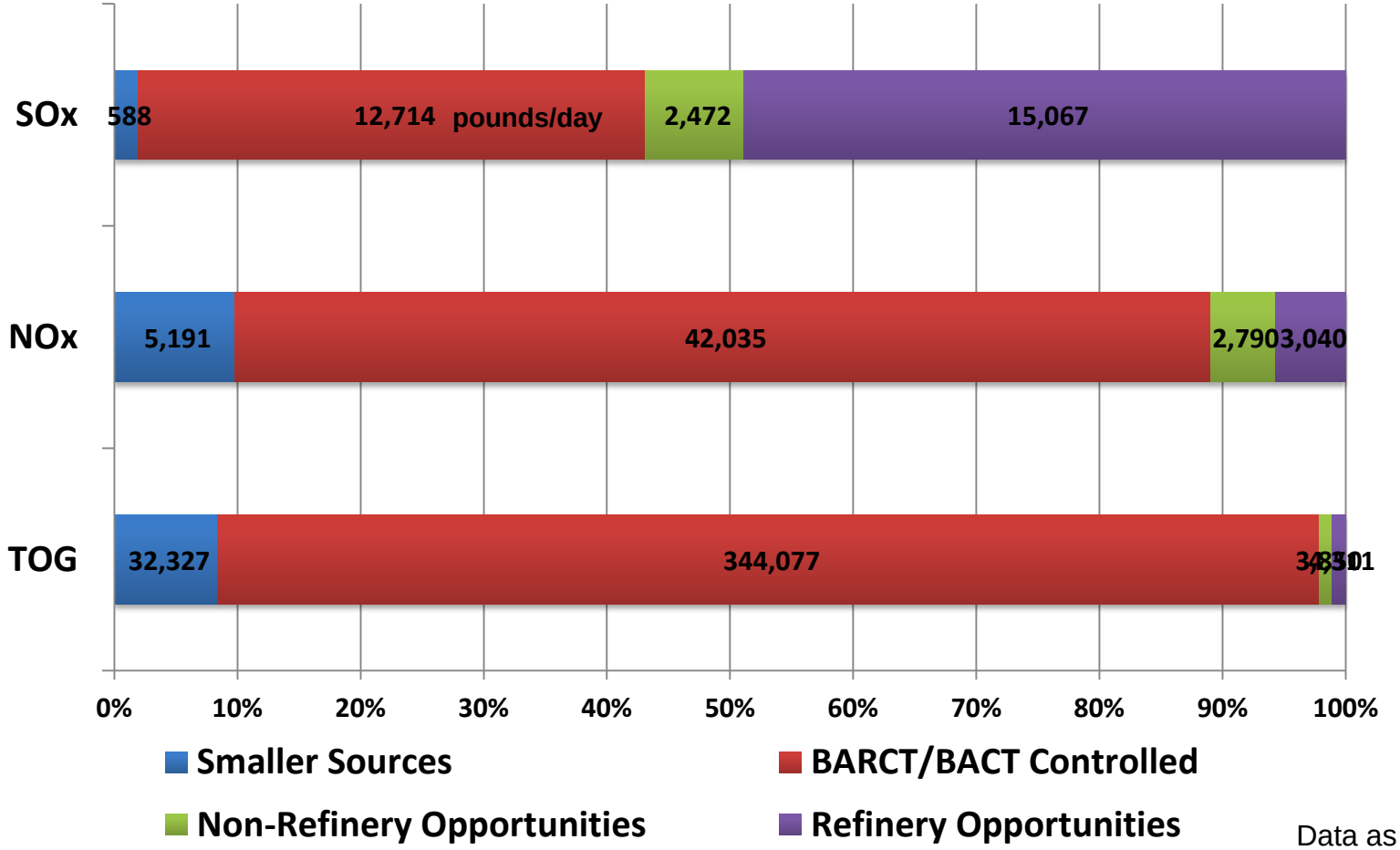
Step 2: Determine whether these sources are subject to BACT or BARCT.

Step 3: Identify the remaining sources as opportunities for additional control.

Step 4: Proceed with rule development process.

Opportunities for Emission Reductions

Most high emitting sources are subject to either BACT or BARCT requirements, but there are some opportunities for additional controls, especially for SO_X.



Data as of 12/15/15

Summary of Evaluation

Criteria	Bay Area RECLAIM	Community-Worker	WSPA	Periodic Technology Review	BARCT/ Focused Toxics
H&SC Compliance	Medium	Low	High	Medium	High
Reduction in health risk from toxics	Low	Medium	Low	Medium	High
Reduction in criteria pollutants	High	High	Medium	High	High
Process transparency	Medium	Low	High	High	High
Technology forcing	High	Medium	Low	Low	Low
Implementation speed/complexity	Low	Medium	Medium	Medium	Medium
Reduced impact on neighboring communities	Low	High	Medium	High	High
Net reduction of GHGs	Low	Low	Low	Low	Low

Proposed Approach

Staff proposes an approach that blends the best of the options reviewed:

- Start with the BARCT/Focused Toxics approach;
- Include the quantitative goals from the Community-Worker proposal;
- Include continuous improvement from the Periodic Technology Review approach;
- Retain compliance with the Health and Safety Code and the process transparency advocated by WSPA.

1. **<u>Overall Goals:</u>**
   - Strive to achieve a 20% reduction in criteria pollutants in the next 5 years.
   - Strive to achieve and additional 20% reduction in health risk from toxics.

Proposed Approach (Cont.)

2. Reduction of Criteria Pollutants and Precursors:

Project	Expected Benefits	Status
Reduce SO_2 from coke calciners	Reduce SO_2 emissions	Rulemaking underway
PM from Fluid Catalytic Cracking Units	Reduce condensable PM and precursor emissions	Rulemaking underway
Stationary gas turbines	Reduce NO_X emissions from turbines	Draft control measure for 2015 Clean Air Plan (CAP)
Further reduce equipment leaks (tanks, valves, other)	Reduce ROG and toxic emissions	Draft control measure for 2015 CAP
Limit sulfur content of refinery fuel gas	Reduce SO_2 emissions at some refineries	Draft control measure for 2015 CAP
Further reduce flaring	Reductions in all pollutants	Further study measure for 2015 CAP
Review of SO_2 emissions from refineries	Determine if substantial SO_2 reductions are available	Further study measure for 2015 CAP
Further reduce NO_X	Determine if substantial NO_X reductions are available	Further study measure for 2015 CAP

Proposed Approach (Cont.)

3: Reduction of Health Risks from Air Toxics

- Review EPA proposed Maximum Achievable Control Technology rules and identify areas where Air District Rules can be strengthened (currently underway).

- Initiate rulemaking to address any opportunities that arise from review. (e.g. cooling towers, delayed coking units.)

- Conduct site-wide Health Risk Assessments as proposed in Rule 12-15. Identify key drivers of health risk from Health Risk Assessment and reduce emissions from those sources to reduce risk.

Proposed Approach (Cont.)

4. GHG Emissions

- Track GHG emissions reductions from refineries, including co-benefits from criteria pollutant controls.
- Compare refinery performance against third party standards for best practices.
- If it appears that there are further opportunities for GHG reductions, staff would propose rulemaking to the Board.

5. Continuous Improvement

- Require that refiners periodically evaluate the sources of the majority of emissions to determine the level of control and whether additional controls are needed.

Next Steps

- Proceed with development of Regulations 12-15 and 12-16.
- Bring rule amendments to implement the emission reduction strategy through the rule development process as a package in 2015.
- Work with the community and industry to implement the strategy.
- Report progress to the Board at regular intervals.

Winter $PM_{2.5}$ Seasons

Year	Days > 35 µg/m^3	Winter Spare the Air Alerts
2011/2012	11	15
2012/2013	1	10
2013/2014	15	30
2014/2015	0	4

- **Spare the Air Alert Called for: 11/9, 11/25, 11/26, 11/27**
- **Days > 35 µg/m^3 24-hr NAAQS: None**