



Update on Flaring Minimization Efforts and Development of Flaring 101

Stationary Source Committee

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Abbreviations

AB: Assembly Bill

CSC: Community Steering Committee

DAHS: Data acquisition and handling system

FMP: Flare Minimization Plan

MRC: Martinez Refining Company

NMHC: Non-methane hydrocarbon

NOx: Oxides of nitrogen

PM: Particulate matter

PTCA: Path to Clean Air

RSR: Refinery Sector Rule

SO₂: Sulfur dioxide

SOx: Oxides of sulfur

South Coast AQMD: South Coast Air Quality Management District

US EPA: United States Environmental Protection Agency

VOC: Volatile organic compound

Presentation Outline

- Background on Flaring
- Impetus and Status of Rule Development Efforts
- Update on "Flaring 101"
- Update on Rule Development and Regulatory Concepts
- Concept Paper Public Comments
- Rule Development Next Steps

Background on Flaring



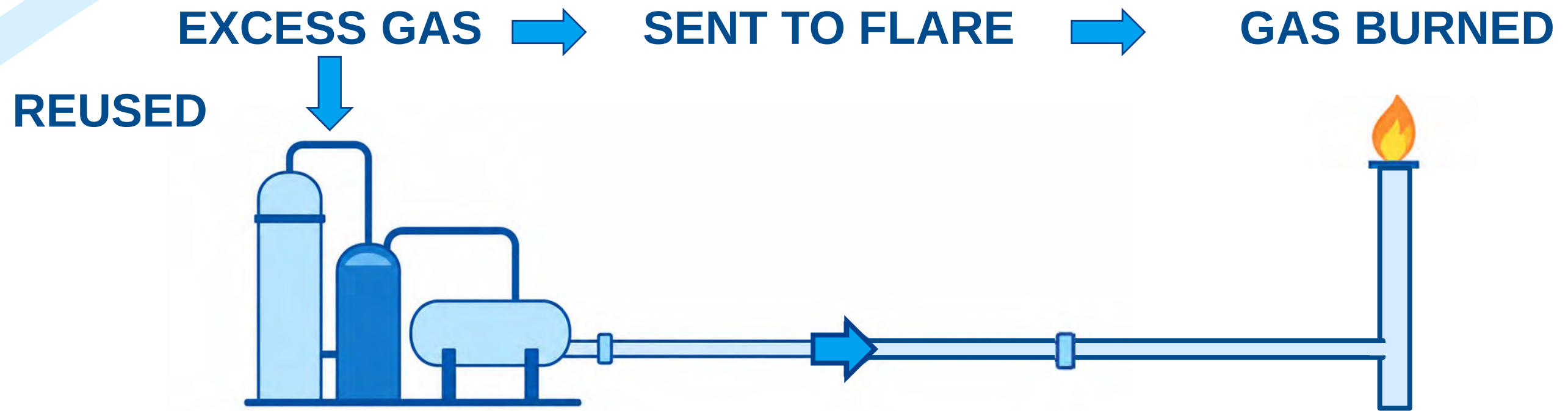
What is a flare?



What is a flare? (cont.)

A flare is a device used at refineries and hydrogen plants.

When excess gas cannot be safely used or stored, it is sent to a flare and burned. Flares burn excess gases instead of releasing them directly into the atmosphere; mitigating impacts on health and the environment.



What comes from a flare?

Flaring can affect nearby communities.

Depending on what is being burned and how the flare is operating, flaring can release dark smoke, sulfur dioxide, nitrogen oxides and other pollutants.



Visible Flame,
Smoke & Light



Heat



Sound



Air Pollutants
(*not always visible*)

Why does flaring happen?

Planned: Due to condition from scheduled operational activities, such as scheduled startup, shutdown, maintenance, and turnarounds.

Unplanned: Due to condition that is not planned, such as due to process upsets, unplanned shutdown, and unforeseen maintenance.

Not preventable: Due to condition beyond reasonable control of the refinery management. Always **unplanned**.

Preventable: Due to condition within reasonable control of the refinery management. Can be **planned** or **unplanned**.



Flare Types

Flare Type	Typical Process Units Served	Gas Routed to Flare	Primary Pollutants	Typical Visual Cues
Non-hydrogen	Refinery process units	Hydrocarbons, including heavier and more complex ones	SO ₂ , PM, VOC	Proper operation: large and bright flame Improper operation: flame with black smoke
Hydrogen	Hydrogen production units	Hydrogen with a small amount of methane	NO _x , VOC	Blue or translucent flame



Impetus and Status of Rule Development Efforts



Impetus of Rule Development Effort

Strategic Plan Strategy 1.3 Minimize Flaring

- Explore ways to minimize flaring
- Increase public engagement on flaring
- Share timely, accessible information
- Increase inspections and air pollution monitoring

AB 617 Path to Clean Air – Richmond-North Richmond- San Pablo - Community Emissions Reduction Plan - Fuel Refining 2.6

Evaluate potential updates to Rules 12-11 and 12-12 incorporating health impact analyses, enhanced enforceability, and more stringent limits

Impetus of Rule Development Effort (cont.)

Air District Commitments in:

- Air District's Strategic Plan
- Richmond-North Richmond-San Pablo Community Emissions Reduction Plan



20 Years of Rules

The Air District has identified ways to strengthen the rules and improve the requirements.

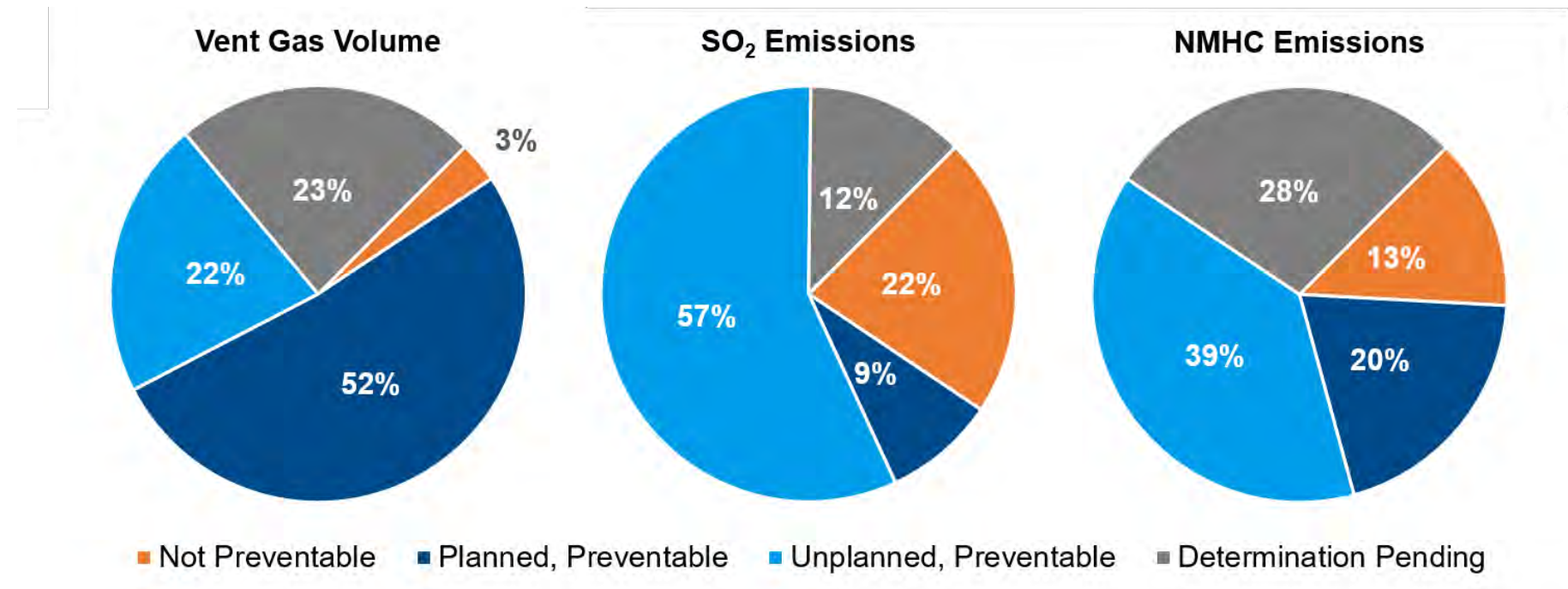


Changing Requirements

Federal requirements and flare rules at other air districts have changed.

Cause Categories of Reportable Flaring Events 2015-2024

- Reportable flaring events account for approx. 90% of vent gas volume and emissions of all flaring from 2015-2024



- Planned/unplanned designation is based on South Coast AQMD Rule 1118 definitions of Planned Flare Event and Unplanned Flare Event.
- Preventable designation is based on Air District determination of each reportable flaring event, which may differ from the published causal report.

Current Air District Refinery Flare Rules

Rule 12-11 Flare Monitoring at Refineries	Rule 12-12 Flares at Refineries
Tracks flaring	Reduces & explains causes of flaring
Requires monitoring and recordkeeping	Requires Flare Minimization Plans
Requires monthly flare data reports	Requires reports explaining causes of flaring events
Provides information about gas flared and emissions	Establishes requirements intended to reduce the frequency, magnitude, and duration of flaring

Other Regulations

United States Environmental Protection Agency

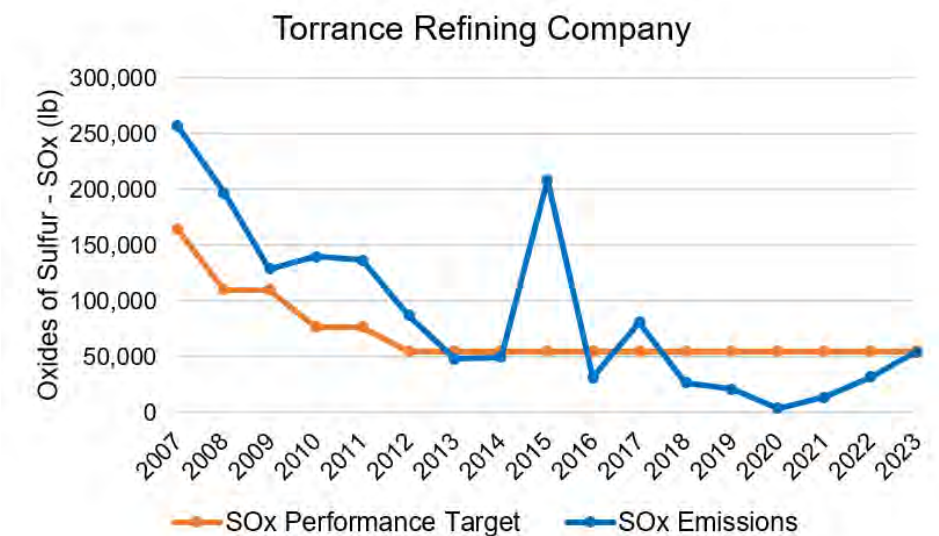
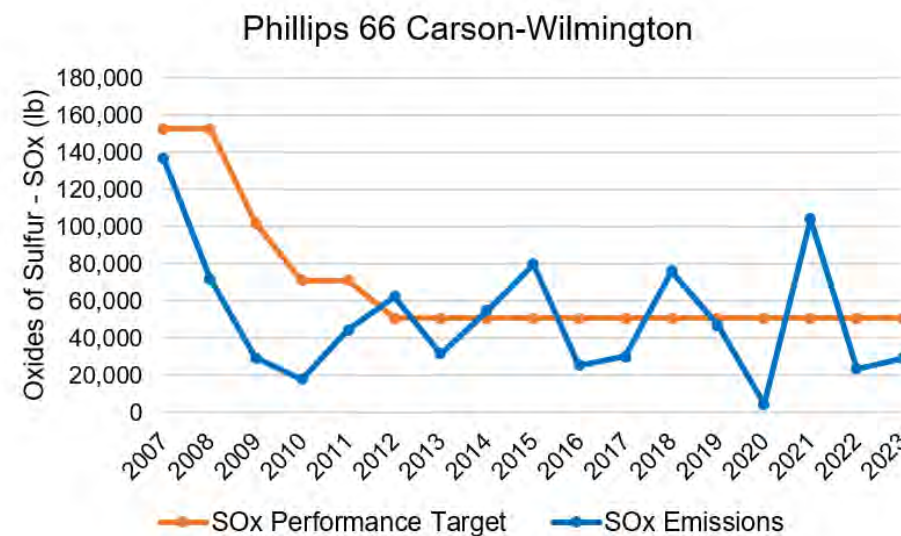
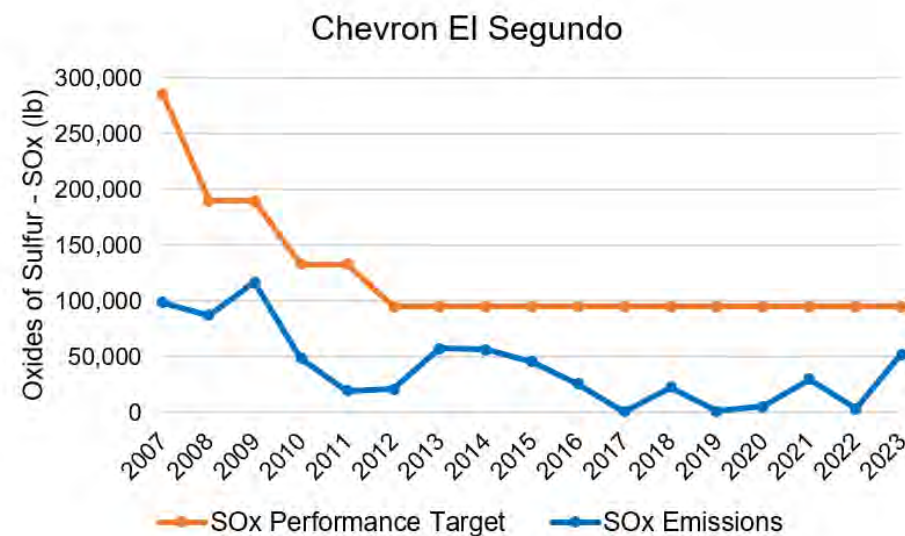
- New Source Performance Standards
- National Emissions Standards for Hazardous Air Pollutants

South Coast Air Quality Management District

- Rule 1118: Control of Emissions from Refinery Flares
- Rule 1118.1: Control of Emissions from Non-Refinery Flares

South Coast Air Quality Management Performance Targets

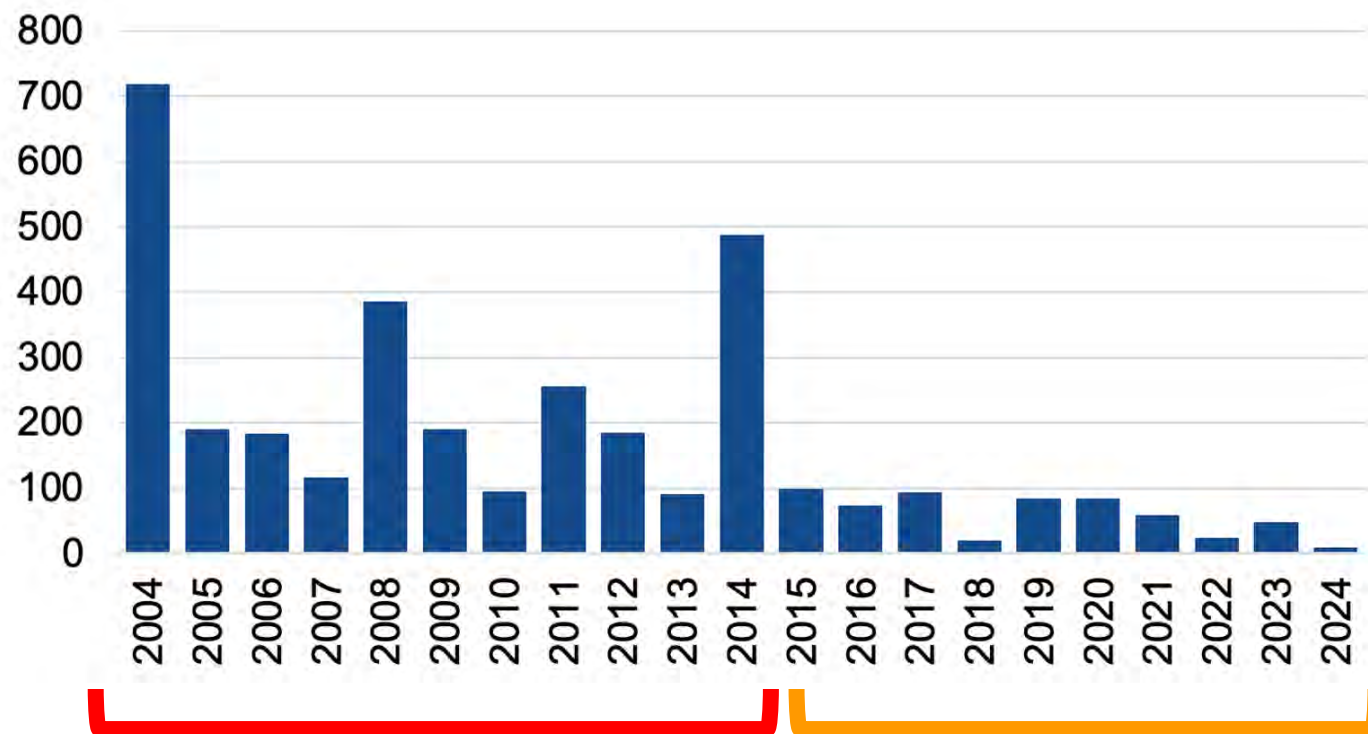
- South Coast AQMD Rule 1118 established mass-based emissions performance targets
- Performance targets incentivize refineries to reduce emissions from flares
- Exceeding target triggers requirements:
 - Payment of a mitigation fee, and
 - Flare Minimization Plan creation or update



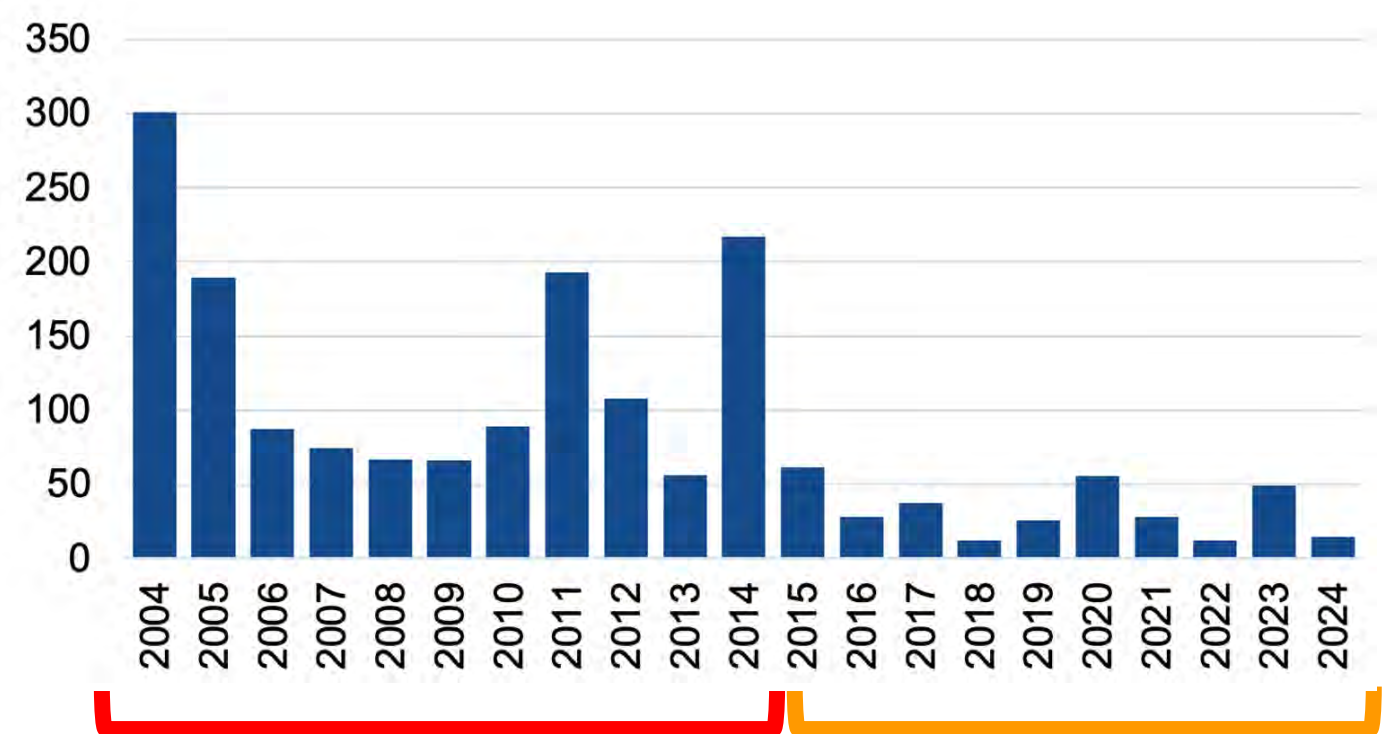
Bay Area Flare Data

Flare emissions are lower than they were prior to 2015, but they remain significant, highlighting the need for continued emission reduction efforts.

Sulfur Dioxide Emissions (tons)



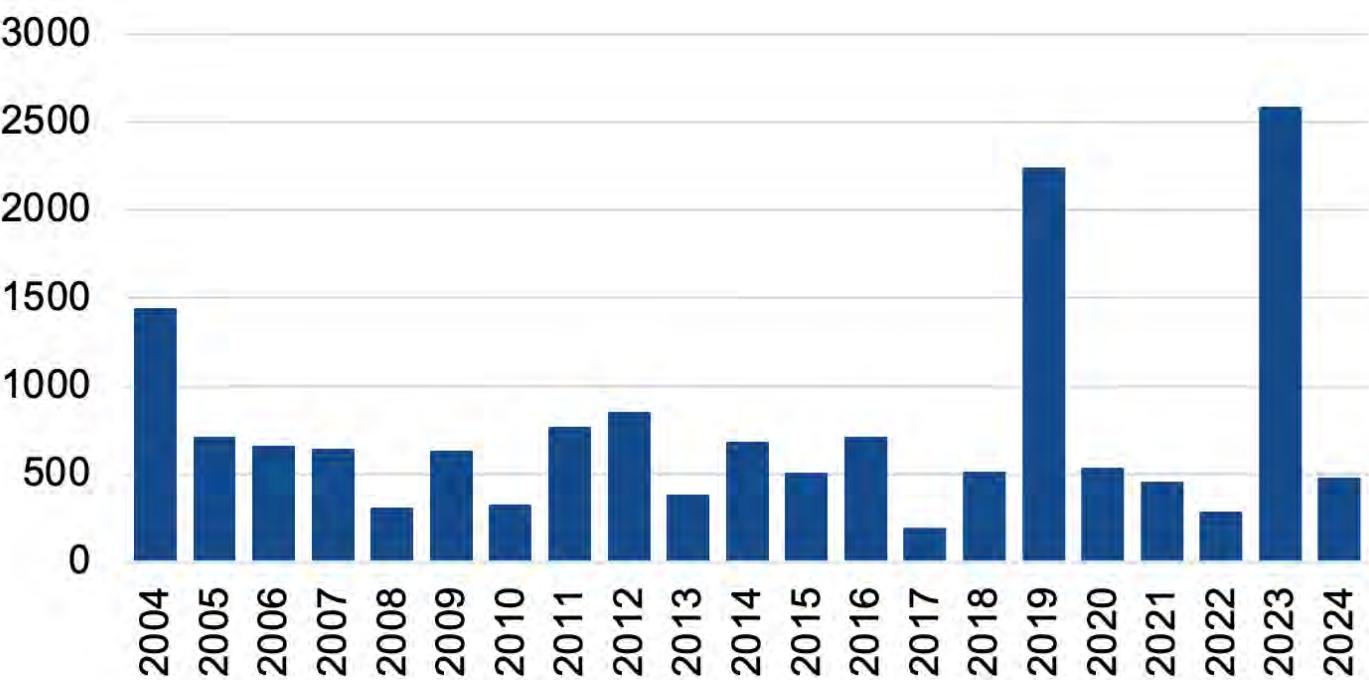
Non-methane Hydrocarbon Emissions (tons)



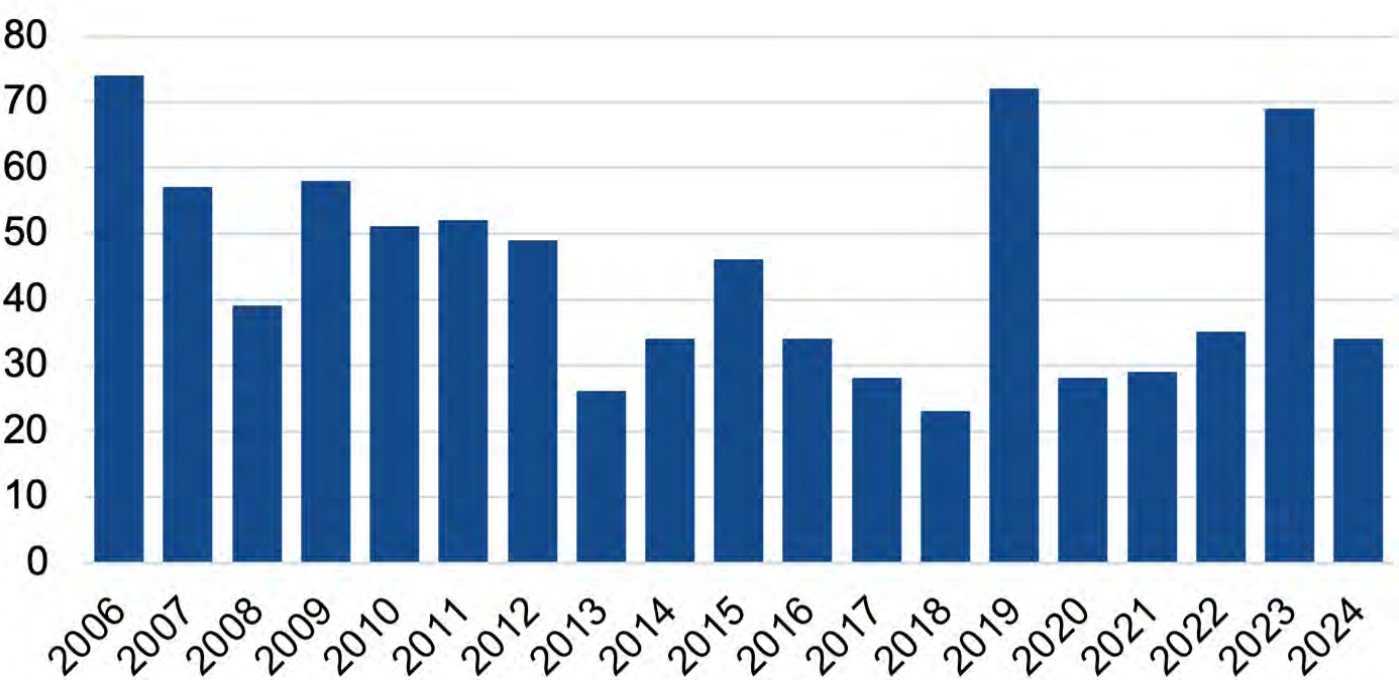
Bay Area Flare Data (cont.)

No clear decrease in vent gas volume or reportable flaring events.

**Vent Gas Volume
(Million Standard Cubic Feet)**



Number of Reportable Flaring Events



What is a reportable flaring event?

Under Rule 12-12, a reportable flaring event is flaring in a day where more than 500,000 standard cubic feet of vent gas is flared or where sulfur dioxide emissions are greater than 500 pounds.

Current Status of Rule Development Efforts

- Refinery Technical Working Group convened
- "Flaring 101"
 - Gathered input from community and labor
 - Developing short-form videos
- Rule Development and Regulatory Concepts
 - Concept paper
 - Stakeholder engagement



Update on Flaring 101



What is “Flaring 101”

“Flaring 101” is being developed to provide informational and educational materials that will assist the residents in communities close to refineries in understanding the root causes of flaring events and their health impacts

Impetus for "Flaring 101" Development

1. Air District Strategic Plan; and
2. AB 617 PTCA – Richmond-North Richmond-San Pablo – Community Emissions Reduction Plan

“Flaring 101” Update

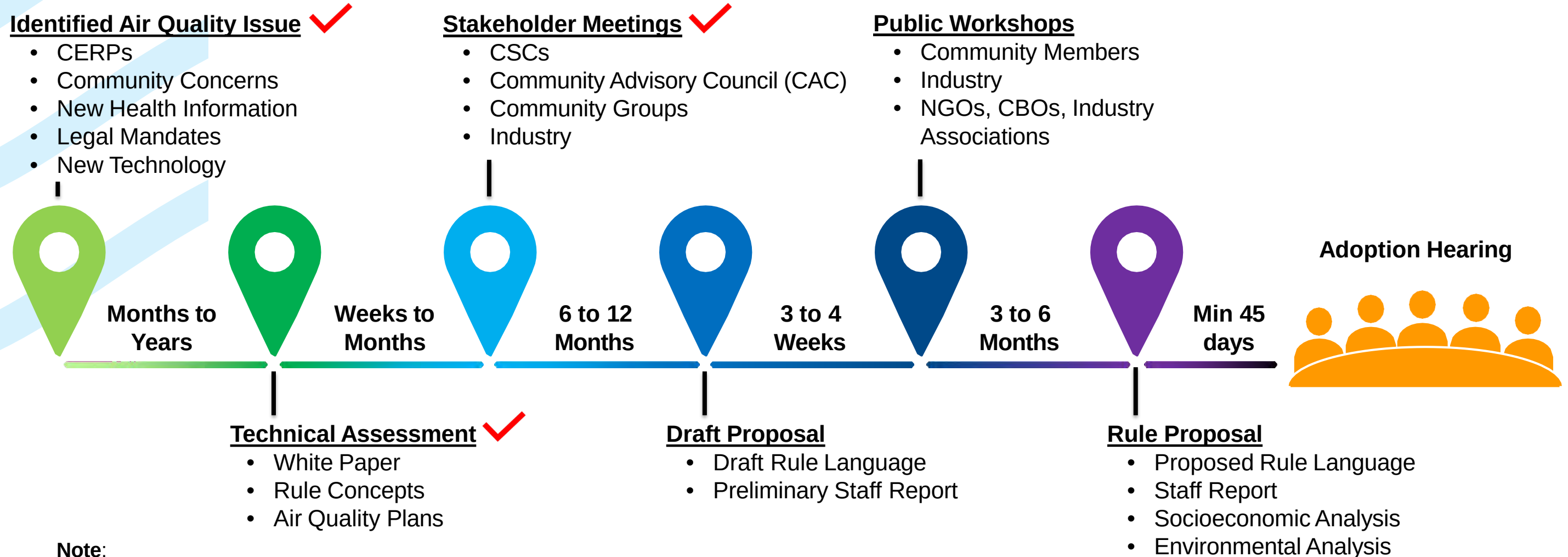
- Met with and received input from:
 - Refinery Technical Working Group in 2025
 - Community and labor groups in 2026
- Community members emphasized the need for simple and accessible language that highlighted community impacts, packaged in digestible, short-form content
- Current Status: Staff is working to produce a series of short-form videos to be published on the Air District website and potentially on social media channels



Update on Rule Development and Regulatory Concepts



Rule Development and Public Engagement



Note:

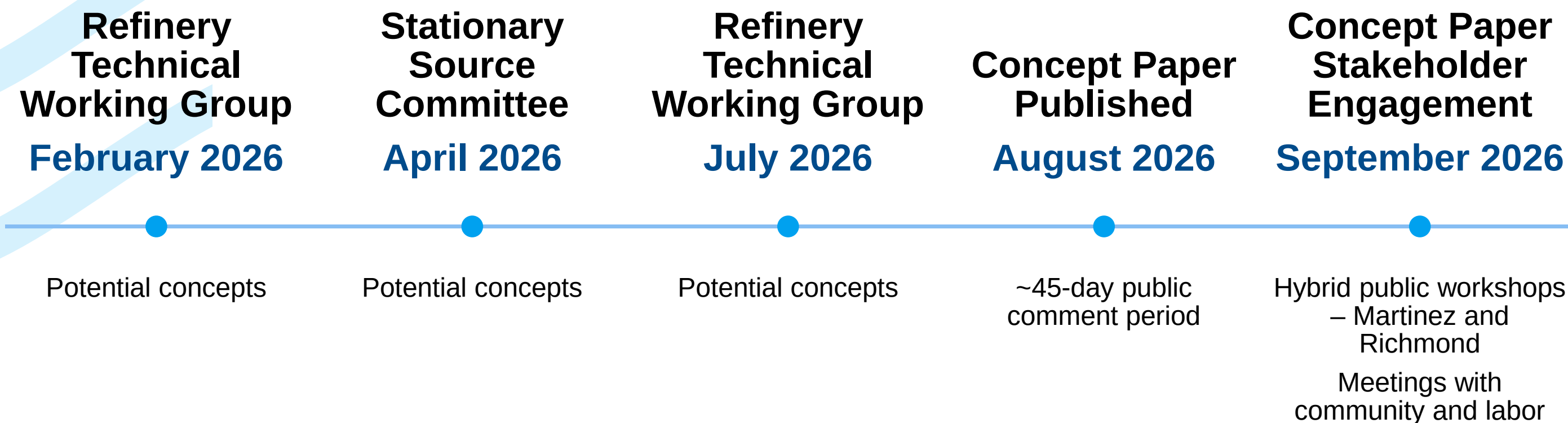
CBO: Community-Based Organization

CSC: Community Steering Committees

CERP: Community Emission Reduction Plans

NGO: Non-Governmental Organization

Stakeholder Engagement



Goals of Regulatory Concepts

1. **Minimize overall flaring** through investments and operational improvements.
2. Ensure **good combustion and destruction of most harmful pollutants** when there is flaring.
3. Differentiate flaring that has a **higher potential for public health risk** versus a lower potential.
4. Improve **availability of flaring information** for public accessibility and transparency, resource efficiency, and improved enforceability.

Alignment of Regulatory Concepts with Goals

Concept	Minimize Overall Flaring	Good Combustion	Identify Public Health Risk	Availability of Information
1.1 Efficient Combustion - US EPA RSR		✓	✓	✓
1.2 Establish Flare Limits	✓			
1.3 Require Mitigation Measures	✓	✓		✓
1.4 Require Submittal of Causal Reports	✓	✓	✓	✓
1.5 Require Third-Party Audits for Facilities	✓		✓	✓
2.1 Strengthen Flare Minimization Plan Updates	✓	✓		✓
2.2 Standardize Reporting Requirements			✓	✓
2.3 Expand Definitions	✓		✓	✓
2.4 Strengthen Monitoring and Reporting Requirements	✓	✓	✓	✓

Section #1 - Reduce Flaring Emissions and Frequency

- 1.1 Incorporate Key Flare Combustion Efficiency Requirements from the US EPA Refinery Sector Rule *
- 1.2 Establish New Flare Limits *
- 1.3 Require Mitigation Measures Based on Triggering Criteria *
- 1.4 Require Submittal of Causal Reports Based on Additional Triggering Criteria *
- 1.5 Require Third-Party Audits for Facilities Based on Triggering Criteria *

**South Coast AQMD Rule 1118*

**US EPA Consent Decree*

Combustion Efficiency Visual Cues

Flare flame appearance provides visual cues about combustion efficiency

Non-hydrogen flares



Poor Efficiency



Good Efficiency

Source: <https://kvia.com/news/abc-7-alert-center/2025/07/08/refinery-stacks-spewing-black-smoke-in-south-central-el-paso/>

Concept 1.1 Incorporate Key Flare Combustion Efficiency Requirements from US EPA Refinery Sector Rule

Current Requirements: Refineries are subject to visible emissions limit per Rule 6-1; Petroleum refineries are subject to Refinery Sector Rule

Concept Description

- Key operating requirements: net heating value of the combustion zone standard, flare tip velocity limit, visible emissions limit
- Data in monthly flare data reports and causal reports

Anticipated Benefits:

1. Reduced emissions at refineries that process alternative feedstocks
2. Increased enforceability of the federal regulation by requiring data to be regularly reported

Refineries

Petroleum:

- Chevron Richmond
- Martinez Refining Company
- Valero Benicia

Alternative feedstocks:

- Marathon Martinez
- Phillips 66 Rodeo

Concept 1.2 Establish New Flare Limits

Current Rules: Flaring is prohibited unless it is (1) not preventable or (2) approved in the FMP; otherwise there are no limits on flaring.

Concept Description

- Establish limits on emissions and vent gas volume for hydrogen and non-hydrogen flares that become more stringent over time
- Further evaluation is needed to determine how the limits would apply to flaring that is preventable versus not preventable

Anticipated Benefits:

1. Reduced emissions and decreased frequency of flaring through investments and operational improvements

Measures to Minimize Flaring

Source Control Management	Flaring Monitoring and Control	Corrective Actions
1. Maintenance and reliability 2. Operations and procedures 3. Flare gas recovery systems	1. Monitoring systems 2. Automated technology to optimize flare combustion	1. Implementation of prevention measures after flaring

Concept 1.3 Require Mitigation Measures Based on Triggering Criteria

Current Rules: FMPs include measures to prevent flaring during select anticipated planned and unplanned events

Concept Description

- Emission reduction measures based on triggering criteria
- Choice to pay mitigation fee in lieu of emissions reduction measures
- More stringent measures for repeated exceedances or deviations of standards

Anticipated Benefits:

1. Reduced emissions and decreased frequency of flaring through emission reduction measures
2. Fund projects to minimize community health impacts from flaring

Concept 1.4 Require Submittal of Causal Reports based on Additional Triggering Criteria

Current Rules: Causal reports are required when vent gas volume or sulfur dioxide emissions exceed thresholds (reportable flaring event)

Concept Description

Require causal reports for:

- Exceeding or deviating from key operating parameters from the Refinery Sector Rule
- Exceeding a new non-methane hydrocarbon threshold

Anticipated Benefits:

1. Decreased frequency of flaring due to repeated causes
2. Expanded reporting requirements for accessibility, transparency, and enforceability

Concept 1.5 Require Third-Party Audits for Facilities Based on Triggering Criteria

Current Rules: Refineries conduct their own audits after reportable flaring events and report the causes and prevention measures in causal reports

Concept Description

Retain independent auditors to verify compliance with flare requirements and their FMPs.

Third party audits may be required when:

- Flaring repeatedly comes from the same source or process area within a specified timeframe
- Flaring that is not preventable exceeding an emissions or vent gas threshold
- Air District determines that internal audits are insufficient

Anticipated Benefits:

1. Reduced emissions and decreased frequency of flaring from targeted causes of flaring

Section #2 - Flare Minimization Plans and Reporting and Monitoring Requirements

- 2.1 Strengthen Flare Minimization Plan Updates
- 2.2 Standardize Reporting Requirements*
- 2.3 Expand Definitions and Categories for Reporting Causes of Flaring *
- 2.4 Strengthen Monitoring and Reporting Requirements*

**South Coast AQMD Rule 1118*

Concept 2.1 Strengthen FMP Updates

Current Rules: Refineries submit FMPs that describe their equipment, processes, flaring reductions, and prevention measures. FMPs are updated annually and before equipment is installed or modified

Concept Description

Require additional information in FMPs, including:

- Technology review and updated cost analyses that could reduce flaring
- A summary of mitigation measures that have been implemented

Frequency of updates to FMPs could be impacted

Anticipated Benefits:

1. Increased enforceability of rule requirements
2. Resource savings for the Air District and regulated facilities

Concept 2.2 Standardize Reporting Requirements

Current Rules: Refineries report required flaring information, but the reports are not standardized.

Concept Description

Standardize:

- Templates used to report flaring information
- Categories used to identify the causes of flaring
- Methods used to calculate emissions

Anticipated Benefits:

1. Increased data consistency and accessibility
2. Resource savings for the Air District and regulated facilities

Concept 2.3 Expand Definitions and Categories for Reporting Causes of Flaring

Current Rules: Flaring is classified as preventable and not preventable.

Concept Description

Update and add definitions for reporting the cause of flaring, including:

- Clarifying the definition of “Emergency,” including whether to rename it “Not Preventable” and align it with the federal “Malfunction” definition
- Adding definitions for “Planned” and “Unplanned” flaring

Anticipated Benefits:

1. Improved clarity and consistency in defining the causes of flaring
2. Stronger enforceability with clearer interpretation of requirements

Concept 2.4 Strengthen the Monitoring and Reporting Requirements

Current Rules: Refineries are required to monitor vent gas composition if certain thresholds are exceeded, and video monitoring information is reported monthly.

Concept Description

Strengthen monitoring and reporting by requiring:

- Continuous monitoring for vent gas: total sulfur and hydrocarbon composition; and flow downstream of the water seal
- Data acquisition and handling system (DAHS) to collect and manage monitoring data
- Video monitoring data: real-time Air District access; and online submission of information

Anticipated Benefits:

1. Increased accuracy and integrity of emissions data
2. Stronger compliance assurance and enforcement
3. More information on flaring to supplement the Community Warning System

Concept 2.4 Strengthen the Monitoring and Reporting Requirements (cont.)

Current Rules: Refineries are required to monitor vent gas composition if certain thresholds are exceeded, and video monitoring information is reported monthly.

Concept Description

Strengthen monitoring and reporting by requiring:

- Infrared camera monitoring that may detect certain emissions
- Notification system to alert the community of planned and unplanned flaring
- Review and approval process for causal reports and flare monitoring systems

Anticipated Benefits:

1. Increased accuracy and integrity of emissions data
2. Stronger compliance assurance and enforcement
3. More information on flaring to supplement the Community Warning System



Concept Paper Public Comments



Concept Paper Stakeholder Engagement

Hybrid Public Workshops

- Martinez – 60 attendees
- Richmond – 45 attendees
- Community, industry, labor, consultants/vendors, government

Stakeholder Meetings

- Community
- Labor

Concept Paper Public Comments

- 23 written comments received

14 Community Members	• Martinez • Richmond • Rodeo
4 Community-based Organizations	• Benicia Community Air Monitoring Program • Communities for a Better Environment • Healthy Martinez • Richmond-North Richmond-San Pablo CSC
1 Labor Organization	• United Steelworkers Local 5
5 Industry Stakeholders	• Chevron • MRC • Marathon • Phillips 66 • Western States Petroleum Association

Concept Paper Public Comments (cont.)

- Topics include:
 - General interest in further data analysis and cost/benefit analysis
 - **Community:** General support with additional considerations (mitigation measures, third-party audits, and other pollutants)
 - **Labor:** General support
 - **Industry:** Considerations/exemptions for refineries that process alternative feedstocks and flares that burn certain gases, flare limits, preventable/not preventable determinations, meetings, and additional questions



Rule Development Next Steps



Rule Development Next Steps

- Review and consider comments on regulatory concepts
- Develop draft proposal, including draft rule language and further analysis
- Anticipate stakeholder engagement during development of draft proposal

Rule Amendments Next Steps (cont.)

Identified Air Quality Issue

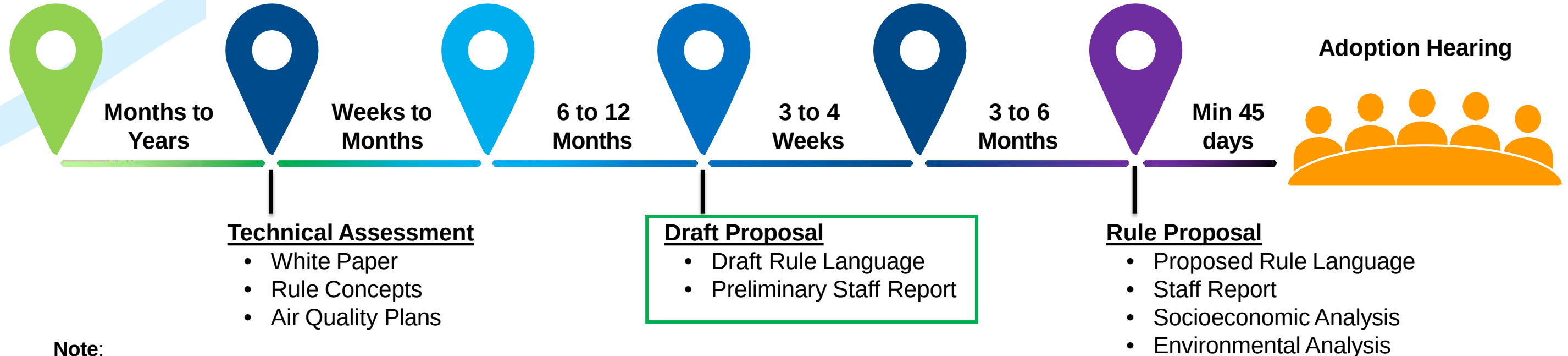
- CERPs
- Community Concerns
- New Health Information
- Legal Mandates
- New Technology

Stakeholder Meetings

- CSCs
- Community Advisory Council (CAC)
- Community Groups
- Industry

Public Workshops

- Community Members
- Industry
- NGOs, CBOs, Industry Associations



Note:

CBO: Community-Based Organization

CSC: Community Steering Committees

CERP: Community Emission Reduction Plans

NGO: Non-Governmental Organization

Questions & Discussion

For more information:

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