Proposed Amended Rule 1180 (PAR 1180)

Major Petroleum Refinery Fenceline and Community Air Monitoring

Proposed Rule 1180.1 (PR 1180.1)

Other Refinery Fenceline and Community Air Monitoring

Working Group Meeting #3
May 30, 2023, 10:00 AM (PDT)

South Coast AQMD

Join Zoom Webinar Meeting:
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Webinar Meeting ID: 969 5637 8405

Agenda

- Background
- Summary of the WGM#2
- Stakeholder Comments
- Stakeholder Meetings and Site visits
- PAH monitoring technology
- QA/QC for Monitoring System
- Rule Proposal Update
- Fenceline Guidelines Update
- Next Steps

Progress of Rule Development

Summary of Working Group Meeting #2 (04/19/2023) included:

- Summary of staff meetings and site visits
- PAR 1180 and PR 1180.1 revised applicability and compound list
- Community air monitoring fees and requirements
- Staff comments on proposed requirements of SB 674
- Proposed rule amendments

Since last working group meeting

- Staff continued meetings and conducted site visits with existing and new potential facilities
- Met with technology vendors

Stakeholder Comments

Stakeholder Comments

- During the Working Group Meeting #2, stakeholders provided comments on:

#1 Alternative/interim monitoring

#2 System performance

#3 Data accessibility

#4 Notification for exceedances

#5 PM monitoring

#6 Metal Monitoring

#7 Overall Success of Rule 1180 Monitoring

Comment #1: Include Alternative or Interim Monitoring

Stakeholders requested staff consider alternative or interim monitoring for PAHs

- Real-time monitoring technology is not currently available

Staff response

- PAR 1180 and PR 1180.1 are focused on real-time fenceline monitoring
- Proposing to include a requirement in resolution to assess real-time monitor technologies every five years and report to Stationary Source Committee
- Considering a trigger in the rule to require facilities to install monitoring technology within 6 months of staff determining technology is feasible

Specific discussion on PAHs monitoring provided in later slides

Comments #2 & 3: Systems Performance and Data Accessibility

Stakeholders inquired about the performance of the existing fenceline monitoring systems

- Staff will provide an analysis on the performance of the monitoring systems in later slides

Stakeholders also expressed support for improved data accessibility

- Staff is considering ways to improve data accessibility
  - Considering data platform to integrate community monitoring and fenceline data
    - Improving data accessibility
    - Facilitate data analysis

Comment #4: Notification Requirements

Stakeholders requested clarification for compound notification thresholds

- Notification thresholds are not currently included in rule language

Staff Response

- Specifications for notification thresholds included in the Refinery Fenceline Air Monitoring Guidelines:
  - Refinery shall operate a notification system that automatically generates and issues notifications to subscribers at an exceedance via email, text message or other communication

Staff considering including notification thresholds in rule language

- Updated rule language presented in later section of this presentation

Comment #5: PM Monitoring

Stakeholders requested clarification on staff's proposal for PM monitoring, monitoring technologies, and cost

Staff Response

- PM monitors are relatively low-cost technologies capable of measuring PM2.5 and PM10
  - OEHHA identifies PM2.5 and PM10 as the most frequently emitted pollutants from refineries

Staff is considering requiring facilities to measure both PM2.5 and PM10

- Available technologies can measure PM2.5 and PM10 either with one or separate monitors
- For facilities subject to PR 1180.1, PM2.5 and PM10 may be required in lieu of black carbon
  - Black carbon is not included in the Final OEHHA Analysis of Refinery Chemical Emissions

Comment #6: Metal Monitoring

Stakeholders raised a question on the capability of metal monitors to report pollutants in “real-time”

Staff Response

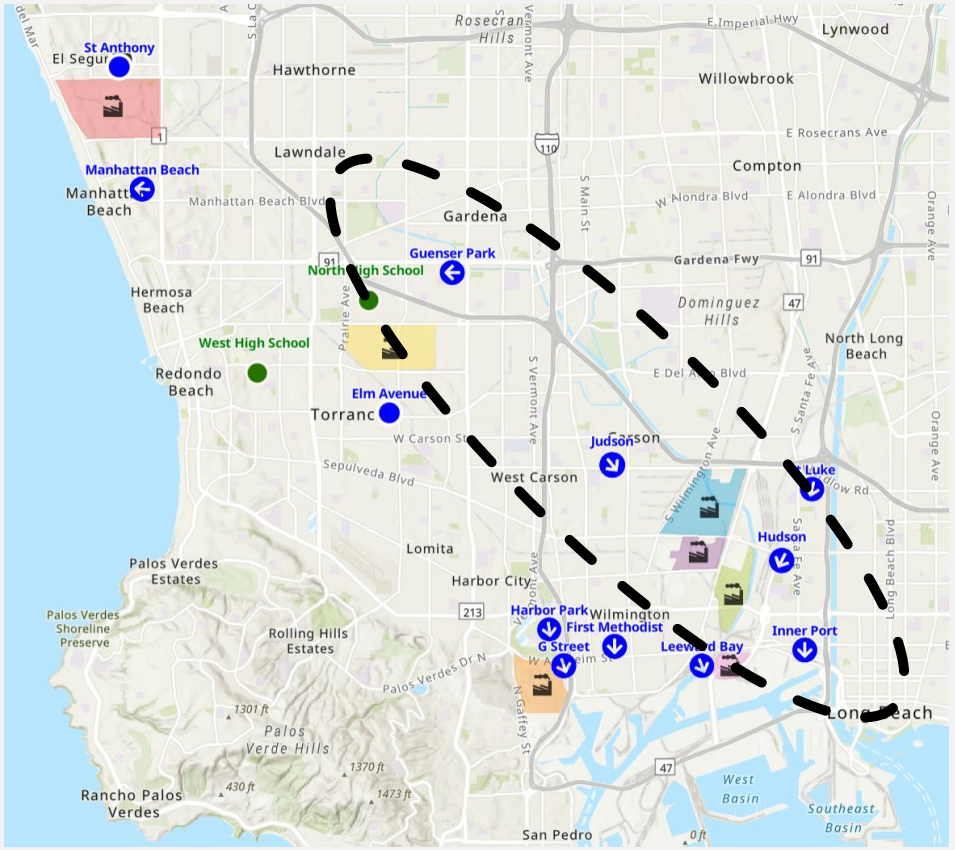
- Some metal monitors are capable of measurements in near real-time, but lower detection limits can be achieved with longer sampling times
  - One-hour sampling intervals will yield more meaningful data
- Longer sampling intervals are addressed in the Refinery Fenceline Air Monitoring Guidelines:
  - Fenceline monitoring shall be operated continuously with five-minute averaging when feasible
  - If not feasible, refinery operators shall provide rationale in the air monitoring plan for any proposed averaging time greater than five-minutes

Comment #7: Overall Success of Rule 1180 Monitoring

- Staff investigates every time a compound is detected above the notification threshold
  - Evaluates concentration of pollutant, emission location, and meteorological conditions, e.g., wind speed and direction
  - Conducts inspection at refinery, inspections may include the use of handheld total volatile analyzers, Jerome meters, and FLIR camera
- Rule 1180 notifications can serve as an indicator of refinery events, some of which have led to Notice of Violations including:
  - Rule 3002 – Requirements
    - Failure to comply with Title V permit by failing to operate equipment in good condition
  - Rule 463 – Organic Liquid Storage
  - Rule 1178 – Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities
- Rule 1180 fenceline and community monitors have provided information to locate odor sources for complaint investigations
  - Have resulted in early detection and mitigation of leaks

Comment #7: Overall Success of Rule 1180 Monitoring (*con't*)

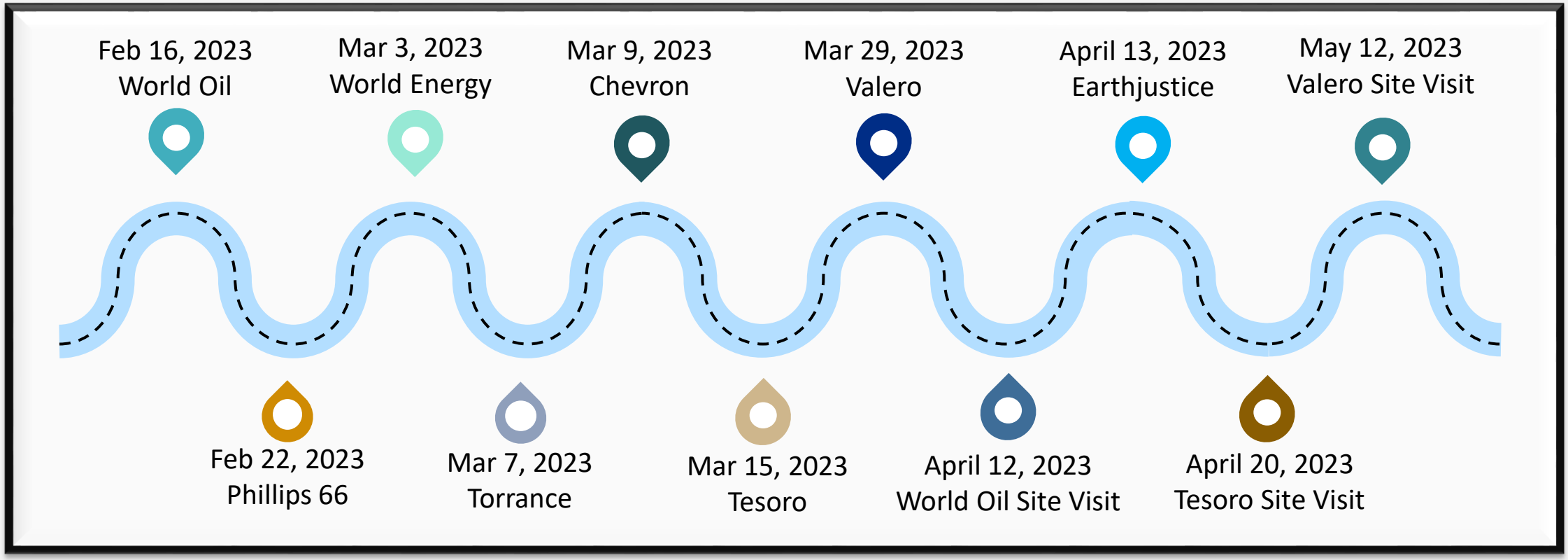
- In October 2021, South Coast AQMD investigated odors from Dominguez Channel
  - Over 4,700 odor complaints received from residents in Carson, Gardena, Long Beach, Redondo Beach, Torrance and Wilmington
- Air monitoring efforts in the impacted areas included a variety of technologies and strategies including using data from Rule 1180 monitors
- Results showed elevated levels of hydrogen sulfide (H_2S) caused strong odors
- Based on data from the Rule 1180 monitors it did not appear that refineries were the source of the elevated levels of H_2S
  - Initial assumptions considered refineries as a potential source for this event
- The Rule 1180 community and fenceline monitors provide continuous real-time measurements of several compounds



Stakeholder Meetings and Site Visits

Stakeholder Meetings

- Staff is meeting and conducting site visits with PAR 1180 and PR 1180.1 stakeholders including existing and new potential facilities and environmental organizations



Tesoro Refineries and Contiguous Facilities Site Visit

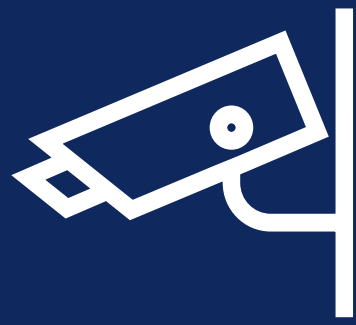
- On April 20, 2023, staff conducted a site visit of Tesoro (Carson & Wilmington) and its contiguous facilities
  - Tesoro Carson and Wilmington included in existing Rule 1180
  - Four contiguous facilities proposed to be included in PAR 1180:
    - Sulfur Recovery Plant (SRP)
    - Carson Crude Terminal
    - Carson Product Terminal, and
    - Tesoro Logistics Wilmington Terminal
- The east side of the Tesoro Logistics Wilmington Terminal parallels existing refinery open path monitors
  - Facility may be able to demonstrate there is adequate coverage based on existing monitors and prevailing wind patterns
- For other contiguous facilities, preliminary analysis identified feasibility for open path and point monitors

Note: map is updated with a corrected property perimeter previously presented in WGM#2 for Carson Product Terminal and SRP

Valero Asphalt Plant Site Visit

- On May 12, 2023, staff conducted a site visit of the Valero Asphalt Plant, which will be subject to PR 1180.1
- Eastern perimeter of facility parallels Tesoro Wilmington refinery's fenceline monitors
  - Facility may be able to demonstrate there is adequate coverage on the east side of the property based on existing monitors and prevailing wind patterns
- For the west and south side perimeter, preliminary analysis identified feasible options for open path and point monitors

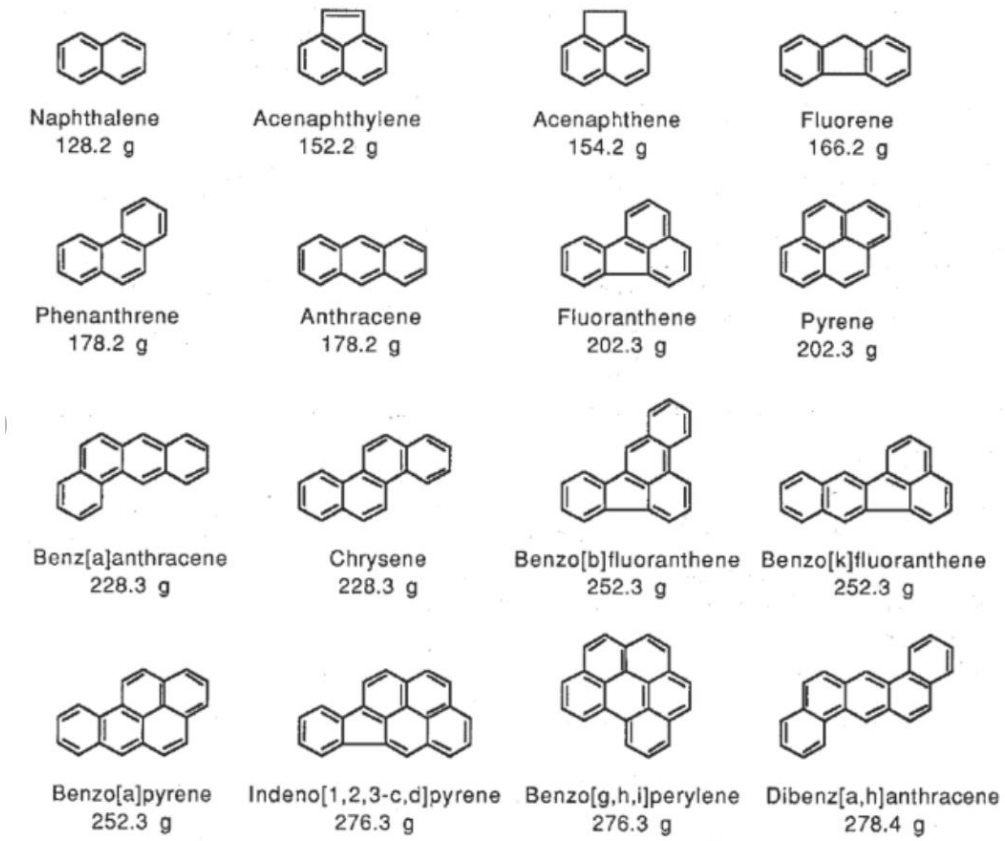
Monitoring Technologies



Polycyclic Aromatic Hydrocarbons (PAHs)

- Stakeholders requested information on PAHs and available monitoring technologies
- PAHs consist of up to 24 hydrocarbons; mainly formed from incomplete combustion of fossil fuels
- Based on OEHHA 2019 report on refinery chemical emissions and health effects:
  - PAH emissions from refineries are relatively small
  - PAH emissions result from routine and non-routine refinery operations
  - PAHs are not one of ten highest routine and non-routine chemical emissions by California refineries
- Based on staff's research, Naphthalene is the only PAH that can be monitored for in real-time
- South Coast AQMD monitors PAH for the MATES and NATTS programs
  - Measured once every six days

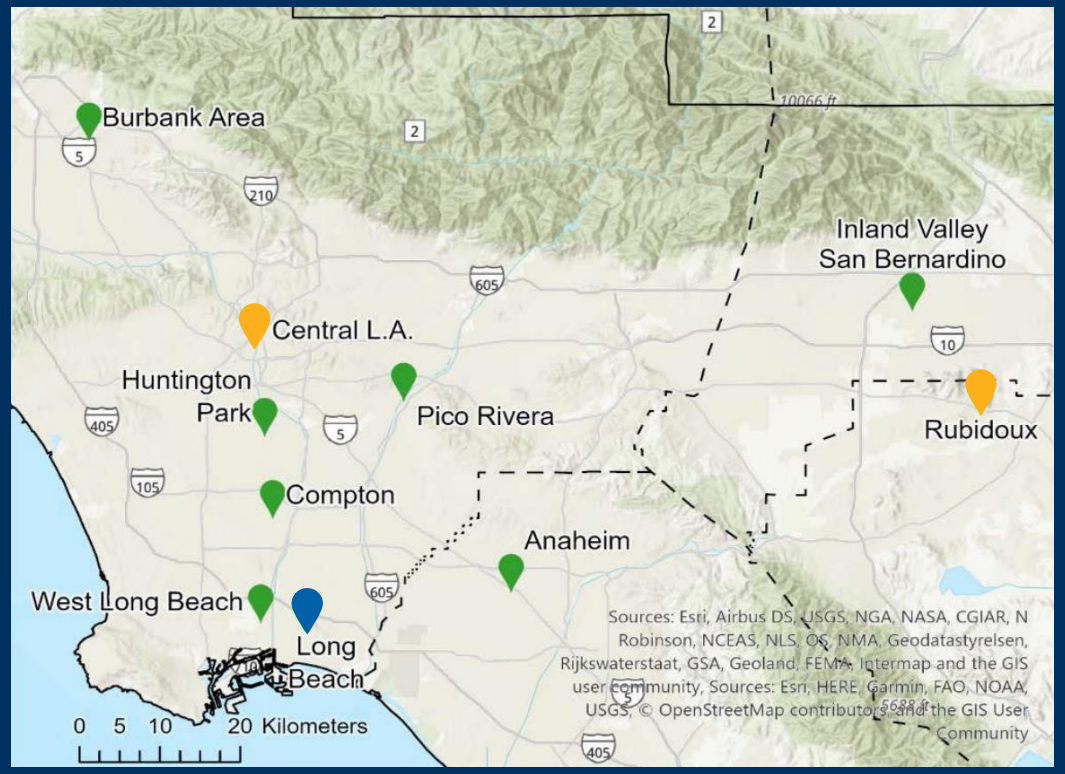
Chemical Structures of Some PAHs



Multiple Air Toxics Exposure Study (MATES)

- South Coast AQMD has conducted five MATES campaigns
- The last MATES campaign (MATES V) included ten fixed monitoring sites
  - Focused on measurements during 2018 and 2019
  - Two out of ten stations monitored for PAHs:
    - Central LA and Rubidoux
- Prior MATES studies measured PAHs at other stations
  - MATES IV included PAH monitoring at the Long Beach station, which is closer to refinery operations
- MATES are designed to:
  - Update inventory of toxic air contaminants and model localized risks
  - Include advanced monitoring technologies, low-cost sensor networks, and near real-time data
  - Include community engagement with a focus on communities near refineries

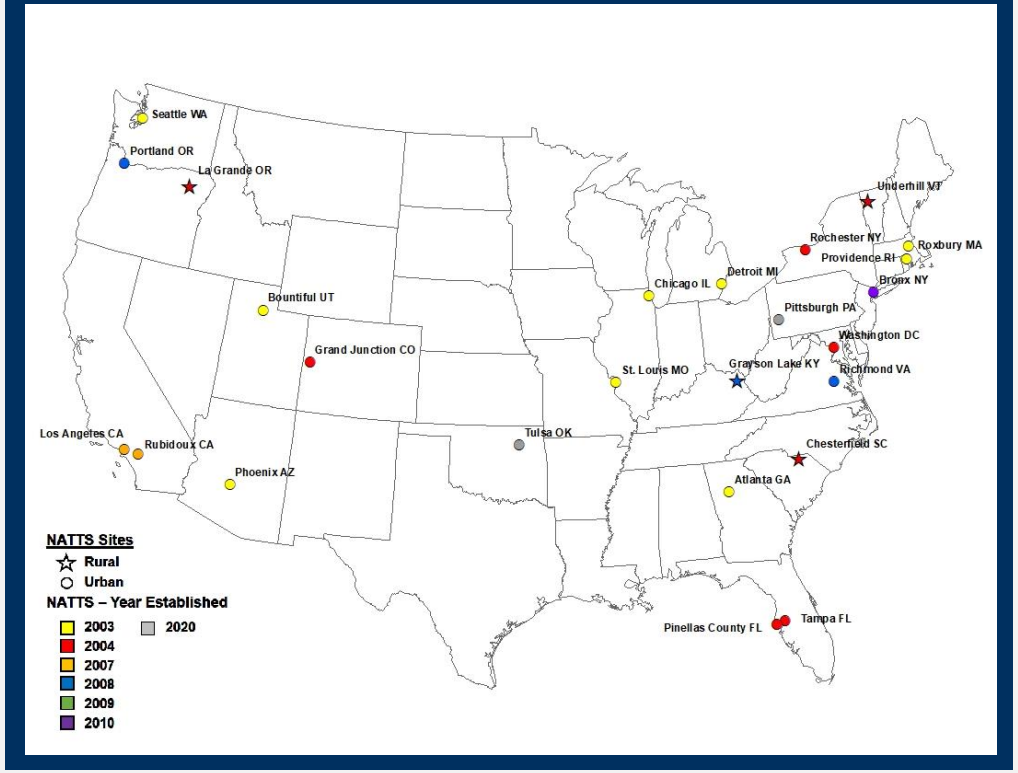
MATES V Monitoring Stations



National Air Toxics Trends Stations (NATTS)

- The goal of the federal NATTS program is to develop long-term air toxics monitoring data of consistent quality
  - NATTS network was initiated in 2003
  - Current network configuration includes 26 sites across the United States
  - There are typically over 100 pollutants monitored at each NATTS station, although only 19 of those are formally required
- South Coast AQMD monitors PAHs at two monitoring locations:
  - Central Los Angeles and Rubidoux – same locations that monitor for PAHs for MATES program

NATTS Network Including two stations in the South Coast AQMD



PAH Sampling Method Analysis

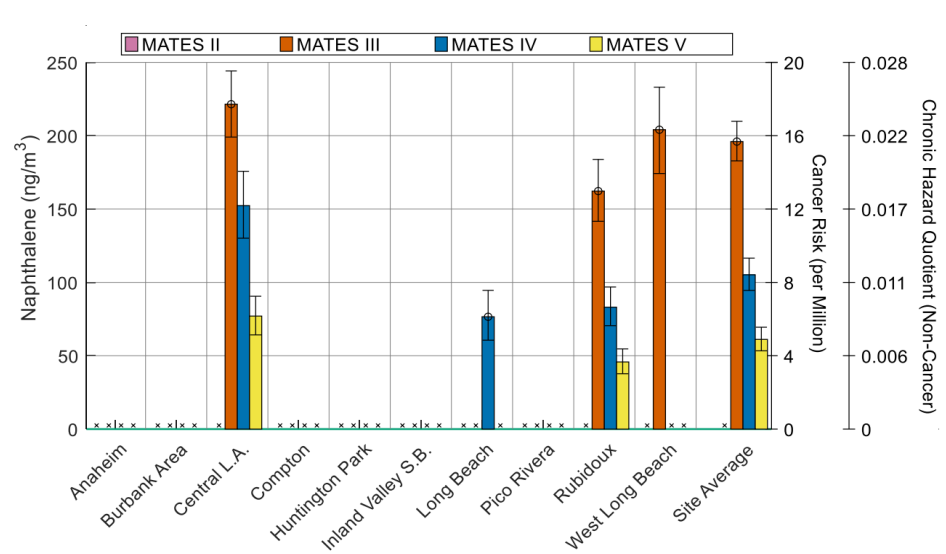
- PAHs are measured according to EPA Compendium Method TO-13A
  - Ambient air is drawn through a Poly-Urethane Foam (PUF) sampler over a 24-hour sampling period
    - Considerable sampler preparation required prior to sampling
  - PAHs are extracted from PUF sampler
  - Samples are analyzed by gas chromatography–mass spectrometry (GC/MS)
  - Sample results are usually obtained within 2-3 weeks after sample collection

PUF Sampler

Gas chromatography–mass spectrometry

PAH Measurement Results

- Figures show measurements of Naphthalene and Benzo(a)pyrene, two PAH compounds
  - Complete measurements can be found in the MATES V Final Report
- OEHHA data and South Coast AQMD data shows Naphthalene is the most emitted PAH
- As shown in the graphs, the PAH emissions have declined compared to previous MATES studies
- During the MATES IV campaign, the Long Beach station, which is closer to refineries, was added to measure PAHs
  - Measured PAH concentrations were similar to other two stations



Quality Assurance/Quality Control (QA/QC) and Monitoring System Performance

Quality Assurance/Quality Control

Community members inquired about the overall performance of existing fenceline monitoring systems

Refinery Fenceline Air Monitoring Plan Guidelines requires refinery fenceline air monitoring plan to address quality assurance

Quality Assurance Project Plan (QAPP), routine maintenance, and technical audits are some of the measures that must be included in plans to provide quality assurance

- All Refinery QAPPs have been partially approved and are undergoing technical review
- Until plans are fully approved, refineries must operate according to the draft plan
- QAPP must follow U.S.EPA guidelines covering appropriate QA/QC steps*

In general QA/QC plan includes automatic data flagging for invalid data, REL exceedance, large fluctuations etc., internal and independent audits, and routine monitor inspection and maintenance

* https://www.epa.gov/sites/production/files/2015-06/documents/g5-final.pdf

Current QA/QC plans

Current QA/QC plans developed by refineries may differ slightly depending on the monitoring technologies and manufacturers' recommendations, generally covering:

- Automatic quality control processes such as flagging data that are invalid, in exceedance of REL, high concentration, or large fluctuations
- Manual data review that could be daily and quarterly for anomalies
- QA/QC checks including:
  - Performance checks (bump tests) for open-path and H_2S monitors
  - Zero/span check for H_2S monitors
  - Flow rate, quarterly span check and semi annual zero check for aethalometer (black carbon monitor)
  - Visibility-extinction coefficient accuracy for meteorology measurement
  - Other checks
- Method Detection Limit (MDL) analysis
- Routine monitor inspection and maintenance according to the manufacturer's recommendations
- Internal audit
- Independent audit: within a year for initial audit and every 3 years afterwards

Standardize QA/QC Check Objectives

QA/QC check objectives in plans vary from refinery to refinery

- Performance checks for open-path and H_2S monitors are conducted on different timelines
  - Monthly by some refineries and quarterly by others
- Objectives of data completeness and accuracy vary by refinery
  - For date completeness and H_2S monitor, 90% and 15% are the common objectives, respectively

Staff proposes to:

- Standardize QA/QC checks requirements in the Refinery Fenceline Air Monitoring Guidelines
- Require an analysis and corrective/preventive actions in the quarterly report when any QA/QC check falls below its objective

	Data Completeness	Accuracy		
		Open-Path (FTIR and UV-DOAS)	H_2S Monitor	Aethalometer (Black Carbon Monitor)
Current Objectives	75% or 90%	25%	20% or 15%	10%
Staff proposal	90%	25%	15%	10%

Standardize Some Quarterly Report Requirements

Refinery quarterly reports generally includes:

- System performance data such as data completeness and measured maximum values
- QA/QC checks, such as method detection limits (MDLs) and data precision/accuracy
- All occurrences of compounds measured above notification thresholds

Staff's preliminary review of the quarterly reports for 2022 identified that:

- Some refineries had isolated Open Path FTIR or UV-DOAS that failed to achieve data completeness of 90% for one or two quarters (lowest around 50%)
- Data precision and accuracy achieved refinery's objectives

Staff considering standardizing some requirements, including:

- Submittal date for quarterly report - 60 days from the end of the quarter
- All occurrences of compounds measured above notification thresholds
- Statistical analysis of measured concentrations of each pollutant
- MDL for each measured pollutant

Staff considering requiring refineries to submit data electronically on a quarterly basis

Independent Audit

- South Coast AQMD currently in process of executing contract to conduct the first independent audits of the Rule 1180 fenceline monitoring systems
  - Contractor was selected through a Request For Proposal process
  - One objective is to develop an audit protocol for future reoccurring audits
- Staff considering proposing audit requirements in rule:
  - Initial audit one year after fenceline monitoring system commences operation
  - Reoccurring independent audit every three years
  - Follow-up audit within six months if an issue is identified
- SB 674 proposes to require the initial independent audit:
  - Three months after the installation
  - Recurring audit every two years
  - Follow-up audit within six months if an issue is identified
- Staff recommended longer timeframe for independent audits to SB 674 author
  - Three months will not provide significant data to evaluate
  - Three-year cycle consistent with U.S. EPA Technical Systems Audit schedule

Pollutants without Established Threshold

Establishing a Notification Threshold for Pollutants with No Existing Standards

- Currently there are no RELs or state/national standards for some pollutants including:
  - Black Carbon, PM, total VOC, Naphthalene, and Cadmium
- Historical data are available for Black Carbon and total VOC
- Newly added pollutants such as Naphthalene and Cadmium don’t have historical data since they have not been measured in the South Coast AQMD
- Staff considering proposing to:
  - Set a notification threshold based on historical data; and
  - Require notification to the public when emissions exceed the historical-data based notification thresholds

New Rule Proposal Updates since last Working Group Meeting

Rule 1180 and 1180.1 Section (c) Definitions

- In addition to definitions included in Working Group Meeting #2, the following definitions are being proposed:
  - New subdivision will include requirements for Independent Audits, definition included for clarity
  - Definition of "Tank Terminal" included in Working Group Meeting #2 proposed to be revised to "Terminal" to include facilities that store and/or transfer products

(7) INDEPENDENT AUDIT means an assessment conducted by a qualified independent-party, i.e., a party unrelated to either the Facility or the South Coast AQMD, that evaluates the Facility's Fenceline Air Monitoring System and quality assurance procedures.

(14) TERMINAL is an industrial facility used to store and/or transfer crude oil, petroleum products, and/or petrochemical products.

Rule 1180

Section (e) Fenceline Air Monitoring System Requirements

- Include compliance schedule for facilities to complete installation of air monitoring equipment at facilities with operations related to refineries and begin monitoring for additional air pollutants

(e) Fenceline Air Monitoring System Requirements

(1) The owner or operator of a Facility shall complete installation and begin operation of real-time Fenceline Air Monitoring System or modify the operation of the Fenceline Air Monitoring System in accordance with the approved, or partially approved, fenceline air monitoring plan:

(A) Beginning no later than one year after a fenceline air monitoring plan pursuant to paragraph (d)(1) or (d)(2) is approved or partially approved by the Executive Officer; and~~, the owner or operator of a petroleum refinery shall complete installation and begin operation of a real-time fenceline air monitoring system in accordance with the approved fenceline air monitoring plan~~.

(B) No later than six months after the Executive Officer approves, or partially approves, an updated fenceline air monitoring plan required pursuant to paragraph (d)(5) ~~is approved or partially approved by the Executive Officer~~.

Rule 1180.1

Section (e) Fenceline Air Monitoring System Requirements

- Considering allowing facilities 18 – 24 months to complete installation and begin operation of their real-time Fenceline Air Monitoring System
  - One year Rule 1180 timeline was very challenging, 18 – 24 months will be more feasible

(e) Fenceline Air Monitoring System Requirements

(1) The owner or operator of a Refinery shall complete installation and begin operation of real-time Fenceline Air Monitoring System or modify the operation of the Fenceline Air Monitoring System in accordance with the approved, or partially approved, fenceline air monitoring plan:

(A) Beginning no later than two years after a fenceline air monitoring plan pursuant to paragraph (d)(1) is approved, or partially approved, by the Executive Officer; and.

(B) No later than six months after the Executive Officer approves, or partially approves, an updated fenceline air monitoring plan required pursuant to paragraph (d)(5).

Requirements in Guidance Document

- Staff is considering adding several provisions currently only referenced in Refinery Fenceline Air Monitoring Plan Guidelines to the rule language:
  - Web-based facility notification program requirements
    - Information required to be included on Facility's Rule 1180 website
    - Public notification requirements for air pollutant measurements that exceed Notification Thresholds
  - Quarterly Reports requirements
  - Independent Audit requirements

Rule 1180 and 1180.1

- Considering updating Table 1 in both rules to include notification thresholds

Note: staff confirming Notification Thresholds with OEHHA guidelines

Table 1– Air Pollutants and Notification Thresholds to be Addressed by Fenceline Air Monitoring Plans

Air Pollutants	Notification Threshold (ppb)
Criteria Air Pollutants	
Sulfur Dioxide	75
Nitrogen Oxides	100
Particulate Matter	N/A
Volatile Organic Compounds	
Total VOCs (Non-Methane Hydrocarbons)	N/A
Formaldehyde	44
Acetaldehyde	260
Acrolein	1.1
1,3 Butadiene	298
Naphthalene	N/A
Diethanolamine	0.7 (Chronic)
Polycyclic aromatic hydrocarbons (PAHs)	N/A
Styrene	43
Benzene	8
Toluene	1300
Ethylbenzene	460 (Chronic)
Xylenes	5000
Metals	
Cadmium	N/A
Manganese	0.1 (8-hour)
Nickel	0.1
Other Compounds	
Hydrogen Sulfide	30
Carbonyl Sulfide	268
Ammonia	4594
Black Carbon	N/A
Hydrogen Cyanide	307
Hydrogen Fluoride+	293
Sulfuric Acid	29

+ If the facility uses hydrogen fluoride.

Proposed Revisions to Refinery Fenceline Air Monitoring Guidelines

Fenceline Monitoring Guidelines Update

- Guidelines will be amended to address the proposed rule requirements
  - Applicable to both PAR 1180 and PR 1180.1
  - Include the new compounds
  - Address the selection of monitoring systems for the new compounds
  - Specify the criteria of excluding any compound from monitoring
  - Specify the notification thresholds for new compounds
  - Independent audits one year after installing monitoring system and every three years after the first year

Next Steps

dates subject to change

- Release Initial Draft of Rule - Early June
- Preliminary Draft Rule and Staff Report – Summer 2023
- Public Workshop – Summer 2023
- Stationary Source Committee – Fall 2023
- Public Hearing – Fall 2023

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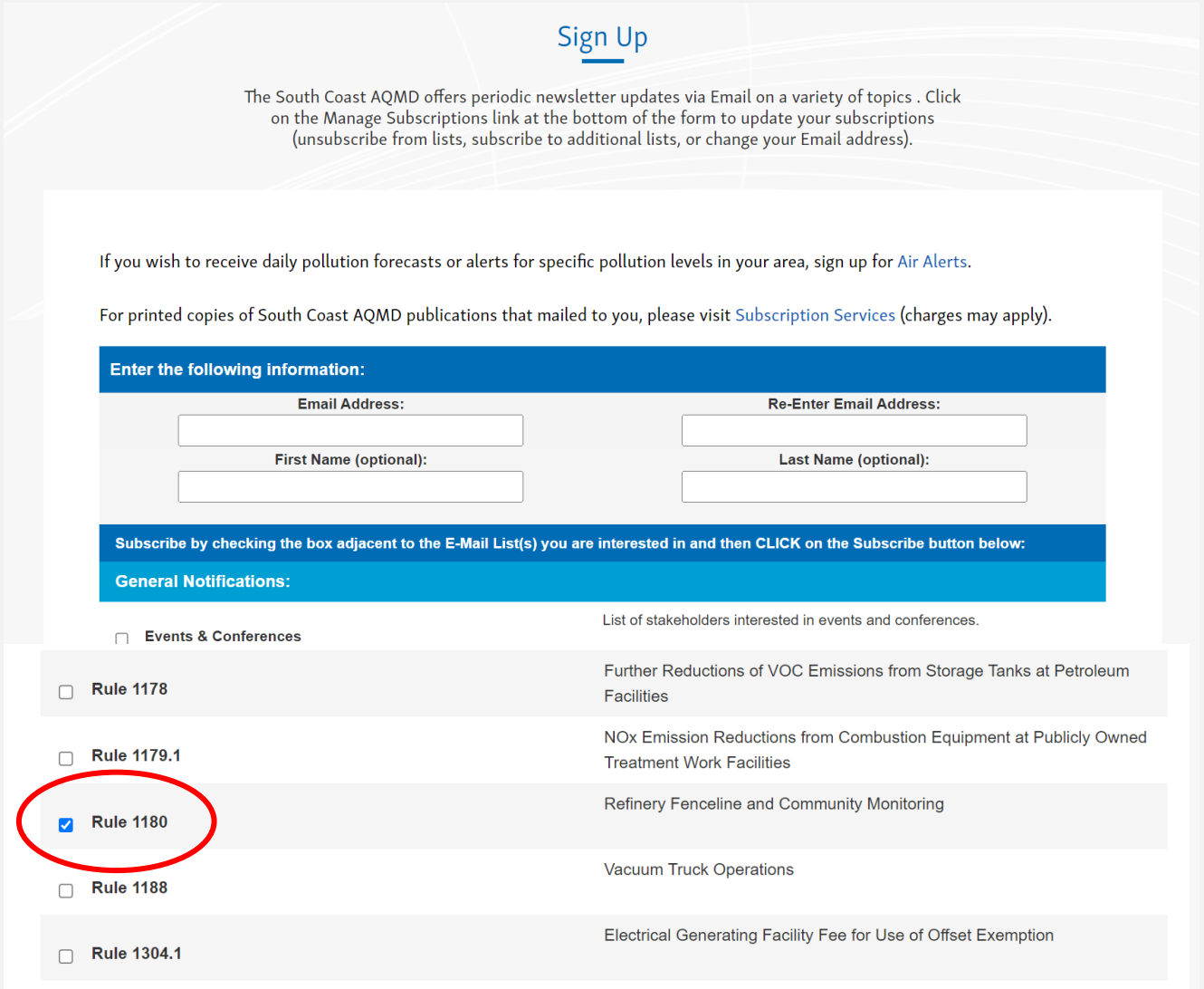

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☑ Rule 1180	Refinery Fenceline and Community Monitoring
☐ Rule 1188	Vacuum Truck Operations
☐ Rule 1304.1	Electrical Generating Facility Fee for Use of Offset Exemption

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