SCAQMD Proposed Rule 1180
Refinery Fenceline and Community Monitoring

Working Group Meeting #1
April 5, 2017

Meeting Agenda

• Background
  - Fenceline Monitoring Techniques
  - Existing refinery fenceline monitoring Regulations
  - Existing fenceline and community monitoring

• Rule development timeline
• Next Steps
• Comments
Background

• Following EPA’s Fenceline Monitoring Rule, all refineries are required to monitor and report levels of benzene around their fencelines
• Benzene is being monitored as a surrogate for all fugitive emissions of Hazardous Air Pollutants (HAPs)
• BAAQMD also has a similar rule requiring petroleum refineries to conduct fenceline monitoring
• Ultimately, fenceline monitoring can be used to identify leaks and unintended or accidental releases, and alert communities

Fenceline Monitoring Techniques

• Fixed Site Direct Measurements:
  - Multiple single-point time integrated samplers: Passive Diffusive (PD) Sorbent Tubes
  - Multiple single-point (near) real-time active sampling: Auto-GC
• Open-path optical remote sensing systems:
  - Use infrared (IR), laser, or ultraviolet (UV) light to measure concentrations of chemical compounds along the distance covered by the light signal
  - Integrated path (near) real-time monitoring of benzene directly: DOAS
  - Integrated path (near) real-time monitoring of surrogate compounds: OP-FTIR
Air Pollutant Monitoring Technologies
Multiple Single Point Fenceline Monitoring

• Passive Diffusion Tube Monitoring Network
  − Following 14 day exposure, benzene is adsorbed in the passive diffusion.
  − The passive diffusion tubes are removed from the field and analyzed in a lab.
  − Relatively low cost
  − One data point per two weeks (data with low time resolution)

• Auto-GC
  − Continuous, near real-time sub-ppbv to ppbv level analysis of BTEX and select VOCs

Open Path Monitoring - Optical Remote Sensing

• Open Path Monitoring:
  − Uses Optical Remote Sensing (ORS) instruments and is an alternative to conventional point monitors for measuring air emissions along an open path
  − Optical Remote Sensing (ORS) instruments use a light signal to measure concentrations of chemical compounds of interest along the distance covered by the light signal, providing a greater spatial resolution
Air Pollutant Monitoring Technologies (Optical Remote Sensing)

Optical Remote Sensing (Source)

Fugitive Refinery Emissions

NO₂
BTEX
SO₂

Receiver

*BTEX: benzene, toluene, ethyl benzene and xylenes

Air Pollutant Monitoring Technologies (Optical Remote Sensing)

Optical Remote Sensing (Source/Detector)

Fugitive Refinery Emissions

NO₂
BTEX
SO₂

Reflector

*BTEX: benzene, toluene, ethyl benzene and xylenes
Air Pollutant Monitoring Technologies
(Configuration Example - Fenceline)

*BTEX: benzene, toluene, ethyl benzene and xylenes

Air Pollutant Monitoring Technologies
(Configuration Example – Optical Tent)
U.S. EPA Refinery Fenceline Monitoring Regulation

• December 2015, U.S. EPA issued a final rule for fenceline monitoring at refineries - 40 CFR Part 63.658

• 40 CFR Part 63.658 requires continuous fenceline monitoring at all refineries
  - Passive air monitoring
  - Target pollutant to be analyzed is benzene
  - Alternative test methods allowed if approved by U.S. EPA

U.S. EPA Refinery Fenceline Monitoring Regulation (continued)

• Sampling locations required to be determined in accordance with U.S. EPA Method 325A
  - Option 1 requires refineries to place samplers for a regular shaped area (i.e., circular, triangular, or square) or an irregular shaped subarea
  - Option 2 requires sampling locations based on the length of a refinery perimeter
U.S. EPA Refinery Fenceline Monitoring Regulation (continued)

• Sampling period and sampling frequency
  – Sample collection required once for each 14-day sampling period
  – Decreased sampling frequency for facilities that consistently demonstrate sample results at or below 0.9µg/m³

• Establishes action level for benzene of 9 µg/m³ on an annual average basis

U.S. EPA Refinery Fenceline Monitoring Regulation (continued)

• Requires facilities to determine changes in benzene concentration (ΔC) within 45 days of each sampling period
  – ΔC on an annual average basis is required to be calculated with the 26 most recent 14-day sampling period
  – ΔC is calculated by subtracting lowest sample results from highest sample results

• Exceedance of action level triggers a root cause analysis
• Recordkeeping and Reporting
  - Requires submittal of sample results quarterly
  - Requires public release of benzene data on U.S. EPA web page 30 days after quarterly reporting period ends

• Implementation Schedule

<table>
<thead>
<tr>
<th>Activity</th>
<th>Dates</th>
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<tbody>
<tr>
<td>Install Fenceline monitoring systems</td>
<td>Present – January 29, 2018</td>
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<tr>
<td>Begin collecting data</td>
<td>January 30, 2018</td>
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<tr>
<td>• Collect 12 months of data to calculate annual average</td>
<td></td>
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<tr>
<td>Report data to U.S. EPA emissions data system</td>
<td>Spring 2019</td>
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<tr>
<td>• Report data quarterly</td>
<td></td>
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<tr>
<td>• Compare annual average to 9 µg/m³</td>
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<tr>
<td>U.S. EPA public release of benzene data on web page</td>
<td>Summer 2019</td>
</tr>
<tr>
<td>30 days after quarterly reporting period ends</td>
<td></td>
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<tr>
<td>• Data refreshed on U.S. EPA webpage quarterly</td>
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BAAQMD Refinery Fenceline Regulation

• Adopted Regulation 12, Rule 15 – Petroleum Refining Emissions Tracking in April of 2016

• Air monitoring applies to petroleum refineries
  – Open path monitoring
  – Targeted pollutants: benzene, toluene, ethyl benzene and xylenes (BTEX) and hydrogen sulfide
  – Requires consideration of open path measurement for sulfur dioxide, alkanes or other organic compounds, 1,3-butadiene and ammonia

• Requires petroleum refineries to conduct fenceline monitoring
  – Air Monitoring Plan required to be submitted by April 20, 2017
  – Begin monitoring within 1-year of approval of Air Monitoring Plan

• Air Monitoring Plan must include the following:
  – Description of equipment to monitor, record, and report air pollutant levels;
  – Description of equipment siting, operation and maintenance of equipment; and
  – Procedures for implementing data quality assurance and control.
• Air Monitoring Plan must also include the following:
  − Description of how the refinery will provide the air monitoring data that the public can readily access and understand
  − A means for the public to provide input toward the way data is displayed

• Subject to public review prior to approval

• Records of all information required by the rule must be maintained for a period of 5 years

The purpose of the BAAQMD Air Monitoring Guidelines are to provide the following:
  − A framework for how fenceline air monitoring systems should be developed and deployed, and
  − Metrics that will use to evaluate of air monitoring systems to meet air monitoring goals.

BAAQMD Air Monitoring Guidelines include the following technical information:
  − Specifications for continuous sampling with a time resolution of 5 minutes,
  − Siting considerations for air monitors (e.g., nearby structures, unobstructed fetch and terrain), and
  − Specifications for air measurements to cover affected populated areas.
# Overview of Key U.S. EPA and BAAQMD Refinery Fenceline Rule Requirements

<table>
<thead>
<tr>
<th>EPA - Electronic Code of Federal Regulations §63.658</th>
<th>BAAQMD - Regulation 12 Rule 15</th>
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<tbody>
<tr>
<td><strong>Target Pollutant(s)</strong></td>
<td>• Benzene • Annual reporting of criterial pollutants, TAC’s and GHG’s • Benzene, toluene, ethyl benzene and xylenes (BTEX) and hydrogen sulfide (H₂S) and consideration of others</td>
</tr>
<tr>
<td><strong>General Monitoring Requirements</strong></td>
<td>• Passive monitoring • Sampling frequency of a 14-day sampling period • Decreased sampling frequency for facilities with consistent results at or below 0.9µg/m³ • Air Monitoring Guidelines: − Open path monitoring − Continuous measurements with time resolution of 5 minutes</td>
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<td><strong>Action Level(s)</strong></td>
<td>• Action level of 9 µg/m³ for benzene on an annual average basis • No action level</td>
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<tr>
<td><strong>Recordkeeping and Reporting</strong></td>
<td>• Submit sample results on a quarterly basis • EPA public release of benzene data on web page 30 days after quarterly reporting period ends • Air Monitoring Guidelines: − Air monitoring data must be provided in a way that the public can readily access and understand − Provide a means for public input toward the way data are displayed • Maintain records for a period of 5 years</td>
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## Existing Fenceline and Community Monitoring

- **Chevron Refinery - Richmond, CA**
  - Five open-path fenceline monitors
    - Emissions reported: benzene, ozone, sulfur dioxide, toluene, xylene, ozone, carbon disulfide
  - Three community monitors
    - Emissions reported: ammonia, black carbon, hydrogen sulfide, PM2.5, benzene, toluene, o-Xylene, m,p-Xylene, ethyl benzene, n-hexane, n-heptane, n-octane, 3-methylpentane, trimethylbenzene
  - Data reported in real-time, however, data is subject to change for quality assurance and quality control
  - Reports generated on a monthly basis that summarize the results of monitoring data, maintenance activities, etc.
  - Data available on dedicated website that is fully operated and maintained by facility
Existing Fenceline and Community Monitoring (continued)

- Phillips 66, Rodeo, CA
  - Six open-path fenceline monitors
    - Emissions reported: benzene, carbon disulfide, xylene, toluene, sulfur dioxide, ozone, 1,3-butadiene, carbonyl sulfide, carbon monoxide, ethanol, ethylene, nitrous oxide, ammonia, total hydrocarbons, methane, methyl mercaptan, MTBE
  - No community monitors
  - Data reported in real-time, however, data is subject to change for quality assurance and quality control
  - Reports generated on a monthly basis that summarize the results of monitoring data, maintenance activities, etc.
  - Data available on dedicated website that is fully operated and maintained by facility

Proposed Rule 1180 Timeline

- Information Gathering
- Working Group #2
- Working Group #3 & Draft Rule Language
- Public Workshop
- Governing Board

- 75-day Notice of Public Hearing
- 30-day Notice of Public Hearing

*Additional Working Groups can be added as needed
PR 1180: Next Steps

• Working Group Meeting #2 in May 2017
• Governing Board Hearing – Fall 2017

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