Air Quality Monitoring Program Meeting
January 11, 2023 – 1:00pm to 3:00pm
Zoom Webinar

Please provide questions in the Q&A box or raise your hand on the web application to participate.

Phone controls for participants:
The following commands can be used on your phone's dial pad while in the Zoom meeting:

- *6 - Toggle mute/unmute
- *9 - Raise hand

Agenda:

1. Welcome
2. Status Update on the Air Quality Monitoring Program Upgrade
3. Air Quality Monitoring Program Overview
4. 17th Annual Monitoring Report (May 2021 – April 2022) Summary
5. Q3/Q4 2022 Stakeholder Questions

For more information, please visit the air quality monitoring website at:
https://monitoring.cleanairactionplan.org/ or contact Amber Coluso, Environmental Specialist, at acoluso@portla.org.
## Current Status of Stations

### Status of Air Monitoring Stations (as of 12/22/2022)

<table>
<thead>
<tr>
<th>Instruments/Equipment</th>
<th>Monitoring Station</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wilmington Community Station</td>
</tr>
<tr>
<td><strong>PM$_{2.5}$ Sequential Filter Sampler</strong></td>
<td>X</td>
</tr>
<tr>
<td><strong>PM$_{2.5}$ Continuous Monitor</strong></td>
<td>X</td>
</tr>
<tr>
<td><strong>PM$_{10}$ Continuous Monitor</strong></td>
<td>X</td>
</tr>
<tr>
<td><strong>PM$_{10}$ Federal Reference Method Filter Monitor</strong></td>
<td>X</td>
</tr>
<tr>
<td><strong>Ultrafine Particle Counter</strong></td>
<td>X</td>
</tr>
<tr>
<td><strong>Aethalometer – Black Carbon</strong></td>
<td>X</td>
</tr>
<tr>
<td><strong>CO Analyzer</strong></td>
<td>X</td>
</tr>
<tr>
<td><strong>NO$_2$ Analyzer</strong></td>
<td>X</td>
</tr>
<tr>
<td><strong>O$_3$ Analyzer</strong></td>
<td>X</td>
</tr>
<tr>
<td><strong>SO$_2$ Analyzer</strong></td>
<td>X</td>
</tr>
</tbody>
</table>

1. Delivery of final UFP counter at Coastal Boundary Station expected January 2023.


3. Delivery of NO$_2$ analyzers expected March 2023.

4. San Pedro Community Station SO$_2$ analyzer currently offline (will be replaced).
Air Quality Monitoring Program – 2022/2023 Upgrade

Criteria Pollutants

- Ozone (O₃) Thermo Model 49IQ
- Sulfur Dioxide (SO₂) Thermo Model 43IQ-TL (Trace Level)
- Carbon Monoxide (CO) Thermo Model 48IQ
- Nitrogen Dioxide (NO₂) T-API Model N500 CAPS True NO₂-NOₓ-NO Analyzer
- Particulate Matter < 10 micrometers (PM₁₀) Met One BAM 1020
- Particulate Matter < 2.5 micrometers (PM₂.₅) Met One BAM 1020

Supplemental PM

- Ultrafine Particle Counts (UFP) TSI, Inc. Model 3783
- Black Carbon (BC) Magee Scientific Model AE-33
Welcome to the San Pedro Bay Ports Air Monitoring Website

https://monitoring.cleanairactionplan.org

Real-time, air quality and meteorological data made available to the public on a near-real-time basis.
Offline equipment and reasoning are noted in Current Data webpage of the monitoring website.
Questions?
Air Quality Monitoring Program
Overview
Air Quality Monitoring Program – History

Air monitoring program commenced in February 2005.

- Main objective of monitoring program is to estimate levels of diesel particulate matter (DPM) in proximity to Port complex.
  - DPM became a focal point since California Air Resources Board (CARB) identified it as an air toxic.
  - DPM is a complex mixture of gases and particulates, ambient concentrations cannot be measured directly.
  - In air quality monitoring, elemental carbon (EC) and black carbon (BC) are surrogates for DPM.

- POLA air monitoring program uses filter-based sampling to measure:
  - Particulate Matter < 10 micrometers (PM$_{10}$)
  - Particulate Matter < 2.5 micrometers (PM$_{2.5}$)
  - Elemental Carbon (EC)
Air Quality Monitoring Program - Expansion

In 2007, a secondary objective for the monitoring program was established to estimate ambient gaseous pollutant and particulate matter (PM) levels in adjacent communities.

To accomplish this, the Port expanded the monitoring program to include continuous monitoring in early 2008.

Criteria Pollutants – have EPA NAAQS

- Ozone ($O_3$)
- Nitrogen Dioxide ($NO_2$)
- Sulfur Dioxide ($SO_2$)
- Carbon Monoxide (CO)
- Particulate Matter < 10 micrometers ($PM_{10}$)
- Particulate Matter < 2.5 micrometers ($PM_{2.5}$)

Supplemental PM

- Ultrafine Particle Counts (UFP)
In 2011, the Port added four (4) TSI Model 3783 Environmental Particle Counters to the program for continuous measurement of ultrafine particle (UFP) counts at all stations in the Port’s network.

Particle counts are important since fine and ultrafine particles, while having little mass, can significantly influence on human health due to ability to cross the blood-brain barrier.

**TSI Model 3783 Particle Counter**

- Provides continuous monitoring of particle counts.
- Detects particles down to 7 nm.
- Highly localized pollutant; common for traffic patterns to significantly influence UFP levels.
- No NAAQS or CAAQS for ultrafine particle counts.
In 2013, the Port added one (1) Model AE-33 Aethalometer to the program for continuous measurement of black carbon (BC) at the Source-Dominated station.

Black carbon is a 0.1 - 0.5 µg particulate matter cluster of different compounds produced by the incomplete burning of:

a) Fossil fuels (primarily oil, diesel and fuel oil)

b) Biomass burning (wood, coal, etc.)

**Model AE33 Aethalometer**

- Real-time, continuous (BC) measurements via filter-based optical technology
- BC is also surrogate for diesel particulate matter (DPM) emissions
- SCAQMD uses same instrument to measure BC levels
- Source Apportionment
  - Differentiates Biomass Burning vs Fossil Fuel
Air Quality Monitoring Program – Stations

**SPBP AQ Monitoring Stations**
- POLA San Pedro Community
- POLA Wilmington Community
- POLA Coastal Boundary
- POLA Source-Dominated
- POLB Inner Harbor
- POLB Outer Harbor

**SCAQMD Monitoring Stations**
- West Long Beach
- Rubidoux
- Pico Rivera
- Central Los Angeles
- Long Beach
- Huntington Park
- Inland Valley San Bernardino
- Compton
- Burbank Area
- Anaheim

© Leidos. All rights reserved.
Summary of Year 17 Monitoring Data (May 2021 - April 2022)
Air Quality and Meteorological Parameters

<table>
<thead>
<tr>
<th>Pollutant Type</th>
<th>Regional</th>
<th>Localized</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO</td>
<td></td>
<td>NO₂</td>
</tr>
<tr>
<td>O₃</td>
<td></td>
<td>SO₂</td>
</tr>
<tr>
<td>PM₂.₅</td>
<td></td>
<td>PM₂.₅</td>
</tr>
<tr>
<td>PM₁₀</td>
<td></td>
<td>PM₁₀</td>
</tr>
<tr>
<td>--</td>
<td></td>
<td>EC</td>
</tr>
<tr>
<td>--</td>
<td></td>
<td>BC</td>
</tr>
<tr>
<td>--</td>
<td></td>
<td>UFP</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Meteorology</th>
<th>Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wind Speed</td>
</tr>
<tr>
<td></td>
<td>Wind Direction</td>
</tr>
<tr>
<td></td>
<td>Temperature</td>
</tr>
<tr>
<td></td>
<td>Relative Humidity</td>
</tr>
<tr>
<td></td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>--</td>
</tr>
</tbody>
</table>
## Year 17 Annual Report - Pollutant Comparison

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Nearest South Coast AQMD Station</th>
<th>POLA San Pedro Community Station</th>
<th>POLA Wilmington Community Station</th>
<th>POLB Inner Harbor Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO (ppm)</td>
<td>0.35</td>
<td>0.30</td>
<td>0.45</td>
<td>0.41</td>
</tr>
<tr>
<td>NO₂ (ppb)</td>
<td>13</td>
<td>12</td>
<td>14</td>
<td>19</td>
</tr>
<tr>
<td>O₃ (ppb)</td>
<td>29</td>
<td>21</td>
<td>24</td>
<td>23</td>
</tr>
<tr>
<td>SO₂ (ppb)</td>
<td>0.5</td>
<td>1.5*</td>
<td>1.5*</td>
<td>2.3</td>
</tr>
<tr>
<td>PM₁₀ (µg/m³)</td>
<td>25.0</td>
<td>26.4</td>
<td>24.7</td>
<td>38.7</td>
</tr>
<tr>
<td>PM₂.₅ (µg/m³)</td>
<td>13.8</td>
<td>14.7</td>
<td>14.6</td>
<td>14.5</td>
</tr>
</tbody>
</table>

**Supplemental Pollutants**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Nearest South Coast AQMD Station</th>
<th>POLA San Pedro Community Station</th>
<th>POLA Wilmington Community Station</th>
<th>POLB Inner Harbor Station</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC (µg/m³)</td>
<td>1.16</td>
<td>0.96</td>
<td>0.85</td>
<td>1.08</td>
</tr>
<tr>
<td>EC (µg/m³)</td>
<td>--</td>
<td>0.69</td>
<td>0.66</td>
<td>--</td>
</tr>
<tr>
<td>UFP (counts)</td>
<td>19,344</td>
<td>10,100</td>
<td>12,600</td>
<td>--</td>
</tr>
</tbody>
</table>

* Current SO₂ instruments cannot detect levels below 1 ppb; measurements are at the lower detection limit. New SO₂ analyzer will be “trace level instrumentation” with detection limits below 1 ppb similar to South Coast AQMD.
Impacts of Meteorology on Air Quality

Inversion Layer

- Does not allow transport of pollutants to free atmosphere.
Period of Record EC Monitoring Results

Monthly Average Elemental Carbon Concentrations at the Port of Los Angeles
(February 2005 - April 2022)

- Wilmington Community Station
- San Pedro Community Station
- Source-Dominated Station
- Coastal Boundary Station

Wildfires December 2017
## Year 17 - Black Carbon Monitoring Results

### Annual Average
(April 2021 - May 2022)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>POLA Wilmington Community</th>
<th>POLA San Pedro Community</th>
<th>POLB Inner Harbor</th>
<th>POLB Outer Harbor</th>
<th>SCAQMD West Long Beach (WLB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC (µg/m³)</td>
<td>0.96</td>
<td>0.85</td>
<td>1.08</td>
<td>0.84</td>
<td>1.16</td>
</tr>
<tr>
<td>Compared to SCAQMD WLB</td>
<td>-17.2%</td>
<td>-26.7%</td>
<td>-6.9%</td>
<td>-27.5%</td>
<td>--</td>
</tr>
</tbody>
</table>

### Summary

- Overall, BC measurements consistent across the five (5) stations in the San Pedro Bay Ports region.
- Port stations’ annual average BC concentrations are slightly lower than corresponding BC measurements at SCAQMD West Long Beach (aka Hudson School) station.
Annual Average Black Carbon Concentrations

Note: 2021/2022 Annual Average BC at Source-Dominated station calculated with only 63% data completeness as instrument was offline May 1 to September 11, 2021 when BC concentrations are seasonally low.

Wildfires during fall months
Average Ultrafine Particle Counts by Hour of Day
Annual Average Filter-Based PM$_{2.5}$ Concentrations

Note: Coastal Boundary station was suspended May 2020 - April 2022.
Source-Dominated station was suspended May 2021 - April 2022.
Annual Average Filter-Based PM$_{10}$ Concentrations

Notes: Filter-based PM$_{10}$ monitoring at Coastal Boundary station commenced in August 2008, suspended in May 2020. Filter-based PM$_{10}$ monitoring at Wilmington Community station suspended in May 2021.
Annual Average NO₂ Concentrations

Year

May 08 - Apr 09
May 09 - Apr 10
May 10 - Apr 11
May 11 - Apr 12
May 12 - Apr 13
May 13 - Apr 14
May 14 - Apr 15
May 15 - Apr 16
May 16 - Apr 17
May 17 - Apr 18
May 18 - Apr 19
May 19 - Apr 20
May 20 - Apr 21
May 21 - Apr 22

Annual Average NO₂ Conc. (ppm)
Maximum 1-Hour O₃ Concentrations

Impact of Wildfires during Fall 2020

Year

Maximum 1-hour Average O₃ Conc. (ppm)
Maximum 1-Hour CO Concentrations

- Wilmington Community Station
- San Pedro Community Station
- Source-Dominated Station
- Coastal Boundary Station
- SCAQMD Signal Hill / Compton
- 1-Hour NAAQS
- 1-Hour CAAQS

Maximum 1-hour Average CO Conc. (ppm)
Maximum 24-Hour SO$_2$ Concentrations

![Graph showing maximum 24-hour average SO$_2$ concentrations from May 08 to Apr 2022. The graph includes data from various stations such as Wilmington Community Station, San Pedro Community Station, Source-Dominated Station, Coastal Boundary Station, and SCAQMD Signal Hill Station. The data is represented with different colored bars for each year and month, showing the fluctuations in SO$_2$ concentrations over time. The graph also highlights the 24-hour CAAQS standard.]
Year 17 Annual Report

Available online at:

https://monitoring.cleanairactionplan.org/reports/
Questions?
Stakeholder Questions
Black Carbon Seasonality

Select A Site      Observation To Graph      Select A View      From      To
Port of Los Angeles - Wilmington      BC (24-HR)      Graph View      2021-05-01      2023-01-04

Wilmington Community - BC (24 hr)
September 2022 - Elevated PM$_{10}$ Concentrations
Quality Assurance Protocols
Data Quality Assurance (QA)

> **Technical Director / QA Officer**
>   > Dr. Gary Bertolin - Senior AQ Scientist
>   > Over 38 years experience in design, implementation, and management of air quality programs.

> **Real-Time Gaseous and PM Measurements**
>   > Daily calibrations on all gaseous instrumentation deployed
>   > Daily review of the previous day’s monitoring data and calibration
>   > Manual checks on all real-time air quality and meteorological instruments on a 3-day basis
>   > Monthly maintenance and cleaning of instruments per manufacturer’s specifications
>   > Monthly QA review of all real-time air quality and meteorological data

> **Filter-Based PM Measurements**
>   > Field blanks taken monthly to determine background PM loading on filters
>   > Instrument flow checks performed before and after each sampling period
>   > Bi-monthly review of all filter-based PM measurements

> **Independent Semi-Annual Audits**
>   > Independent contractor performs audits (per EPA guidelines) on all instruments twice per year