

The Port Of Los Angeles Air Quality Monitoring Program

Semi-Annual Report

May 2008 – October 2008

1.0 Introduction

This report provides a summary of the operation of the four-station air monitoring network at the Port of Los Angeles (POLA), during the period from May 2008 to October 2008. The period represents the first half of the 4th year of operation, as the monitoring program came online with all four stations at the end of April, 2005.

The initial focus of this program has been to monitor for particulate matter (PM₁₀ and PM_{2.5}, or particulate matter less than 10 and 2.5 micrometers in diameter, respectively) and meteorological data. During the months leading up to November 2007, a great deal of planning and work by the POLA Environmental Management Division's Staff and the SAIC team was done toward a phased expansion of the initial Program. As a result, the expanded Program will include the continuous monitoring of gaseous criteria pollutant monitors (carbon monoxide, sulfur dioxide, nitrogen oxides, and ozone), PM_{2.5} and PM₁₀, ultrafine particle counters (UFP) and polycyclic aromatic hydrocarbon (PAH) analyzers.

The first of this three-phase expansion started in November 2007, and included the start-up of the Source-Dominated and Coastal Boundary stations. The remainder of the monitoring program expansion included the start-up of the Wilmington station in March, 2008 and the start-up of the San Pedro station in April, 2008.

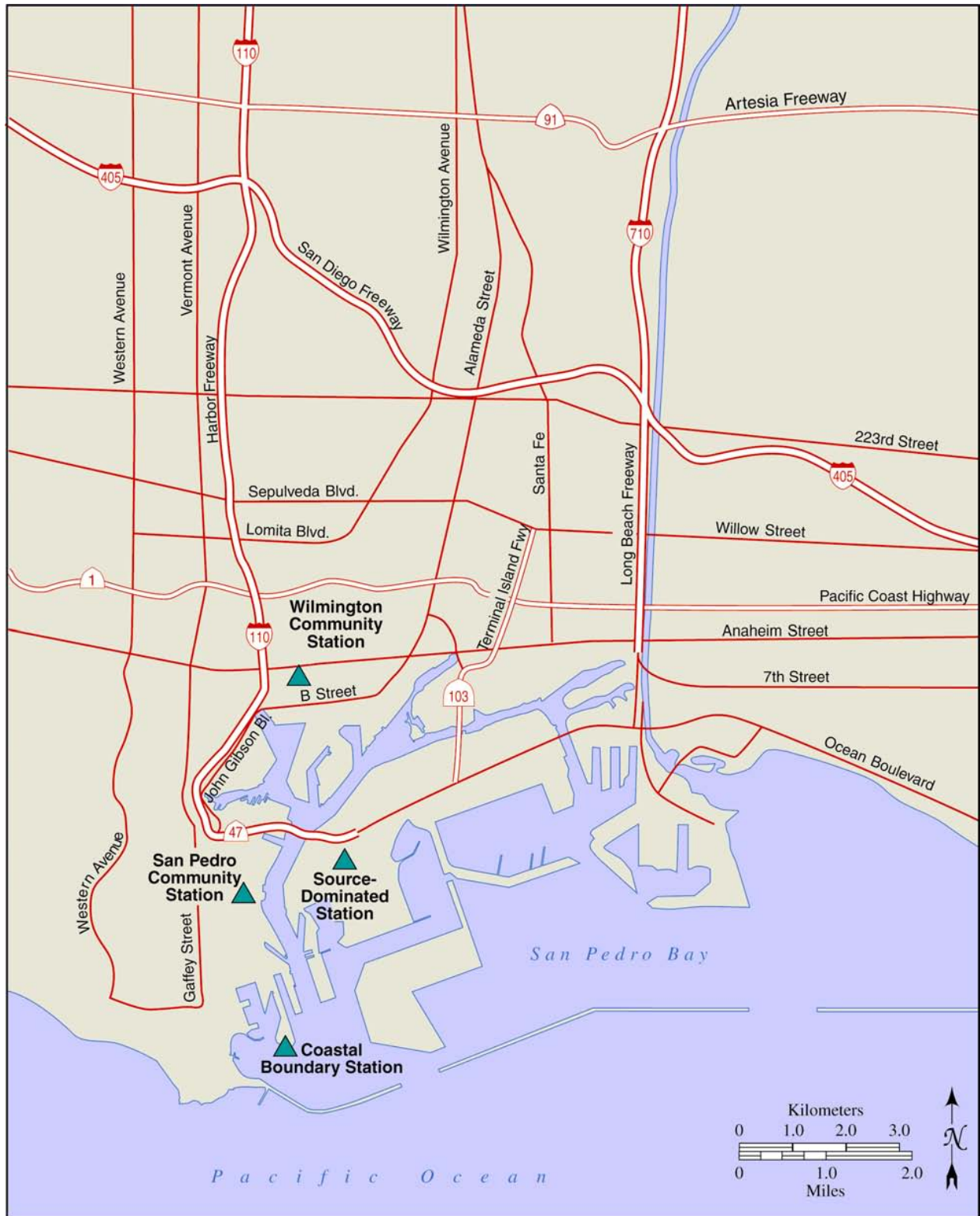
The main objectives of this report are to supplement the Program's detailed annual reports, briefly summarize the operation of the monitoring network during the six-month time frame, and discuss planned activities for the Program over the next six months.

1.1 Monitoring Locations

The Port's air monitoring network has been designed to collect ambient air quality and meteorological measurements within a network of four monitoring stations located within the POLA's operational region of influence (ROI). The Program's monitoring sites were selected such that they measure representative ambient air quality conditions near the coast, within the adjacent communities of San Pedro and Wilmington, and near the middle of Port operations on Pier 300. The details of the station locations are provided below, and a map of the stations is provided in Figure 1.

- *Wilmington Community Monitoring Station (33° 46' 43.79" N, 118° 16'10.56" W)* – This station is located at the Saints Peter and Paul Elementary School (SPPS) in the City of Wilmington. This station is designed to collect air quality levels that are representative of the residential areas of Wilmington, and is centrally located approximately 0.5 miles

Figure 1. Locations of the Four Stations in the Port Air Monitoring Network



north of Port operations. The Wilmington station has been designated as the “primary” station, because it is in a central location and measures some additional meteorological and air quality parameters.

- ***San Pedro Community Monitoring Station (33° 44' 27.54" N, 118° 16' 48.25" W)*** – A second station is located near the Promenade walkway along Harbor Drive, across the street from the intersection of Harbor Boulevard and West 3rd Street in the city of San Pedro. This station is designed to measure air quality levels that are representative of the residential areas of San Pedro, and is located approximately 0.1 miles west of the main ship channel.
- ***Coastal Boundary Station (33° 42' 50.58" N, 118° 16' 27.07" W)*** – A third station is located at Berth 47 in the Port Outer Harbor. This location has the least direct exposure to emissions from Port operations.
- ***Terminal Island Treatment Plant Station (33° 44' 41.03" N, 118° 15' 40.13" W)*** – A fourth station is located on Pier 300, at the Terminal Island Treatment Plant (TITP) on Ferry Street. This station is expected to have the highest exposure to emissions from Port operations, as it is in direct proximity to terminal operations which use a large number of diesel engine sources (trucks, trains, ships, and cargo handling equipment). It is also referred to as the “source-dominated” station, because of the predominance of on road and off-road diesel emission sources in the area.

1.2 Monitoring Parameters

Monitors at all four stations in the POLA network:

- ***PM_{2.5} monitors*** – Each station is equipped with a multi-port PM_{2.5} “sequential filter sampler” (SFS) monitor that simultaneously collects samples on a 24-hour basis on two different filter media (Teflon and quartz). This allows for the analysis of samples for mass (Teflon filters) and detailed chemical speciation (quartz filters), including carbon fractions (elemental carbon/organic carbon), metals, and soluble ions.
- ***Meteorological Monitoring*** – Each station measures wind speed, wind direction, and temperature. The meteorological data is used to analyze the air quality monitoring data and to define periods of onshore and offshore winds. The Wilmington station also measures additional meteorological parameters that should be representative of the POLA ROI, including relative humidity, solar radiation, and barometric pressure.
- ***Continuous PM_{2.5} Monitoring*** – Each station is equipped with a DustTrak continuous PM_{2.5} monitor. The data collected by this instrument are used to supplement the integrated data collected by the SFS PM_{2.5} monitors. The data collected by these instruments are not designed to determine compliance with regulatory standards, but are useful in evaluating short-term variations in PM_{2.5} levels and source/receptor relationships.
- ***Detailed 24-hour sampling*** – Each station is equipped with a multi-port PM_{2.5} “sequential filter sampler” (SFS) monitor that simultaneously collects samples on a 24-hour basis on

two different filter media (Teflon and quartz). This allows for the analysis of samples for mass (Teflon filters) and detailed chemical speciation (quartz filters), including carbon fractions (elemental carbon/organic carbon), metals, and soluble ions. A second SFS monitor at each station collects samples over shorter time periods, to target specific wind regimes (onshore/offshore flows) and associated source/receptor situations.

- **Continuous Gaseous Pollutant Monitoring** - Each station is equipped with analyzers to determine real-time air pollutant concentrations for the gaseous pollutants (i.e. NO-NO₂-NO_x, O₃, CO, and SO₂). These analyzers are federal reference method or federal equivalent method designated monitors and include the following:
 - Pulsed Fluorescence SO₂ Analyzer
 - Chemiluminescent NO-NO₂-NO_x Analyzer
 - Gas Filter Correlation CO Analyzer
 - U.V. Photometric Ozone (O₃) Analyzer
- *Meteorological Monitoring Station* - Each station is equipped with a meteorological monitoring station, which measures wind speed, wind direction, and temperature. The meteorological data is used to analyze the air quality monitoring data and to define periods of onshore and offshore winds. The Wilmington station also measures additional meteorological parameters that should be representative of the broader Port region (barometric pressure, solar radiation, and relative humidity).
- *Continuous Monitoring of PM* - In addition to the detailed 24-hr PM sampling described above, the Port's monitoring stations are now equipped to continuously monitor PM₁₀ and PM_{2.5} on a continuous and real-time basis. These data are collected with Beta Attenuation Monitors (BAMs) that measure real-time PM₁₀ and PM_{2.5} concentration at hourly intervals.

Additional Monitors at the primary Wilmington station:

- *PM₁₀ Monitor* - An additional SFS monitor equipped with a PM₁₀ inlet is used to measure PM₁₀ concentrations at the Wilmington station. This monitor allows the collection of simultaneous samples of PM₁₀ mass and carbon fractions, which can be compared with the results of the PM_{2.5} monitoring.
- *Federal Reference Monitors* - In addition to the instrumentation discussed above, the Wilmington station has two federal reference monitors (FRMs) that are certified to measure PM₁₀ and PM_{2.5} 24-hour average concentrations for compliance with the National and California Ambient Air Quality Standards (NAAQS/CAAQS). The data from these instruments are used as a check and validation of the data collected by the SFS monitor.

Additional Monitor added at the Coastal Boundary station:

- *PM₁₀ Monitor* - An additional SFS monitor equipped with a PM₁₀ inlet was added on August 31, 2008 to the Coastal Boundary station, to measure PM₁₀ concentrations at the

Coastal Boundary station. These data will be used to compare with the PM_{2.5} data collected at that station, and to validate data from the real-time BAM PM₁₀ monitor also operational at the station.

2.0 Summary of Monitoring Network Operation

All of the equipment needed for the expanded monitoring Program are housed in a climate-controlled shelter. At each station, the existing meteorological sensors were rerouted and incorporated into the new data logging system which also collects data from the new monitoring instruments. The data logging system automatically transmits the data to SAIC's offices for review, analysis and archiving, and the preliminary data are also transmitted on a real-time basis to a public website (<http://www.cleanairactionplan.org>).

Filter-based sampling for both PM₁₀ and PM_{2.5} is conducted every three days according to the EPA nationwide schedule; however, the expanded monitoring parameters are continuously collected on a real-time basis. As before, all of the monitoring sites are visited by the Program's field technicians on a three-day schedule to provide routine maintenance for the monitors and to download the DustTrak data. Exposed filters collected by the technicians are routinely sent to the Desert Research Institute (DRI) for analysis of PM₁₀, PM_{2.5}, and elemental carbon concentrations. Upon receipt of the results from the DRI laboratory, they are reviewed, analyzed, archived and subsequently presented on the Port's website: (<http://www.portoflosangeles.org>) and in the Program's annual reports.

The field technicians routinely complete a monitoring checklist during each site visit to document the operation of the program and communicate any problems, issues or observations directly to the Technical Project Manager. In addition, if the technicians identify any serious problems during their site visit, they communicate with the SAIC team immediately by cell phone.

2.1 Summary of Monitoring Results

There were no unusual events or conditions that affected the air quality during this six-month period (e.g., wildfires in the region). A brief summary of the results is provided below; a more detailed analysis of the data will be included in the upcoming fourth annual monitoring report (for the May, 2008 - April, 2009 period).

The following summary is a comparison of data collected during the six-month reporting period with the air quality standards (NAAQS/CAAQS):

Gaseous criteria pollutants (NO₂, O₃, SO₂, and CO)

There were no exceedances of the NAAQS or CAAQS measured for any of these pollutants.

PM₁₀

- There was one exceedance of the PM₁₀ 24-hour NAAQS (150 µg/m³) measured at both the Wilmington Community Station and the Coastal Boundary Station during this six-month reporting period. Both exceedances occurred on the same day, October 13, when there were two wildfires burning in Los Angeles County (the Sesnon and Marek fires, which eventually burned almost 20,000 acres).
- There were a number of exceedances of the PM₁₀ 24-hour CAAQS (50 µg/m³) recorded at both stations during this period. Some of these exceedances were triggered by unusual conditions, including the annual weekend “fiesta” event held during a weekend in May at the Sts. Peter & Paul School, where the Wilmington Community monitoring station is located. The fiesta attracts thousands of visitors during the weekend. Another exceedance at the Wilmington station occurred on July 4th, and is likely due to fireworks set off in the surrounding residential area.

PM_{2.5}

- There were no exceedances of the PM_{2.5} 24-hour NAAQS or CAAQS measured during this six-month reporting period.

2.2 Data Recovery

Overall data recovery for the monitoring program during this six-month reporting period has generally been quite good. The discussion on data recovery is divided into three categories reflecting the type of data being collected: the filter-based, 24-hour integrated particulate data, the real-time air quality data, and the meteorological data.

Filter-Based Monitors - Data recovery during the six-month reporting period for the filter-based particulate monitors very good, exceeding 90 percent at all stations, and 95 percent at the Coastal Boundary, Wilmington Community, and Source-Dominated stations. The only exception was the new PM₁₀ monitor installed at Berth 47, but that was because the instrument only became operational during the last third of this six-month reporting period.

Real-Time Instruments - Maximum data recovery for the real-time gaseous criteria pollutants is limited to 95.8 percent, because of the requirement to conduct zero and span calibrations over a one-hour period every calendar day (the instruments are programmed to do this automatically at 2 am in the morning). Data recovery for all gaseous and particulate real-time instruments was above 94 percent, with the following exceptions:

Coastal Boundary Station

SO₂ instrument – data recovery was 87 percent

O₃ instrument – data recovery was 86 percent

CO instrument – data recovery was 77 percent

The SO₂ instrument failed and had to be returned to the manufacturer for repair; the other instruments had recurring technical problems that took extended periods to diagnose and repair.

San Pedro Community station

O₃ instrument - data recovery was 87 percent

The O₃ instrument started having problems soon after it became operational, and required the installation of new parts.

These instrument problems primarily occurred during the shakedown period, not long after the start-up of the expanded monitoring program. Since that time, the instruments have been operating with fewer problems, such that program data recovery has improved significantly.

Meteorological Data Recovery - Meteorological data recovery at all four stations was excellent, exceeding 99 percent, with one exception - there was an apparent power failure at the Promenade station in July, which reduced data recovery at that station to 97 percent.

3.0 Upcoming Events

The focus over the next six months will be to continue to improve the operation of the newly expanded monitoring program.