

The Port Of Los Angeles Air Quality Monitoring Program

Semi-Annual Report

May - October 2009

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 to October 2009. The period represents the first half of the 5th 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 was 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. An expanded Program that began between November 2007 and April 2008 includes 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 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 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.

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



- **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 (TIIP) 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 of 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:

- *PM₁₀ Monitor* – An additional SFS monitor equipped with a PM₁₀ inlet is used to measure PM₁₀ concentrations at the Wilmington and Coastal Boundary stations. These monitors allow 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.

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

A summary of the air quality measurements will be described briefly below; a more detailed analysis of the data will be included in the upcoming fifth annual monitoring report for the period May 2009 through April 2010.

Gaseous Criteria Pollutants (NO₂, O₃, SO₂, and CO)

- O₃ concentrations exceeded the 1-hour CAAQS (0.09 ppm) at the Coastal Boundary during one hour of the reporting period (0.097 ppm on August 26). The 8-hour O₃ CAAQS or NAAQS were not exceeded. In addition, there were no other exceedances of the NAAQS or CAAQS measured for any of the other pollutants.

PM₁₀

- There were no exceedances of the PM₁₀ 24-hour NAAQS (150 µg/m³) measured at any of the four stations.
- There was one exceedance of the PM₁₀ 24-hour CAAQS (50 µg/m³) measured at the Wilmington Community Station during an annual May weekend "fiesta" event. The fiesta attracts thousands of visitors over the course of the weekend, and the monitoring station is located on top of a building at the Sts. Peter & Paul School, where the event is held. The highest measured PM₁₀ concentration was 71.0 µg/m³, measured during the fiesta on May 16, 2009.

PM_{2.5}

- There were no exceedances of the PM_{2.5} 24-hour NAAQS (35 µg/m³) measured during this period.

2.2 Data Recovery

Overall data recovery for the monitoring program during this six-month reporting period has 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 95 percent at all stations.

Real-Time Instruments - Data recovery for all gaseous and particulate real-time instruments exceeded 90 percent, with the exception of the PM₁₀ instrument at the San Pedro Community Station (82 percent data recovery). That PM₁₀ instrument had recurring instrument problems, in addition to a four-day station power outage in June 2009.

Meteorological Data Recovery - Meteorological data recovery at all four stations was excellent, exceeding 99 percent, except at the San Pedro Community Station which had a 95 percent data recovery. This was primarily due to a four-day station power outage that occurred in June 2009.