

Annual Report on the Air Resources Board's Fine Particulate Matter Monitoring Program



January 2013



California Environmental Protection Agency

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State of California
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California's PM2.5 monitoring network includes:

- Federally-approved monitors that measure PM2.5 mass over a 24-hour period at 65 sites;



Health and Safety Code 39619.5(g) requires the Air Resources Board (ARB or Board) to provide an update each year on the status and results of the fine particulate matter (PM2.5) monitoring program. This report provides a summary of PM2.5 monitoring activities in 2011 and how the data are being used to support ARB programs.

California's PM2.5 air quality monitoring program provides information used for determining which areas violate standards, characterizing the sources that contribute to pollution, determining background concentrations, assessing pollution transport, and supporting health studies and other research. Monitoring data also provide information to develop and evaluate programs for improving air quality.

California's PM2.5 monitoring network began collecting data in 1998. A number of different types of PM2.5 monitors are operated to provide information on PM2.5 mass and chemical composition which are summarized below. Figure 1 displays the locations of PM2.5 monitors throughout the State. Additional information on PM2.5 monitoring can be found at:

<http://www.arb.ca.gov/aaqm/partic.htm>

Federal Reference Monitors

The installation of federally-approved PM2.5 mass monitors throughout California began in 1998. In 2012, federal reference monitors were operated at 65 sites. These monitors collect particulate samples on filters, which are later weighed and analyzed in a laboratory. Because of this two-step process, PM2.5 air quality data collected with these monitors are not immediately available. To provide "real-time" PM2.5 air quality information, we added continuous PM2.5 mass monitors to our network.

Continuous Mass Monitors

Continuous PM2.5 mass monitors provide valuable information for public reporting, temporal representation, health studies, transport studies, and background monitoring. PM2.5 mass can be measured continuously with several different commercially available technologies.

- Samplers that quantify PM2.5 mass continuously at 101 sites;



and

- Monitors that collect PM2.5 samples for analysis of chemical components at 20 sites.



We chose the Beta Attenuation Monitor (BAM) for use in California and have installed monitors at 101 sites. Recently, the U.S. Environmental Protection Agency (U.S. EPA) designated certain models of the continuous monitors as Federal Equivalent Monitors (FEM). They are considered to provide equivalent data to the Federal Reference Monitors and can therefore be used to determine compliance with federal standards. California has deployed 47 of these FEM monitors.

Speciation Monitors

Another major stage of network implementation is the deployment of PM2.5 speciation monitors. Speciation monitoring provides valuable information about the composition (and ultimately sources) of PM2.5 pollution. However, monitoring of the individual species that make up PM is still an emerging field, with continuous speciation measurements the greatest challenge. To develop the best speciation network, California will need to take full advantage of emerging technologies. We have been evaluating newly emerging methods not currently used in routine monitoring.

Federally-Required Speciation Monitors

There are two components to the PM2.5 speciation network in California. The first component, mandated by the U.S. EPA, required filter-based PM2.5 speciation monitoring at eight California sites that are now part of a national trends network for PM2.5 speciation. These monitors are the National Air Monitoring Stations (NAMS) monitors for the speciation network. The eight PM2.5 speciation monitors are located in Bakersfield, El Cajon, Fresno, Sacramento, San Jose, Los Angeles, Riverside, and Simi Valley.

Additional Speciation Monitors

The second component of California's PM2.5 speciation network is the selection and deployment of samplers at selected State and Local Air Monitoring Stations (SLAMS). Data from these sites provide additional information needed for developing effective air quality attainment plans. The focus of the SLAMS PM2.5 speciation network

**State and National PM2.5
Ambient Air Quality Standards
(micrograms per cubic meter)**

	California	National
Annual	12	15
24-hour	---	35

is to enhance the spatial coverage of the NAMS sites in areas with a diversity of PM problems.

ARB and the air districts have deployed filter-based speciation monitors at twelve sites - Anaheim, Calexico, Chico, Fontana, Escondido, Modesto, Portola, Visalia, Sacramento, Vallejo, Livermore, and Oakland.

In 2007, ARB began monitoring for specific wood smoke tracers to determine the contribution of wood burning sources to PM2.5 ambient levels. Wood smoke tracers are being monitored at seven of the speciation SLAMS sites - Calexico, Chico, Escondido, Modesto, Portola, Sacramento, and Visalia during the winter season.

Accessing PM2.5 Data

Data collected as part of California's PM2.5 monitoring program can be obtained through a number of means. Daily PM2.5 values as well as summary statistics can be accessed through the interactive query program on ARB's web page at:

<http://www.arb.ca.gov/adam/welcome.html>

Real-time hourly PM2.5 data from California's continuous monitors can also be found at:

<http://www.arb.ca.gov/aqmis2/aqdselect.php>

PM2.5 Designations

Based on data collected as part of California's PM2.5 monitoring network, the ARB designated areas as attaining or not attaining the State annual average PM2.5 ambient air quality standard of 12 µg/m³. Most urban areas of California exceed the State PM2.5 standard, as well as several more isolated sub-areas. However, as air quality has improved more areas now meet the State PM2.5 ambient air quality standard.

In September 2006, the U.S. EPA strengthened the national 24-hour PM2.5 standard from the 1997 level of 65 µg/m³ to 35 µg/m³. The U.S. EPA issued final designations for this standard which became effective in





Attainment Plans for 2006
35 $\mu\text{g}/\text{m}^3$ standard are due to
U.S. EPA in 2012.

December 2009. Seven areas in California were designated as not meeting the strengthened federal 24-hour PM2.5 standard – the South Coast Air Basin, San Joaquin Valley Air Basin, Bay Area Air Basin, Sacramento Metropolitan area, a portion of the Feather River Air Pollution Control District, a portion of Butte County, and a portion of Imperial County. However, based on recent data, the Bay Area Air Basin, the Feather River Air Pollution Control District, Sacramento Metropolitan area, and Butte County now meet the standard. On October 15, 2012, U.S. EPA proposed to determine that these areas attained the PM2.5 standard. Information on the proposed determination can be found at:

<http://www.epa.gov/region9/air/actions/ca.html>

PM2.5 Attainment Plans for the 2006 standard are due to U.S. EPA in December 2012. Information on State and federal designations can be found at:

<http://www.arb.ca.gov/desig/pm25desig/pm25desig.htm>

PM2.5 Attainment Plans

Using network monitoring data as one of the tools, the South Coast Air Quality Management District prepared the 2007 Air Quality Management Plan for attaining the 1997 PM2.5 federal standards in the South Coast Air Basin. The Plan projects attainment of the standards by the 2015 deadline. ARB adopted the Plan in the fall of 2007 and submitted it to U.S. EPA as a revision to the California State Implementation Plan. U.S. EPA approved the plan in 2011. Information on the South Coast Plan is available at:

<http://www.arb.ca.gov/planning/sip/2007sip/southcoast/sca/sip.htm>

The San Joaquin Valley Air Pollution Control District prepared the 2008 PM2.5 Plan for attaining the 1997 federal PM2.5 standard. This Plan also projects attainment of the standards by the 2015 deadline. ARB adopted the plan in May of 2008 and submitted it to U.S. EPA as a revision to the California State Implementation Plan. U.S. EPA approved the 2008 PM2.5

plan in 2011. Information on the San Joaquin Valley Plan is available at:

<http://www.arb.ca.gov/planning/sip/sjvpm25/sjvpm25.htm>

As noted above, new PM2.5 attainment plans for the revised 24-hour PM2.5 standard will be due at the end of 2012.

Figure 1: PM2.5 Monitoring Stations in California

