2004 Annual Report
on the
Air Resources Board's
Fine Particulate Matter Monitoring Program

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California Environmental Protection Agency
Air Resources Board

State of California
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PM2.5 Air Quality Monitoring Program

California's PM2.5 monitoring network now includes:

- Federally-approved monitors that measure PM2.5 mass over a 24-hour period at 81 sites;

Health and Safety Code 39619.5 requires the Air Resources Board (ARB) to provide an update by January 1 of 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 2004 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 on how effective our programs are in improving the 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 the PM2.5 monitoring network can be found at:

http://www.arb.ca.gov/aqd/pm25/pmfdsign.htm

Federal Reference Monitors

The installation of federally-approved PM2.5 mass monitors at 81 sites throughout California began in 1998 and was completed in 2000. 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 have 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. We have chosen the Beta Attenuation Monitor (BAM) for

- Samplers that quantify PM2.5 mass continuously at 34 sites;

and

- Monitors that collect PM2.5 samples for analysis of chemical components at 17 sites.

use in California and have installed monitors at 43 field sites.

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 – including instrumentation that is not yet commercially available. We are participating in the development of new sampling technology and critical research in this field, including special studies to evaluate 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 seven California sites that are now part of a national trends network for PM2.5 speciation. These monitors are the National Air Monitoring Stations monitors for the speciation network. Siting of the seven PM2.5 speciation monitors in Bakersfield, El Cajon, Fresno, Sacramento, San Jose, Riverside, and Simi Valley was completed in January 2002.

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 Monitoring Stations (SLAMS). Data from these sites will provide additional information needed for developing effective air quality attainment plans. The focus of the SLAMS PM2.5 speciation network is potential nonattainment areas that do not have data available from special studies.

Ultrafine particle monitoring network

In support of the Children's Health Study, we deployed ultrafine particle counters in 12 Southern California communities.

Ultrafine Particle Sampler

ARB and the air districts have deployed filter-based speciation monitors at ten sites - Anaheim, Calexico, Chico, Fontana, Escondido, Los Angeles, Modesto, Portola, Sacramento, and Visalia as of September 2002. To complete the SLAMS speciation network, we are also evaluating various continuous sampling technologies.

Ultrafine Particle Counter Network

In support of the Children's Health Study, we deployed and operated from 2002 through mid-2004 a network of ultrafine particle counters in Southern California including: Los Angeles County (Lancaster, Glendora, and Long Beach), Riverside County (Lake Elsinore, Mira Loma, and Riverside), San Bernardino County (Lake Arrowhead and Upland), Santa Barbara County (Santa Maria and Lompoc), San Luis Obispo County (Atascadero), and San Diego (Alpine) County. Ultrafine particles - particles that are 100 nanometers or less in diameter - are usually present in high numbers and due to their small size can be especially harmful to human health. They are emitted by common combustion sources such as cars, trucks, buses and power plants. Data from this monitoring effort will provide new insights into the impact of PM on children's health and into approaches to effectively reduce the levels of all particles in community air.

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 an interactive query program on ARB's web page at:

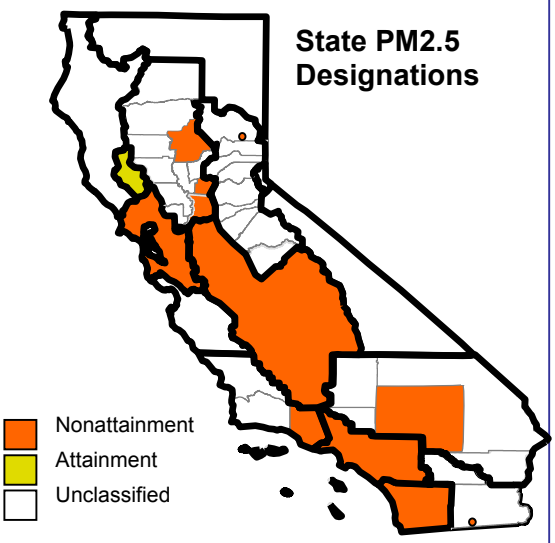
http://www.arb.ca.gov/adam/welcome.html

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

http://www.arb.ca.gov/aqd/aqinfo.htm

In addition, the annual California Almanac of Emissions and Air Quality now includes a five-year summary of PM2.5 air quality data which is available at:

(http://www.arb.ca.gov/aqd/almanac/almanac.htm



PM2.5 Designations

Based on data collected as part of California's PM2.5 monitoring network, in 2004 the ARB designated areas as attaining or not attaining the State PM2.5 ambient air quality standard. All major urban areas of California exceed the State PM2.5 standard, as well as several more isolated sub-areas. Information on the 2004 designations can be found at:

http://www.arb.ca.gov/regact/area04/area04.htm

ARB will be updating the designations in early 2005. Two new areas qualify for attainment of the State PM2.5 standard – the Lake Tahoe Air Basin, and the North Central Coast Air Basin. Information on the 2005 designations can be found at:

http://www.arb.ca.gov/regact/area05/area05.htm

The ARB also identified areas that do not meet the national PM2.5 standards and proposed designations to the U.S. Environmental Protection Agency (U.S. EPA) in 2004. The U.S. EPA issued final designations in December 2004. Three areas in California do not meet the federal standards – the San Joaquin Valley Air Basin, the South Coast Air Basin, and the San Diego Air Basin. These areas must submit State Implementation Plans in early 2008, with attainment of the federal standards by 2015. Information on the federal designations can be found at:

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

Figure 1: PM2.5 Monitoring Stations in California