

**PARTICULATE MATTER
MONITORING NETWORK DESCRIPTION
FOR THE
SACRAMENTO VALLEY
MONITORING PLANNING AREA**

PREPARED BY

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California Air Resources Board

June 30, 1998

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1.0 INTRODUCTION

This plan provides a description of the PM_{2.5} and PM₁₀ ambient monitoring network designed for the Sacramento Valley Monitoring Planning Area (MPA). Airborne particles with aerodynamic diameter less than 10 microns (PM₁₀) are small enough to be inhaled. The PM₁₀ includes fine particles with aerodynamic diameter less than 2.5 microns (PM_{2.5}) as a component. The deployment of the PM_{2.5} network is critical to the national implementation of the new PM_{2.5} National Ambient Air Quality Standards (NAAQS). The ambient data from this network will be used for designating areas as attainment or nonattainment, developing particulate matter control programs, and tracking the progress of such programs.

During the early stages of the PM_{2.5} network design process, the Air Resources Board (ARB) and the local air quality management districts established MPAs for the State. The entire State is covered by 18 MPAs. These MPAs will be used for planning monitoring locations for PM_{2.5}. They are not intended for designating areas as attainment or nonattainment or planning control measures. The boundaries to be used for these purposes will not be established until adequate PM_{2.5} data are available. The ARB and the local air quality management districts will recommend appropriate nonattainment boundaries to the U.S. EPA.

The proposed PM_{2.5} monitoring network for the Sacramento Valley MPA includes ten monitoring sites. In most cases, the PM_{2.5} sites are located at existing PM₁₀ sites. Each monitoring site will operate a PM_{2.5} Federal Reference Method (FRM) monitor and five sites also include a speciation monitor to further define the chemical composition of the PM_{2.5}. The individual monitors will be operated by the following agencies:

- ▶ Air Resources Board - 5 sites.
- ▶ Sacramento Metropolitan Air Quality Management District (AQMD) - 3 sites.
- ▶ Yolo-Solano AQMD - 1 site.
- ▶ Shasta County AQMD- 1 site.

1.1. Physical Setting

The Sacramento Valley MPA is the same as the Sacramento Valley Air Basin. The MPA consists of all or part of 11 counties -- all of Shasta, Tehama, Glenn, Butte, Colusa, Yolo, Sutter, Yuba, and Sacramento Counties, and the eastern portion of Solano County and the western part of Placer County.

The Sacramento Valley is about half as large as the San Joaquin Valley. It is readily divided into four land-use subdivisions: (1) the Redding District, (2) the West Side, (3) the Flood Basins (i.e. the Rice Bowl), and (4) the East Side.

The Redding District, northernmost portion of the Sacramento Valley, is semi-circular in shape - about 30 miles north-south and 30 to 40 miles east-west. It extends from Red Bluff to

Redding, occupying the central portions of Shasta and Tehama counties.

The west side is an almost treeless undulating plain. Specialized agriculture is largely restricted to the floodplains of east-flowing tributaries. The extensive tracts underlain by the red lands are not suitable for irrigation agriculture and generally are used only for seasonal pasturage. Over wide stretches, the second production of winter grains persists as rainfall is sufficient for dry farming.

The contemporary Flood Basins are located in the south central portion of the Sacramento Valley, occupying lands to both the west and the east of the Sacramento River. Rice output in the Flood Basins (plus a modest amount from the San Joaquin Valley) continues to make California a major source of rice in the United States. The “rice bowl” is located principally in Butte, Colusa, Glenn, Sutter and Yolo counties.

The East Side which first achieved importance with the Gold Rush, remains the dominant area in the Sacramento Valley economy. It also possesses the largest cities in the Valley and a series of fertile agricultural districts on alluvial fans or west-flowing Sacramento tributaries.

1.2 Population Characteristics

The population of a Metropolitan Statistical Area (MSA) is one of the key parameters in determining the minimum number of required monitoring sites per the U.S. EPA PM2.5 regulations. The MSAs included in the Sacramento Valley MPA are listed along with 1990 population figures in Table 1.5.1. The counties included in the MPA are listed along with population figures in Table 1.2.1.

Table 1.2.1 Population in the Sacramento Valley MPA by County

<u>County</u>	<u>Population (in 1990)</u>
Butte County	184,563
Colusa County	16,503
Glenn County	25,171
Placer County (P)	140,276
Sacramento County	1,065,583
Shasta County	149,191
Solano County (P)	96,510
Sutter County	65,938
Tehama County	50,209
Yolo County	144,243
Yuba County	59,491
Total Population	1,997,678

(P) - Portion of a county within the MPA

1.3 Climate and Weather

All of the Sacramento Valley MPA is in the northern part of the Central Valley Climatic Zone. This area has a Mediterranean climate with a dry, warm summer alternating with a wet, mild (above freezing) winter. In this zone, it is unusual to have anything but a trace of precipitation during the months of June, July, August, and September.

1.4 Dominant Economic Activities and Emission Sources

In the Sacramento Valley MPA, trade and services are the fastest growing sectors. Manufacturing and especially food processing build on the history of the Valley to produce agricultural products like rice, tomatoes, prunes, almonds, grapes, and dairy products. Emerging high-tech industries in the urban areas include electronics, data processing, and biotechnology. Publishing, printing, and insurance lead the list of expanding local industries. Tourists are drawn through the valley on their way to the mountains for skiing and hiking.

The PM2.5 in California’s air is the result of primary and secondary particulates. Primary particulate emissions are directly emitted from sources such as residential fireplaces, diesel trucks, forest burning, dust sources, and industrial processes. Secondary particulates form when gaseous or non-particulate substances react in the atmosphere with other substances to produce particulate matter.

The predominant sources of directly emitted PM2.5 vary regionally in California. In the Sacramento Valley MPA, inventory estimates show that the largest contributors of directly

emitted PM2.5 are burning (including waste burning, residential wood burning, wildfires) and geologic dust sources.

Precursors to secondary PM2.5 formation in California include oxides of nitrogen (NOx) from motor vehicles and other combustion sources, ammonia emissions, certain organic substances which form particulate matter, and additional emission sources. Secondary particulate levels are highly variable and are dependent on atmospheric conditions and precursor levels for formation. For example, in some regions at certain times of the year the secondary particles can comprise 50% or more of the total ambient measured PM2.5 concentrations. At other times, the secondary particulates are nearly negligible. Because secondary particles form through complex and variable atmospheric processes, it is not currently possible to produce accurate secondary particulate emission estimates as can now be done for the primary, directly emitted PM2.5.

1.5 PM2.5 Monitoring Requirements

Based upon the U.S. EPA PM2.5 regulations, all Metropolitan Statistical Areas with population greater than 200,000 are required to have a core PM2.5 SLAMS (this is a site in a populated area representing PM2.5 concentrations on a neighborhood or urban scale). The required number of core SLAMS and the required sampling frequency are determined by the 1990 census population statistics for each MSA. In general, the greater the population in an MSA, the more monitoring sites required for that area. One additional core PM2.5 monitor that samples everyday is required for each Photochemical Assessment Monitoring Station (PAMS) area included in the MPA.

In the Sacramento Valley MPA, there are five MSAs or Primary MSAs (PMSAs). Only one of them, the Sacramento PMSA, has a population level that requires PM2.5 monitors. Based on the population, the Sacramento PMSA is required to have two monitoring sites for everyday sampling and one site collecting a 24-hour sample once every three days. The boundaries of Sacramento PMSA extend outside of the Sacramento Valley MPA boundaries into the Mountain Counties MPA. The Sacramento Valley MPA includes a PAMS area and is required to have a PM2.5 monitor sampling everyday at a PAMS site.

The regulations also require a PM2.5 monitor for every 200,000 people living either outside of an MSA or in MSAs with fewer than 200,000 people. These additional sites are supposed to sample for PM2.5 once every three days. In the Sacramento Valley MPA, there were 791,819 people living outside of MSAs or in MSAs with fewer than 200,000 people. At a minimum, four additional sites are needed to satisfy the requirement for PM2.5 monitoring within this outlying area. However, more sites will be deployed than the minimum number required in an effort to provide better coverage.

Table 1.5.1 identifies the number of core PM2.5 monitoring sites to be operated within the Sacramento Valley MPA.

Table 1.5.1 Required and Planned Core PM2.5 Monitoring Sites

MSA/PMSA/County	Population in 1990	Required Core PM2.5 Monitoring Sites		Planned PM2.5 Sites		
		Everyday Sampling	1 in 3 day Sampling			
Sacramento PMSA (P)	1,205,859	3	1	5		
Yuba City, MSA	125,429	0	4	1		
Yolo, PMSA	144,243			1		
Redding, MSA	149,191			1		
Chico-Paradise, MSA	184,563			1		
Vallejo-Fairfield-Napa, PMSA (P)	96,510					
Colusa County	16,503			1		
Glenn County	25,171			0		
Tehama County	50,209			0		
Total	1,997,678			3	5	10

(P) Portion of Sacramento PMSA within Sacramento Valley MPA

2.0 PM2.5 MONITORING NETWORK ELEMENTS

This section summarizes PM2.5 monitoring sites planned for deployment in 1998 and 1999. In most cases, existing particulate matter monitoring sites will be used for the additional PM2.5 monitoring. The existing particulate matter data have assisted in the design of the PM2.5 network by providing information on the trends and the magnitude of concentrations. These data will be valuable in the future in understanding the particulate size distributions of emission sources and developing control strategies. The particulate matter monitors currently operating at the sites selected for PM2.5 monitoring are also summarized in this section.

Refer to Section 2.0 in the California Particulate Matter Monitoring Network Description for a summary of particulate matter monitoring outside of the PM2.5 monitoring network

2.1 PM2.5 Monitors Planned for Deployment

The planned PM2.5 monitoring network will collect data for multiple objectives, including:

- (1) Comparing sampling results with the PM2.5 NAAQS to determine attainment/nonattainment status.
- (2) Developing and tracking implementation plans for the area.
- (3) Assisting health studies and other ambient aerosol research activities.

In order to understand the nature of the PM2.5 problem in the Sacramento Valley and to develop control strategies, multiple monitor types will be needed. The PM2.5 Federal Reference Method (FRM) sampler is a gravimetric filter-based sampler that produces a concentration measurement of PM2.5 over a 24-hour period. The FRM alone cannot support multiple information needs of the PM2.5 network. The sampler design includes a Teflon filter that can experience a loss of volatile constituents, which can be captured and retained better by other sampling techniques. In addition, it does not provide temporally resolved data or full chemical characterization of ambient aerosols.

In addition to FRM monitors, two other types of instruments are required for deployment as part of the PM2.5 network: speciation samplers and continuous mass monitors. Speciation samplers provide a chemical characterization of ambient aerosols for developing emission mitigation strategies and for tracking the success of implemented control programs. Continuous PM2.5 mass monitors will collect data for public reporting of short-term concentrations, for understanding diurnal and episodic behavior of fine particles, and for use by health scientists investigating exposure patterns. However, currently available instruments for continuous measurements of suspended particulate mass have many shortcomings. The Tapered Element Oscillating Microbalance (TEOM) sampler uses a heated inlet causing evaporation of the volatile components of the air sample. The Beta Attenuation Monitor (BAM) which samples at ambient temperatures and relative humidities may overestimate particle concentrations by allowing liquid water to be collected along with particles. The ARB and the local air quality management

districts will select the type of continuous instrument best suited for the monitoring conditions in the Sacramento Valley MPA.

The Sacramento Valley MPA PM2.5 monitoring network will consist of 10 monitoring sites. Nine of these sites will be deployed in 1998 and one in 1999. Each of the ten sites will operate FRM samplers purchased through the national contract established by the U.S. EPA. Two of these monitoring sites in the MPA will operate collocated samplers for quality assurance and quality control evaluation. PM2.5 speciation samplers are proposed for five sites in 1999.

Table 2.1.1 lists the monitoring sites and the type of instruments planned at these sites. Figure 2.1.1 shows the locations of the proposed sites. The site that will operate a continuous monitor will be determined during the annual network review and included in the 1999 network plan.

Table 2.1.1 PM2.5 Monitoring Network Planned for Deployment

Site Location	AIRS Site ID	PM2.5 FRM	PM2.5 Speciation	PM2.5 TEOM/BAM	Other PM2.5 Monitor
Chico-Manzanita Avenue	060070002	X	Y		
Colusa-Sunrise Blvd	060111002	X			
Redding-Health Dept Roof	060890004	X			
Roseville-N Sunrise Blvd	060610006	X	Y		
Sacramento-Del Paso Manor	060670006	XX	Y		
Sacramento-Health Dept Stockton	060674001	X			
Sacramento-T Street	060670010	X	Y		
Woodland	new site	X			
Yuba City-Almond Street	061010003	XX	Y		
Elk Grove-Bruceville	060670011	Y			

Codes:

- X Monitor to be deployed in 1998
- Y Monitor to be deployed in 1999
- XX Collocated particulate monitors used for precision data to be deployed in 1998

Figure 2.1.1

2.2 Existing Particulate Matter Monitors

The existing particulate matter State and Local Air Monitoring Stations (SLAMS) network in the Sacramento Valley MPA consists of 22 monitoring sites. The monitoring instruments operating at these sites include:

- ▶ 18 High Volume Size Selective Inlet (SSI) samplers collecting 24-hour PM10 samples.
- ▶ 1 dichotomous sampler collecting 24-hour fine fraction (≤ 2.5 microns in diameter) and coarse fraction (> 2.5 and ≤ 10 microns in diameter) sample.
- ▶ 8 continuous mass samplers collecting PM10 measurements hourly, using either a Tapered Element Oscillating Microbalance (TEOM) sampler or Beta Attenuation Monitor (BAM) sampler.
- ▶ 12 coefficient of haze instruments.
- ▶ 10 nephelometers.
- ▶ 1 dry deposition sampler.

Eight of the proposed PM2.5 sites will be located at existing PM10 sites. The other two PM2.5 sites will be at locations where there has not been any previous PM monitoring. Table 2.2.1 summarizes the particulate matter monitoring resources available at the proposed PM2.5 monitoring sites. The complete summary of particulate matter monitoring resources in the Sacramento Valley can be found in Attachment 1 in the statewide summary.

The particulate matter data obtained from these sites are used to meet the following objectives:

- ▶ Compare measured concentrations to the State and national PM10 standards.
- ▶ Track changes in the particulate matter concentrations over time.
- ▶ Evaluate the population exposure.
- ▶ Assess the impact from transported particulate matter.
- ▶ Assist in health studies and other research.
- ▶ Manage the agricultural burning program in the Sacramento Valley.

2.3 PM2.5 Quality Assurance

The agencies operating PM2.5 monitors in the Sacramento Valley MPA will adopt a schedule for implementing quality assurance procedures developed by the ARB. Please refer to Section 3.7 in the statewide summary for more information about the schedule.

2.4 Laboratory Analyses

The FRM instruments collect PM2.5 over 24-hour periods on Teflon-membrane filters from air drawn at a controlled flow rate through a tested PM2.5 inlet. Within 96 hours after the sample collection period, the filter contained in the filter cassette will be removed from the

sampler and placed in a protective container. During the period between filter retrieval from the sampler and the start of conditioning, the filter will be maintained at a temperature below 25 degrees centigrade. The filters will be transported to the ARB Monitoring and Laboratory Division in Sacramento. The filters containing PM2.5 samples will be “conditioned” and weighed at the laboratory.

Samples collected from the speciation monitors will be analyzed by a nationwide network of 1 to 3 laboratories. These laboratories will be working under contract performing the necessary laboratory analyses. The establishment of this network of laboratories is still under development, with the specific laboratories yet to be determined.

Table 2.2.1 Existing Particulate Matter Monitors at Proposed PM2.5 Sites

Site Location	AIRS Site ID	Dichot	PM10 SSI	PM10 TEOM/BAM	Other PM Monitors
Chico-Manzanita Avenue	060070002		X		COH, Neph
Colusa-Sunrise Blvd	060111002		X	X	COH, Neph
Redding-Health Dept Roof	060890004		X		
Roseville-N Sunrise Blvd	060610006		X		COH, Neph
Sacramento-Del Paso Manor	060670006		X	X	
Sacramento-Health Dept Stockton	060674001		X	X	
Sacramento-T Street	060670010	X	X	X	COH, Neph, Dry Dep
Woodland	new site				
Yuba City-Almond Street	061010003		X	X	COH, Neph
Elk Grove-Bruceville	060670011				

Codes:

- X Existing monitor
- COH AISI tape sampler for soiling index (coefficient of haze)
- Neph Light Scatter (nephelometer)
- SSI High Volume Size Selective Inlet sampler collecting 24-hour PM10 samples
- Dichot Dichotomous sampler collecting 24-hour fine and coarse fraction samples
- TEOM Tapered Element Oscillating Microbalance collecting PM10 measurements hourly
- BAM Beta Attenuation Monitor collecting PM10 measurements hourly
- Dry Dep Dry deposition (gases and particulate matter)

3.0 PM2.5 MONITORING SITES TO BE DEPLOYED IN 1998

During 1998, nine PM_{2.5} monitoring sites are planned for deployment in the Sacramento Valley MPA. This section discusses the criteria used in the selection of the nine PM_{2.5} monitoring sites along with the important parameters that characterize each site.

3.1 Monitor Siting

The Sacramento Valley MPA has fairly uniform topography and climate. The existing particulate matter network in the Sacramento Valley MPA consists of 22 sites. During the PM_{2.5} site selection process, the following factors were evaluated:

- ▶ Population statistics and distribution.
- ▶ Land use characteristics.
- ▶ Local climate.
- ▶ Suspected area emission sources (wood smoke, agricultural burning, etc.).
- ▶ Existing particulate matter monitoring network.
- ▶ Existing particulate matter data, including data collected by the dichotomous network, PM₁₀ network, and special studies.
- ▶ Potential transport corridors.
- ▶ Ongoing special health studies.

After the review process, it was determined that existing PM₁₀ sites would be well suited as locations for monitoring PM_{2.5}. Only two of the PM_{2.5} sites will be located at new particulate matter sampling locations. All sites selected to operate PM_{2.5} samplers are located in populated areas where high PM_{2.5} concentrations are expected. These sites should provide useful information about PM_{2.5} transport, emission sources, and population exposure.

3.2 Site Description

The network for the Sacramento Valley MPA, as proposed, includes nine sites that will be deployed in 1998. The following characteristics apply to all of the proposed sites:

- ▶ Use a Federal Reference Monitor (FRM) type sampler purchased through the national contract established by the U.S. EPA.
- ▶ Sited in a population-oriented location.
- ▶ “Site Type” is Core SLAMS.
- ▶ Represent neighborhood spatial scale.
- ▶ Provide data that will be compared to both the annual standard and the 24-hour standard.

Based on these criteria, the following sites listed in Table 3.2.1 are identified for use for PM_{2.5} monitoring within the Sacramento MPA.

Table 3.2.1 PM_{2.5} Monitoring Sites to be Deployed in 1998

Site Location	AIRS Site ID	Operating Agency	Spatial Scale	Monitoring Objective	Site Type	Measurement Method
Chico-Manzanita Avenue	060070002	ARB	Neighborhood	M	C	FRM/SCH
Colusa-Sunrise Blvd	060111002	ARB	Neighborhood	R,T	C	FRM/SQ
Redding-Health Dept Roof	060890004	SH	Neighborhood	R,T	C	FRM/SCH
Roseville-N Sunrise Blvd	060610006	ARB	Neighborhood	R,T,HS	C	FRM/SCH
Sacramento-Del Paso Manor	060670006	SAC	Neighborhood	M,P,HS	C	FRM/SQ
Sacramento-Health Dept Stockton Blvd.	060674001	SAC	Neighborhood	R,HS	C	FRM/SQ
Sacramento-T Street	060670010	ARB	Neighborhood	M,HS	C	FRM/SQ
Woodland	new site	YS	Neighborhood	R,HS	C	FRM/SCH
Yuba City-Almond Street	061010003	ARB	Neighborhood	R,T	C	FRM/SCH

The following codes are used in this table:

Operating Agency :

ARB California Air Resources Board
SAC Sacramento Metropolitan AQMD
YS Yolo Solano AQMD
SH Shasta County AQMD

Monitoring Objectives:

R Represent high concentrations in a populated area.
M Determine the highest concentration expected to occur in the area covered by the network (more than one site per area may be needed).
T Determine the extent of regional pollutant transport.
HS To support special health studies.
P Monitoring at PAMS areas

Site Type:

C Core SLAMS
S Non-core SLAMS
P Special Purpose Monitors

Measurement Method :

FRM/SCH Federal Reference Method Single Channel Sampler
FRM/SQ Federal Reference Method Sequential Sampler

Many of the monitoring sites in the Sacramento Valley MPA will serve multiple purposes. The monitoring sites at Chico-Manzanita, Sacramento-T Street, and Sacramento-Del Paso Manor will be used to represent areas of maximum PM_{2.5} concentrations with high population density. The other six sites that will be deployed in the Sacramento Valley in 1998 are intended to be representative of poor air quality in populated areas. They may not necessarily be in an area of expected maximum concentrations. The monitoring sites at Colusa, Redding, Roseville, and Yuba City will collect data for assessing transport of PM_{2.5} between different areas within the Sacramento Valley and from outside of the Sacramento Valley into the Valley. All of the sites to be used for transport assessments, except the Redding site, also collect meteorological data. Unless meteorological data are collected at the same sites as the PM_{2.5} data, it is difficult to assess transport. The ARB and the local air quality district are planning to add surface meteorological monitoring instruments at the PM_{2.5} site in Redding in 1999. The following monitoring sites in the Sacramento Valley participate or may in the future participate in ongoing or future planned health studies: Roseville-N Sunrise Blvd, Sacramento-Del Paso Manor, Sacramento-Health Department Stockton, Sacramento-T Street, and Woodland.

The monitoring objectives at each of the monitoring sites in the Sacramento Valley MPA will be further evaluated during the next year's annual network review when PM_{2.5} data will be available from these sites.

4.0 PM2.5 MONITORING SITES TO BE DEPLOYED IN 1999

There are plans to establish an additional PM2.5 monitoring site in 1999 that would operate an FRM monitor. The PM2.5 data from this site are intended to help better define the boundaries of nonattainment areas and satisfy other monitoring objectives of the PM2.5 monitoring network. There are plans to deploy PM2.5 chemical speciation monitors in 1999 as well as a continuous PM2.5 monitor.

4.1 Monitoring Sites Operating PM2.5 FRM Monitors

There are plans to deploy an additional PM2.5 FRM monitoring site in the southern part of the Valley in 1999. This additional FRM will be sited at the existing monitoring site at Elk Grove-Bruceville Road, which currently operates gaseous monitors, and will provide information about PM2.5 concentrations in the southern rural portion of the Sacramento Valley. The PM2.5 data collected at this site will be used to determine the boundaries of PM2.5 national attainment/nonattainment areas and to evaluate regional PM2.5 atmospheric transport.

Table 4.1.1 PM2.5 Monitoring Sites to be Deployed in 1999

Site Location	AIRS Site ID	Operating Agency	Spatial Scale	Monitoring Objective	Site Type	Measurement Method
Elk Grove-Bruceville Road	060670011	SAC	Neighborhood	R	C	FRM

SAC Sacramento Metropolitan AQMD
 R Represent high concentrations in a populated area.
 C Core SLAMS

4.2 PM2.5 Chemical Speciation Sampling

The basic objective of the PM2.5 chemical speciation sampling and analysis program is to develop seasonal and annual chemical characterizations and distributions, across the country, of the ambient aerosols present in PM2.5 samples. These chemically resolved data will be used to perform source attribution analyses, evaluate emission inventories and air quality models, and support health related research studies.

The EPA recognizes that sampling for chemical speciation is a developing science, and encourages creative approaches to chemical speciation sampling. The ARB and the local air quality management districts will evaluate existing chemical speciation samplers and select the best-suited instruments for the monitoring conditions in the Sacramento Valley. The selected instrument will collect samples for the currently targeted chemical analytes, that include the following:

- ▶ Cations: particulate ammonium, ionic sodium, calcium, and magnesium.
- ▶ Anions: particulate sulfate, nitrate, and chloride.

- ▶ Carbon: total, organic, and elemental.
- ▶ Trace elements: sodium, magnesium, etc., through lead.
- ▶ Semi-volatile organic particles.

The sites listed in Table 4.2.1 below were selected for collecting chemically speciated data because they best meet the following list of criteria in the order of importance:

- ▶ High PM2.5 concentrations, or expected significant contribution of PM2.5 to high PM10 concentrations.
- ▶ Located in a area of significant population density.
- ▶ Support the agricultural burning program in the Sacramento Valley.
- ▶ Located in PAMS areas where there is a maximum precursor site for PM2.5 (this may also be a high concentration site).
- ▶ Significant for atmospheric transport determinations.
- ▶ Geographical representation of a monitored area.

Table 4.2.1 PM2.5 Chemical Speciation Sampling

PM2.5 Chemical Speciation Site	AIRS Site ID	Operating Agency	Monitoring Method
Chico-Manzanita Avenue	060070002	ARB	to be determined
Roseville-N Sunrise Blvd	060610006	ARB	to be determined
Sacramento-Del Paso Manor	060670006	SAC	to be determined
Sacramento-T Street	060670010	ARB	to be determined
Yuba City-Almond Street	061010003	ARB	to be determined

ARB California Air Resources Board
 SAC Sacramento Metropolitan AQMD

4.3 Continuous PM2.5 Monitoring

The Federal regulation 40 CFR 58, Appendix D, 2.8.2.3, requires that continuous PM2.5 samplers be placed in metropolitan areas where the population is greater than 1 million people. Continuous PM2.5 data are useful for public reporting of short-term concentrations, for understanding diurnal and episodic behavior of fine particles, and for use by health scientists investigating exposure patterns. The Sacramento PMSA, with a population of 1,340,010 based on the 1990 census, is required to have one continuous PM2.5 monitor. The site selected to operate a continuous monitor will be determined during the annual network review next year and included in the 1999 monitoring network plan. The monitor will be installed in late 1999.

5.0 SAMPLING FREQUENCY

The U.S. EPA requirements call for everyday sampling of PM_{2.5} at certain core SLAMS sites and one in three day sampling at all other PM_{2.5} and all PM₁₀ sites. In order to collect sufficient data and at the same time conserve monitoring resources, the ARB and the local air quality management districts are proposing alternative sampling frequencies for PM_{2.5} and PM₁₀.

5.1 PM_{2.5} FRM Sampling Frequency

Everyday sampling is required at three core PM_{2.5} sites in the Sacramento Valley MPA as specified in the regulations, i.e., two sites per area over 500,000 population and one site per PAMS area. All other core PM_{2.5} monitoring sites are required to collect a sample once every three days.

The U.S. EPA provides for a waiver from the everyday sampling requirement for 1 year from the time a PM_{2.5} sequential sampler was approved by the EPA. This waiver is being requested for the Sacramento Valley MPA. During the time between the PM_{2.5} monitoring commencement at a site to the end of March, 1999, three of the monitoring sites required to sample everyday will actually be on a one-in-three-day sampling schedule. After March 1999, the sampling frequency at these three sites will change. The ARB along with the local air quality agencies in the Sacramento Valley MPA are proposing that one site in the Sacramento Valley MPA sample for PM_{2.5} everyday on a year-round basis. This would be the Sacramento-T Street monitoring site. The Sacramento-Del Paso Manor and the Sacramento-Health Department Stockton Boulevard sites would sample everyday only during the high PM_{2.5} season (October through March) and once every three days during the low season (April through September). This is based on data from the existing PM_{2.5} samples collected at the Sacramento-T Street site which show a strong seasonal pattern in PM_{2.5} ambient levels. The levels are high during fall and winter (October through March) and low during spring and summer (April through September). The 1990-1994 dichot data identified the maximum 24-hour concentration during spring and summer as 29 ug/m³. During the same time period, the maximum concentration during winter and fall was 80.2 ug/m³, approximately 2.7 times higher.

All other PM_{2.5} sites in the Sacramento Valley are required to sample once every three days. Two of these sites will adhere to the required sampling schedule (except for the initial start up period during 1998). The four remaining sites will sample once in six days. The 1-in-6-day sampling schedule should be sufficient to represent PM_{2.5} concentrations in these areas. These four sites will use single channel FRM samplers. The ARB and the local air quality control agencies will re-evaluate the sampling schedule during the annual network review next year. Monitoring sites with PM_{2.5} concentrations above the 24-hour standard will be considered for more frequent sampling during the high PM_{2.5} season (fall and winter).

Table 5.1.1 PM2.5 FRM Sampling Frequency

Site Location	AIRS Site ID	Operating Agency	Sampling Frequency	
			Required	Proposed
Chico-Manzanita Avenue	060070002	ARB	1 in 3 day	1 in 6 day
Roseville-N Sunrise Blvd	060610006	ARB	1 in 3 day	
Yuba City-Almond Street	061010003	ARB	1 in 3 day	
Colusa-Sunrise Blvd	060111002	ARB	1 in 3 day	During 1998: sampling on a 1 in 6 day schedule. Beginning January 1, 1999: as required.
Sacramento-T Street	060670010	ARB	everyday	From site commencement to March 31, 1999: 1 in 3 day sampling. After that, the sampling frequency will be as required
Redding-Health Dept Roof	060890004	SH	1 in 3 day	1 in 6 day
Woodland	new site	YS	1 in 3 day	1 in 3 day
Sacramento-Del Paso Manor	060670006	SAC	everyday	From site commencement to March 31, 1999: 1 in 3 day sampling. During the period of expected high PM2.5 concentrations (October 1 through March 31): as required. During the period of expected low PM2.5 concentrations (April 1 through September 31): 1 in 3 day.
Sacramento-Health Dept Stockton	060674001	SAC	everyday	
Elk Grove-Bruceville Road	060670011	SAC	1 in 3 day	to be determined

ARB California Air Resources Board
 SAC Sacramento Metropolitan AQMD
 YS Yolo Solano AQMD
 SH Shasta County AQMD

5.2 PM2.5 Chemical Speciation Sampling Frequency

The federally required sampling frequency for PM2.5 chemical speciation is once in 12 days. This sampling frequency may not be sufficient in some cases to adequately support plans to control PM2.5 emission sources. The appropriate sampling frequency will be determined at a later date and will depend largely on PM2.5 data needs and available resources.

5.3 PM10 Sampling Frequency

The new U.S. EPA minimum requirement for PM10 sampling frequency is once every three days. The Air Resources Board and the local air pollution control districts in California are requesting that the U.S. EPA Region 9 grant a statewide waiver allowing sampling at the current schedule of 1-in-6-days, with certain exceptions to be determined on a case-by-case basis. To demonstrate changes in the attainment status for the national 24-hour PM10 standard, more frequent sampling may be needed. Monitoring sites with maximum 24-hour concentrations close to the 24-hour standard may be required to sample everyday or at least on a 1-in-3-day schedule. Also, during the agricultural burning season in the Sacramento Valley, sites that are in the agricultural burning areas will sample on a 1-in-3-day schedule.