

**Particulate Matter
Measurement Methods
for
State Ambient Air Quality Standard
Review**

**Air Quality Advisory
Committee January 2002**

Monitoring and Laboratory Division

GOAL: ACCURATE AND RELIABLE METHODS FOR PM MEASUREMENT

- **Primary use of results:
Attainment determinations and
trends analyses**
- **Accuracy benchmark: Reference
methods**
- **High degree of reliability in
network deployment**

GOAL: ACCURATE AND RELIABLE METHODS FOR PM MEASUREMENT

- **Important secondary uses of data**
 - **AQI reporting for PM possible**
 - **Improved utility for research**
 - **Understanding nature and extend
of PM**
 - **More comprehensive temporal
coverage**

EXISTING STATE METHODS

- **PM10: Filter-based sampler**
 - High-volume SSI (ARB Method P)
 - Regulation allows for equivalent samplers
- **Sulfate: TSP filter, extraction, and analysis by ion chromatography (ARB Method 033)**

ARB METHOD P

- **Required for attainment of PM10 State Ambient Standards**
- **High volume (40 cu ft/min) filter-based sampler**
- **Alkalinity-controlled quartz fiber filters**
- **No requests for equivalency to date**
- **155 samplers in CA**

DISADVANTAGES OF METHOD P

- Nitrate losses during and after sampling
- Filter handling concerns (sloughing)
- Intermittent sampling
- Labor intensive
- Precludes use of most federal samplers in CA

FEDERAL REFERENCE METHODS

- **Evaluated and approved by the USEPA**
- **Variety of Hi-volume (quartz) and Lo-volume (Teflon) samplers and filter matrices available**
- **Well documented performance of sampler and inlet**
- **Extensive regulations govern sampler and laboratory operation**

PROPOSED ARB SAMPLING METHODS

- **Adopt FRMs for PM10**
- **Adopt FRM for PM2.5**
- **Adopt selected* continuous samplers as state methods for PM10 and PM2.5**
- **Retain provision for state approved equivalent samplers**
- **Adopt PM10 as sulfate method (Method 007)**

* pending on-going study

ADVANTAGES OF PROPOSAL

- **Allows continued use of existing network of PM10 hi-vol samplers**
- **Aligns state approved samplers with USEPA filter-based reference samplers**
- **Permits proven continuous samplers to be used for regulatory programs in CA**
- **Opens door for developing methodologies under equivalency provision**

ARB CONTINUOUS SAMPLERS EVALUATION

- **Rigorously controlled head-to-head comparison study**
- **Located at ARB's Bakersfield-California site**
- **October, 2001 through January, 2002**
- **Sharp Cut Cyclone inlet**

ARB CONTINUOUS SAMPLERS EVALUATION

- **Four candidate continuous PM10 samplers compared to 2 dissimilar* PM10 FRM filter-based samplers**
- **Four candidate continuous PM2.5 samplers compared to PM2.5 FRM**
- **All samplers paired**

* (hi-vol and lo-vol)

MEASUREMENT OF SULFATES

- **Current method (007) requires sulfate on TSP filters**
- **17 TSP sulfate samplers in CA; 13 in SCAQMD**
- **Sulfate also collected statewide by PM10 SSI using same analytical method**
- **TSP Samplers could be discontinued**

ISSUES CHANGING FROM TSP TO PM10 SULFATE

- **Positive sulfate artifact observed with existing method (glass fiber filters)**
- **Ambient SO₂ concentrations have been substantially reduced**
- **PM10 SSI quartz filters are alkalinity controlled**
- **Should Standard level (25 ug/m³) be adjusted for historical artifact?**

STATE/FEDERAL PM SAMPLER ALIGNMENT

- **Proposal improves alignment for all integrated filter methods**
- **Proposal excludes continuous PM10 FEMs not suited for CA**
- **Approves continuous PM2.5 samplers in advance of USEPA***
- **USEPA promoting continuous PM2.5 outside FRM or FEM regulations**

*** pending outcome of Bakersfield study**

SUMMARY

- **ARB adopt PM10 FRMs and PM 2.5 FRMs as methods for PM Ambient Air Quality Standards Recommend for PM10 and PM2.5**
- **ARB adopt continuous PM10 and PM2.5 methods that compare favorably in on-going Bakersfield study.**
- **ARB adopt PM10 Sulfate method**