

Air Pollution Monitoring

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Air Monitoring Objectives

- ◆ Determine whether or not a NAAQS has been exceeded.
- ◆ Determine trends - is the air pollution control program working?
- ◆ Assess environmental risk - how bad is the problem?
- ◆ Corroborate the emission inventories
- ◆ Validate the models - how good are the model predictions?
- ◆ Air Quality Index Reporting

Air Monitoring Stations

- ◆ NAMS - National Air Monitoring Stations
- ◆ SLAMS - State and Local Air Monitoring Stations
- ◆ SPMS - Special Purpose Monitors
- ◆ PAMS - Photochemical Assessment Monitoring Stations
- ◆ PM fine Chemical Speciation Sites

National Air Monitoring Stations

- ◆ Objective: Determine national policy decisions and trends
- ◆ Subset of SLAMS
- ◆ Locations:
 - Areas of maximum concentration
 - Areas of high population exposure

State and Local Air Monitoring Stations

- ◆ Required for State Implementation Plans
- ◆ Data planned for State and local uses
- ◆ Operated by State and local agencies
- ◆ Monitor Criteria Pollutants (PM, CO, O₃, SO₂, NO₂ and Pb)

SLAMS (cont'd)

Monitoring Objective

High Concentration

Population

Source Impact

Scale of Measurement

Micro, middle, neighborhood, urban

Neighborhood, urban

Neighborhood, regional

SLAMS (cont'd)

**Monitoring
Objective
Background**

**Scale of
Measurement
neighborhood,
regional**

Frequency of Sampling

- ◆ Gaseous pollutants (CO, NO₂, O₃, SO₂ and Continuous PM)
- ◆ Particulate Matter - once every day or every 3rd or 6th day
- ◆ Lead - once every 6th day

Photochemical Assessment Monitoring Stations (PAMS)

- ◆ Required by 1990 Clean Air Act
- ◆ Objective: Improved monitoring of O_3 and its precursors - VOCs and NO_x to make better National policy decisions
- ◆ Locations: 21 metropolitan areas designated serious, severe and extreme for O_3
 - Up to 5 locations per metropolitan area

PAMS Objectives

- ◆ Evaluate control strategies
- ◆ Corroborate VOC and NO_x emission inventories
- ◆ Evaluate photochemical grid models
- ◆ Corroborate O₃ attainment decisions
- ◆ Determine O₃, VOC and NO_x trends
- ◆ Characterize VOCs
- ◆ Assess risk to O₃ & selected air toxic pollutants

PAMS Network Requirements

Type 1 Site

Upwind of
metropolitan area

Type 2 Site

Maximum precursor
emission impact (also
air toxic site)

Type 3 Site

Maximum O₃
concentration

Type 4 Site

Downwind site

PAMS Monitoring Requirements

- ◆ Measure O_3 , NO, NO_2 and NO_x
 - Hourly data
- ◆ Measure 56 volatile organic compounds
 - Some hourly (type 2 sites), some 3-hour basis
- ◆ Measure surface meteorology at each site
- ◆ Upper air measurements for each metropolitan area

Types of PM fine (2.5)

Monitors

- ◆ Federal reference methods (FRM) or federal equivalent methods (FEM)
 - Used for NAAQS compliance
- ◆ Continuous methods
 - PSI reporting
- ◆ Chemical speciation methods
 - Determine aerosol composition
- ◆ Regional haze/visibility monitoring

Types of PM fine Monitors

Site Category	Projected Number	Major Purpose
Core sites	850 FRM/FEM	Compliance
SPMs/Spatial Averaging	200 FRM/FEM	Compliance or Short Term Studies
IMPROVE	100 monitors	Regional Haze
Speciation	300 samplers	Trends, Source apportionment
Continuous	100 monitors	Public Reporting
Supersites	4-7 areas	Research

Sampling Frequencies

- ◆ FRM (mass) measurements
 - Mix of everyday, 1 in 3 and 1 in 6
- ◆ Speciation sampling
 - 1 in 3 at trends sites.
 - 1 in 6 at others
- ◆ Continuous sampling
 - Hourly values used to provide 24 –hour averages