

Ambient Air Monitoring for Industry

Air Resource Specialists supports industry with air pollution, visibility, and meteorological monitoring programs.



Industry relies on monitoring to ensure compliance with governmental air quality limits and standards. Environmental regulations at the federal, state, and municipal levels are the basis for environmental programs. Monitoring programs may need to address regulatory requirements for new construction or expansion, road-dust impacts, stack emissions, wind trajectories, and health risk assessments of employees or neighbors. Other concerns may be visual aesthetic impacts to the surrounding environment.

Industry Issues

- Pollutant Emissions:
 - Particulate matter (PM)
 - Sulfur dioxide (SO₂)
 - Nitrogen oxides (NO_x)
 - Carbon monoxide (CO)
 - Volatile organic compounds (VOCs)
 - Hydrocarbons (HCs)
 - Ammonia (NH₃)
 - Lead (Pb)
 - Mercury (Hg)
 - Hazardous air pollutants (HAPs)
- Emissions Sources:
 - Power plants, smelters, paper mills, agricultural industries, energy (oil, gas, coal) exploration, production and refining, other industrial processes
 - Exhaust from vehicles, diesel engines, and industrial machinery
 - Vehicular traffic (dirt/gravel roads, well pads, construction activities)
 - Agricultural burning
- Air Quality Impacts:
 - Compliance with National Ambient Air Quality Standards
 - Compliance with state guidelines / standards
 - Compliance with the Regional Haze Regulations
 - BART analysis
 - Visibility impairment
 - Health effects



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Ambient Gaseous Monitoring

- Employs continuous gas analyzers configured as reference or equivalent methods specified by the EPA to monitor ozone, sulfur dioxide, nitrogen oxides, and carbon monoxide
- Denuder and filter pack federal reference method monitoring for gaseous ammonia and nitric acid, and nitrate (particle), and ammonium (particle)
- Provides data to determine NAAQS compliance and to calculate exposure indices
- Provides high quality, traceable data
- Often accompanied by a full range of meteorological parameters



Particulate Monitoring

- Both continuous and integrated particulate sampling
- Criteria monitoring of mass for regulatory applications using EPA-certified filter-based and continuous measurement technologies
- Supports coarse and fine particle measurement of aerosol species (elemental, ion, or carbon analyses)
- Filter-based measurements in cooperation with selected analytical laboratories based on specific requirements

Monitoring is available for the following particulates:

- TSP, PM₁₀, PM_{2.5}, PM Coarse
- Aerosol species (elements, ions, and carbon)



Air Toxics and Hazardous Air Pollutant Monitoring

- Selection of appropriate monitoring techniques and EPA-approved analysis methods for a variety of chemical compounds and concentrations
- Monitoring is performed with evacuated cylinders, canisters, filter packs, continuous monitors, and other techniques

Monitoring is available for the following compounds:

- Volatile organic compounds (VOCs)
- Formaldehyde
- Acetaldehyde
- Metals (including mercury and other heavy metals)
- Dioxins (isometer specific)
- Benzopyrene
- Polycyclic aromatic hydrocarbons (PAHs)
- Pesticides
- Other compounds



Meteorology Monitoring

ARS is experienced in both traditional and next-generation monitoring technologies. We design, purchase, install, and operate systems that best meet each client's needs.

ARS employs a broad range of meteorological monitoring systems including:

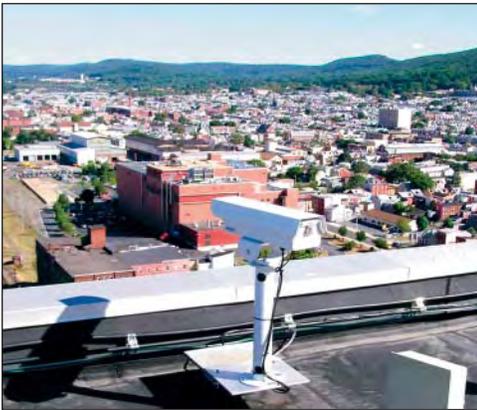
- PSD systems
- Tall-tower multilevel systems
- Portable systems and remote systems
- SODAR, acoustic radar, and radiosonde systems
- Evapotranspiration systems
- Micrometeorological systems



Visibility Monitoring

- Optec LPV transmissometers estimate the ambient atmospheric extinction coefficient (b_{ext}) along a several kilometer sight path
- Optec NGN2A ambient nephelometers estimate the atmospheric scattering coefficient (b_{scat}) attributable to aerosols and gases in a sampled air volume
- Non-ambient nephelometers:
 - Variety of size-cut and heated instruments
 - Measure dry aerosol scattering
 - Surrogate for PM_{10} or $PM_{2.5}$ mass sampling
- Aethalometers estimate the atmospheric absorption coefficient (b_{abs}) attributable to black carbon
- Visibility-related aerosol samplers:
 - Filter-Based Systems:
 - Collect time-integrated samples on specific filter media to characterize scattering and absorbing aerosols in the atmosphere.
 - Media are laboratory-analyzed to identify specific aerosol species (elements, ions, and carbon species).
 - The IMPROVE Modular Aerosol Sampler is an example of a widely used filter-based system.
 - Continuous Systems:
 - Individual systems measure near real-time concentrations of specific aerosol species such as sulfates, nitrates, and carbon species.





High-Resolution Digital Camera Systems (HRDC)

- High-resolution (8 megapixel) digital camera with internal scripting
- Weatherproof, heated environmental enclosure
- Enclosure mounts are static directional, or automatic, programmable, pan-tilt
- Extended temperature image capture computer
- Various digital communications technologies available for FTP/Web posting
- Development and hosting of Image/Data Web sites for public outreach

Data Analysis and Research Services

Suite of data analysis and visualization tools directly linked to ARS' Air Quality Database Management System:

- Comprehensive scientific data analyses and interpretation
- Custom tools and techniques created to meet client needs
- Web-based data analyst tools
- Interpretation of visibility impacts based on aerosol or optical monitoring data
- Computer image simulations of visibility impairment
- Air quality modeling and interpretation
- Transport and dispersion analyses
- Meteorological back trajectory analyses



Site and Network Management

ARS provides site, network, and special studies management through the design, coordination, implementation, and operation of monitoring tasks:

- Design, fabrication, turnkey installation, operation, and management of monitoring systems
- Site selection, evaluation, and preparation (access and utilities)
- Instrument procurement and acceptance testing
- Custom fabrication of monitoring and calibration support systems
- Systems and performance audits and quality assurance services
- Quality assurance documentation including preparation of Quality Assurance Project Plans, Quality Management Plans, and supporting standard operating procedures and technical instructions
- Operational field and laboratory maintenance and calibration of stations
- Intercomparison studies of new instruments and methods in cooperation with instrument manufacturers
- Remote monitoring systems
- Operator training and support
- Comprehensive data management services and systems development including data collection, review, validation, reporting, analysis, and archive

