Ambient Air Monitoring

EPA Responsibilities Under CAA

- National Ambient Air Quality Standards (NAAQS)
  - Identification
  - Attainment
- Toxic air pollutants
  - Identification
  - Control
- Acid Rain
- Pollution Index
- PSD

Monitoring

- Attainment
- Progress Toward Attainment
- Pollution Trends
- Emergency Control Procedures
- Database.

Regulations

- U.S. EPA
  - 40 CFR 50 – NAAQS
  - 40 CFR 53 – Methods
  - 40 CFR 58 – Monitoring criteria
  - 40 CFR 51.24 – PSD

- State and Local Regs
Ambient Air Monitoring

Monitoring Networks

- SLAMS -- State and Local Air Monitoring Station
- NAMS -- National Air Monitoring Station
- PAMS -- Photochemical Assessment Monitoring Station
- NCore—National Core Multipollutant Network

- PSD -- Prevention of Significant Deterioration
- SPM -- Special Purpose Monitoring
- IMPROVE -- Interagency Monitoring of Protected Visual Environments Acid Rain Network

State and Local Monitoring (SLAMS) Network
Ambient Air Monitoring

NCore Network

NCore pollutants

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM2.5 speciation</td>
<td>Organic and elemental carbon, major ions and trace metals</td>
</tr>
<tr>
<td>PM2.5 PM10 mass</td>
<td>24 hr. average at least every 3rd day</td>
</tr>
<tr>
<td>continuous PM2.5 mass</td>
<td>1 hour reporting interval; FEM or pre-FEM monitors</td>
</tr>
<tr>
<td>PM(10-2.5) mass</td>
<td>Fiber-based or continuous</td>
</tr>
<tr>
<td>ozone (O₃)</td>
<td>all gases through continuous monitors</td>
</tr>
<tr>
<td>carbon monoxide (CO)</td>
<td>capable of trace levels (low ppm and below)</td>
</tr>
<tr>
<td>sulfur dioxide (SO₂)</td>
<td>capable of trace levels (low ppb and below)</td>
</tr>
<tr>
<td>nitrogen oxide (NO)</td>
<td>capable of trace levels (low ppb and below)</td>
</tr>
<tr>
<td>total reactive nitrogen (NOₓ)</td>
<td>capable of trace levels (low ppb and below)</td>
</tr>
<tr>
<td>surface meteorology</td>
<td>wind speed and direction (reported as &quot;resultant&quot;), temperature, rel</td>
</tr>
</tbody>
</table>

IMPROVE Sites
Ambient Air Monitoring

CURRENT NAAQS

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Primary/Secondary</th>
<th>Averaging Time</th>
<th>Lead</th>
<th>Ex.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Monoxide (CO)</td>
<td>primary</td>
<td>8 Hours</td>
<td>0.15 ppm</td>
<td>not to be exceeded more than once per year</td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>primary</td>
<td>8 Hours</td>
<td>0.05 ppm</td>
<td>not to be exceeded</td>
</tr>
<tr>
<td>Nitrogen Dioxide (NO₂)</td>
<td>primary</td>
<td>8 Hours</td>
<td>0.05 ppm</td>
<td>not to be exceeded</td>
</tr>
<tr>
<td>Sulfur Dioxide (SO₂)</td>
<td>primary</td>
<td>24 Hours</td>
<td>0.15 ppm</td>
<td>not to be exceeded more than once per year</td>
</tr>
</tbody>
</table>

Criteria Pollutants

New York State Dept of Environmental Conservation
2012 Ambient Air Monitoring Network

Bureau of Air Quality Surveillance
Acid Deposition Monitoring Sites
(with NAAQS Sites)
Ambient Air Monitoring

Carbon Monoxide (CO) Standards—Table of Historical CO NAAQS

<table>
<thead>
<tr>
<th>Date</th>
<th>Primary and Secondary</th>
<th>Indicator</th>
<th>Averaging Time</th>
<th>Level</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971</td>
<td>Primary and Secondary</td>
<td>1-hour period</td>
<td>12 ppm</td>
<td>Primary and Secondary</td>
<td>1-hour period</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8-hour period</td>
<td>3 ppm</td>
<td>1-hour period</td>
<td>9 ppm</td>
</tr>
</tbody>
</table>

Primary standards retained, without revision; secondary standards revoked.

1985
50 FR 37484
Sept 13, 1985
Primary standards retained, without revision; secondary standards revoked.

1994
59 FR 38906
Aug 1, 1994
Primary standards retained, without revision.

2011
76 FR 54294
Aug 31, 2011
Primary standards retained, without revision.

Serious Area has a design value of 16.5 ppm and above.

Moderate Area has a design value of 9.1 up to 16.4 ppm.

Not Classified an area designated as an carbon monoxide nonattainment area as of the date of enactment of the Clean Air Act Amendments of 1990 and did not have sufficient data to determine if it is meeting or is not meeting the carbon monoxide standard.

Current CO monitors

[Map of United States with CO monitor locations shown]
Ambient Air Monitoring

Nitrogen Dioxide (NO2) Standards – Table of Historical NO2 NAAQS

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Description</th>
<th>Averaging Time</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971</td>
<td></td>
<td>Primary and Secondary</td>
<td>Annual</td>
<td>53 ppb</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Description</th>
<th>Averaging Time</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td></td>
<td>Primary and Secondary NO2 standards retained, without revision.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Description</th>
<th>Averaging Time</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td></td>
<td>Primary and secondary NO2 standards retained, without revision.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Current NO2 monitors

Oxides of Sulfur (SO2) Standards – Table of Historical SO2 NAAQS

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Description</th>
<th>Averaging Time</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971</td>
<td></td>
<td>Primary</td>
<td>1-hour</td>
<td>75 ppb</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Description</th>
<th>Averaging Time</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1973</td>
<td></td>
<td>Secondary</td>
<td>3-hour</td>
<td>0.5 ppm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Description</th>
<th>Averaging Time</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td></td>
<td>Primary</td>
<td>1-hour</td>
<td>75 ppb</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Description</th>
<th>Averaging Time</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td></td>
<td>Primary</td>
<td>1-hour</td>
<td>75 ppb</td>
</tr>
</tbody>
</table>
Current SO₂ monitors

SO₂ Nonattainment areas

Lead (Pb) Standards–
Table of Historical Pb NAAQS

<table>
<thead>
<tr>
<th>Year Rule</th>
<th>Rule Reference</th>
<th>Scenario</th>
<th>Indicator</th>
<th>Averaging Time</th>
<th>Level</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978</td>
<td>43 FR 46246</td>
<td>Primary and Secondary</td>
<td>Pb-TSP</td>
<td>Calendar Quarter</td>
<td>1.5 µg/m³</td>
<td>Not to be exceeded</td>
</tr>
<tr>
<td>2008</td>
<td>73 FR 66964</td>
<td>Primary and Secondary</td>
<td>Pb-TSP</td>
<td>3-month period</td>
<td>0.15 µg/m³</td>
<td>Not to be exceeded</td>
</tr>
</tbody>
</table>

Ambient Air Monitoring

Current Lead monitors

Lead Nonattainment areas

The UNITED STATES
Nonattainment Designations for Lead as of August 1999

Pb
Ambient Air Monitoring

**Ozone (O3) Standards—Table of Historic O3 NAAQS**

<table>
<thead>
<tr>
<th>Year</th>
<th>Type of Indicator</th>
<th>Averaging Time</th>
<th>Level</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971</td>
<td>Primary and secondary</td>
<td>1-hour</td>
<td>6.08 ppm</td>
<td>Not to be exceeded more than one hour per year</td>
</tr>
<tr>
<td>1979</td>
<td>Primary and Secondary</td>
<td>O₃</td>
<td>1-hour</td>
<td>6.02 ppm</td>
</tr>
<tr>
<td>1993</td>
<td>EPA decided that revisions to the standards were not warranted at the time</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**History of the NAAQS for Ozone, From 1971 to 2015**

<table>
<thead>
<tr>
<th>Final Rule/Decision</th>
<th>Primary/Secondary</th>
<th>Indicator¹</th>
<th>Averaging Time</th>
<th>Level²</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971</td>
<td>Primary and secondary</td>
<td>Total photochemical oxidants</td>
<td>1-hour</td>
<td>6.08 ppm</td>
<td>Not to be exceeded more than one hour per year</td>
</tr>
<tr>
<td>1979</td>
<td>Primary and Secondary</td>
<td>O₃</td>
<td>1-hour</td>
<td>6.02 ppm</td>
<td></td>
</tr>
<tr>
<td>1993</td>
<td>EPA decided that revisions to the standards were not warranted at the time</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>Primary and Secondary</td>
<td>O₃</td>
<td>8 hours</td>
<td>6.01 ppm</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>Primary and Secondary</td>
<td>O₃</td>
<td>8 hours</td>
<td>6.07 ppm</td>
<td></td>
</tr>
<tr>
<td>2015</td>
<td>Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹ O₃: days per calendar year |
² Level: not to be exceeded more than one hour per year
Ambient Air Monitoring

OZONE Formation

Ground-Level Ozone

Ground-Level Ozone in the Sacramento Region

Sacramento Region Ground-Level Ozone
July 31, 2002 5:00 pm PDT

Sacramento Region Ground-Level Ozone
August 1, 2002 11:00 am PDT
Ambient Air Monitoring

Current Ozone monitors

Ozone Nonattainment areas
(8 hour, average 4th maximum, 0.75 ppm)
## Ambient Air Monitoring

### Particulate Matter (PM) Standards—Table of Historical PM NAAQS

<table>
<thead>
<tr>
<th>Date</th>
<th>Initial Promulgation</th>
<th>Form of Standard</th>
<th>Annual Average PM 2.5</th>
<th>98th percentile PM 2.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971</td>
<td>Primary</td>
<td>24-hour</td>
<td>150 µg/m³</td>
<td>65 µg/m³</td>
</tr>
<tr>
<td></td>
<td>Secondary</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1987</td>
<td>Secondary</td>
<td>24-hour</td>
<td>150 µg/m³</td>
<td>65 µg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>Primary/Secondary</td>
<td>24-hour</td>
<td>35 µg/m³</td>
<td>15.0 µg/m³</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>Primary/Secondary</td>
<td>24-hour</td>
<td>35 µg/m³</td>
<td>15.0 µg/m³</td>
</tr>
</tbody>
</table>

### Current PM 10 and 2.5 monitors

### PM-10 Nonattainment areas
Ambient Air Monitoring

PM-2.5 Nonattainment areas
For standards of different years

Current Improve monitors

Current NATTS monitors
Ambient Air Monitoring

Current NCORE monitors

Counties Designated "Nonattainment" for Clean Air Act's National Ambient Air Quality Standards (NAAQS)  

Legend:
- County Designated Nonattainment for 1 NAAQS Pollutant
- County Designated Nonattainment for 2 NAAQS Pollutants
- County Designated Nonattainment for 3 NAAQS Pollutants
- County Designated Nonattainment for 4 NAAQS Pollutants
- County Designated Nonattainment for 5 NAAQS Pollutants

Counties Designated "Nonattainment" or "Maintenance" for Clean Air Act's National Ambient Air Quality Standards (NAAQS)  

Legend:
- County Designated Nonattainment for 1 NAAQS Pollutant
- County Designated Nonattainment or Maintenance for 1 NAAQS Pollutant
- County Designated Nonattainment or Maintenance for 2 NAAQS Pollutants
- County Designated Nonattainment or Maintenance for 3 NAAQS Pollutants
- County Designated Nonattainment or Maintenance for 4 NAAQS Pollutants
- County Designated Nonattainment or Maintenance for 5 NAAQS Pollutants
Ambient Air Monitoring

Siting Criteria

Network Design Considerations
- Concentration Expected
- Representative Concentrations
- Significant Sources or Source Categories

Network Design Considerations
- Background Concentrations
- Regional Transport
- Welfare–Related Impacts for Rural Areas
Scales of Monitoring

- Micro
- Middle
- Neighborhood

Micro Scale Site

Middle Scale Site

Up to 100 m

Up to 100 m to 0.5 km
Remote Sensing

Scales of Monitoring
- Urban
- Regional
- National and Global

Urban Scale Site

0.5 km to 4 km

4 km to 50 km

Ambient Air Monitoring
Ambient Air Monitoring

Monitoring Objectives & Scale

<table>
<thead>
<tr>
<th>Monitoring Objective</th>
<th>Appropriate Siting Scales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest concentration</td>
<td>Micro, middle, neighborhood</td>
</tr>
<tr>
<td>Source impact</td>
<td>Micro, middle, neighborhood (sometimes urban)</td>
</tr>
<tr>
<td>Population</td>
<td>Neighborhood, urban</td>
</tr>
<tr>
<td>General / Background</td>
<td>Neighborhood, regional, global</td>
</tr>
</tbody>
</table>

(On the Scale of a Nation or the World as a Whole)
Ambient Air Monitoring

Network Design Considerations

- Priority area (zone of highest pollution conc.)
- Air Transport
- Evaluation

- Population Areas
- Future development
- Full Representation

Number of Stations – PM$_{10}$

<table>
<thead>
<tr>
<th>Population</th>
<th>Expected Maximum Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 1,000,000</td>
<td>High 1: 6-10</td>
</tr>
<tr>
<td>500,000 - 1,000,000</td>
<td>4-8</td>
</tr>
<tr>
<td>250,000 - 500,000</td>
<td>3-4</td>
</tr>
<tr>
<td>100,000 - 250,000</td>
<td>1-2</td>
</tr>
</tbody>
</table>

1 Exceeding NAAQS by 20% or more, or 95% Probability of PM$_{10}$ Nonattainment
2 Exceeding 80% of NAAQS, or 20% to 95% Probability of PM$_{10}$ Nonattainment
3 Less than 80% NAAQS, or < 20% Probability of PM$_{10}$ Nonattainment
Station Siting Considerations

- Available sites
- Start-up costs
  - Equipment
  - Facility improvements
- Operation costs
  - Equipment operation and maintenance
  - Station costs (lease payments, heating, etc.)
  - Expendables (calibration gases, chart paper, etc.)
  - Personnel

Types of Pollutants

- Topography
- Air flow

Station Categories

<table>
<thead>
<tr>
<th>Station</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (Ground Level)</td>
<td>Heavy pollutant concentration, high potential for pollutant buildup</td>
</tr>
<tr>
<td>B (Ground Level)</td>
<td>Heavy pollutant concentration, minimal potential for buildup</td>
</tr>
<tr>
<td>C (Ground Level)</td>
<td>Moderate pollution concentration</td>
</tr>
<tr>
<td>D (Ground Level)</td>
<td>Low pollutant concentration</td>
</tr>
<tr>
<td>E (Air Mass)</td>
<td>Sampler probe that is between 6-45m (20-150 ft) above ground</td>
</tr>
<tr>
<td>F (Source-Oriented)</td>
<td>Sampler that is adjacent to a point source</td>
</tr>
</tbody>
</table>
Site Information

- Local Sources
  - Flues & Vents by Inlet
  - Non-Vehicular/Local Industry
  - Traffic

- Dominant Influence Category
  - Industrial
  - Residential
  - Commercial
  - Vehicular
  - Urbanization
  - Near Urban
  - Agricultural
  - Recreational Area

Local Sources Near Monitoring Stations

Site Information

- Data Acquisition Objective
- Station Type
- Spatial Scale
- Instrumentation
- Sampling System
- Influential Pollutant Sources
- Topography
- Atmospheric Exposure
Site Information

- Obstacles
  - Description
  - Distance
  - Height above inlet
  - Walls
  - Air flow arc
- Trees
  - As obstacles
  - As interferants

Obstacle Effects

Location of Monitors

- C = Core site
- S = SLAMS site
- p = Special Purpose Monitor
**Ambient Air Monitoring**

**Measurement Process**

- Separate pollutant from air
- Determine pollutant quantity and air volume
- Calculate pollution concentration by dividing pollutant quantity by air volume
- Analyze data

**Air Pollutant Measurement Process**

**Types of Monitoring**

- Automated analytical methods
  - Point analyzers
  - Open path analyzers
- Time averaged samplers
  - Manual methods
  - Filter (ex. PM₁₀) samples
Ambient Air Monitoring

Electromagnetic Spectrum

Visible Range

Beer–Lambert Law

Absorption of light related to:
- Absorption coefficient dependencies
  - Wavelength of light
  - Properties of the pollutant molecule
- Number of molecules in light path
  - Concentration
  - Path length

Diagram of Beer–Lambert absorption of a beam of light as it travels through a cuvette of width l.
Analytical Techniques

- Infrared Methods
  - Differential Absorption
  - Gas Filter Correlation
  - Fourier Transform Infrared

- Ultraviolet Methods
  - Differential Absorption
  - Second Derivative Spectroscopy

- Visible Light - Opacity Measurement
  - Scattering & Absorption

Analytical Techniques

- Luminescence Methods
  - Fluorescence
  - Chemiluminescence
  - Flame Photometry

- Electroanalytical Methods
  - Polarography
  - Electrocatalytic
  - Paramagnetism
  - Conductivity

Station Instrumentation
Site Information

- Site Description
  - Ground Cover
  - Height of Inlet
  - Type of Samplers
  - Spacing Between Samplers
  - Inlet Boom Description and Orientation
  - Meteorological Instrument Tower Description
  - Meteorological Instrument Radiation Shield

Site Information

- Probe Information
  - Probe Material
  - Probe Dimensions
  - Manifold Description
  - Manifold Dimensions
  - Tubing Material
  - Tubing Dimensions
  - Residence Time
    - Probe, Manifold, Tubing, Total
Ambient Air Monitoring

Instrument Manifold

Non-Dispersive IR Analyzer

Sample In
Sample out

Bandpass filter
Detector

Reference cell

Light source
Ambient Air Monitoring

NOx & CO Analyzer

Let's Discuss GFC CO Analyzer

Gas Filter Correlation Analyzer
Ambient Air Monitoring

Looking Inside a GFC CO Analyzer

Chemiluminescence NOx Analyzer

Thermo Environmental Chemiluminescence NOx Analyzer
Calibrations and Zero Air

Calibration is the process of establishing the relationship between the output of a measurement process and a known input

- Pure (zero) air generators
- Certified cylinder gases
- Dilution calibration systems
Ambient Air Monitoring

Station Instrumentation

Calibration Gases

Calibration Gases
Particulate Properties

- Collected Mass
- Inertial Properties
- Particle Size
- Optical Density
  - Haze and Opacity in the Air
  - Density of Collected Deposit

Measures of Particulate Matter in the Atmosphere

- Total Suspended Particles
- PM$_{10}$
- PM$_{2.5}$
- Aerosols
Ambient Air Monitoring

Particulate

- Total Suspended Particulate (TSP) Samplers
  - Lead
- PM10 and/or PM2.5 samplers
  - Size Selective Inlet
  - BAM
  - TEOF
- Visibility Samplers
  - Nephelometer
  - Optical Test Tape Sampler

Size Selective Inlet (SSI) Sampler

PM$_{10}$ – Size Selective Inlet (SSI)
Ambient Air Monitoring

虚体撞击器

虚拟撞击器喷嘴
细颗粒 < 2.5 μm
粗颗粒 > 2.5 μm

PM 10 到 2.5 粗颗粒滤芯
PM 2.5 到 0

细颗粒滤芯

虚拟撞击器接收管

粗滤芯套件
1.67 LPM

细滤芯套件
15.03 LPM

从入口

到控制模块

EPA-WINS
PM<sub>2.5</sub>
撞击器

PM-10 气溶胶从入口

收集杯带防溢流环

撞击滤芯

PM-2.5 气溶胶到滤芯

锥形元件

振荡微天平

(TEOM) 入口
Ambient Air Monitoring

BAM Sampler

Meteorological Instruments

- Wind speed
- Wind direction
- Atmospheric pressure
- Temperature
- Relative humidity, dew pt
- Solar radiation
Data Handling

- Data loggers
  - Strip charts
  - Computers
  - Temporary data storage
  - On-line data retrieval

Data Acquisition System

OAQPS Real-Time Air Pollution Data

Click on shaded states for sites (or the state abbreviations below the map) containing real-time air pollution data (see our FAQs).
Ambient Air Monitoring

Site Survey Data

- Quality Assurance Procedures and Plans
- Cleaning Schedule
- Calibrations
- Station Temperature Control
- In-Line Filters

Documentation

- Instrument Log
  - Stays with Instrument
  - Documents Acceptance Tests
  - Documents Routine Maintenance
  - Documents Repairs
  - Documents Calibrations
  - Other Instrument Specific Information
    - i.e. Location, History, etc.

- Station Log
  - Stays at Station
  - Documents Conditions that may Influence Data
    - Nearby Construction
    - Changes in Traffic Patterns and Flow
  - Documents Alterations of Sampling Train
    - Probe and Equipment Changes
  - Contains Completed Site Reports
Ambient Air Monitoring

Typical Monitoring Station

Quality Assurance

Quality Assurance

Air Monitoring Network

Quality Assurance Program

Data

Valid Data
Quality Assurance

- Field QA
  - Daily and Weekly Zero and Span Checks
  - Semi-Annual Multipoint Calibrations
  - External Audits
    - Agency Audits
    - EPA NPAP (National Pollutant Audit Program)

Data Handling

- Data review and editing
  - Complete data set
  - Reviewed for accuracy
  - Reviewed for consistency

Data Handling

- Data Processing
  - Upload to AQS (formerly AIRS)
  - Air Quality Data Actions
    - Data Deletion
    - Data Correction
    - Links Data to Field QA
Station Inspection

- Review Siting
- Examine Instruments
  - Condition, Zero/Spans, Calibration, Audit Results
- Examine Gases
  - Certification
- Review Logs
- Evaluate Overall Station Cleanliness and Operation

ARB Audit Van

ARB Audit Van Instrumentation
Ambient Air Monitoring

Accuracy & Precision

Safety
- Compressed Gas Cylinders
- Hazardous Gases
- Electrical Hazards
- Heights
Ambient Air Monitoring

Outdoor Air Quality Data

Monitor Values Report

This report displays criteria pollutant summary data for individual monitoring sites. Read more about what’s in this report.

1. Pollutant
   - 
2. Year
   - 2016
3. Geographic Area
   - Select a State
     - 
     - Seattle-Tacoma-Bellevue, WA
     - 
     - Select a County
       - 
6. Exceptional Events
   - Include exceptional events data
   - Exclude exceptional events data

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<th>NOx</th>
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<th>O3</th>
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The future

- Greenhouse Gases
- Real time Particulate Speciation
- Satellite Stations
- ???????
Ambient Air Monitoring

The Web

- https://www.epa.gov/outdoor-air-quality-data
  Monitoring data

- http://www.airnow.gov
  - AQI

- https://www.epa.gov/technical-air-pollution-resources
  - NAAQS
    Air monitoring regulations and information

- https://www.epa.gov/green-book
  - Non attainment Areas

Questions???