Tribal Air Monitoring

Randall Chang
USEPA, Region 9
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RTOC
Introduction

- Assessing Potential Ambient Air Quality Issues
- Ambient Air Monitoring Objectives
  - Setting Data Quality Objectives
  - Monitoring for “Informational Purposes”
  - Monitoring for “Regulatory Purposes”
- Key Air Monitoring QA Requirements
- EPA Expectations for Air Monitoring Programs
Assessing Potential Ambient Air Quality Issues

• Understanding Emissions Sources
  • Identifying types of emissions sources
  • Developing an emissions inventory

• Ambient Air Monitoring
  • Reviewing existing monitoring data
  • Implementing an air monitoring program

• Air Quality Modeling
Ambient Air Monitoring Objectives

- Setting Data Quality Objectives
  - Why are data needed?
  - How will the data be used and by whom?
  - What measurements are required (e.g. which pollutants)?
  - How much uncertainty can the data have, while still meeting your data needs?
Ambient Air Monitoring Objectives

- Monitoring for “Informational Purposes”
  - Initial assessment of air quality
  - Identify potential sources
  - Provide public information/outreach/notification
  - Characterize high pollution episodes
  - Support research studies
  - Evaluate effectiveness of air pollution control measure/strategies
Ambient Air Monitoring Objectives

- Benefits of Monitoring for “Informational purposes”
  - Informational air quality data can be used for state/local/tribal policy and regulation
  - Increased flexibility in implementation (e.g. monitoring equipment, location, and duration)
  - Fewer requirements + More flexibility = Appropriate information that costs less
  - Informational monitors enable greater spatial coverage and can help determine locations for siting regulatory monitors
Ambient Air Monitoring Objectives

- Monitoring for “regulatory purposes”
  - For a very specific objective
  - Data from “regulatory” monitors is required for specific EPA regulatory actions (e.g. NAAQS* designations decisions, attainment/Clean Data findings).

* National Ambient Air Quality Standards
Ambient Air Monitoring Objectives

• Benefits of monitoring for “regulatory purposes”
  • Tribe specific data can be used for regulatory actions
    • Tribal lands are currently designated non-attainment along with surrounding area, but information sources (e.g., informational monitoring) indicate air quality on the reservation is different (attaining the NAAQS).
  • Tribal lands are currently designated attainment along with surrounding area, but information sources (e.g., informational monitoring) indicate NAAQS violations on the reservation.
Key Air Monitoring QA Requirements
(Regulatory Monitoring)

- **Key Considerations:**
  - A strong quality assurance program must be in place so that national decisions on air quality with respect to the NAAQS are consistent and based on data that is technically and legally defensible.
  - Primary Quality Assurance Organization (PQAO)
    - Approved by EPA as a PQAO or
    - Joining with an already established PQAO
  - Regulatory monitoring is **very** resource intensive: personnel, equipment, O&M, contract services (e.g. audits, PM$_{2.5}$ filter weighing laboratory)
Key Air Monitoring QA Requirements
(Regulatory Monitoring)

- Regulatory monitoring requires strict adherence to 40 CFR Parts 50, 53, 58 and related appendices:
  - 40 CFR Part 50 (NAAQS)
  - 40 CFR Part 53 (FRM/FEM methods)
  - 40 CFR Part 58, and Appendices A, C, D, & E

- Additional key EPA documents:
  - EPA QA Handbook Volumes II and IV
  - EPA QA Guidance Documents
  - EPA Technical Assistance Documents (TAD)
Key Air Monitoring QA Requirements
(Regulatory Monitoring)

- Perform all required QC checks including:
  - One point QC checks ($O_3$, $NO_2$, $SO_2$ & $CO$)
  - Monthly/quarterly flow verifications ($PM_{10}$, $PM_{2.5}$ & $Pb$)

- Perform all required QA audits including:
  - Annual/quarterly performance evaluations ($O_3$, $NO_2$, $SO_2$ & $CO$)
  - Semi-annual flow audits ($PM_{10}$, $PM_{2.5}$ & $Pb$)

- Monitoring instruments must be designated FRM or FEM

- Certifications for reference standards (reference gas, zero air, flow, temperature, RH) must be NIST-traceable and recertified regularly and appropriately.
Key Air Monitoring QA Requirements
(Regulatory Monitoring)

• Documents to be submitted to EPA for review and approval:
  • QA documents (in place prior to start of monitoring), reviewed/revised annually or for significant changes/updates:
    • Quality Management Plan (QMP)
    • Quality Assurance Project Plan (QAPP)
    • Standard Operating Procedures (SOPs) – part of the QAPP
  • Annually submit a Network Plan (ANP)
  • Every five years, submit a Network Assessment (with the ANP)
Key Air Monitoring QA Requirements
(Regulatory Monitoring)

• Data Requirements
  • Valid design value requires 3 Years* of complete data
    • Pollutant data “completeness” requirements defined in CFR
  • A robust data review process is needed to ensure that data used for regulatory purposes is technically and legally defensible.
  • Failure to adhere to QA requirements can result in invalidation of data.
  • Monitor data and QA/QC data must be submitted to AQS quarterly
    * Except for CO
Key Air Monitoring QA Requirements
(Regulatory Monitoring)

- Participate in EPA Technical Systems Audits (TSA) every three years.
- Region 9 tribal TSAs:
  - Generally last 2-3 days depending on size of the network
  - EPA issues a TSA report
  - Tribe must submit to EPA for approval, Corrective Action Plans (CAPS) to address all TSA findings and implement the approved CAPS.
Key Air Monitoring QA Requirements
(Regulatory Monitoring)

- Grant funds* for participating in EPA National QA programs
  - National Performance Audit Program (NPAP) (O₃, NO₂, SO₂ & CO)
  - Performance Evaluation Program (PEP) (Pb and PM₂.₅)

*Funds held back from grant
Key Air Monitoring QA Requirements

- Monitoring for “informational purposes” does not require strict adherence to 40 CFR Parts 50, 53, 58 and related appendices.
- QA/QC requirements still apply but are dependent on the specific monitoring purpose and associated data quality objectives.
EPA Expectations for Air Monitoring Programs

Regardless of monitoring objective, tribal monitoring programs should:

- Have clear expectations and understanding of the purpose of the monitoring program
- Efficiently and effectively implement program requirements
- Establish a strong quality assurance program that includes documentation, QA personnel, and processes
- Submit data to EPA via AQS
- Regularly communicate and work with EPA Air Quality Analysis Office
Thank you for your time and interest!

Contact Info:
Randall Chang
U.S. EPA Region 9
Air Quality Analysis Office
Chang.randall@epa.gov
415-947-4180
Additional Information
Region 9 Ambient Air Monitoring Network
Key Regulations and Requirements Documents

- **Key regulations:**
  - 40 CFR Part 50 (NAAQS),
  - 40 CFR Part 53, and
  - 40 CFR Part 58, and Appendices A, C, D, & E

- **Additional key EPA requirements documents**
  - List of Designated Reference and Equivalent Methods
  - EPA QA Handbook Volumes II and IV
  - EPA QA Handbook Volume II, Appendix D, Measurement Quality Objectives and Validation Templates
  - EPA QA Guidance Documents 2.10 (PM$_{10}$), and 2.12 (PM$_{2.5}$)
  - EPA Technical Assistance Documents (TAD)
NPAP and Pb-PEP Program

- **NPAP**
  - Audits of 20% of PQAO sites (primary monitors for all gaseous pollutants) every year, 100% in six years

- **Pb-PEP**
  - One audit/year for PQAOs with ≤ five Pb sites
  - Two audits/year for PQAOs with > five Pb sites
  - Approximate EPA/ESAT contractor cost = $3000/audit
  - PQAOs that desire to self-implement NPAP/PEP must receive approval from EPA
PM$_{2.5}$ PEP Program

- Five valid audits/year for PQAOs with $\leq$ five PM$_{2.5}$ sites
- Eight valid audits/year for PQAOs with $>$ five PM$_{2.5}$ sites
- Approximate EPA/ESAT contractor cost = $3000/audit
- PQAOs that desire to self-implement NPAP/PEP must receive approval from EPA
Useful Web Links

- **Sources of monitoring data**
  - AirNow: [www.airnow.gov](http://www.airnow.gov)
  - AIRNow-Tech: [www.airnowtech.org](http://www.airnowtech.org)
  - AQS: [http://www.epa.gov/aqs](http://www.epa.gov/aqs)
- **Ambient Monitoring Technology Information Center (AMTIC)** [https://www.epa.gov/amtic](https://www.epa.gov/amtic)
Useful Web Links (cont.)

- Emissions
  - [https://www.epa.gov/air-emissions-inventories](https://www.epa.gov/air-emissions-inventories)

- Air quality modeling
  - EPA Support Center for Regulatory Atmospheric Modeling (SCRAM): [www.epa.gov/scram](http://www.epa.gov/scram)
EPA AirData

Air Data: Air Quality Data Collected at Outdoor Monitors Across the US

Daily Air Quality Tracker
The new daily air quality tracker lets you compare recent AQI values with historical data.

This website provides access to outdoor air quality data collected from state, local and tribal monitoring agencies across the United States.

Download Data  Monitor Locations  Air Data Updates
Pre-generated Data Files

Subscribe to our RSS feed to keep up with the latest news, including scheduled updates.
AirNow – Air Quality Index (AQI): Region 9
AirNow-Tech: Region 9
Sensor Considerations and Resources

- **Key Considerations for Using Sensors for AQ Measurements**
  - Not a replacement for regulatory grade, high quality monitors
  - Must be selected to fit a purpose
  - Quality assurance is critical
  - Requires more sophisticated data recovery and manipulation software. Data collection often results in millions of data points!
  - Allows for partnerships and engagement with government, academia, and the public are important
Sensor Resources

- EPA Air Sensor Toolbox web page provides citizen scientists and others resources on air sensors
- Air Sensor Guidebook is one of the most popular resources in the Toolbox
  - https://www.epa.gov/air-sensor-toolbox
- The South Coast AQMD Air Quality Sensor Performance Evaluation Center (AQ-SPEC) also provides a wealth of resources on sensors, including laboratory and field performance sensor evaluations
  - http://www.aqmd.gov/aq-spec