2012 AQS Conference
Providence, RI

AQS Metadata Requirements

Ambient Monitoring Perspectives and Priorities

AQS Metadata

- EPA is currently reviewing and asking monitoring agencies to update, where appropriate, certain key metadata fields associated with sites and monitors in AQS
- Topic was the addressed at the recent National Ambient Air Monitoring Conference in Denver, CO on May 16, 2012
  - See: http://www.epa.gov/ttn/amtic/2012present.html
  - *Data Roadmap – From Monitoring Regulations to National Databases. A review of monitoring definitions and metadata fields with a crosswalk of how that information is stored in AQS*
- With consideration of the input received during this session, the EPA-OAQPS monitoring group is providing a memo and detailed spreadsheets to Regions requesting updates to metadata.
- EPA Regional Offices will be sharing this information with monitoring agencies.

Why are Metadata Important?

- Consistency of metadata across networks is critical to ensuring appropriate interpretation and use of the data.
  - e.g., Health studies may be under-utilizing pollution data where key metadata is missing or labeled incorrectly.
- With a large investment by EPA and monitoring agencies to collect data, its important to maximize the data's utility with the appropriate metadata
- Assessment tools are becoming more readily available with a large number users; need to provide enough key information to address most common questions.
- Availability of tools such as Google maps provides visual ground truth with AQS entries

Metadata from AirData web site (www.epa.gov/airdata/)

E Millbrook Middle School

AQS Site ID: 37-183-0014

POC: 3

State: North Carolina

City: Raleigh

MSA: Raleigh-Durham-Chapel Hill,NC

Local Site Name: E Millbrook Middle School

Address: 3801 SPRING FOREST RD.

Datum: WGS84

Latitude: 35.856111

Longitude: -78.574167

Lat / Lon Accuracy (meters): 3.04

Elevation (meters): 100

Parameter Name: PM2.5 - Local Conditions

Monitor Start Date: 01JUN09

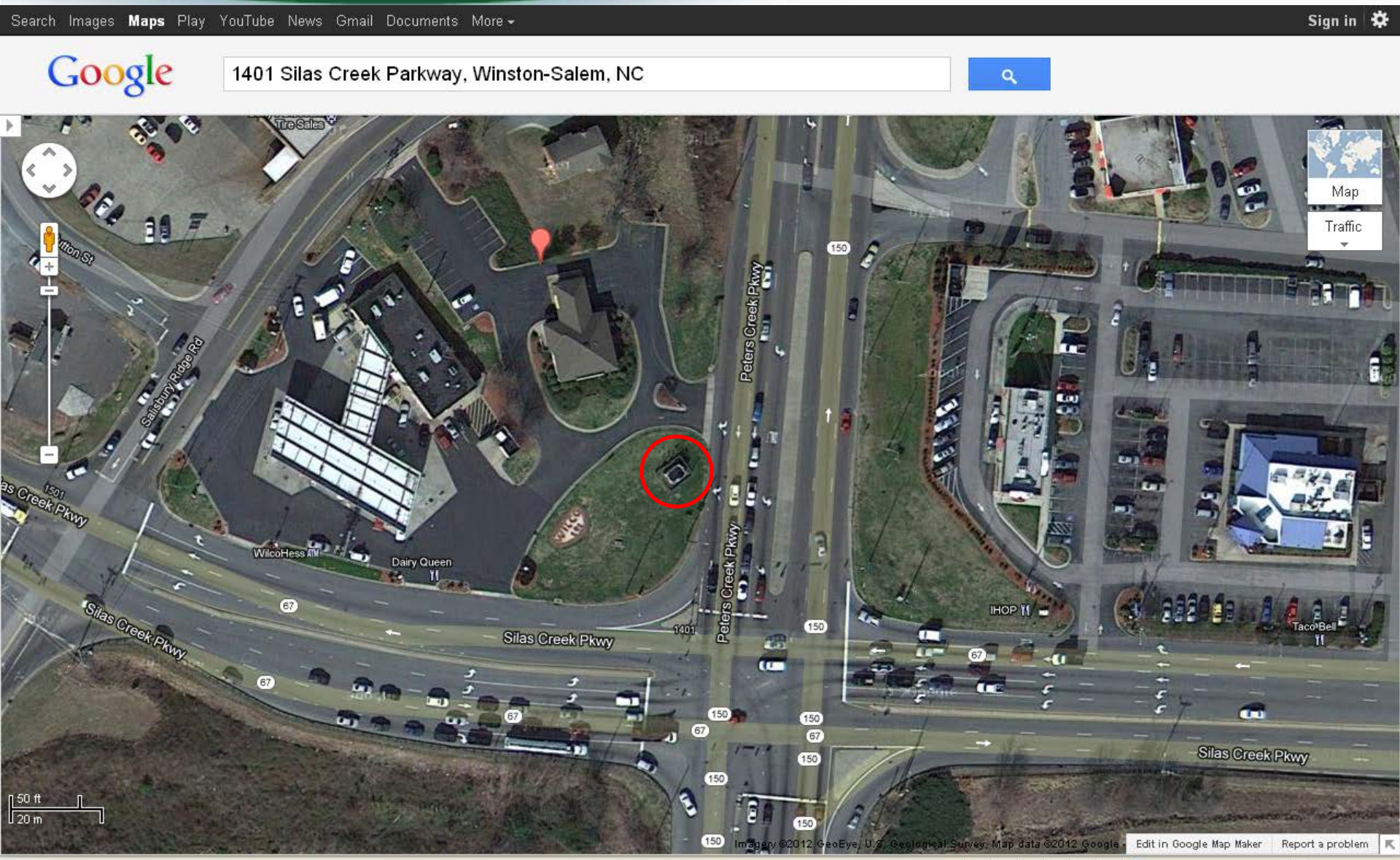
Last Sample Date: 29FEB12

Measurement Scale: NEIGHBORHOOD

Measurement Scale Definition: 500 M TO 4KM

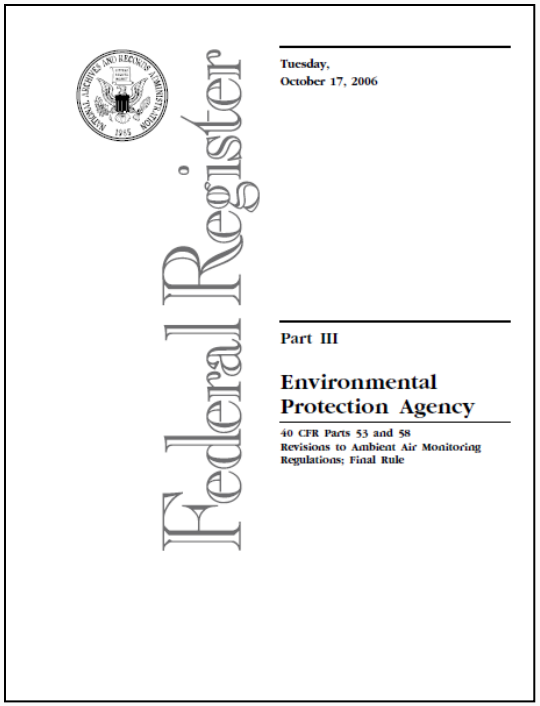
AQS ID 37-067-0023

Microscale CO monitor



Many metadata fields in AQS are referenced in the Monitoring Regulations 40 CFR, Part 58 – Ambient Air Quality Surveillance

- Definitions connected to AQS metadata
  - SLAMS, SPM, PQAO
- Annual Monitoring Network Plans §58.10
- Sample Frequency Requirements
- Quality Assurance in Appendix A
- Methodology in Appendix C
- Network Design in Appendix D
  - Spatial scales are detailed for each NAAQS pollutant
- Probe and Siting Criteria in Appendix E



Requirements for the Annual Monitoring Network Plan

§ 58.10 (b) The annual monitoring network plan must contain the following information for each existing and proposed site:

(1) The AQS site identification number.

(2) The location, including street address and geographical coordinates.

(3) The sampling and analysis method(s) for each measured parameter.

(4) The operating schedules for each monitor.

(5) Any proposals to remove or move a monitoring station within a period of 18 months following plan submittal.

(6) The **monitoring objective** and **spatial scale of representativeness** for each monitor as defined in appendix D to this part.

Green = Generally populated very well in AQS
Maroon = Identified as needing improvement

Requirements for the Annual Monitoring Network Plan - *Continued*

(7) The identification of any sites that are suitable and sites that are not suitable for comparison against the annual $PM_{2.5}$ NAAQS as described in §58.30.

(8) The MSA, CBSA, CSA or other area represented by the monitor.

(9) The designation of any Pb monitors as either **source-oriented** or **non-source-oriented** according to Appendix D to 40 CFR part 58.

(10) Any source-oriented monitors for which a waiver has been requested or granted by the EPA Regional Administrator…

(11) Any source-oriented or non-source-oriented site for which a waiver has been requested or granted by the EPA Regional Administrator for the use of Pb-PM_{10}monitoring in lieu of Pb-TSP monitoring…

(12) The identification of required NO_2monitors as either **near-road or area-wide sites** in accordance with appendix D, section 4.3 of this part.

Purple = not provided for in AQS
Green = Generally populated very well in AQS
Maroon = Identified as needing improvement

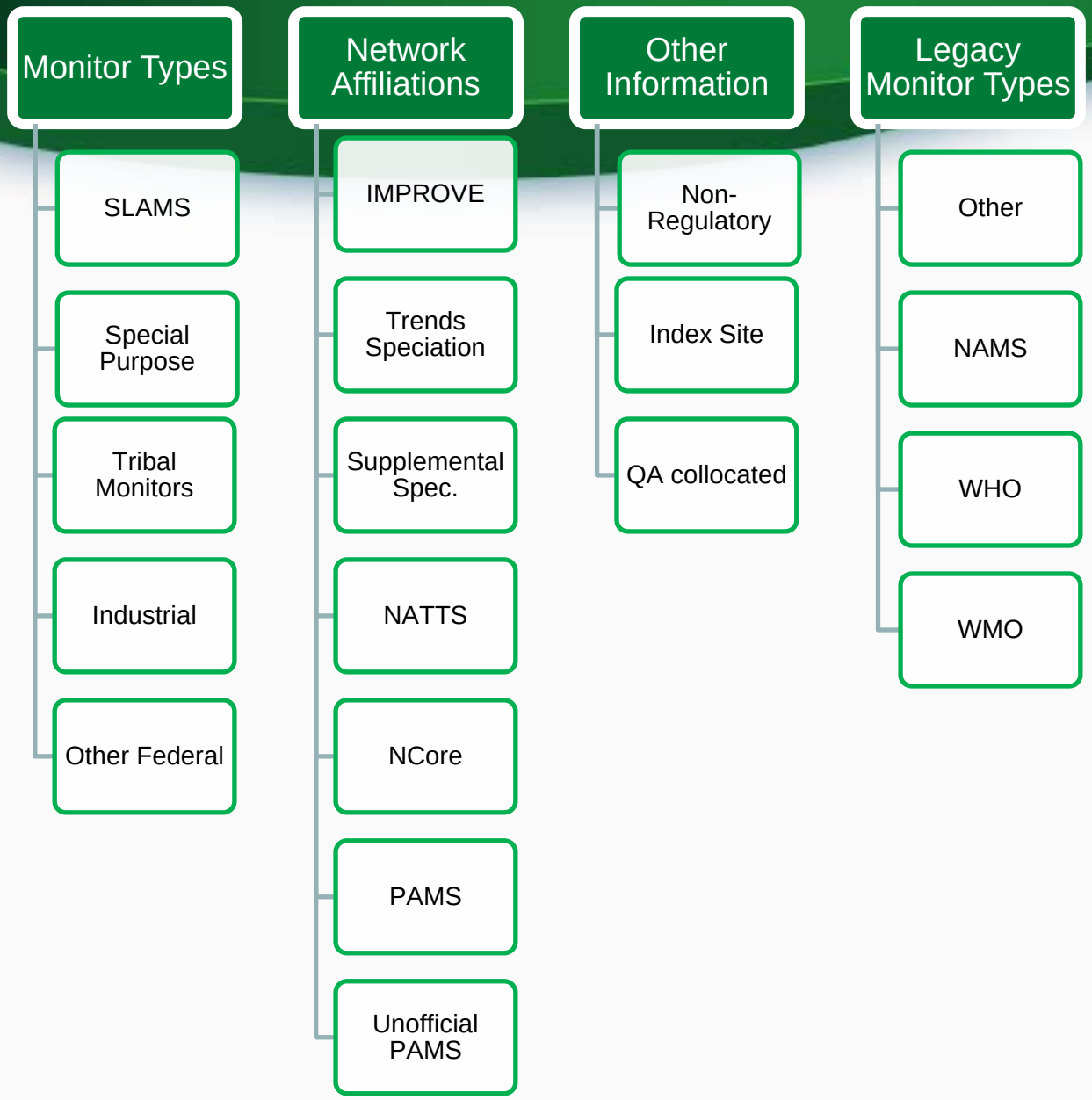
Status of Monitoring related Improvements to AQS we are working on:

Items we are asking be implemented now:

- For criteria pollutants, migrating “Monitor Type” back to its original definition (the administrative classification of the monitor) (e.g., SLAMS, SPM, Tribal, Industrial)
- Discontinue use of “QA Collocated” with Monitor Type; use “Monitor Objective” to describe these instead.

Items we intend to work towards:

- Allowing easier identification of method in daily and annual summary reports
- Making better use of the “Parameter Classification” table – e.g., for CSN, IMPROVE, NATTS
- Having a different field available to identify the technical network a monitor is associated with. This is the other part of how “Monitor Type” is used now. (e.g., IMPROVE, NCore, NATTS)
- Deleting “Collection Frequency Description” since this is somewhat redundant with “Required Collection Frequency Code”.
  - May delete “Required” from above for use with other pollutants.



Monitor Type is defined as "The Administrative Classification of the monitor"

The first three columns are currently available as a "Monitor Type"

For criteria pollutants we recommend using a Monitor Type from the first column.

Current Status of Monitor Type Reporting to AQS for Filter-based $PM_{2.5}$ FRM/FEM monitors

Monitor Type is required and it can be populated multiple times.

Red = ones that should no longer be used

"Non-Regulatory" may be applicable for certain $PM_{2.5}$ continuous FEMs also labeled with a Monitor Type of "Special Purpose"

Monitor Type	Monitor Types Associated with a Filter-based $PM_{2.5}$ FRM/FEM monitor
SLAMS	766
Special Purpose	99
Tribal Monitors	18
Industrial	2
NCore	60
QA Collocated	58
Non-Regulatory	11
Other	67
Individual Number of stations Reporting	**872**

Measurement Scales for $PM_{2.5}$ Sites Reporting a filter-based FRM/FEM to AQS

Measurement Scale is not currently required; however, it is well documented in Appendix D for criteria pollutants and required in annual monitoring network plans

Red = ones that should no longer be used

Measurement Scale	Area represented	Number of Filter-Based $PM_{2.5}$ Monitors in each scale Reporting to AQS
Microscale	Up to 100 meters	4
Middle Scale	100 meters to 0.5 kilometers	23
Neighborhood	0.5 to 4.0 kilometers	585
Urban Scale	4 to 50 kilometers	108
Regional Scale	Tens to hundreds of kilometers	59
Null		**93**
Totals		**872**

Monitoring Objectives for $PM_{2.5}$ Sites Reporting a filter-based FRM/FEM to AQS

At least one Monitoring Objective is required, but more than one can be Populated

Green = Monitoring Objectives expected for rural monitors

Blue = Monitoring Objectives expected for urban/suburban monitors

Orange = descriptive information that can be used. Usually as a second monitoring objective.

Red = ones that should no longer be used

Monitoring Objective	Number of Filter-Based $PM_{2.5}$ Monitors Reporting to AQS
Upwind Background	13
General Background	60
Regional Transport	44
Population Exposure	747
Highest Concentration	80
Source Oriented	25
Max Precursor Emissions Impact	3
Max Ozone Concentration	1
Extreme Downwind	2
Welfare related impacts	3
Other	34
Unknown	10
Quality Assurance	15
Totals at 872 stations	1037

Common Site Level Fields – That Need Attention:

Field	Required in AQS?	Example	Recommendations
Street Address	No	Queens College 65-30 Kissena Blvd Parking Lot#6	Should field be required? At a minimum recommend populating field with address from annual monitoring network plans
Latitude and Longitude	Yes	40.736140, -73.821530 Please update w/ GPS derived coordinates if needed.	Set to Latitude and Longitude to the EPA Standard for horizontal datum - **WGS84**. Many but not all sites have migrated to this datum. See 8/28/07 Memo - Procedure to populate Standard Coordinates on AQS memo web page at: http://www.epa.gov/ttn/airs/airsaqs/memos/
Local Site Name	No	Queens College 2	Recommend having this populated with a conventional name for the site. This makes it easier when discussing data with stakeholders. AIRNow does have site names. At this point we are not recommending making this mandatory for AQS.

Common Monitor Level Fields – that Need Attention:

Field	Required in AQS?	Example	Recommendation(s)
Monitoring Objective	Yes	Population Exposure	Establish consensus on use of available fields.
Measurement Scale (Spatial Scale of Representativeness)	No	Neighborhood	Recommend requiring this field for criteria pollutants. Should it be required for any other measurements?
Monitor Type	Yes	SLAMS	Realign field so that only one “Monitor Type” can be loaded per monitor. Move technical aspects of existing monitor types to another field

Summary of Recommendations for EPA to work on:

- Monitor Type - Realign field so that only one “Monitor Type” can be loaded per monitor. Move technical aspects of existing monitor types to another field
- Require Measurement Scale for criteria pollutants
- Discontinue use of “QA Collocated” as a monitor type
- Make better use of Parameter Type to group common measurements for programs such as NATTS
- Continue to communicate these and other changes
- Other?

Summary of Recommendations for Monitoring Agencies to Work on:

- Populate street address in AQS from annual monitoring network plans
- Align Latitude and Longitude with EPA standard datum (WGS84) and ensure coordinates are GPS derived
- Populate Local Site Name
- Align monitoring objectives across agency network
- Populate spatial scale of representativeness for criteria pollutants
- For criteria pollutants, align Monitor Type with the appropriate selections – usually SLAMS, SPM, Tribal
  - For collocated monitors use the same Monitor Type as the Primary Monitor rather than “QA Collocated”