

Validation of CSN Data

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► Preview

- Purpose in Validating Data
- Keys to quality speciation data
- What are the service labs' QA tools and associated work products
- Monitoring agency responsibilities
- Resources for more information

Purpose of Validating Data

- ▶ “to ensure that environmental programs and decisions are supported by data of the type and quality needed and expected for their intended use....”

Guidance on Environmental Data Verification and Data Validation; EPA QA/G-8; EPA/240/R-02/004, November 2002

Keys to High Quality Filter-Based Air Monitoring Data

- ▶ **Good Filter prep work and handling**
 - Utilizing SHAL Blank
 - Prompt filter recovery and cold shipping
- ▶ **Good Field work**
 - Monthly verifications and periodic sampler audits
 - Review of sampling event data: flow CV's, temperature and barometric pressure readings
 - Periodic cleaning of cyclones
 - Producing Field Blanks
 - Documenting unusual circumstances during sampling events

Keys to High Quality Filter-Based Air Monitoring Data (continued)

- ▶ **Good lab work**
 - Lab Blanks, Check Standards, QC procedures
 - Internal audits, independent PE's and audits
- ▶ **Establishing data quality indicators**
 - Analyte averages and outlier limits
 - Average and outlier limits of ratios between analytes of importance or higher ambient concentrations

What the Service Lab Does for You

- ▶ Verification of data attribution to the correct site, POC, and date
- ▶ Automated range checks (e.g., barometric pressure, temperature)
- ▶ Level 1 checks (e.g., reconstructed mass balance, anion/cation balance, sulfur/sulfate balance, and historic organic carbon/total carbon ratios)

What the Service Lab Does for You, (continued)

- ▶ Investigation and corrective actions in lab analyses and QC when anomalies are found
- ▶ Review of monthly data packages destined to AQS for miscellaneous errors in information and data quality flags

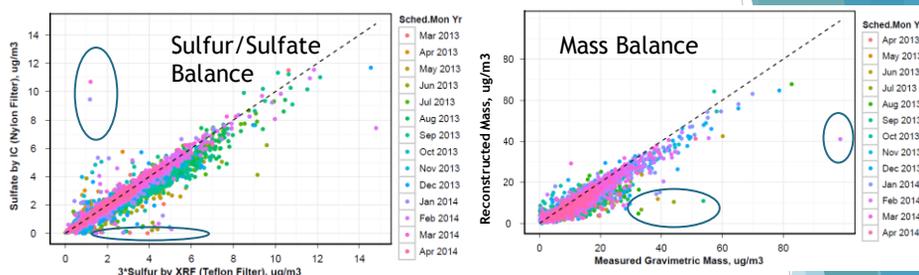
Additional QA Provided by the Service Lab

- ▶ Precisions Analysis of 6 Collocated site data
- ▶ Analysis of Trip and Field Blanks and back-up filters for the URG 3000N
- ▶ Direct reporting to monitoring agency if data is outside established advisory limits for particular parameters
- ▶ (RTI created and provides technical support for SDVAT)

What is left for the Monitoring Agency?

- ▶ Establish the agency's specific advisory limits and acceptance criteria for speciation data unique to their monitoring needs and objectives.
- ▶ Review reported results for outliers and flags that have been identified by the service laboratory
- ▶ Utilize the SDVAT tool if desirable
- ▶ Investigate reported outlier and null value results to determine if circumstances surrounding the sampling event warrant changing the disposition of the result

Examples of Data Validation Plots



- Lab verifies analysis results and available field information to determine any issues; For extreme outliers, data invalidated only if sufficient evidence available.
- Monitoring agency needs to review analytical results and examine field data, sampler performance and any local events/episodes that may have impacted data; determine if data is valid, suspicious or invalid; submit data review and change submission form.

Example Case of Invalidation

(actual invalidation; *site information removed*)

- ▶ Two events (3/24, 3/27) were outliers for the Mass Balance checks
 - ▶ Reconstructed mass was about 49% higher than the gravimetric mass for 3/24/14, while it was about 60% lower for 3/27/14 event.
- ▶ Sulfur loading on the Teflon filter was quite similar for both events. However, the Sulfate loading was about twice that of sulfur for 3/24, while it was zero for 3/27.
- ▶ Filter receipt records indicated receipt of Nylon modules in the wrong container.
- ▶ Above factors collectively suggested that the Nylon filter for 3/24 was possibly double-sampled, while the 3/27 Nylon filter was not sampled.
- ▶ Hence the ion data from the nylon channel for both these events were invalidated with the “AQ - Collection Error” flag.

Resources for More Information

- ▶ RTI Data Summary Reports on AMTIC
 - <http://www.epa.gov/ttn/amtic/files/ambient/pm25/spec/2012ADSReport.pdf>
- ▶ What is in your QAPP?
 - http://www.epa.gov/ttn/amtic/files/ambient/pm25/spec/CSN_QAPP_v120_05-2012.pdf
- ▶ Chemical Speciation - SDVAT Speciation Data Validation Tool
 - <http://www.epa.gov/ttn/amtic/sdvat.html>
- ▶ If there is interest OAQPS can conduct a more in-depth training on data validation in the fall