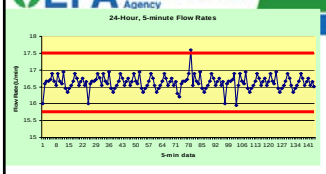
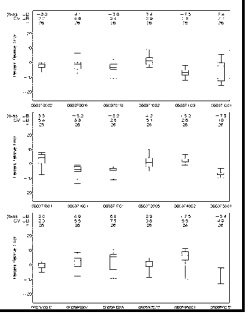


Ambient Air Monitoring Lead Quality System

And Other Ambient Air QA Activities



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Revisions in the QA Regulations (40 CFR Part 58 Appendix A)

- Included a DQO Goal
- Reviewed QC
  - Flow rate verifications - stayed the same
    - 1/quarter (TSP Hi-Vol)
    - 1/month (PM10 Lo-Vol)
  - Flow Rate Audits (2/year)- stayed the same
  - Collocation stayed the same (15% of samplers/PQAO, every 12 day sampling)
  - Pb strip lab audits
    - Same frequency (2 concentration- 3/strips/concentration/quarter/lab)
    - Different concentration (30-100% and 200-300% of NAAQS)
  - Added a Performance Evaluation (PEP-Like) for estimate of overall bias
    - ≤ 5 sites in PQAO- 1 PEP and 4 collocated
    - > 5 sites in PQAO- 2 PEP and 6 collocated
- Changed paired assessment cut-off value for precision and bias from 0.15 $\mu g/m^3$ to 0.02 $\mu g/m^3$
- Revised data quality assessment statistics

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DQOs

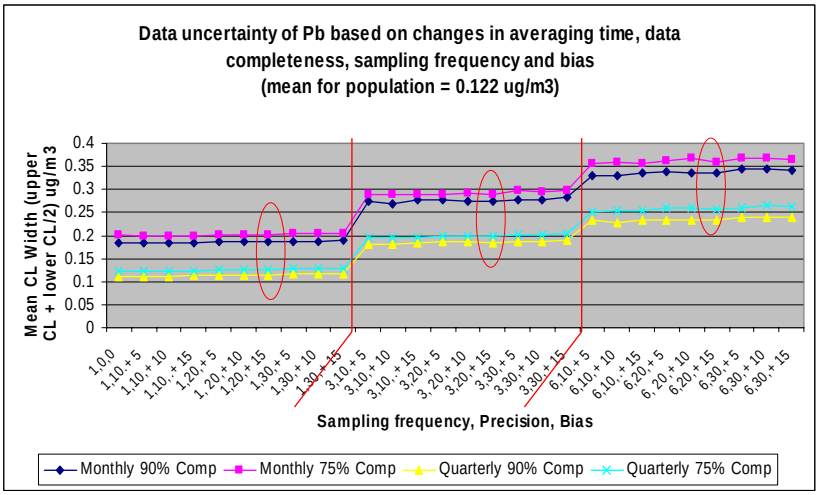
GOAL

explore how changes in design value averaging times, sampling frequency, data completeness, precision and bias affect ones ability to compare Pb estimates to a NAAQS value.

DQO Scenarios

- Two design value averaging times
  - monthly and rolling quarterly
- Two completeness scenarios
  - 75% and 90%
- Three sampling frequencies
  - every day, every three days, every six days
- Three precision scenarios
  - 10%, 20% and 30%
- Six bias scenarios
  - ± 5%, ± 10%, ± 15%

Tables to Graphs



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Results

- All independent variables- design value averaging time, sampling frequency, completeness, precision and bias- have a statistically significant impact on the width of the confidence interval for the mean
- The design value averaging time and sampling frequency have the greatest impact on the width but the two variables interact.
- The change in design value averaging time also interacts with the change in bias.

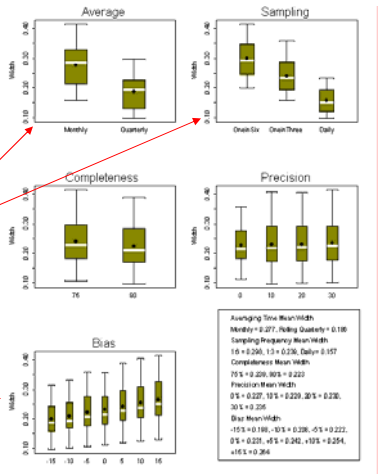

Figure 4 Effect of data quality scenarios on the data

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Decide on Data Quality Indicators

- Completeness -75% Completeness is a rule of thumb
  - Keep it but when we do better we reduce levels of decision uncertainty
- Precision- Looked at all Pb data in AQS from:
  - SLAMS, NATTS and CSN
  - Pb data was collected by various sampling and analytical methods.

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Cutoff Value

- Theory- At low concentrations, agreement between measurements of paired values to estimate precision or bias is poor.
- Cut off value indicates the concentration that the QC values must be greater than or equal to for the values to be used in a data quality assessment.
- Prior to 2008, TSP-Pb cut off was 0.15 $\mu g/m^{3.}$ This value was lowered to 0.02 $\mu g/m^3$ · three reasons:
  1. It is a reasonable distance from the MDL (MDL is 0.0075 $\mu g/m^{3)}$,
  2. it is ~ one order of magnitude away from the NAAQS and provides an adequate margin of safety for data review, and
  3. the measurement technology should be reliable at this concentration level

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Precision Estimate

- *Looked at precision from various programs using different sampling and analytical methods*
- *Looked at different precision/bias "cutoff" values*
- *Used Current CFR statistic (90% Upper CV limit)*
- *Selected 20% CV Goal*

90% Coefficient of Variation Summary								
Data Values	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Pb > 0.002 ug/m3	19.4	13.0	16.9	9.4	36.6	37.0	23.5	15.5
Pb > 0.006 ug/m3	20.7	11.8	16.8	8.8	29.1	36.1	14.9	15.4
Pb > 0.01 ug/m3	11.2	11.7	16.5	8.1	24.1	18.3		15.4
Pb > 0.02 ug/m3	12.0	6.7	15.0	9.0		14.0		16.4

1. PM10 NATTS Pb High-volume sampling (~113 LPM) Analysis ICP-MS
2. TSP Pb High-volume sampling (~113 LPM) Analysis ICP-MS
3. TSP Pb High-volume sampling (~113 LPM) Analysis Atomic Absorption
4.TSP Pb High volume NY Data Analysis Graphite Furnace AA
5. TSP Pb Low-volume sampling Analysis XRF
6. PM2.5 CSN Very-low-volume sampling (~6 & 7 LPM) Analysis XRF
7. PM2.5 CSN Texas Low-volume sampling (16.7 LPM) Analysis XRF
8. TSP Pb High-volume sampling (~113 LPM) Analysis ICAP

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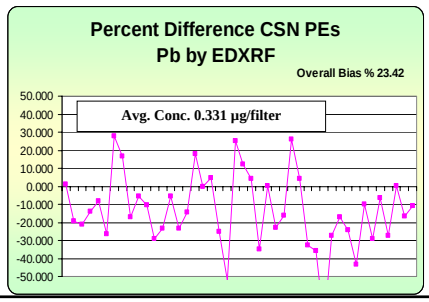
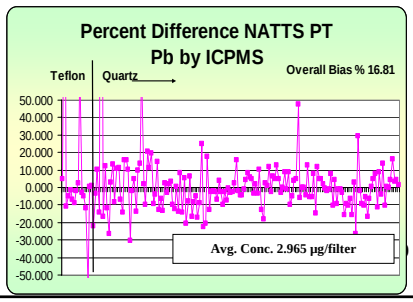
Bias Assessment

- **The XRF PEs- Overall Bias Estimate 23.42% (44 Obs)**
  - Based on PM2.5 particles collected in the field and include "matrix" effects (closer to a PEP-Like sample).
  - the XRF PE samples at a concentration level that is one order of magnitude lower than the ICP-MS PE samples and below the proposed cutoff value
- **ICP-MS PEs Overall Bias Estimate 16.81% (175 Obs)**
  - lab-generated liquid aerosols. More stable, more quality control and no field effects.

It's expected that Pb audit samples that are developed above cutoff value will produce acceptable results for both analytical methods.

No lab PE acceptance goal establish in CFR. We will probably suggest a 10% MQO





Overall Bias
Pb Performance Evaluation Program (PEP)

- DQO Goal ± 15% (95 % CL absolute bias)
- 5 audits for PQAOs with ≤ 5 sites (15 over 3 years)
  - 1 PEP-Like audit
  - 4 collocated values- one additional collocated sample/quarter
- 8 audits for PQAOs with > 5 sites (24 over 3 years)
  - 2 PEP-like audits
  - 6 collocated values
- Less costly than $PM_{2.5}$ PEP

All samples sent to independent lab for analysis
Like PEP- Federal Implementation will be a available

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Work to be done- Pb-PEP

- Need portable samplers
  - Plan to purchase 2/Region for Federal implementation
  - Pb-PEP and $PM_{2.5}$ PEP integrated
  - Training in Nov-Dec timeframe
  - Monitoring organizations to decide to self-implement or allow Federal implementation (Fed. Implementation = STAG funds)
    - Memo to come out in July
- National Pb-PEP lab
  - Region 9 has agreed to be Federal Pb-PEP lab
  - Rough estimate of about 300-350 filters/year
  - Lab needs to get FEM status (discussed below)
- Documentation
  - Implementation Plan/SOPs – June
  - QAPP-July/Aug

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Pb Strip development

- Concentration: 30-100% and 200-300 % of NAAQS
- Need audits for TSP (glass fiber) and PM_{10} (Teflon) filters
  - Work Assignment in place for testing
    - destructive (ICP-MS, GF-AA etc) pipette/nebulization
    - nondestructive (XRF) nebulization
  - May-June
- Does OAQPS develop strips nationally?
  - Not an OAQPS responsibility
  - We can. It's a good idea for consistency/comparability
    - Would need to come out of STAG
  - NIST produces Pb SRM

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Statistics

- Collocation statistics the same
- Flow rate statistics now the same as PM10
- Pb Strips now are the same as bias statistics for gaseous pollutants
  - No more trying to combine flow rate and Pb strips into a bias estimate!!!
- Bias estimate same as bias statistic for gaseous pollutants

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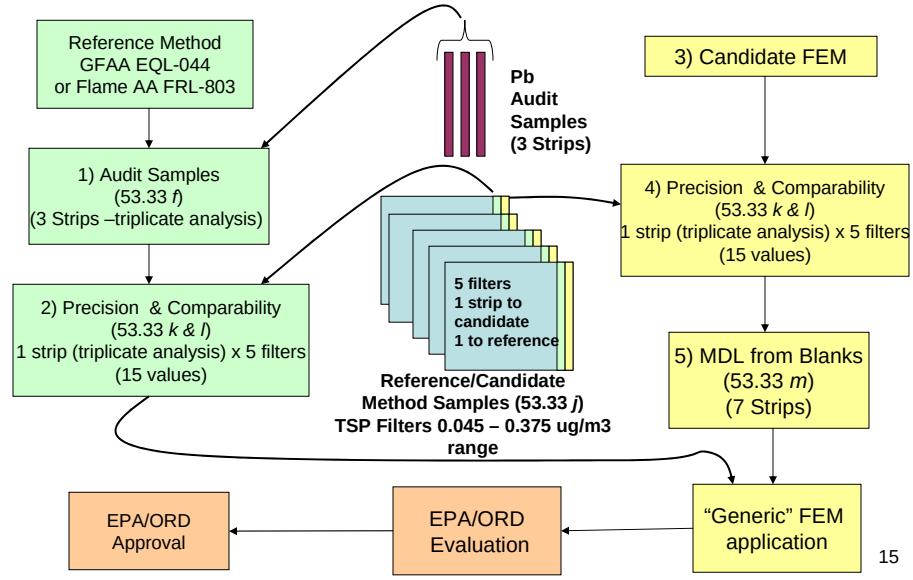
Streamlined Performance Based FEM application for Existing FEMs & other Methods in use by Monitoring Organizations for NAAQS (assumes GFAA/Flame AA is an approved FRM)



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What sampler designs are approved for Pb-TSP sampling?

- Any TSP sampler design that meets the requirements of Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere (High-Volume Method) is acceptable as for use as a FRM sampler for Pb-TSP.
  - Unlike other FRM samplers, EPA has not issued specific approvals for individual manufacturer versions of TSP samplers. Alternative types of flow control and measurement per sections 6.1 and 6.2 of Appendix B are acceptable. Any adaptations to the peaked roof design should be consistent with the requirements of sections 7.3.1 and 7.3.2 of Appendix B.

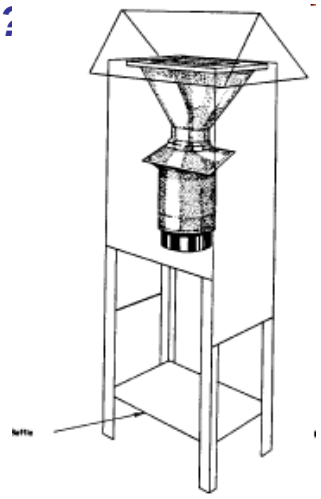

Figure 1. High-volume sampler in shelter.

What sampler designs are approved for Pb-PM_{10} sampling?

- Low-volume PM_{10} samplers that meet the requirements for PM_{10C} samplers (as described in Appendix O of Part 50) can be used for Pb-PM_{10} monitoring intended to meet NAAQS comparison objectives.
- Good rule of thumb – if it's an approved filter-based sampler for $PM_{2.5}$ then you can use it for Pb-PM_{10}
  - just replace the $PM_{2.5}$ separator with a straight-tube connector

http://www.epa.gov/ttn/amtic/files/ambient/criteria/reference-equivalent-methods-list.pdf

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Related Issues

- Sampler spacing per 40 CFR Part 58 Appendix E
  - High-volume samplers (and other types of samplers drawing more than 200 liters/min of air) should be spaced a minimum of 2 meters away from other samplers and inlet probes.
  - Low-volume samplers should be placed a minimum of 1 meter away from other samplers and inlet probes.
- Ensure that high volume sampler exhaust is ducted away from other samplers and probe inlets
- Remember to leave room on sampling platform for QA samplers (collocated sampling and/or Pb-PEP)

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