Establishing Terminology & Approach for and Hierarchy of NIST Traceability for Flow Rate Audit and Calibration Standards

Primary, Traceable, or Comparable: Is It a Political Election or a Reliable, Accurate Comparison?

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GOALS for Flow Traceability

Our Goal for Ambient Air Flow standard certification traceability (as it is for Ozone) has started with audit flow standards, but must include all air monitoring flow standards, because flow is critical to determining not only concentration, but also PM cut points.
What is our Specific Traceability Goal?

To show how comparable two different SLT agencies are to NIST. Why?: NIST has been set up to be our single national std. source. All groups making the same type of measurements can have trust in independent measurement comparison to each other, through their quantified NIST traceability (including mean & variability).
Flow Traceability Issues – Terminology and Approaches for Accomplishing Flow Traceability

Recent vendor uses of EPA Traceability Terms have been related to issues about the best approach for accomplishing Flow Traceability

EPA Definitions for traceability to NIST come from 1979 Ozone Standard Certification Guidance
Terminology Updated and Approach Goals Revisited in 2008 - 2009

Following work by Ambient Air QA Workgroup, lead by Mike Papp, A Draft Update of the 1979 Ozone Traceability Guidance Was Posted on AMTIC in May 2009

The review of Terminology and Approach refocused goals and terminology from specifying equipment and SOPs onto quantifying amount of variability of SLT measurements from what NIST would have measured.
Refocus Approach from Equipment Basis to Performance Objective Basis: O3 → Flow

Since 1979, when the last guidance version was published, EPA has set up a traceability network for O3 based on NIST SRPs.

EPA is now looking at summarizing the data for the intercomparisons to estimate an acceptance limit(s) for total variability from SLTs to NIST.
Proposal: Discuss Extending the O3 Goal and Approach to Flow

Consider Several Flow Traceability Scenarios, substituting SRIs (I = Instrument) for SRPs, at the NIST, EPA National, EPA Regional and SLT levels of comparison.
Best (may not be practical for O3 monitoring)

1. NIST SRI#0
2. EPA SRI#Traveling
3. Regional SRI
4. Mon. Org Primary
5. Transfer

Good

1. NIST SRI#0
2. EPA SRI#T
3. Regional SRI
4. Mon. Org Primary

Acceptable (the limit)

1. NIST SRI#0
2. EPA SRI#T
3. Regional SRI
4. Mon. Org Primary
5. Transfer

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Proposed Additional Details of a National Flow Certification Traceability Approach

• *National*- meaning used by any cert lab used by SLT that reports flow audit data to EPA

• Procedures: NIST (as should all cert. labs) certifies flow stds. using a tandem comparison design that controls for effects due to test level order and power status (on\off). May also need an apparatus that adds *NO additional pressure during the certifying procedure*

• Per Test-Do more than once, varying flow levels (Lo, med, hi), and turning on and off and on, and preferably over more than one day.
Proposal: Additional Details of a National Flow Certification Traceability Approach

All Certifying metrology laboratories should follow the same procedure if Monitoring QA data will be reported to EPA.

Note: Flow is even more critical (vulnerable to) due to zero air sources at the Trace level; some PM samplers work at ~ 5LPM; or even at 1.5 LPM (Fairbanks AK study).
Proposal: Discussion on Frequency

• 1. Primary "Bench" flow, temperature, pressure standard certified NIST traceable annually.

• 2. Compare any Field (i.e., Traveling) standards against primary "bench" standard annually. [We could propose this as one option among other frequencies, such as semiannual or quarterly, given the biweekly calibration of ozone span/zeros as a basis]

• 3. Submit Field standards to manufacturer every (?) three years for refurbishment and NIST certification. -Whatever accumulated appropriate data shows.
Proposal: What Do You Think?

Lets Talk!!