NATTS Technical Assistance Document Revision 4 – Updates from 2016

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Audience

- NATTS monitoring agencies
- Analytical support laboratories (ASLs)
- Air toxics monitoring agencies
- EPA Regional staff overseeing air toxics monitoring

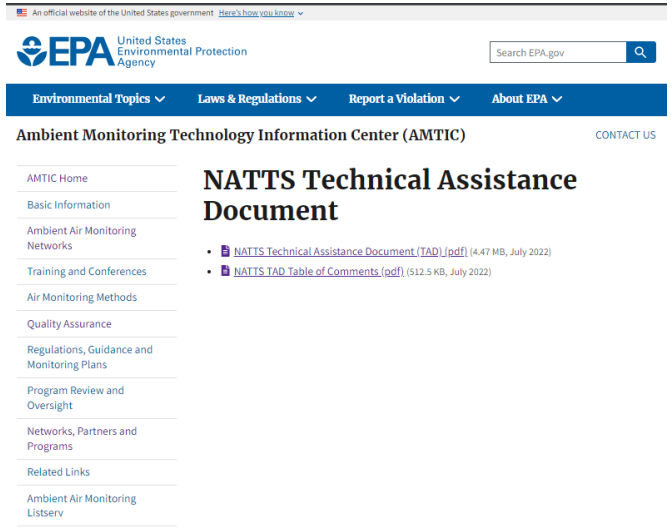
Presumes attendees are familiar with the guidance in the NATTS Technical Assistance Document (TAD) Revision 3

Agenda

- NATTS TAD Revision Rationale
- TAD Revision 4 Development
- Notable changes and updates to TAD Rev 4
  - Programmatic
  - Individual methods
  - Data handling and reporting
- Question and Answer
  - Please submit questions via the chat

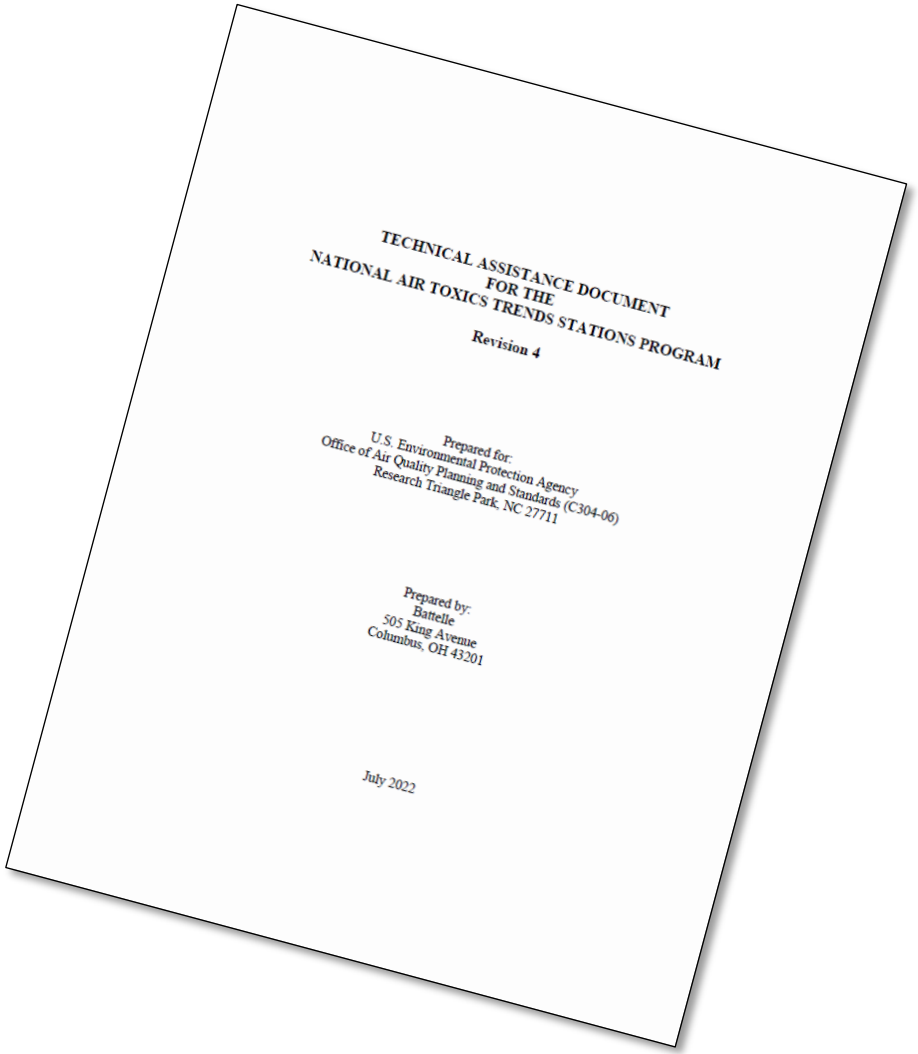
TAD Revision 4 - Development

- The NATTS Technical Assistance Document Revision 4 was recently published in early August 2022
  - https://www.epa.gov/amtic/natts-technical-assistance-document
- For the revision:
  - EPA was aware there were known needed changes:
    - Include new analytes
    - Address updated instrumentation and method guidance (e.g., TO-15A)
    - Address ambiguities and discrepancies in TAD Revision 3
  - EPA sought NATTS and air toxics monitoring stakeholder input on the revision and considered input for inclusion
  - EPA assembled a small workgroup of EPA and SLT monitoring agency staff to review and adjudicate comments



TAD Revision 4 - Implementation

- NATTS monitoring agencies and analytical support laboratories (ASLs) are expected to be compliant with the Technical Assistance Document Revision 4 by August 2023



TECHNICAL ASSISTANCE DOCUMENT
FOR THE
NATIONAL AIR TOXICS TRENDS STATIONS PROGRAM

Revision 4

Prepared for:
U.S. Environmental Protection Agency
Office of Air Quality Planning and Standards (C304-06)
Research Triangle Park, NC 27711

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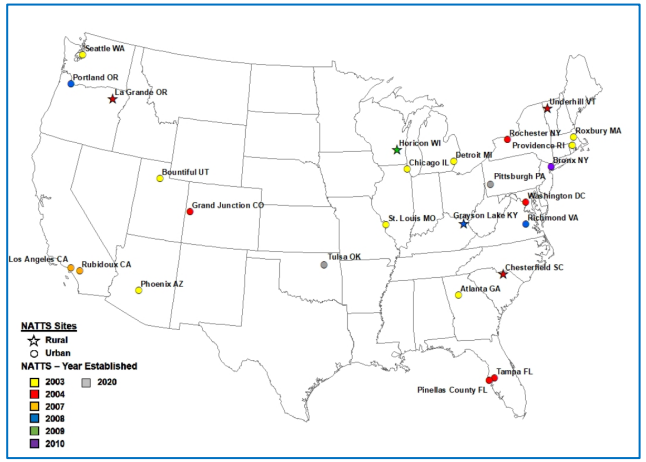
July 2022

Notable Changes for TAD Revision 4



Overall programmatic changes

- Updated active NATTS sites
- Method Detection Limits (MDLs)
  - Adjusted to adopt all aspects of the 2017 40 CFR procedure
- Stressing data validation is SLT monitoring agency responsibility
- Precision data evaluation
- Entry of flow verification data to AQS
- Chromatographic peak integration guidance
- Analyte identification criteria clarifications
- Relaxing of some performance metrics and maintenance to manufacturer recommendations
- Allow submission of study to demonstrate method modifications
- Focus on qualification of data in lieu of invalidation

Notable Changes for TAD Revision 4 (cont'd)

- VOCs
  - Addition of new Tier I analyte – ethylene oxide
  - TO-15A updated details adopted (refer to previous webinar)
- Carbonyls
  - Addition of UHPLC
  - Cartridge handling clarifications
  - Known standard challenge
- Metals
  - Reconfiguration of interference check standard (ICS) procedure
- PAHs
  - Adoption of performance aspects of 8270E
  - Media lot acceptance criteria
  - MS tuning

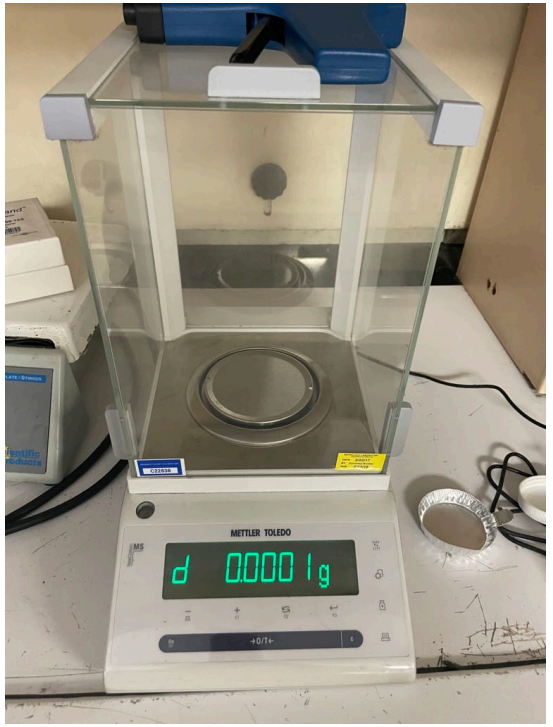
Critical Instruments

Critical Instruments

- A critical instrument is one whose measurements directly impact the accuracy of the final reported concentration.
  - Measures or meters a physical property
  - Examples include:
    - Flow transfer standards (total collected air volume)
    - Mass flow controllers, mechanical flow controllers for metering sample and standard gases
    - Thermometers and barometers (conversions of local meteorology conditions to standard)
    - Volumetric delivery devices such as pipettes and dispensers
    - Electronic balances (preparation of calibration standards)
    - Pressure gauges and transducers used to measure sample or standard pressures
- Must be calibrated and calibrations verified periodically
  - Frequencies and tolerances in Table 3.3-1

Terminology

- **Calibration** – assignment or standardization of the measurement response to a certified standard
  - Recalibration is a calibration
  - Required before use and when verification shows out of tolerance
- **Calibration verification** – functional check of a calibrated instrument as-is to assess calibration status
- **Certification** – Assignment of a standard's response or value by a properly qualified authority (e.g., NIST)
- **Audit** – assessment of an instrument's measurement using a standard independent of the standard used for calibration or calibration verification



Method Modifications

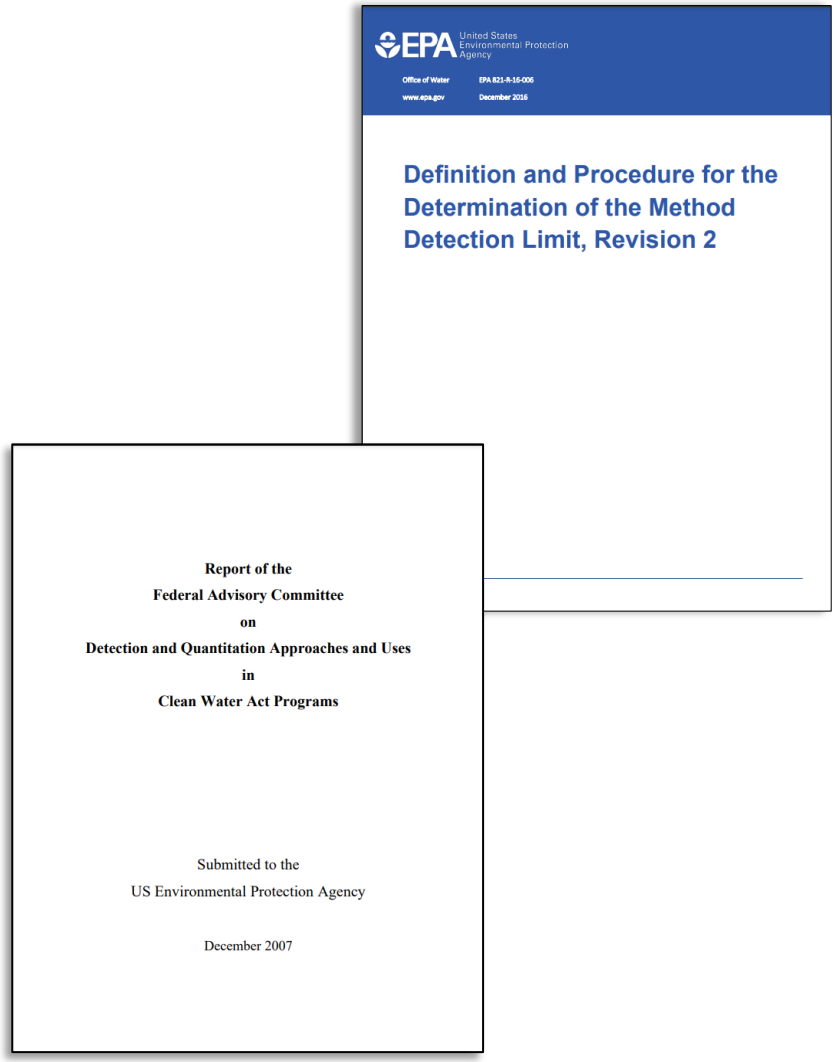
Method Modifications

- NATTS Methods are performance-based
  - Allows method modifications provided acceptance criteria are met
  - Text specifies instances where modifications are not permitted
    - Storage temperatures
    - Holding times
    - Sampling media specifications
- Includes a provision for approved method modifications with rigorous study following EPA approval
  - Provide application to OAQPS
    - Justification of rationale
    - Proposed study design to demonstrate equivalence
      - Number of measurements
      - QC measurements
    - Acceptance criteria for study to demonstrate equivalence

Method Detection Limits

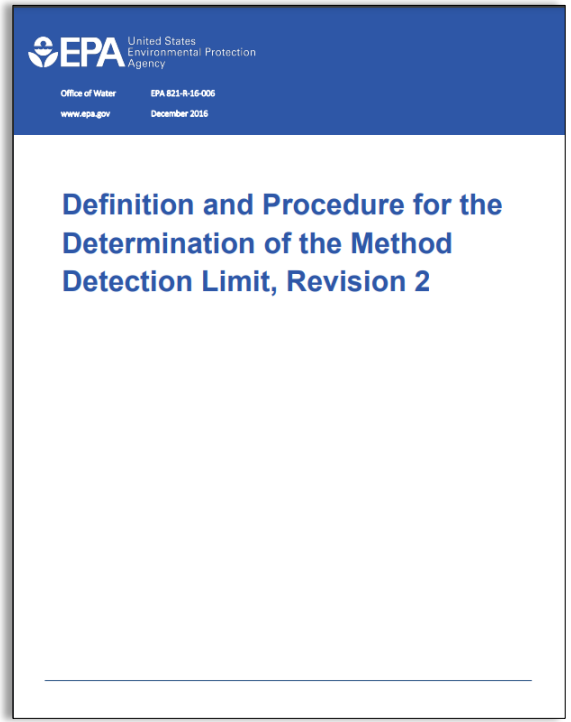
Method Detection Limits

- Two procedures/conventions to determine MDLs
  - 40 CFR Part 136 Appendix B procedure – final rule of Revision 2 – April 2017
    - Most ASLs will perform this procedure
  - Federal Advisory Committee on Detection and Quantitation Approaches and Uses In Clean Water Act Programs (DQ FAC procedure)
    - Procedure is suitable for high throughput laboratories
    - Not covered in this webinar



Method Detection Limits (cont'd)

- 40 CFR Part 136 Appendix B procedure – final rule of Revision 2 – April 2017
  - Three main differences from 1981 procedure
    - Determine two MDLs – one for blanks and one for spikes
    - Samples are to be representative of the calendar year
    - Laboratories may pool data from multiple instruments
  - Represents concentration at which there is 99% confidence the measurement is above *background*
  - Prescribes to determine an initial MDL and then verify annually thereafter
  - Initial MDL determined with minimally 7 spikes and 7 method blanks
  - Verify or recalculate data annually
  - Redetermine initial MDL if method changes are made to method sensitivity

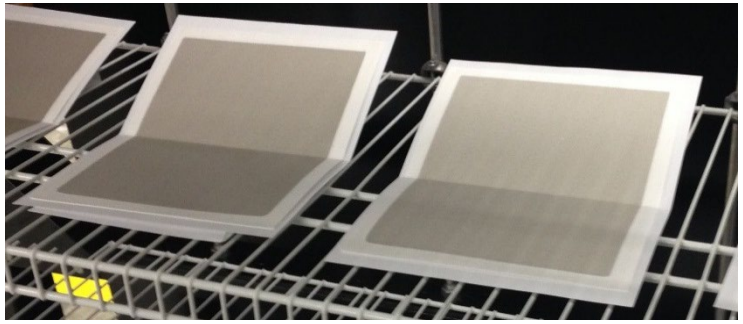


Method Detection Limits (cont'd)

- Accommodation for multiple instruments for a method
  - One MDL for the laboratory inclusive of all method instruments
    - Distribute measurements across instruments and combine data
  - MDL for each instrument
    - Report highest
    - Report individual with associated data
- Collect data throughout the year - minimally quarterly
  - Two spiked samples
  - Two method blanks
  - Goal is to have 8 spiked sample and 8 method blank sample results for the year

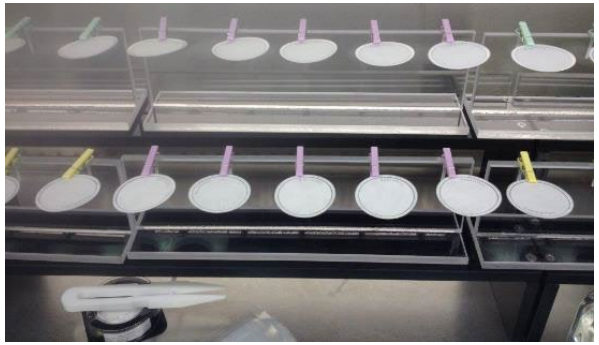
Method Detection Limits (cont'd)

- Must represent all portions of the method (as practical)
- For NATTS, does not incorporate sample collection
- Employs routine method blank data
- Determine an MDL
  - For spiked samples
  - For method blanks
  - The higher of the two is the laboratory MDL



Method Detection Limits (cont'd)

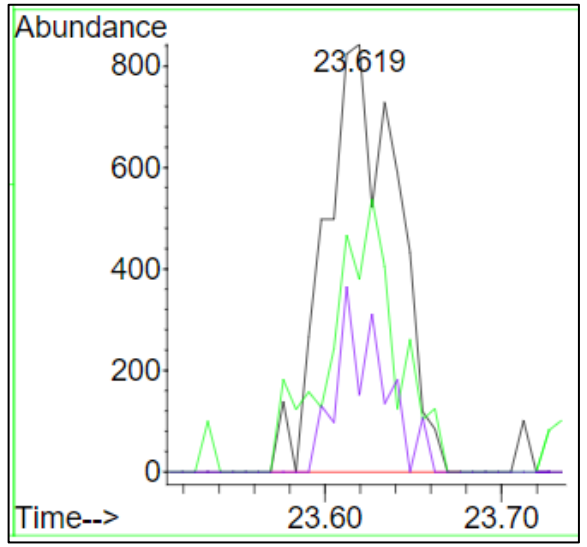
- Goal is to determine representative MDL
  - Not lowest concentration measurable
- Select variety of media
  - VOCs – different canister types, electropolished or silicon-ceramic lined
  - Carbonyls – DNPH cartridges from different lots
  - Metals – individual filters from different lots or boxes
  - PAHs – XAD-2, PUF, and filters from different lots and cleaning batches



Method Detection Limits – Initial MDL

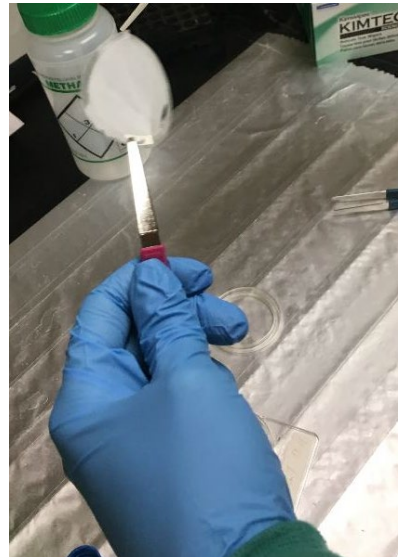
Determine the initial MDL

- Select a spiking level
  - Suite of method blanks (MB) samples – average + 3 standard deviations
  - Concentration at which instrument signal-to-noise ratio (S:N) is 3 to 5- fold
  - Analysis of suite of low concentration (S:N 5:1 or 10:1) spikes – 3-fold this standard deviation
  - Concentration at which qualitative identification criteria are lost
  - Previously acceptable MDL studies and experience
- Prepare and analyze 7 spikes and 7 MBs
  - Prepare in 3 separate batches/dates (preferably non-consecutive days)
  - Analyze in 3 separate batches/dates (preferably non-consecutive days)



Method Detection Limits – Initial MDL (continued)

- May use existing data if:
  - All portions of method are included in the preparation and analysis
  - MDL spike concentration is identical in all spiked samples
  - Data are from previous 24 months and must be from the same method parameters
- Calculate MDL_{sp} and MDL_b



Method Detection Limits – Initial MDL (continued)

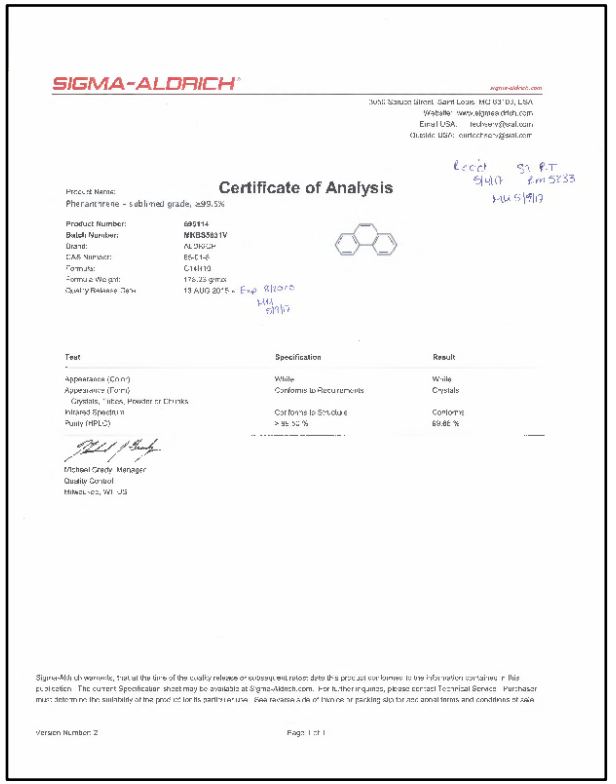
- Calculate MDL_{sp}
  - Average of spiked samples * student's T statistic for number of samples
- Calculate MDL_b
  - If none of MBs have a numerical results, MDL_b does not apply
  - If some MBs are non-detect and some provide a numerical result:
    - MDL_b = highest MB value
      - Do not include known atypical contaminated MB values
    - If more than 100 MBs, set MDL_b to 99th percentile value
  - If all MBs are numeric value
    - Calculate average, if average < 0, set average to 0
    - Calculate standard deviation of MB concentrations, s_b
    - Multiply s_b by the appropriate student's T statistic
    - Add the average MB value to the product of s_b*T
- Highest of MDL_{sp} or MDL_b is laboratory MDL for that pollutant

Method Detection Limits – Initial MDL (continued)

- Verify MDL (recommended)
  - Prepare a standard sample at 1 to 5-fold the determined MDL
  - Evaluate against approximately double the method CCV acceptance criteria
  - Examine for reasonableness if criteria are exceeded
    - May need to adjust spiking concentration and repeat

Method Detection Limits – Annual Verification

- Ongoing annual verification
  - Minimally each quarter
    - Prepare and analyze
      - 2 MDL spiked samples
      - 2 MBs
- Recalculate the MDL_{sp} and MDL_b
  - Include the data from the initial MDL if the data were collected in the previous 24 months
  - Include data from the previous 24 months
  - Do not include data
    - if spike concentration is different
    - If data are known to be technically problematic
    - From prior to a known sensitivity change in the method has occurred
    - Generated from batches with failing QC criteria
- The <u>verified</u> laboratory MDL is the higher of MDL_{sp} or MDL_b
  - One more step…(next slide)


SIGMA-ALDRICH

Certificate of Analysis

Product Name:
Phenanthrene – sublimed grade, ≥99.5%

Product Number: 695114
Batch Number: MKBS5831V
Brand: ALDRICH
CAS Number: 85-01-8
Formula: C14H10
Formula Weight: 178.23 g/mol
Quality Release Date: 13 AUG 2015

Test	Specification	Result
Appearance (Color)	White	White
Appearance (Form)	Conforms to Requirements	Crystals
Crystals, Flakes, Powder or Chunks		
Infrared Spectrum	Conforms to Structure	Conforms
Purity (HPLC)	≥ 99.5 %	99.66 %

Michael Grady, Manager
Quality Control
Milwaukee, WI, US

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Method Detection Limits – Annual Verification(cont'd)

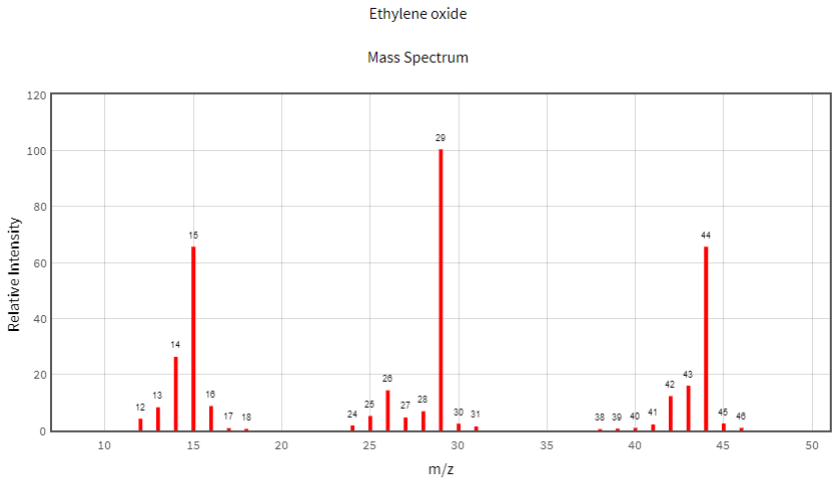
- The laboratory MDL is determined:
  - As the established MDL If…
    - The verified MDL is within 2-fold of the established MDL
    - Fewer than 3% of the MB values exceed the established MDL
  - Otherwise, the verified MDL is the laboratory MDL

VOCs

VOCs updates

Covered in-depth in NATTS TAD VOCs webinar August 10, 2022

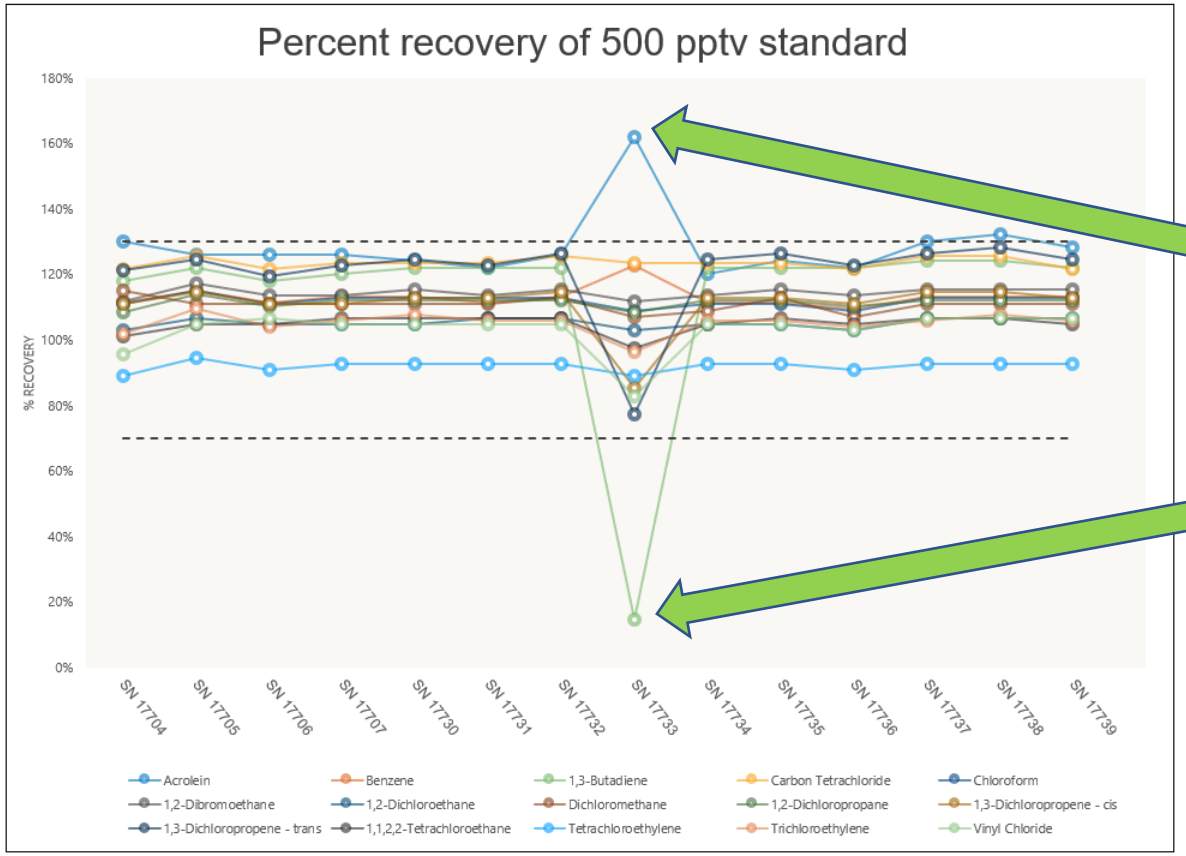
- New Tier I analyte – ethylene oxide
- Numerous changes – primarily adoption of TO-15A aspects
- Method background reduction
  - Canister qualification
  - Sampler qualification
  - Canister cleaning blank criteria lowered
  - Sampling unit flow rate establishment
- Residence time ≤ 20 seconds
  - https://www.epa.gov/sites/production/files/2020-10/residence_time_determination_worksheet.xls



https://webbook.nist.gov/chemistry/

VOCs updates - continued

Canister qualification – practical example



acrolein

1,3-butadiene

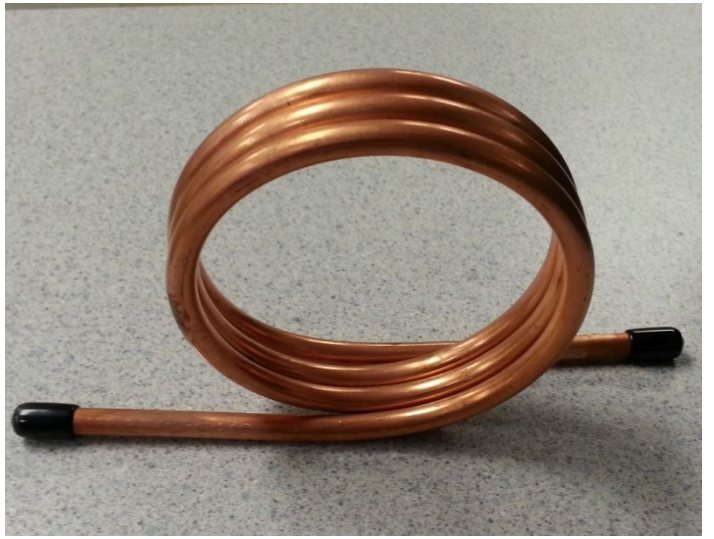
Carbonyls

Carbonyls Updates

- Addition of ultra high pressure liquid chromatography (UHPLC)
- Sampler qualification
  - Zero challenge is unchanged
    - Collect sample upstream (reference) and through sampler (challenge)
    - Challenge ≤ 0.2 ppbv more than reference for each carbonyl
  - Known standard challenge (NEW)
    - Not required
    - Assesses potential negative bias

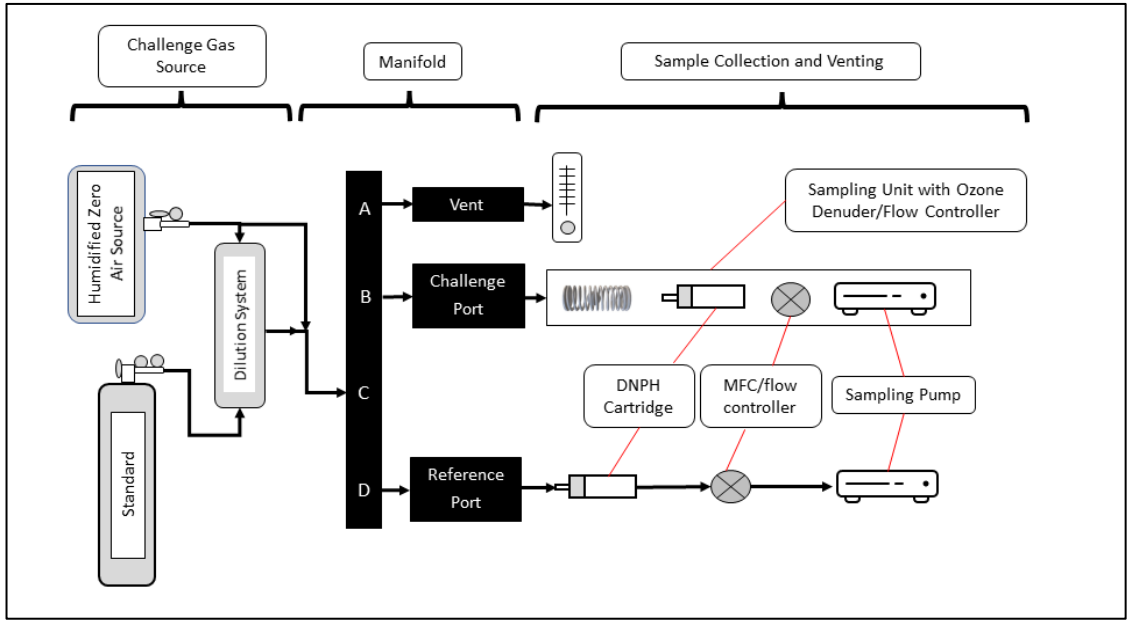
Carbonyls – Sampler Qualification

- Sampler known standard qualification
  - Assesses potential negative bias
  - Active sites within sampling unit may be suppressing carbonyls collections
  - Denuder consists of copper tubing coated with potassium iodide (KI)
    - Copper is forbidden in carbonyls sampler flow paths
    - Uncoated copper tubing may catalytically destroy carbonyls
  - Due to poor quantitative transfer of formaldehyde, critical to collect a reference sample



Carbonyls – Sampler Qualification (continued)

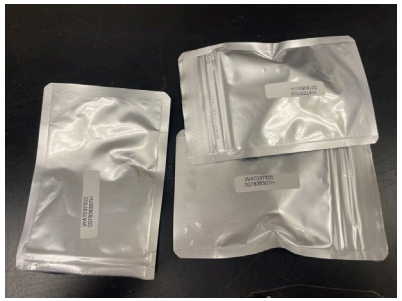
- Provide concentration approximately 10 to 15-fold the MDL
- Dilute with humidified HCF zero air
- Collect a reference sample and challenge sample
- Target carbonyls within 15% of the reference sample concentration or mass



Carbonyls – Sampler Qualification (continued)

Data handling for sampler qualification

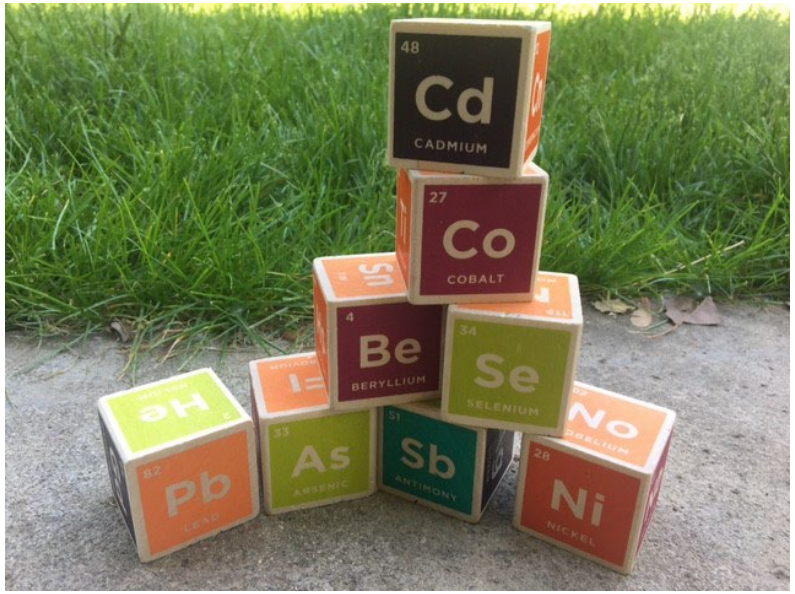
- Zero qualification
  - Affected carbonyls for affected samplers
    - ≥ 0.2 ppbv above reference sample, qualify
      - SB – sampler bias check failure
      - LK – estimated with high bias
    - > 5-fold MDL above reference sample, invalidate as EC (exceeds critical criterion)
- Known standard qualification
  - Affected carbonyls for affected samplers
    - < 85% recovery – qualify
      - SB – sampler bias check failure
      - LL – estimated with low bias
    - >115% recovery – qualify
      - SB – sampler bias check failure
      - LK – estimated with high bias



Metals

Metals - Updates

- No substantive changes to sample collection
- Most updates relate to ICP-MS analysis
  - Linear dynamic range (LDR)
    - For sample analyses exceeding calibration range
    - Analyze high concentration standard
    - If within ±10.1% of theoretical nominal, no qualification needed for measurements above the calibration range (but less than LDR concentration)
  - Interference check standard (ICS)

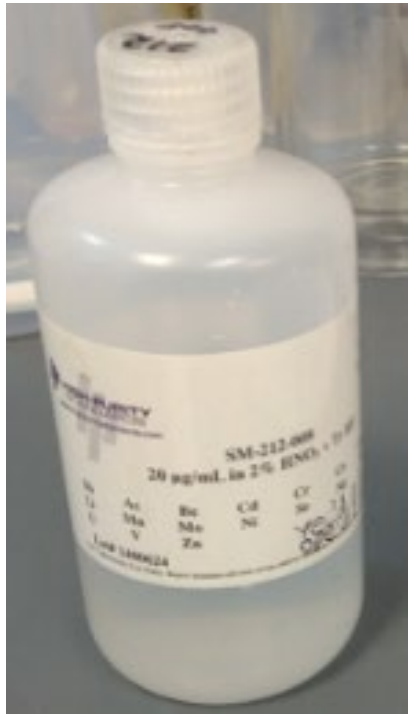


Metals – Interference Check Standard

- Interference check standard (ICS)
  - Very little interference in air filter analysis
  - Interferences are addressed and minimized
    - Standard equations
    - Collision reaction cells
    - Magnetic field sector MS instruments
  - IO3.5 ICS based on water analysis, which has much higher minerals
  - Assesses enhancement or suppression of target metals based on known isobaric and polyatomic interferences

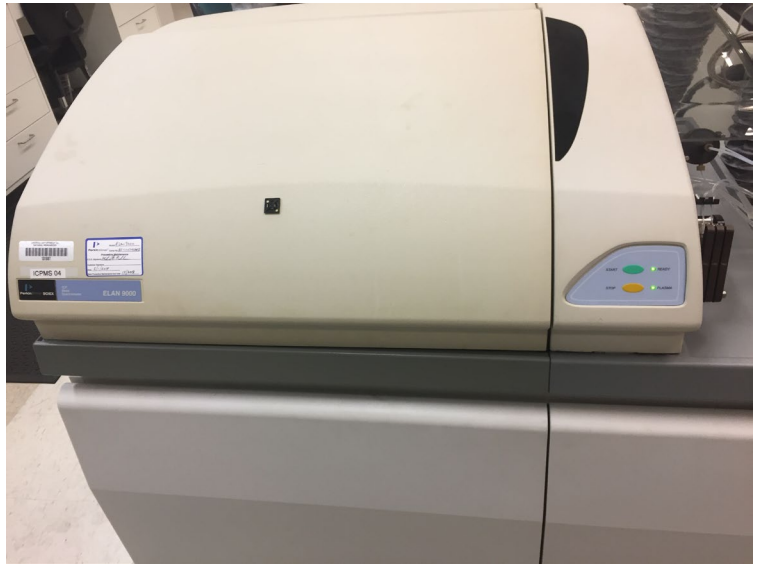
Metals – Interference Check Standard (continued)

- Interference check standard (ICS)
  - Frequency reduced from each analysis batch to quarterly
  - Type A solutions contain known interfering elements:
    - Al, Ca, Cl, Fe, Mg, Mo, P, K, Na, S, and Ti
    - Assess positive bias when no target elements present
  - Type B solutions contain known interferences identical to Type A, but add target elements
    - Assess both positive and negative bias in the presence of target elements
  - Concentration range selected by laboratory
    - Interferences: 1 to 1000 µg/mL
    - Target elements: 0.01 to 0.1 µg/mL



Metals – Interference Check Standard (continued)

- Type A solutions (no target elements)
  - Target elements should be < 3xMDL_{sp} (not pass/fail)
- Type B solutions (yes, target elements)
  - Subtract response of each target element in Type A
  - Target elements must be 79.9 to 120.1% to demonstrate acceptably low interference
- If interference is found to exceed the Type B criterion, qualify:
  - < 80% recovery – LL indicating low bias
  - > 120% recovery – LK indicating high bias
- Recommend measuring interference levels in sample digestates to and adjusting interference concentrations in Type A and Type B ICS demonstration



PAHs

PAHs – Sample Collection

- Specified sampling media
  - 3 inches of PUF plug
  - Mass of XAD-2 resin is 15-g
    - Standardizes collection efficiency for NATTS network
    - Less resin impacts more volatile PAHs such as naphthalene
- Update holding time for field surrogates to 3 months

PAHs – Sampling Media Cleanliness

- Sampling media batch blank
- Assess cleanliness of equivalent of 1 sampling cartridge
- Can extract and analyze as convenient and normalize to the amount of media for a cartridge
  - e.g., extract 90 grams of XAD-2 and divide by 6 to normalize the measured contamination to 15 grams
- Acceptance criteria
  - Naphthalene < 200 ng or 10% of the site's 5th percentile concentration for the previous 3 years
  - Other target PAHs < 10 ng or 10% of the site's 5th percentile concentration for the previous 3 years
- Qualify associated data as LB to indicate laboratory blank exceeds criteria

PAHs

Extraction and analysis

- Adopted criteria from 8270E (SW-846 wastewater and solid waste analysis method for PAHs)
  - Ion trap and tandem MS/MS instruments
  - MS tuning per manufacturer instructions
    - No longer requires DFTPP
  - Analyte retention times (RTs) can be ±10 seconds of
    - ICAL average RT
    - midpoint standard RT
    - most recent CCV
    - ±0.006 RRT still applicable

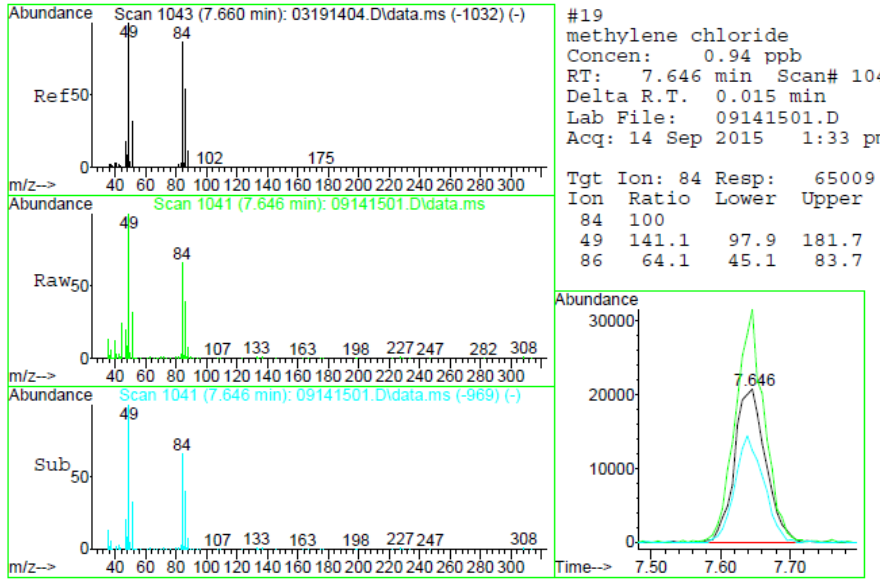
Analyte Identification (PAHs)

PAHs Analyte Identification

Positive identification requires meeting four criteria

1. Peak retention time (RT) within ±10 seconds of mid-point ICAL standard or most recent CCV RT
2. Relative abundance of at least one qualifier ion within ±30% of the relative abundance of the ICAL average
   - Low limit should never be zero
3. Signal-to-noise ratio (S:N) > 3:1, preferably > 5:1 for target and qualifier ion
4. Target and qualifier ion peaks co-maximized (within one scan)

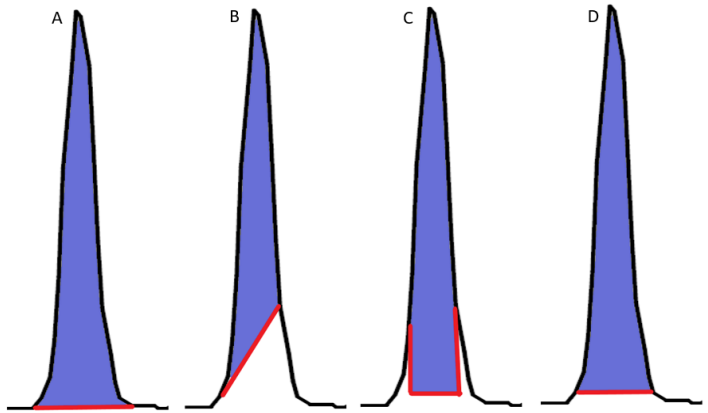
Analytes may be positively identified by an experienced analyst when any of these four criteria is not met. Rationale for such positive identification should be documented and reported data should be appropriately qualified.



Peak Integration

Integration of chromatographic peaks should be:

- Technically justifiable
  - Not adjusted to meet acceptance criteria
- Optimized through automation in software
  - Minimizes manual intervention and increases consistency
- Consistent among standards, QC samples, and ambient samples
- Manually changed when needed, with justification
- Reviewed by a peer for suitability



Refer to Appendix D for guidance

Data Handling Guidance

Data Handling Guidance

- Data impact for criteria exceedances described throughout TAD
- Section 7 includes this guidance in data validation tables
  - Categories of importance carryover from TAD Revision 3

> The categories of importance, in order of decreasing importance, are:
>
> 1. Critical – Criteria must be met for reported results to be valid – Samples for which these criteria are not met are invalidated.
> 2. MQO – Required NATTS Measurement Quality Objective which must be attained – Failure to meet these criteria does not necessarily invalidate data, but may compromise data and result in exclusion from trends analysis.
> 3. Operational – Failure to meet criteria does not invalidate reported results; the results are compromised and on a case-by-case basis may require qualification – refer to the rightmost column in the tables for guidance on qualifiers in addition to Section 3.3.1.3.15 for the list of AQS qualifiers
> 4. Practical – Failure to meet criteria does not invalidate reported results; results may be compromised but do not require qualification.

  - If Parameter is not required, states so in the Description and Required Frequency column

Data Handling Guidance – Validation Tables

- Addition of data reporting impact column (example from PAHs)

Parameter	Description and Required Frequency	Acceptance Criteria	Reference	Category	Data Reporting Impact
Field Sampler Flow Rate Calibration and Calibration Verification	Calibration of sampling unit flow controller Prior to field deployment and verified quarterly (recommended monthly). Calibration re-established following failure of flow calibration verification Flow rates calibrated at EPA standard conditions of 760 mmHg and 25°C	Flow set to match a certified flow transfer standard and verified to be within ±10.1%	Table 3.3-1 and 4.5.2.1	Critical	Invalidate data back to the most recent passing calibration or calibration verification as AH
Sampling Unit Siting	Verify conformance to requirements Annually	270° unobstructed probe inlet Inlet 2-15 meters above-ground level ≥ 10 meters from drip line of nearest tree Collocated sampling inlets measured at nearest edges, spaced 2-4 meters horizontally and within 3 meters vertically from primary sampling unit inlet	Section 2.4	Operational	Qualify affected data as SX
Media Handling	All field-collected samples and quality control samples, both QFFs and PTFE filters	Plastic or fluoropolymer coated forceps or powder-free gloves	Section 4.4.3.2	Practical	NA

Satisfaction of Measurement Quality Objectives

- To be considered in the NATTS assessment for trend detection
  - Bias ≤ 25%
    - Instrument performance audits
    - Proficiency testing (PT)
  - Precision coefficient of variation ≤ 15%
  - Completeness ≥ 85%
    - 51 of 60 annual samples
  - Sensitivity – laboratories report MDLs that are ≤ MDL MQO
    - Table 4.1-1
- Data meeting the MQOs are Grade A and are included in the assessment
  - In previous assessments, there were not sufficient Grade A data
- Data that do not meet the MQO specifications may be of sufficient quality and may be included in the trends assessment
  - Data that are just outside the MQOs are Grade B, and are also included in the assessment
- Important that monitoring agencies and ASLs strive to satisfy MQOs
  - Minimize bias
  - Collect make-up samples
  - Minimize contamination and background

Image courtesy: https://www.arb.ca.gov/desig/excevents/2008wildfires.htm

Routine QC Criteria

For Tier I analytes with failing QC criteria for the ICAL, SSCV, or CCV, the data should not be reported, samples should be reanalyzed with passing QC, and the acceptable data reported

- When samples cannot be reanalyzed with passing QC, data for Tier I analytes will be invalidated as EC (failure of critical criterion)
- Non-Tier I analyte data can be qualified as listed in Section 7 validation tables
- Data are not invalidated for criteria exceedances for blanks or precision analyses
  - Refer to Section 7 for data qualification guidance

Precision Evaluation

Precision Evaluation

Precision evaluated as relative percent difference (RPD)

RPD = absolute difference divided by average (as a percentage)

HAP Class	Precision Comparison Threshold	Collocation *	Duplicate Field Samples *	Preparation (Digestion/ Extraction) Duplicate	Laboratory Control Sample Duplicate	Matrix Spike Duplicate	Analysis Replicate
VOCs	5xMDL	25%	25%	NA	NA	NA	25%
Carbonyls	0.5 µg/cartridge	20%	20%	NA	20%	NA	10%
PM_{10} metals – high volume collection	5xMDL	20%	NA	20%	20%	20%	10%
PM_{10} metals – low volume collection	5xMDL	20%	NA	20%	20%	NA	10%
PAHs	0.5 µg/mL	20%	NA	NA	20%	NA	10%

* Note: Collection of collocated and duplicate field samples is highly desired, but not required, and will be detailed in the site's annual monitoring plan.

Precision Evaluation - continued

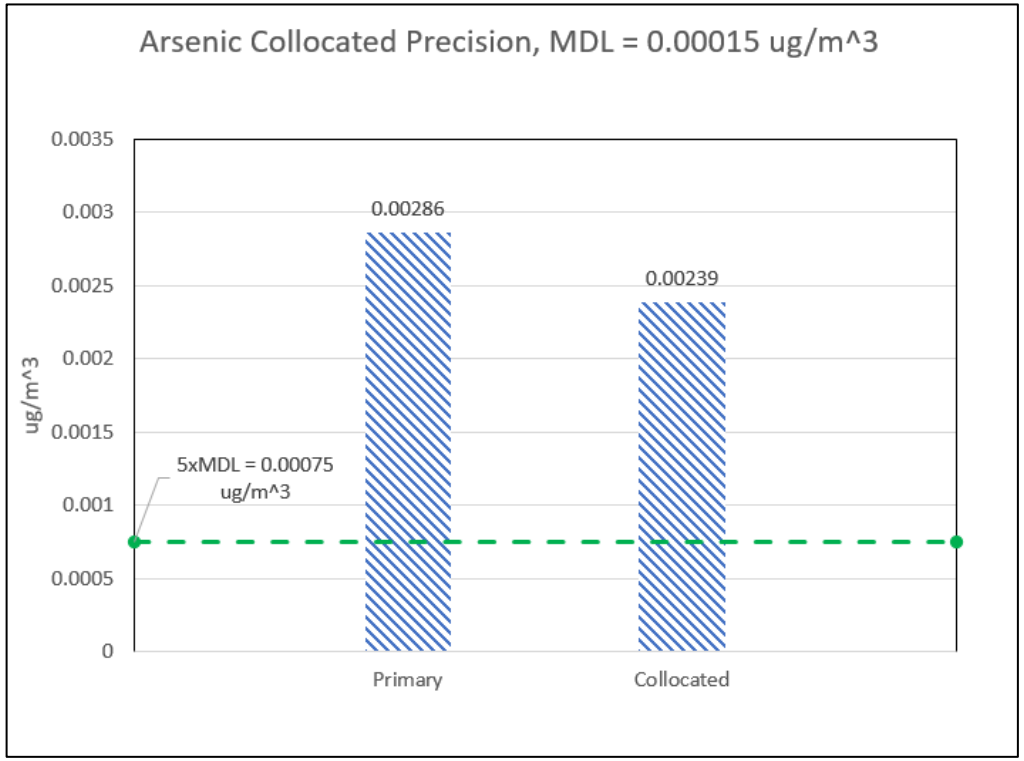
- Evaluation is not needed when both measurements are < specified threshold
  - For TAD Rev 3, when either was < specified threshold, no evaluation was needed
  - This overlooked clearly discrepant precision measurements
- Evaluation is needed when one or both precision measurements is above the specified threshold
  - Straightforward when both measurements are > threshold
  - Substitution needed when only one measurement is > threshold
- Represents the minimum RPD that could be expected for discrepant precision measurements
- Qualify associated data
  - QX (quality control exceedance)
  - LJ (estimated)

Precision Evaluation - example

SCENARIO 1

Both arsenic precision measurements are > 5xMDL

- Visually reasonable
- Primary = 0.00286 µg/m³
- Collocated = 0.00239 µg/m³
- 5xMDL = 0.00075 µg/m³
  - MDL = 0.00015 µg/m³
- RPD = 17.9%
  - meets precision criterion of < 20.1% RPD

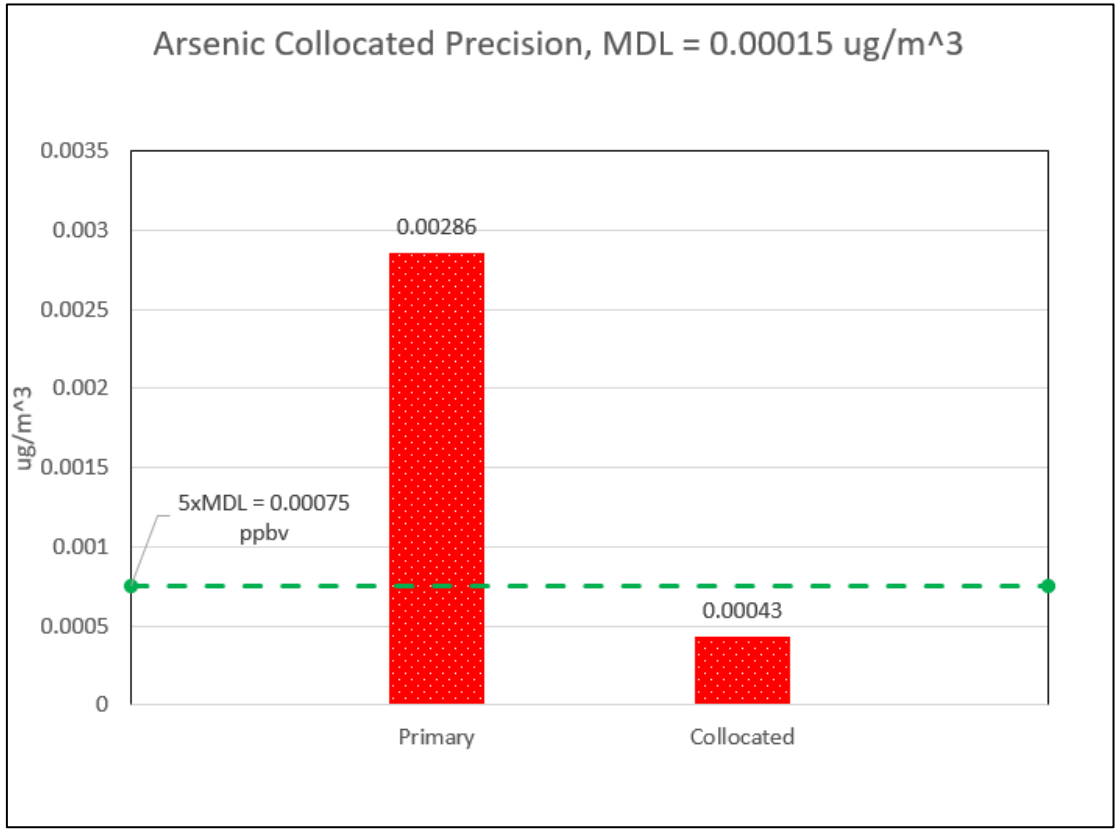


Precision Evaluation - example

SCENARIO 2

Only one precision measurement is > 5xMDL (assessment wasn't required under TAD Rev 3)

- Clearly discrepant
- Primary = 0.00286 µg/m^3
- Collocated = 0.00043 µg/m^3
- 5xMDL = 0.00075 µg/m^3
  - MDL = 0.00015 µg/m^3
- RPD = 148%
- Substitute the 5xMDL value (0.00075 µg/m^3) for the collocated value
  - RPD = 117%
  - far exceeds the precision criterion of < 20.1% RPD



Precision Evaluation – Reporting to AQS

- Collocated data are reported as RD transactions (identical to primary but with different POC)
- Precision data for duplicate and replicate samples are reported as QA transactions
  - Do not permit addition of qualifiers
  - Invalidate by entering -999 in the concentration field for the invalid measurement
- RP transactions are no longer available
- Duplicate – QA – Duplicate transaction
- Replicate – QA – Replicate transaction

Precision Evaluation – Reporting to AQS (continued)

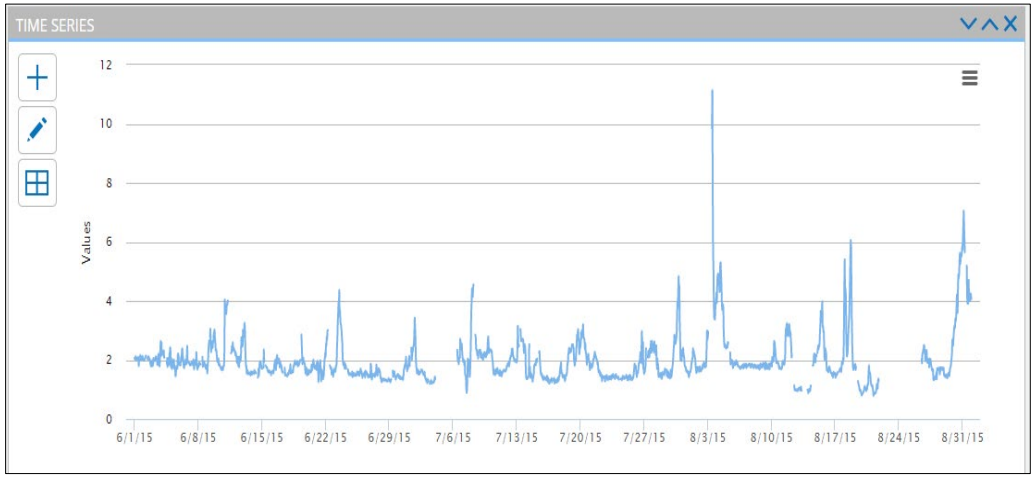
- When a primary sample is invalidated (Null coded), preference is to report available precision data
  - The duplicate of the precision pair can be substituted in the RD transaction, qualify as SS (data from secondary monitor)
  - The replicate of the precision pair can be substituted in the RD transaction, qualify as SS (data from secondary monitor)
- Plan to collect a make-up measurement
- If a make-up precision measurement cannot be made, report a QA transaction with -999 for the invalidated precision measurement
  - Duplicate sample using QA Duplicate transaction
  - Replicate measurement using QA Replicate transaction

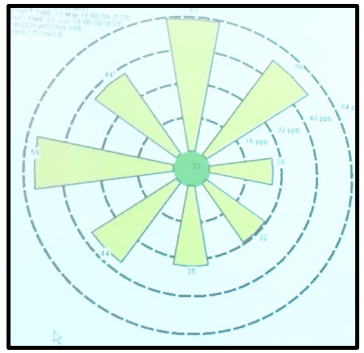
Data Validation

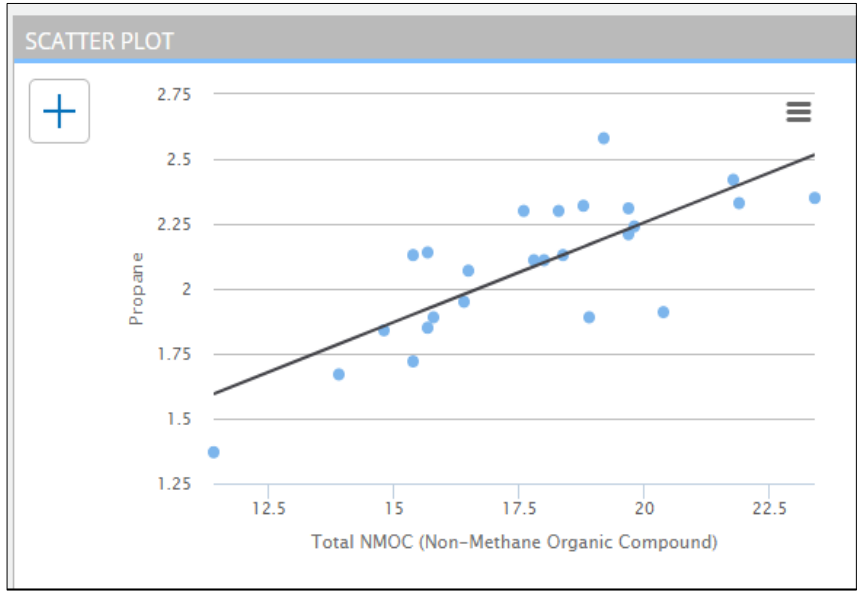
NATTS Data Validation

Data validation is the responsibility of the NATTS site monitoring agency

- May be delegated
- EPA expects that data are validated prior to reporting to AQS
- Examples of plots and tools for data validation







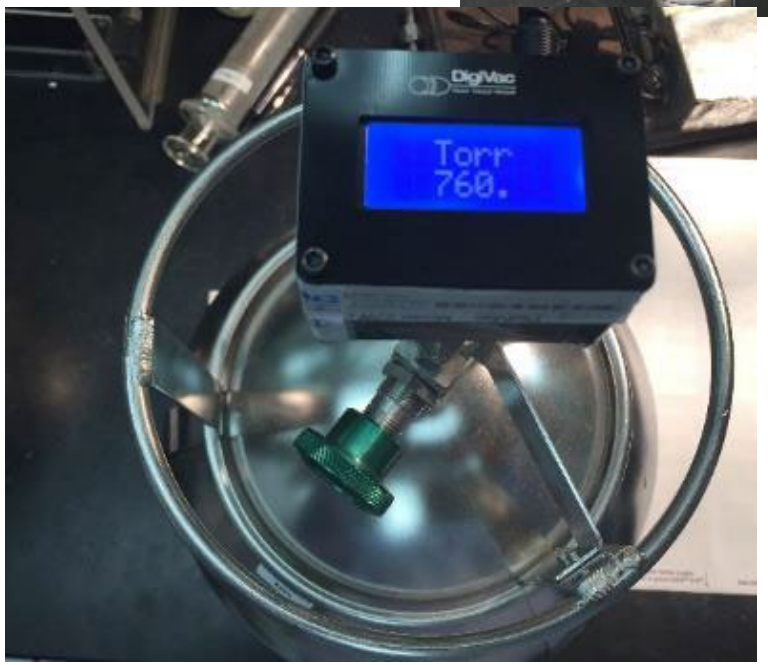
Data Reporting

Flow Rate Verification and Audit Data Reporting

- NATTS bias data requires flow rate data to assess field collection bias
- Historically these data inputs were from periodic (e.g., every 3 years) performance audits
  - Sparse data set
- Monitoring agencies conduct quarterly flow verification checks
  - Independent flow check audits minimally twice/year
  - Upload these data to AQS
  - Data coded as QA transactions
  - Described in TAD Appendix E (EPA formalizing a technical memo)
- Establish monitors and sampler channels (similar to CSN sampler flow channel assignment) in AQS

Updated AQS Qualifiers

- QA Qualifiers
  - 1V – data reviewed and validated
  - CF – (VOCs only) canister bias failure for this pollutant
  - DN – (carbonyls only) DNPH peak < NATTS TAD requirement – estimated
  - SB – (VOCs and carbonyls) sampler bias failure for this pollutant
  - SP – spike recovery out of limits
  - Y – elapsed time out of specification



Additional Resources

- EPA Method TO-15A https://www.epa.gov/sites/default/files/2019-12/documents/to-15a_vocs.pdf
- TO-15A webinar questions/responses – June 3, 2020 https://www.epa.gov/sites/default/files/2020-08/documents/to-15a_webinar_june_3_2020_comment_table.pdf
- EPA Compendium Method TO-11A: https://www.epa.gov/sites/default/files/2019-11/documents/to-11ar.pdf
- EPA Compendium Method TO-13A: https://www.epa.gov/sites/default/files/2019-11/documents/to-13arr.pdf
- SW-846 Method 8270E: https://www.epa.gov/sites/default/files/2019-01/documents/8270e_revised_6_june_2018.pdf
- EPA Compendium Method IO3.5: https://www.epa.gov/sites/default/files/2015-07/documents/epa-io-3.5.pdf
- EPA QA Handbook Volume IV: https://www.epa.gov/sites/default/files/2020-10/documents/final_handbook_document_1_17.pdf

Question and Answer

Please submit questions via the chat. Note that questions and answers will be compiled into a document for distribution.

Thank you

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