SUMMARY OF Hg MONITORING EXPERIENCES

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How Many Are Out There?

Total Monitors Surveyed

- Compliance Monitors: 113
- Process Monitors: 86
How Many Are Out There?

Monitoring Principle

- Hg CEMS: 150
- Sorbent Traps: 49
How Many Are Out There?

Compliance Monitors

86

27

Hg CEMS
Sorbent Traps
How Many Are Out There?

Process Monitors

- Hg CEMS: 64
- Sorbent Traps: 22
Hg CEMS

Hg CEMS Manufacturers

- Thermo: 105
- Tekran: 45
Sorbent Traps

Sorbent Trap Manufacturers

- Apex
- Clean Air
- Environmental Supply

Numbers:
- Apex: 20
- Clean Air: 27
- Environmental Supply: 2
Hg Monitoring & Testing Needs

- Compliance Determinations
- Process Monitoring
  - Control Feedback
  - Periodic Monitoring
  - Parametric Monitoring
- Can sorbent traps provide process insight?
Hg CEMS Compliance vs Process

- 7-day Calibration Error Test
  - Required for Compliance
  - Not for Process Monitoring

- Linearity Check (Elemental Hg)
  - 3 Runs Required for Compliance
  - Recommend 1 Run for Process Monitoring

- 3-Level System Integrity Check (Oxidized Hg)
  - 3 Runs Required for Compliance
  - May be of Limited Benefit – 1 Run Should be Performed
Hg CEMS Compliance vs Process

- **RATA**
  - Required For Compliance
  - May Use Sorbent Trap RATAs or Sorbent Trap Data

- **Cycle Time Test**
  - Batch sampling Hg CEMS exempt
  - Batch sampling Hg CEMS must provide a Hg reading at least once every 15-minutes.
  - Useless – You Do it Every Time You Calibrate
Daily Calibration Error Test (w/ Hg\(^0\) or Hg\(^{2+}\))

- Performed “Daily” Recommended for Both
- Serves as the Basis for All Assessments by Technicians
- 5.0% of span or abs diff 1.0 \(\mu\)g/m\(^3\)
- Not Every Stringent Pass/Fail Criteria
Single Level System Integrity Check (w/ Hg\textsuperscript{2+})

- Performed weekly (every 7 unit operating days)
  - Required for Compliance
  - May be able to Perform Less Frequently for Process Monitoring – Consider the Portion of Hg\textsuperscript{2+} and Emissions Relative to the Limit
- Single injection at either mid or high gas level
  - SIE ≤ 10.0% or abs diff R-A of ≤ 0.8ug/m\textsuperscript{3}
  - Again, Not Very Stringent
Hg CEMS Compliance vs Process

- **Linearity Check**
  - 3-Run Test Required Once per “QA operating quarter”
  - Use 1-Run for Process Control
    - LE ≤ 10.0% or abs diff 0.8ug/m³
    - Again, Not Very Stringent
**Annual RATA**
- Required for Compliance
- RA must be within 20% of the mean RM value
- Alternatively, if RM test data is less than 5.0 $\mu$g/scm, then the absolute difference must be less than or equal to 1.0 $\mu$g/scm
- For Process Control, Check with Sorbent Trap Data or Sorbent Trap RATA

**Be Careful Not to Eliminate too Much QA/QC**
NIST Traceability for Hg CEMS

- EGU MATS Rule Requires NIST Standards
  - Section 3.2.1.2.1 of Appendix A of Subpart UUUUU

- Interim EPA Traceability Protocols
  - Elemental Hg Protocol
    - MOST IMPORTANT!!
  - Oxidized Hg Protocol

- ONLY applicable to spans \( \geq 5\, \text{ug/m}^3 \)
  - MATS Rule limit is \(~1.2\, \text{ug/m}^3\)
NIST Traceability for Hg CEMS

- **Calibrator Certification using Bracketing Procedure**
  - Calibrator will be certified at 3 output concentrations
    - Low, Mid and High
  - Interim Protocol Requires
    - Periodic checks, AND
    - Recertification at all 3-levels every 24-months
  - Types of Periodic Checks
    - Single-level comparison vs. Reference Calibrator
    - Hg Gas Cylinder
    - Permeation Source
    - Sorbent Tubes