HAP Metal Monitoring: Using The Xact Multi-Metals CEMS as an Alternative to Monitoring with a PM CEMS and a Mercury CEMS
What Is The Xact?

- Multi-Metals CEMS
- Based on X-ray Fluorescence Analysis (XRF) and beta-gauge type reel-to-reel tape drive technology
- Can measure up to 24 metals simultaneously including Cr, As, Cd, Hg, and Pb
Xact: History and Accomplishments

Developed by Cooper Environmental Services
EPA Method 301 Validated for Multi-Metals
EPA Site Certified

AMP EPA Approved
~6 Years On-Stack Operations on Hazardous Waste Incinerator
Passed Hg CEMS RATA

May 2007 – EPA Clean Air Excellence Award
M301 Validation on Hazardous Waste Incinerator

\[ y = 0.952x - 1.10 \]

\[ r = 0.995 \]

\[ n = 960 \]

All RESULTS INCLUDED
Hg Measurement on a Coal Fired Power Plant

3.53% RELATIVE ACCURACY FOR CES XACT

Thermo QA Period

Mercury Conc. (µg/dscm)

RATA Number
Summary of Utility MACT for HAP Metals Monitoring

- Hg Monitoring
  - Hg CEMS
  - Sorbent Traps

- PM as a Surrogate
  - Total (Filterable + Condensable) PM as a Surrogate for Non-Hg HAP Metals
  - Se is the primary driver for total instead of filterable PM
  - Continuous Compliance with PM CEMS (Measure Filterable PM)
  - Requires Performance Test – Operational Limits (Filterable PM) are essentially determined during test

- HAP Metals – Optional on CFPP Required for Liquid Oil Fired
  - Total Metals Floor
  - Individual Metals Floor
  - Compliance determined with monthly or bi-monthly M29 testing
Where the Xact Fits Into These Requirements

Proposed Utility MACT Rules for HAP Metals Monitoring On CFPPs

Mercury
- Hg CEMS
- Sorbent Traps

Non-Hg HAP Metals
- PM CEMS
- Metals Monitoring

Xact Can Monitor Both for Hg and Non-Hg HAP Metals
Proposed Route to EPA Acceptance

- Mercury -
  - PS12A or Performance Specifications as promulgated under Utility MACT Rule
  - Xact will include Hg\textsuperscript{o} and HgCl\textsubscript{2} Generators

- Metals
  - Alternative Monitoring Petition
  - Performance Specification and On-going QA as done at compliance monitoring hazardous waste incineration site
    - Daily Upscale, Zero, and Flow Checks - Automated
    - Quarterly XRF Audits – 2 hour procedure
    - Quarterly Flow Audit - 15 minute procedure
    - Annual Rata – Dynamic Spiking with Quantitative Aerosol Generator – 2 days
Advantages of Total Metals Monitoring Approach

- **Cost Savings**
  - One CEMS instead of two (capital acquisition savings and maintenance savings)
  - No costly PS-11 to perform – No modification of plant operations

- **Regulatory Certainty**
  - Operational PM Limits are determined during performance testing and based on ratio of filterable to condensable PM (a ratio that may change over time)
  - Metals Limits are numeric and written the proposed rule

- **Continuous Compliance Assured**
  - Real time data means no surprise test results from M29 or sorbent traps and no long periods of non-compliance
2004 CES Version Converted to more robust Pall instrument
  • Convert Microcontroller to PLC
  • 19 inch Rack Mount Design

Develop Hg Generators
  • Hg⁰ Generator – Prototype being built
    • Designed to operate at 60 to 500 Lpm
    • Head space type design
    • Will be Rack Mountable
    • Final Unit will be submitted to NIST for certification as Vendor Prime
  • HgCl₂ generator – in design development stage
  • With Addition of Hg Generators the Xact will be able to meet PS 12A Requirements

Multi-Metals Probe Refinement for Wet Stack Operations
Xact Development Schedule

- **December 2011** Prototype Hg Generator Complete
- **March 2012** Generation 1 Xact 640/645 Pilot Unit Complete
  - Will be installed on stacks for testing and demonstration work
- **July 2012** NIST Certification of Hg⁰ Generator Complete
- **July 2012** Generation 2 Xact 640/645 Pilot Unit built
  - Ruggedized design
  - Incorporation of Hg Generators
- **Fall 2012** Field Testing Generation 2 Stack Unit
QUESTIONS

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