

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



*Krag Petterson,
Oct 13, 2011*

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**

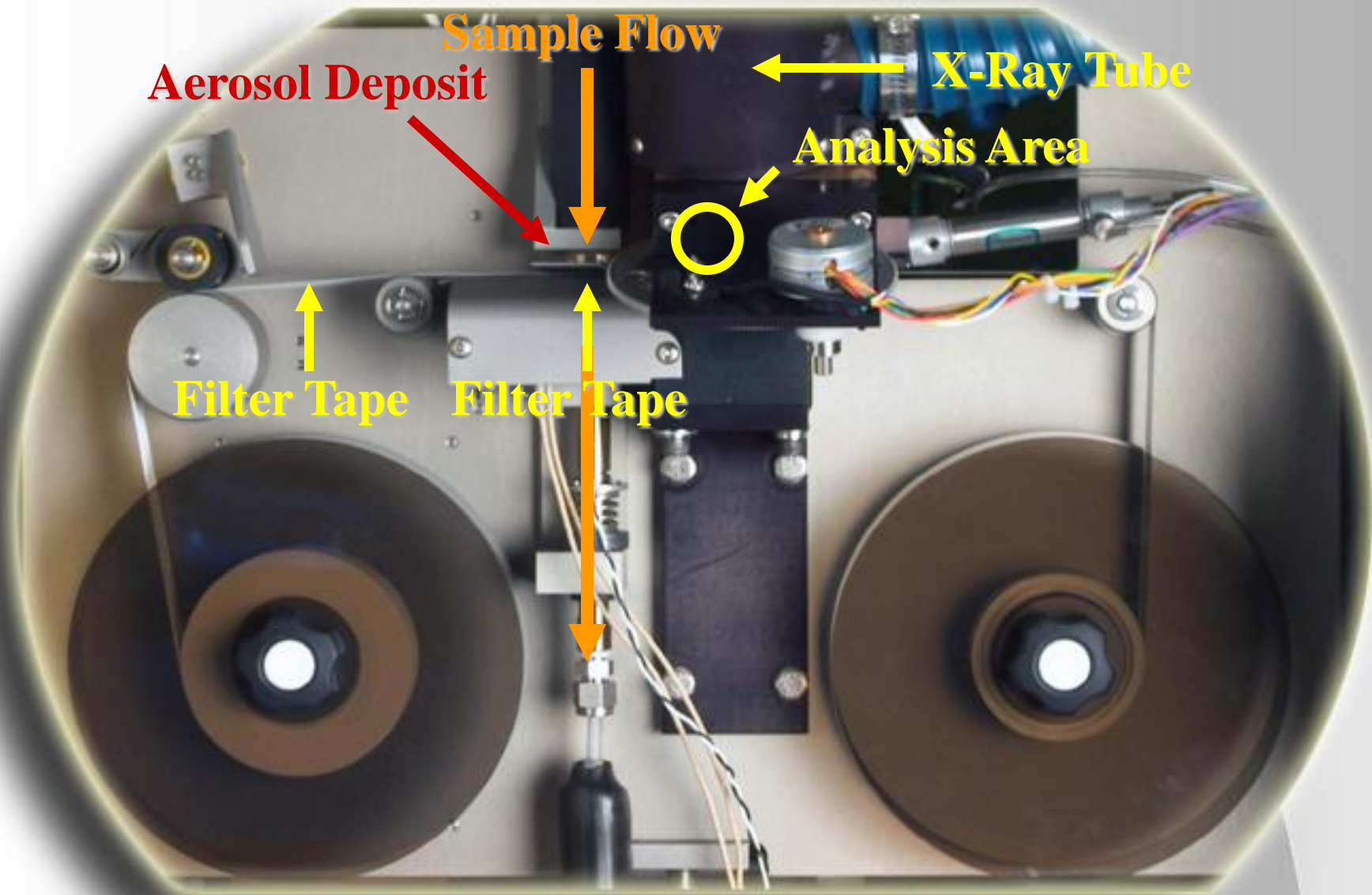


**May 2007 – EPA Clean Air
Excellence Award**

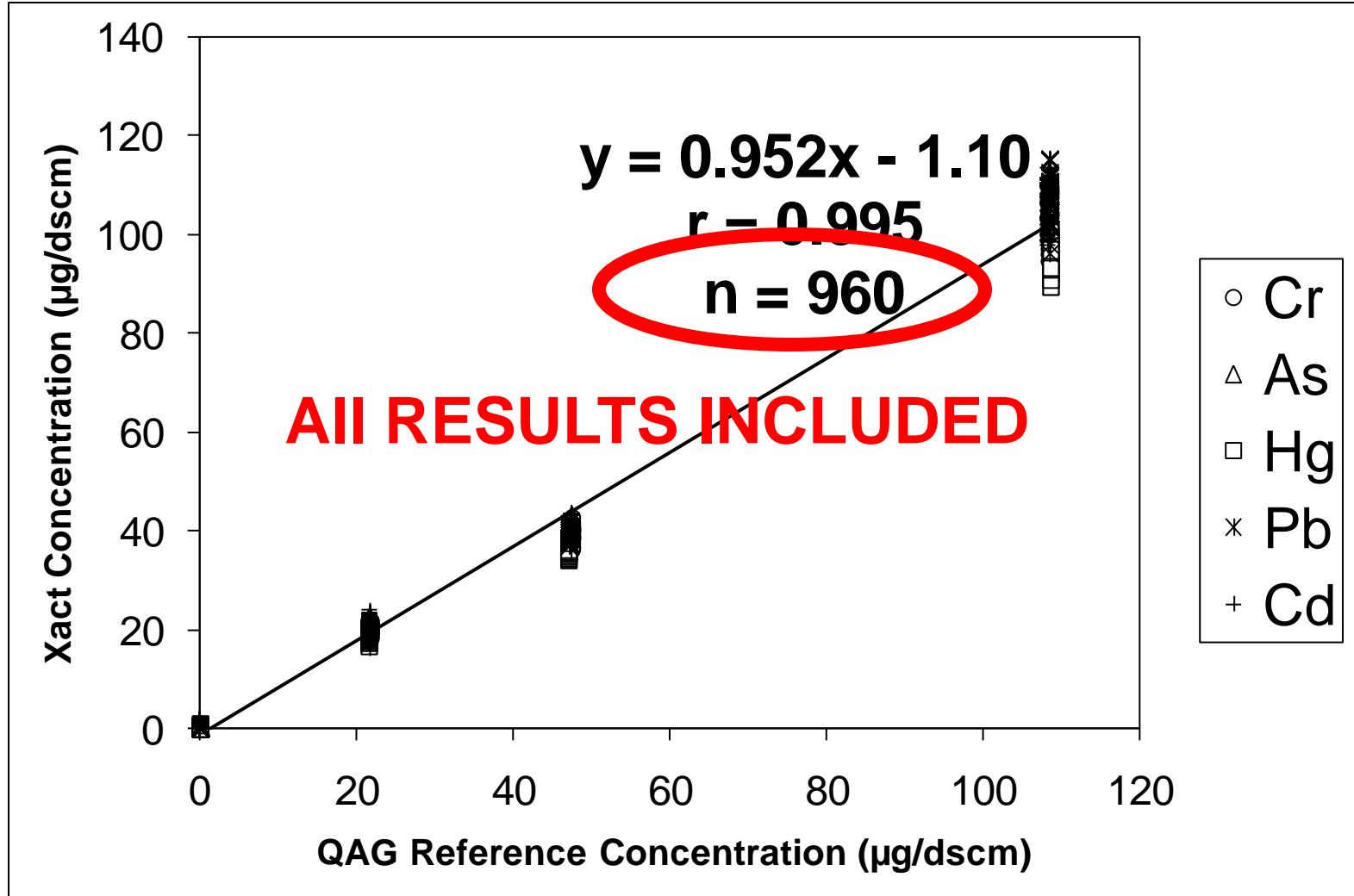
**AMP EPA
Approved**

**~6 Years On-
Stack Operations
on Hazardous
Waste Incinerator**

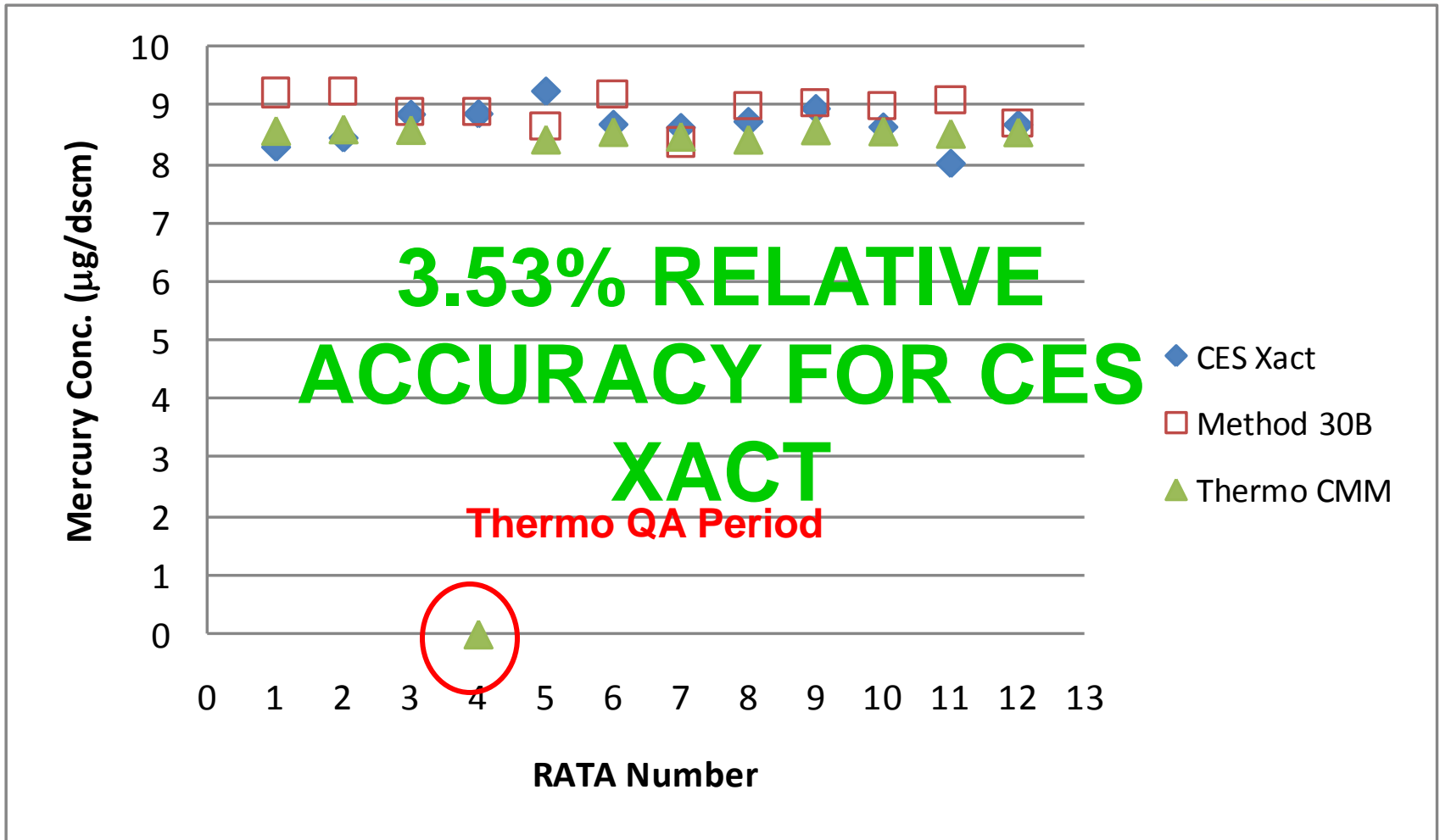
**Passed Hg
CEMS RATA**



M301 Validation on Hazardous Waste Incinerator



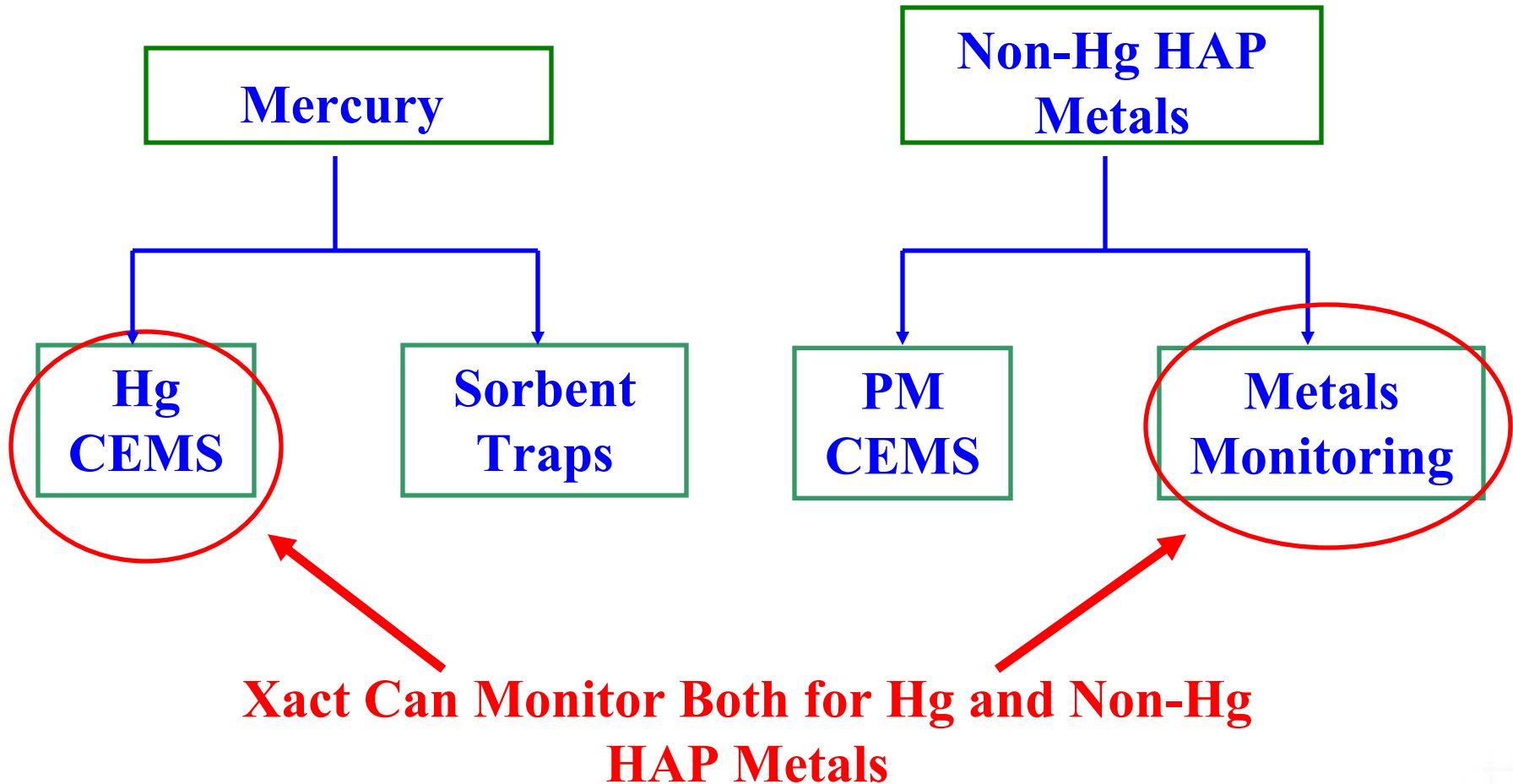
Hg Measurement on a Coal Fired Power Plant



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

Proposed Utility MACT Rules for HAP Metals Monitoring On CFPPs



Proposed Route to EPA Acceptance

- Mercury -
 - PS12A or Performance Specifications as promulgated under Utility MACT Rule
 - Xact will include Hg⁰ and HgCl₂ 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

Pall Xact CEMS Development

Where are things at Now?

- 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

- **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 Hg^o 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

Krag_Petterson@pall.com