Mercury Monitoring Issues Regulatory Perspective

DOE/EPRI Mercury Workshop
July 13, 2004
Pittsburgh, PA

Ralph Roberson
RMB Consulting & Research, Inc
5104 Bur Oak Circle
Raleigh, NC 27612
919-510-0376
http://www.rmb-consulting.com

Mercury Monitoring Issues

- Technical issues depend on whether one is discussing MACT rule or Cap & Trade rule.
- Technical issues also depend on whether one is discussing Hg CEMS (instrument) or Quick SEM (dry sorbent method).
- There are three major components that are common regardless the form of final rule.

©RMB Consulting & Research, Inc.

Hg CEMS Technical Issues

- EPA will require continuous Hg monitoring for coal-fired power plants
  - Vapor phase Hg CEMS
  - Dry sorbent method
- Performance Specification 12A
  - Hg CEMS
- Method 324
  - Applies to dry sorbent method

©RMB Consulting & Research, Inc.

Performance Specification 12A

- PS-12A is used to certify Hg CEMS
  - Relative accuracy test
  - Seven-day upscale drift test
  - Seven-day zero drift test
  - Three-level measurement error (Linearity) test

©RMB Consulting & Research, Inc.

PS-12A Relative Accuracy Test

- Relative accuracy test is used to certify initially a Hg CEMS.
  - Compares paired reference method (i.e., Ontario Hydro or Method 29) results to CEMS readings
  - Paired RM results must agree within 10% above 1.0 $\mu g/m^3$ and within 20% below 1.0 $\mu g/m^3$
  - Nine ***valid*** paired results must be obtained
  - RA must be within 20% of the mean RM value or 10% of the applicable standard, whichever greater.

©RMB Consulting & Research, Inc.

PS-12A Relative Accuracy Test

- Relative accuracy testing likely to take 3-5 days.
- Results may not be available for 2-4 weeks.
- Up to 12-15 paired RM runs could be necessary in order to ensure 9 ***valid*** paired runs.
- Failure of relative accuracy test could result in long periods of missing data.

©RMB Consulting & Research, Inc.

PS-12A Drift Tests

- 7-day upscale drift test - Hg^0 only.
  - Check upscale calibration at mid-level (40-60% of span) each day for 7 days.
  - No unscheduled maintenance, repair or adjustment permitted
  - Must be within 5% of span each day
- 7-day zero drift test - Hg^0 only.
  - Performed at zero level - otherwise same as above

©RMB Consulting & Research, Inc.

PS-12A Measurement Error Test

- The measurement error (ME) test is essentially a linearity check.
  - Tests required at three levels (high, medium, low) of the Hg CEMS range
  - Must read within 5% of the span value at all levels
  - ME tests are required for both Hg^0 and $HgCl_2$ with NIST traceable calibration gases

©RMB Consulting & Research, Inc.

PS-12A Measurement Error Test

- ME test poses a number of issues, which have ***never*** been thoroughly field tested.
  - NIST traceable Hg^0 and $HgCl_2$ calibration standards are not available
  - Only one vendor provides Hg^0 gas cylinders
  - $HgCl_2$ cylinder gases are impossible to make
  - $HgCl_2$ standards will need to be made with a liquid solution vaporization device

©RMB Consulting & Research, Inc.

Future EPA Field Studies

- EPA plans to install and operate several Hg CEMS at two sites.
- EPA's stated purposes are to:
  - gain additional knowledge of achievable long-term performance
  - further advance Hg CEM and Hg reference method technologies
  - optimize Hg CEM evaluation procedures

©RMB Consulting & Research, Inc.

EPA CEMS Studies (Cont'd)

- First site likely to be a bituminous coal-fired unit with only ESP
- Hg CEMS challenges are twofold:
  - Majority of Hg expected to be oxidized; catalytic converter must operate reliably
  - Acid gases have quickly "killed" catalyst performance in previous studies.

©RMB Consulting & Research, Inc.

EPA CEM Studies (Cont'd)

- Second site should be a bituminous coal-fired unit with SCR, ESP & FGD.
- Hg CEMS challenges also twofold:
  - CEMS must operate in wet stack environment.
  - Hg measurement levels likely to be much lower (e.g., ≤ 1 $\mu g/m^3$).

©RMB Consulting & Research, Inc.

RMB's Implementation Project

- RMB has structured a project to work with EPA on Hg CEMS studies.
- Mechanisms to fund and support the RMB project.
  - Direct contract/purchase agreement
  - EPRI TC (contact Chuck Dene).

©RMB Consulting & Research, Inc.

RMB's Project Objectives

- Help EPA select and gain access to appropriate sites.
- Encourage development of instrumental Hg reference method.
- Ensure response from CEMS venders.
- Evaluate performance from the utility industry's perspective.

©RMB Consulting & Research, Inc.