STATE OF SORBENT-BASED MERCURY MONITORING AT COAL-FIRED POWER PLANTS

Timothy D. Rodak, James E. Wright, Volker Schmid

CleanAir Engineering

Summary

Despite a 2008 court ruling that eliminated the U.S. Environmental Protection Agency's (EPA) federal Clean Air Mercury Rule (CAMR), many coal-fired power plants have been monitoring mercury emissions for the past three years in order to comply with individual state requirements, consent decrees or to evaluate mercury emission and monitoring technology for future considerations.

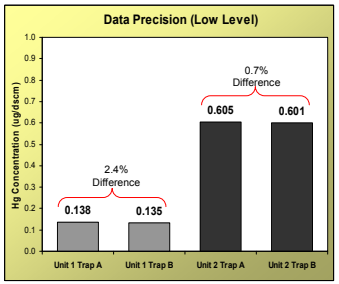
Although originally intended as either a back-up to or a way of independently validating continuous emissions monitoring systems (Hg CEMS), sorbent trap monitoring systems (STMS) have become accepted as a primary monitoring approach.

This poster examines long-term emissions and compliance data generated by sorbent trap systems currently operating at three coal fired utility plants. An evaluation of the trends and operating considerations that lead to increased data availability, expectations from operation of sorbent trap systems and the lessons learned from over 125,000 hours of operation are highlighted.

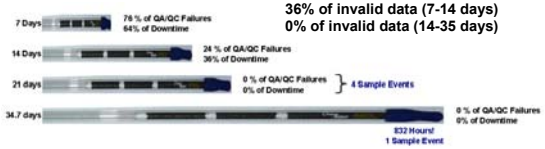
Facility 1 – 34,000 hours

Unit	Description	MW (NET)	Pollution Control
1	B&W Wall-fired Boiler	280	• Bituminous Coal • Low-NOx Burners • Baghouse
2	FW Wall-fired Boiler	300	• Bituminous Coal • Low-NOx Burners • Baghouse • Dry Scrubber/Flyash Reinjection

Accuracy and Precision at Low Hg Levels



Sample Duration at Low Hg Levels



Longer Sample Event = Higher Risk? Is 832 Significant?

64% of invalid data (0-7 days)
36% of invalid data (7-14 days)
0% of invalid data (14-35 days)

Note: Data normalized for number of sample events and sample volume

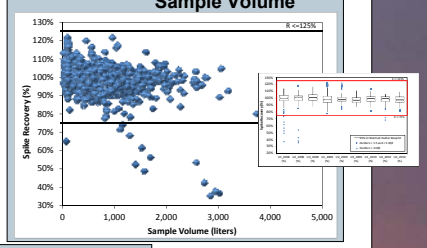
Facility 2 – 56,000 hours

Unit	Description	MW (NET)	Pollution Control
1	B&W Water Tube Boiler	84	• Low-NOx Burners • Selective Non-Catalytic Reduction • Electrostatic Precipitator
2	B&W Water Tube Boiler	81	
3	B&W Water Tube Boiler	150	

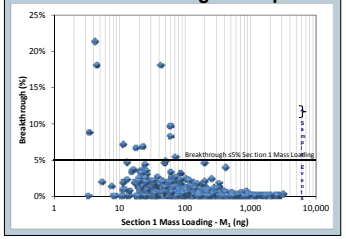
Analytical QA/QC

1187 out of 1200 traps (99%) within criteria

Spike Recovery in relation to Sample Volume



Breakthrough in relation to Mass Loading on Trap



1190 out of 1200 traps (99%) within criteria

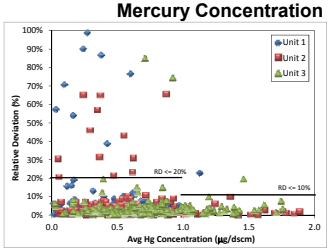
With high quality traps breakthrough not necessarily a function of sorbent function or sampling parameters but low section 1 mercury mass loadings (<70 ng). Target sample volume should be considered greater requirement than sample duration.

Data Precision

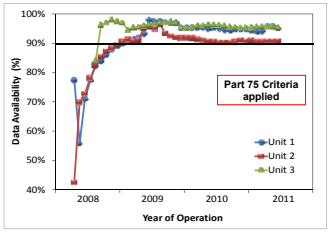
Paired trap agreement early indicator of sampling system maintenance.

Higher trap concentration more likely to be non representative

Paired Trap Agreement in relation to Mercury Concentration



Data Availability

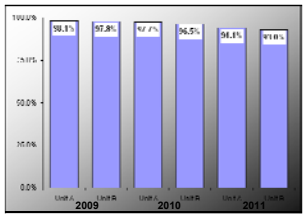


Facility 3 – 36,000 hours

Unit	MW (NET)	Pollution Control
1	250	• Bituminous Coal • Low-NOx Burners • ESP
2	300	• Bituminous Coal • Low-NOx Burners • ESP

Sampling System Reliability

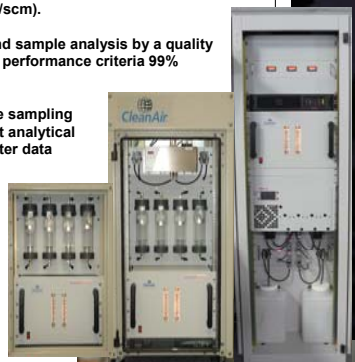
Data included through August 2011



Key Findings

1. **Long-term mercury compliance monitoring is successful using sorbent trap technology. Data availability above 90% can be expected.**
2. **<u>Low Level Sources</u> - Improved success is achieved by maintaining consistent sample flow rate range and a sample volume designed to obtain greater than 70 ng of mercury on the sorbent trap.**

   Higher sample volumes do not necessarily increase QA/QC failures
3. **Long-term sorbent trap monitoring is based fundamentally on EPA reference method technology. High accuracy and data precision can be expected for coal-fired utility source compliance reporting even at low level mercury sources (<0.1 µg/scm).**
4. **Current sorbent trap technology and sample analysis by a quality outside laboratory exceeds QA/QC performance criteria 99% of the time.**
5. **Paired trap agreement may indicate sampling system maintenance needs and not analytical issues. Evaluate sampling parameter data before using higher emission result for reporting. Higher emission result was invalid 75% of the time.**



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