Does Periodic Monitoring of Mercury Emissions Provide an Accurate Picture of Actual Mercury Emissions?

The majority of coal-fired Part 75 utilities in the United States are now using real time continuous Mercury Vapor monitors. ThermoFisher Scientific has sold more than 450 Mercury CEMS and the majority are installed and operational. These CEM Systems are true real-time monitors designed to comply with the stringent data availability criteria required by Part 75. In defiance of the D.C. Court's vacature of the Clear Air Mercury Rule (CAMR), many states are moving forward with the requirement of continuous Mercury emissions monitoring systems.

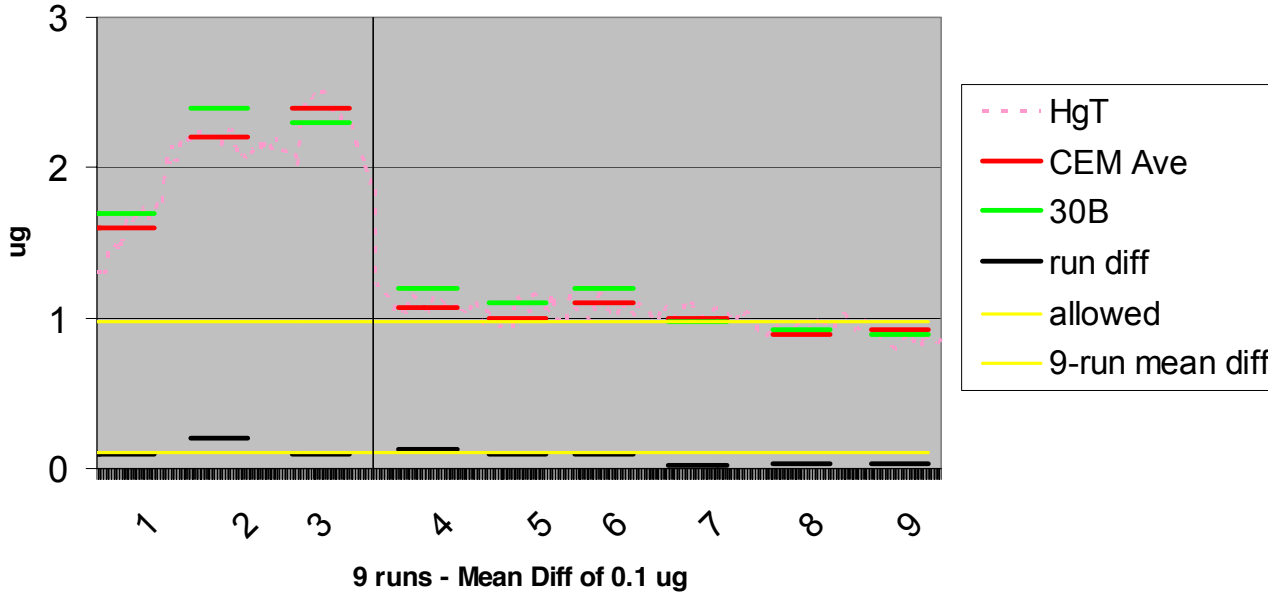
Since 1993, all thermal power plants subject to the Part 75 Acid Rain Regulations have been required to continuous monitor for the regulated emissions, SO_2, NO_x, and CO_2. Continuous monitoring of Mercury emissions is also expected to be the most accepted monitoring method for obtaining reliable real-time Mercury emissions.

The test results at all Mercury emissions evaluation sites have shown that Mercury concentration variability far exceeds that of other regulated criteria pollutants. Multiple types of "routine operational events" occur during normal boiler operation and often trigger dramatic changes in the concentrations of both Elemental and Oxidized Mercury.

These events include, but are not limited to:

- Source of Coal Origin and Type
- Changes in rapper patterns for the precipitators
- Plant load changes
- Coal Mill changes
- Pulverizer activities
- Baghouse Operations

Figure 1: Typical Variability in Emission Concentration Rates over a 2-day period. Micrograms per cubic meter from the CEM as compared to the Reference Method 30B Trap values.[2]



It has been documented during Mercury emissions test programs that Mercury concentrations are often significantly impacted when any of the above listed operational events occur. These

intermittent spikes and excursions also generate challenges for logging and transmitting information via scaled analog signals. We have urged the monitoring community to use digital connectivity for all Hg concentration signals. Use of the available digital interface with the CEMS to the data acquisition system ensures that these spikes and excursions are accurately captured.

Additionally, concentration variability causes challenging accurate data capture conditions for Method 30B Sorbent traps. For example; at a cyclone fired boiler in the Midwest, ThermoFisher in partnership with a major utility during their performance of Part 75 RATAs on 2 units observed and recorded the following;

- Mercury Concentrations in the stack dropped from 2.4 to 0.9 ug/m3 during the 2-day RATA test period for Unit 2. There were no load changes during this period of testing to explain the concentration change.
- If the Mercury concentration in the above example had fallen another 0.2 ug/m3, a new spike target would have to be used, doubling the amount of Method 30B QA testing required.
- QA for the Method 30B trap is very specific to the initial concentration values when choosing the sampling parameters. i.e. The Stack Tester needs a good estimate of the native or 'existing' concentration before starting the testing. parameters, i.e., the Stack

Many states have promulgated rules requiring high percentage based reductions, i.e. 90% removal or reduction.[1] Those targets cannot be reliably measured with periodic testing due to the variability in emission concentration rates.

In summary, while periodic testing does provide a "snap-shot" of the current Mercury emissions concentrations, it clearly can not provide the necessary real-time Mercury mass emission concentrations required for truly understanding what effect the various boiler operational events may have on any given coal-fired boiler at any given operation time.

1. Reductions of that magnitude will require the installation of control equipment and continuous monitoring will be required to tune and adjust such equipment to reach the stringent reduction targets.
2. Actual Mercury CEM RATA results from a Coal Fired utility presented at 2008 EPRI CEM User Group Conference in Nashville, TN.