Portland Cement 2010 NESHAP Final Rule

Mercury Emission Standards and CEMS Requirements

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History

- Early ’90s Method 29 Procedure – the first real look with quality data at mercury emissions from cement kilns.
- Even so, about 30% of the industry data was invalidated based on a GCI review per PCA contract.

1996

- As a result of EPA promotion of mercury CEMS, EPA conducted tests of commercial mercury CEMS at the Holcim plant in Holly Hill, South Carolina.
- Under PCA contract, GCI provided a third party review on-site during testing.
- The result – no CEMS passed.

Mid to Late ’90s

- GCI data review and compilation efforts revealed a number of cement plants with mercury emission control rates at 90% or greater!

Late ’90s

- GCI with Ash Grove Cement developed a computer model of mercury dynamics in modern preheater/precalciner cement kilns with an in-line raw mill.
- Results led to the slip stream control strategy.

GCI Tech Notes that Discuss Mercury Emissions Testing and Control Issues

- “Cement Kiln Mercury (Hg) Emission Issues” - December 2006
- “Cement Kiln Mercury (Hg) Emission Testing Issues” - January 2007
- “Precalciner Cement Kiln Mercury (Hg) Emissions Control” - February 2007

2010 NESHAP Portland Cement Final Mercury Limits

40 CFR 63.1343(b)(1)

Source	Operating Mode	Hg Limit	Units
Existing	Normal	55	lb/MM tons clinker
Existing	Startup and Shutdown	10	µg/dscm
New	Normal	21	lb/MM tons clinker
New	Startup and Shutdown	4	µg/dscm

Mercury Compliance

40 CFR 60.1348(a)(5)

- Mercury CEMS or sorbent trap
- First 30 days data determine initial compliance
- Hourly production rate of clinker to be determined 63.1350(d)

Mercury Compliance

40CFR 60.1348(b)(7)

- Normal operation
  - Continuous compliance documented based on 30 day rolling average
- Startup/shutdown
  - Continuous compliance documented based on 7 day rolling average

Mercury Emission Tests

40 CFR 63.1349(b)(5)

- Hourly mercury emissions and stack gas flow rate data must be obtained.
- Optionally, sorbent trap data is gathered daily.
- Stack gas flow rate monitored in accordance with 40 CFR 63.1350(k)4)
- Note: Reporting units are specified in the rule as lb/million (lb/MM) tons of clinker.

Mercury Monitoring Reporting

40 CFR 63.1350(k)

- Performance Specification 12A (PS 12A) of Appendix B to Part 60 is specified for CEMS.
- Nevertheless, this section specifies a span requirement that is different from PS 12A.

Mercury Monitoring Reporting

40 CFR 63.1350(k)

- Needs to include upper limit for only normal “mill on” operation.
- Must also include 2 times the emission standard.
- Could this be the basis for a rule challenge?

Site Specific Monitoring Plans

40 CFR 63.1350(p)

- The New SSMP!
- Different one required for each Continuous Monitoring System (CMS)
- Must be available for submission at least 60 days prior to initial performance evaluation.

Mercury CEMS Regulations

- Special Notes on PS 12A.
- It does not detect *particulate mercury*!
- Standards are elemental mercury and $HgCl_2$.
- Mercury CEMS extraction point requires stack or duct – open top bag houses won't comply.
- While other options exist, Method 30A should be considered the method of choice for RATA.

Interesting Items from Preamble - Mercury

- Eleven (11) kilns were used to set MACT floor limits.
- EPA acknowledges that the main source of variability is raw materials and fuel.
- EPA is eliminating the restriction on the use of fly ash containing mercury.

Interesting Items from Preamble - Mercury

- EPA is also eliminating restrictions on the CKD waste rate.
- ACI appears to be the only control technology EPA has evaluated.
- EPA, in developing the standard, assumed no kilns currently control mercury emissions.

Hg CEMS – Times Have Changed

- One key was elimination of particulate bound mercury.
- Numerous manufacturers – some include:
  - TEKRAN
  - PS Analytical
  - CEMTREX
  - SICK MAIHAK
  - Thermo Scientific
  - Nippon Instruments

CEMS Calibration

- Requires NIST traceable standards.
- NIST only has elemental standards at 41-353 µg/dscm.
- Limits of 4-10 µg/dscm require a span of 10-20 µg/dscm.
- EPA will need to address this issue.

Strategy – Step 1

- Start early – get mercury CEMS now!
- Gain mercury CEMS operating experience.
- Check for compliance status over different operating conditions as well as during start-up and shut-down.

Strategy – Step 2

- If out of compliance, how far?
- If in compliance, how close?
- Evaluate need for operating flexibility.
- Identify sources of mercury in system.
- Speciate mercury in emmissions under different operating conditions.
- Can small changes in raw feed/fuel impact compliance?

Strategy – Step 3

- Develop slip stream bleed options and test.
- Evaluate if improvements in particulate control will impact mercury emissions.
- Investigate alternative/innovative technologies.
- Avoid ACI unless absolutely necessary!