Novinda Corporation

McIlvaine Hot Topic Hour
Mercury Sorbent Options
July, 2014

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Company Overview

• Advanced Patented Product Platform
  o Air Quality Products for coal-fired utility and industrial boilers
  o Mercury control – Flagship product – Amended Silicates™

• Technology
  o AS-HgX (2nd gen) Production & Shipping began April 2013
  o 2014 New Product Rollouts
    • Oxidation Product
    • ESP Performance Enhancement (Fly Ash Resistivity Modifier)
    • AS-HgX-ESP (4th Gen): PRB / CS-ESP High Performance Hg Removal

• Business
  o > 50 Full Scale Plant Tests Completed
  o MATS Compliance in Wet FGD, Dry FGD, CS-ESP configurations/Bit, PRB/sub-bit
  o Environmental Services -
    • Mobile Hg CEMS
    • Sorbent injection services
Why Novinda

Novinda’s Amended Silicates Product – Non Carbon

- Powerful Hg oxidation and removal reactions
- Delivers 40% - 75% Savings: More Efficient / No Additives Required
- Preserves Fly Ash for Resale Into Concrete Products
- Cleaner Way to Remove Mercury – 10% of CO₂
- No Damage to Plant Components & Non Flammable
Benefits of Amended Silicates

✓ Outstanding Hg Oxidation & Capture
✓ Broad Operating Temperature
✓ Powerful Non-halogen Oxidation
✓ Reduced Corrosion
✓ Preservation of Fly Ash (Direct Use in Portland Cement)
✓ Reduction of Fly Ash Resistivity
✓ Will Not Contaminate Waste Water
✓ Passes Landfill Leachability Tests (EPA Methods 1311 & 1313)
✓ Non-flammable / “0” Explosibility (ASTM E1226-10)
Re-Emission Prevention by AS HgX

- Amended Silicates capture mercury in the form of mercuric-sulfide complexes on the particle surface.
- Some of the mercury is released in an oxidized form that is more effectively captured and retained in wet scrubbers than typical oxidized mercury in coal-fired power plants.
- Amended Silicates that reach the scrubber will release sulfide components into the scrubber. The range of solubility of the sulfides released from the Amended Silicates covers a wide pH range, which allows them to react with dissolved mercuric compounds and remove them in the wet scrubber, thus mitigating mercury re-emission.
The mercury in the scrubber liquid phase is currently identified as most susceptible for reduction to elemental form and subsequent re-emission. At this plant we have shown 30% reduction in mercury in the scrubber liquid, with a balancing increase in mercury in the solids (inert) by 70%.
AS Injection Reduces Hg Re-emission

AS-022 – First Gen

Amended Silicates
12/13/2012

Shaded Oval – Minimum re-emission

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AS Injection reduces Hg re-emission

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Outstanding Economics

Higher Hg Removal Performance & Preserves Fly Ash Revenues

Example - 760 MW Power Plant Test

Comparative Annual Mercury Control Costs

- $7.5M Hg Removal Savings (50%)
- $4.8M Fly Ash Revenue Savings
- $12.3M Annual Savings in Operating Costs with Novinda Product

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*EPA Method 30B tests were conducted at all CEM locations throughout the trial.
125 MW Sub-Bituminous/PRB Blend, CS-ESP Only
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Econ Outlet Duct Hg Levels 4-5 lb/TBtu