DSI for MATS ---- (and CSAPR)

January 29, 2015 – hot topic
Emission Levels Needed for Compliance

- **MATS**
  - HCl – 0.002 lb/MM Btu -- (<2 ppm)
  - Hg – DSI does not remove Hg – but removing SO₃ increases Activated Carbon performance

- **CSAPR**
  - SO₂ – performance level varies with unit in order to meet the allotted emissions
HCl Test Results
HCl Emissions
Medium Cl Coal – Air Heater Outlet T - Baghouse

Hydrate Feedrate (lb hydrate/lb acid gas) vs. HCl Emissions (lb/MM BTU)

- Blue diamonds: Sorbacal SP
- Red squares: Standard Hydrate
HCl Emissions
CFB Boiler – Air Heater Inlet T - Baghouse

![Graph showing HCl Emissions vs Hydrate Dosage](image)

- **Sorbacal SPS**
- **standard Hydrate**
- **Sorbacal SP**
HCl Emissions
Industrial Boiler - 380°F Injection T - Baghouse
Sorbacal® SP and/or SPS performed >30% better than any other hydrate that was evaluated

It may be possible to achieve the Industrial Boiler MACT HCl level (0.022 lb/MM BTU) with good standard quality hydrated lime, but Sorbacal® SP can meet the MACT HCl emission level using 30-50% less reagent

Utility boiler MATS HCl level (0.002 lb/MM BTU) may require Sorbacal® SP to meet the limit

Sorbacal can be an effective approach to reducing Cl build-up in FGD systems
SO$_2$ Test Results
SO₂ Removal
Coal-Fired Boiler – Furnace Injection T - ESP
SO$_2$ Removal @ Air Heater Inlet Injection T

SO$_2$ Removal % vs. Sorbacal Feedrate

- Sorbacal SPS
- Sorbacal H
- Sorbacal SPS
500 MW Utility Boiler

40-45% Overall SO$_2$ Removal at Mass Ratio of ~1.25 – 1.50 lb sorbent / lb Inlet SO$_2$ to achieve 70% SO$_2$ Removal Overall
Coal-fired Pilot Plant

50% SO₂ Removal at Mass Ratio of ~2.7 lb sorbent / lb Inlet SO₂

50% SO₂ Removal at Mass Ratio of ~4.5 lb sorbent / lb Inlet SO₂
Cement Plant

SO2 Removal vs. lb sorbent / lb Inlet SO2

- MR ~14
- MR ~12
- MR ~17
- MR ~40

Legend:
- ID Fan Outlet (RM On)
- ID Fan Outlet (RM Off)
- Fabric Filter Inlet (RM Off)
- Fabric Filter Inlet (RM On)
SO$_2$ Removal Summary

- Very SO$_2$ high removals (>98%) have been demonstrated for some industrial applications
- Sorbacal® SPS performed 30–50% better than other hydrates tested for all conditions
- Reaction is very temperature dependant – in general the higher the temperature, the better the removal