Advanced Air Quality Control Retrofit Solutions for PC Fired Boilers

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- Address SO_X, HCI, NO_X, Hg, PM₁₀ and PM_{2.5} individually OR comprehensively
- Fully retrofit and add-on technologies
- Small footprint require little space for installation
- High performance require shorter residence times
- Cut into existing ductwork; Short tie-in time
- Leverage inherent process chemistries to achieve minimal operating cost
- Low capital and operating costs

- Scrubbing (Multi-phase Reaction) Optimization Solutions
 - Acid Gas Scrubbing and Neutralization
 - sorbent efficiency and utilization
 - Elemental Hg Conversion and Adsorption
 - Oxidation and particulate formation
- Particulate Control Solutions
 - PM Capture Optimization for ESPs
 - Resistivity and Humidity control
 - Condensables and Ionic Hg Capture
 - Nucleation by Gas Cooling

BoldEco Family of Technical Solutions

Eco|SprayTech Systems

- Gas cooling and reaction chambers, patented injection systems for gas cooling, humidification, emergency dilution and chemical reactions

Eco|SorbTech Systems

- Low-cost BACT and MACT level acid gas and combined PM removal

Eco|PulseTech Systems

- Low-cost MACT level high efficiency Fabric Filters for PM removal, controls and add-on systems for FF optimization

Eco|SelecTech Systems

 Low-cost MACT level, low temperature SCR and SNCR NO_X removal, hybrid SNCR/SCR systems

- Acid Gas Scrubbing Optimization
 - Dry Sorbent Injection Reactor or In-duct Injection Approaches
 - Calcium-based DSI
 - Spongiacal Lime Injection
 - Microfine Lime Injection
 - Hybrid Dry-Wet Injection Retrofits
 - Fully Dry or Humidification-Assist
 - Sodium-based DSI
 - Trona Grinding/Dosing and Injection
 - Sodium Bicarbonate Grinding/Dosing and Injection

- Hg and Particulate Control Enhancement
 - ESP Enhancement
 - Spray Cooling
 - Condensables Enhancement
 - Spray Cooling
 - ACI Enhancement
 - Spray Cooling



Gas Cooling Solutions

Low-Cost ESP Enhancements

- ID-side Evaporative Gas Cooling Tower
- FD-side Fan Inlet Cooling





Solution Element -EGC Spray Cooling Tower

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 Downflow EGC Tower in installed after APH where finely atomized water is evaporated to cool gases to lower resistivity

•EGC tower eliminates danger of build-up in ductwork and provides engineered evaporation times



Flyash Resistivity



Air Preheater Outlet Temperature Profile



PRECIPITATOR INLET TEMPERATURES

Zone Cooling Approach



Zone Cooling Implementation with EGC





Additional Benefits of Cooling Technology

- Enhancement of DSI
- Enhancement of ACI
- Enhanced Collection of Condensable Fraction
- More Stable ESP Electrical Operation



Acid Gas Control Solutions

Low-Cost Acid Gas Solutions

- DSI Enhancement
 - Evaporative Gas Cooling Tower (EGC) Temperature Control
 - Enhances Acid Gas Removal by Approach to Saturation
 - Enhances HCI, H₂SO₄ and SO₂ Capture
 - EGC Combined with Turbulent Fluid Bed Reactor
 - Increases Utilization of Sorbent
 - EGC establishes Optimum Temperature to Optimize Reaction
 - Provides Increased Turbulence
 - Increases Gas Contact Time
 - Eliminates Sorbent Build-up



Solution Element -TFB Reaction Chamber

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 Upflow reactor closecoupled to an EGC
Tower

 Sorbent is injected downstream of precooled gases to maximize reaction

• Upflow reactor greatly increases turbulence, mixing and residence time



Dry Injection Solutions

BoldEco/STM Micron Technology Benefits

- Increased efficiency for removal and injection rates
- Guaranteed particle size distribution
 - Optimized for SO2 or HCI removal, depending on requirements
- 8000 Hr guaranteed operating time without maintenance
- Maintenance friendly design
- Soundproof enclosures available for inside installations



JCF Mill Schematic





Bicarmill Installation











Integral Controls

Automatic Greasing



Operating Guarantee 8'400 h

Air Flowmeter









Vibration Sensor



Temperature Measurement

Bicarmill Installation Example







