

SOLVAir®

SOLUTIONS



SOLVAY

asking more from chemistry®

SOLVAir® Solutions Focus on DSI

- ◆ The SOLVAir Solutions team focuses on acid gas mitigation mainly, but not exclusively, using DSI technology
- ◆ Have worked with various state and federal agencies to promote DSI as a viable treatment option.
 - ▶ The EPA lists DSI and trona specifically as treatment options in the Utility MATS
 - ▶ DSI is now a standard technology for acid gas control in utility and industrial markets in US
- ◆ SOLVAir is the market leader - developing products and technology to improve DSI
- ◆ Experience with customers, trials and studies gives the SOLVAir Solutions group a unique ability to help customers understand how DSI can work for them.

Why do anything? - Market Drivers

◆ Regulations

- ▶ NESHAPS
 - ◆ Utility MATS
 - ◆ Industrial Boiler MACT
- ▶ NAAQS non-attainment zones at 75ppm SO₂
 - ▶ States putting SIPS together now
- ▶ Regional Haze
- ▶ Permits for new units
- ▶ CAIR and its successors

◆ Court orders and consent decrees

- ▶ Civil suits
- ▶ NOV - negotiated settlements

◆ Process Improvement

- ▶ ESP
- ▶ Corrosion control

Upcoming Applications

◆ SO₂ control

- ▶ Untreated utilities burning low sulfur (PRB) coal affected by CSAPR, Consent Orders, or NAAQS
 - ▶ Dominion Kincaid is the largest bicarbonate DSI system in the US treating SO₂ on two 600 MW units.
- ▶ Canadian utilities are interested in DSI for SO₂ as well.

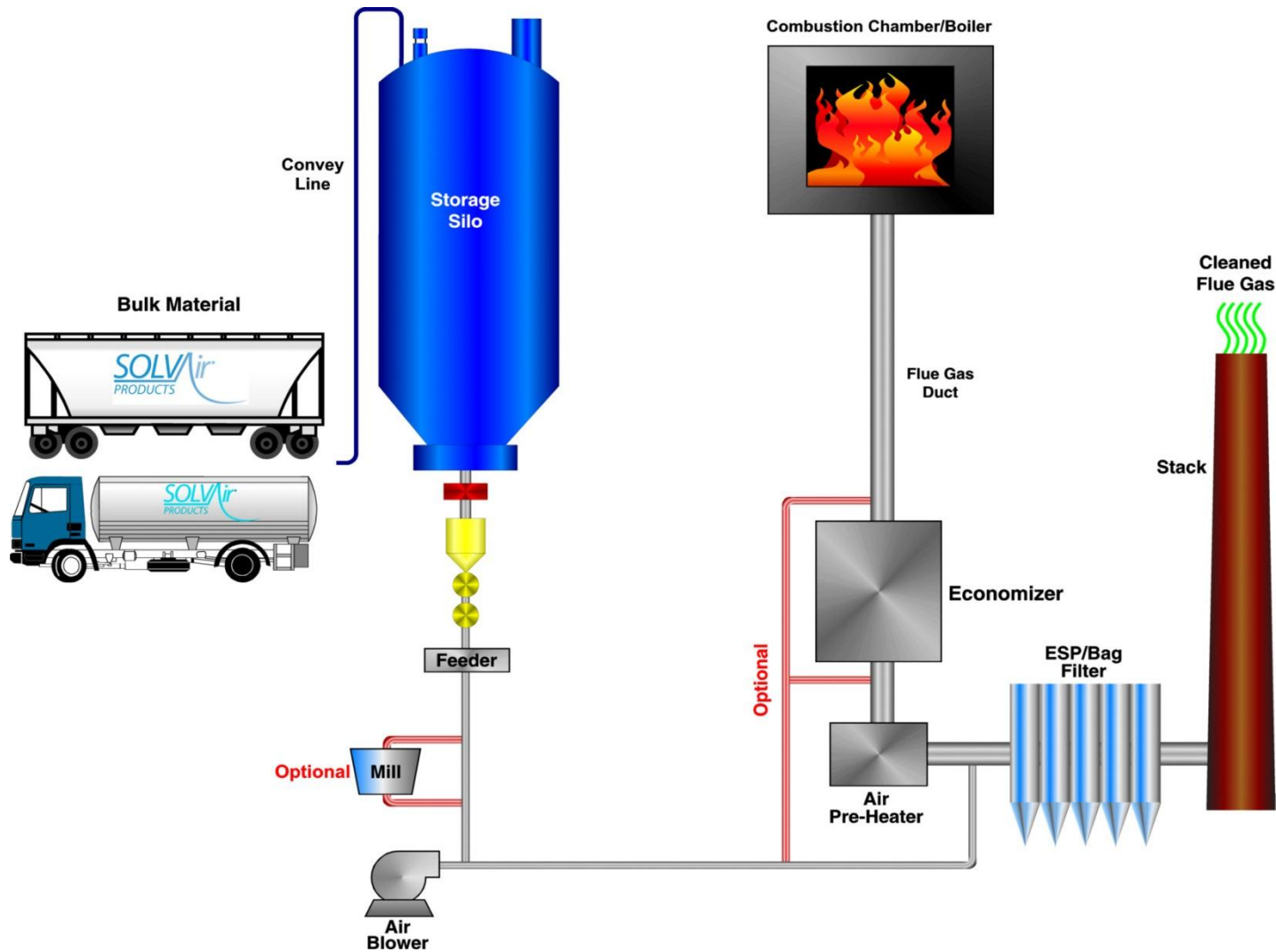
◆ SO₃ control

- ▶ Started with treating blue plume, caused by high sulfur coal and worsened with SCR installation
- ▶ Utilities need to reduce to less than 5 ppm to optimize PAC injection, 2 ppm can yield even better mercury removal

◆ HCl control

- ▶ Covered by the Utility MATS
 - ◆ DTE has largest sodium DSI project covering 4 facilities
- ▶ Industrial facilities looking at DSI for IB MACT compliance

Example of a Typical DSI System



What Can DSI Achieve?

- ◆ SO₂ removal >98%
- ◆ SO₃ removal to less than measurable
- ◆ HCl removal >99%
- ◆ Enhanced mercury removal – in some cases
 - ▶ Enhanced native capture
 - ▶ Better utilization of activated carbon
 - ▶ Removal of SO₃ interference
- ◆ ESP resistivity improvements
- ◆ Results are site specific with a number of factors affecting performance

Trona

SOLVAir® Select 200

- ◆ Chemical Structure: $\text{Na}_2\text{CO}_3 \cdot \text{NaHCO}_3 \cdot 2\text{H}_2\text{O}$
- ◆ Mined underground in Green River WY
 - ▶ Numerous beds containing hundreds of years of reserves
 - ▶ 4.5 MM tons mined annually by Solvay
 - ▶ 14 MM tons mined in the area
 - ▶ Most extracted and converted to sodium carbonate (soda ash)
- ◆ Select 200 is industry standard
- ◆ SOLVAir Select 200 is injectable as-is – no further processing required
 - ▶ Milling is optional to reduce usage

Sodium Bicarbonate

SOLVAir® Select 300 & 350

- ◆ Chemical Structure: NaHCO_3
- ◆ Made from soda ash which is made from trona in the USA
- ◆ Sorbent of choice in Europe and other parts of the world
- ◆ 700,000 tons per year of sodium bicarbonate are consumed in the USA in other applications from cooking to blasting media.
- ◆ Flue gas applications are a small share of US market but could become the largest end use by the end of the decade
- ◆ Solvay built 125,000 TPY plant dedicated to flue gas market
 - ▶ Uses unique, patent pending process to manufacture Select 300
 - ▶ Can expand to 250,000 TPY if market increases
- ◆ Select 300 produced in Green River must be milled on-site
- ◆ Select 350 milled sodium bicarbonate is ready to use



All technical advice and recommendations provided, if any, are intended for use by persons having the appropriate education and skill. Solvay Chemicals, Inc. and its affiliates shall not be liable for any use or non-use of such advice and/or recommendations. Users of our products are solely responsible for the design, construction and operation of their own facilities.

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