

# ***Reinhold Environmental Ltd.***

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***2007 APC Round Table & Expo  
Presentation***

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***July 8-10, 2007  
Chattanooga, TN  
Hosted by TVA***

# *SO<sub>3</sub> Mitigation Economics*

## *Sorbent Comparisons*



<u>Sorbent Tested</u>	<u>Effectiveness</u>	<u>Relative O&amp;M Costs</u>	<u>Relative Capital Costs</u>	<u>Relative Maintenance</u>
Ammonia	Good for lower SO <sub>3</sub> Concentrations	Low	Low - NH <sub>3</sub> already in use w/ SCR	Low
Magnesium Hydroxide	Good Furnace Only	High	Moderate	Moderate
Hydrated Lime	Good Limited by ESP performance	Low	Low	Moderate to Low Nightly POR required
Magnesite	Poor	Low to Moderate	Low	Low
SBS	Excellent	High	Moderate	High
Morpholine Analyzed but not tested	Inert	N/A	N/A	N/A
Magnesium Silicate Hydroxide (Talc)	Inert	Low to Moderate	Low	Low
OmniClear	Less Than Expected Furnace Only	Moderate	Low	Low
Soda Ash (Fuel additive)	Poor Furnace Only	Moderate	Low	High Furnace Slagging
High Surface Area Lime	Good to Excellent	Low	Low	Moderate ESP Concerns
Trona	Excellent	Low	Low	Low

# *Trona Testing Timeline*



- *2002 Initial testing aborted, plugged up silo (Contamination)*
- *2003 Initial Testing*
  - *Trona demonstrated to be very reactive and effective*
  - *Injection system had to be modified to LOWER feed rate*
- *2004 Trona System installed on Gavin 2*
  - *Moisture problems identified and resolved*
  - *Deposition problems identified, solutions proposed*
- *2005 Trona*
  - *Low conversion catalyst*
  - *Deposition solutions tested successfully*
- *2006 Trona*
  - *Fixes implemented; No moisture or deposition problems encountered.*
- *2007 Trona systems started up on Mitchell and Mountaineer*

# *Trona Use Within AEP*



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- ***Current Users of Trona for SO<sub>3</sub> control***
    - ***Gavin Units 1&2: 2600 MW***
    - ***Mountaineer: 1300 MW***
    - ***Mitchell Units 1&2: 1600 MW***
  - ***Trona systems to be installed by 2010***
    - ***Amos 1-3: 2900 MW***
    - ***Cardinal 1-3: 1830 MW***
    - ***Kyger 1-5/ Clifty 1-6:***
    - ***Conesville 4: 780 MW***

# *Mercury Capture Technologies*



- ***SCR/WFGD Co-Benefits***
  - *Proven Capture for Bituminous Coals, Capital Intensive*
- ***Activated Carbon Injection (ACI)***
  - *Most Proven Hg-Specific Capture Method*
  - *Not Effective with All Fuel Types*
- ***Fuel Switching/Blending***
  - *Lower Reductions, Fuel Variability*
- ***Boiler Chemical Additives (BCA)***
  - *Limited Research, Varied Results*
- ***Non-Carbon Sorbents***
  - *Some Promise, Still Developing Technologies*

# *Activated Carbon Injection*

*In-House Test Program*



- ***Full Scale Testing Performed at Three Facilities, 30-Day Long-Term Tests***
  - ***Bituminous/PRB Blend***
    - ***Standard Carbon***
  - ***Texas Lignite***
    - ***Brominated Carbon***
  - ***100% PRB***
    - ***Brominated Carbon***