Reinhold Environmental Ltd.

2008 APC Round Table & Expo Presentation

July 13-15, 2008, in Savannah, GA

Small Wood Chips Co-milling

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Small Wood Chips Co-milling

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Summary of Results from Gadsden

- Small wood chips successfully co-fired at 3 to 5% energy input
- Boiler efficiency unaffected at 3%, slightly lower at 5% co-firing
- Derate of 5% load at 5% co-firing energy input
- Emissions were reduced (SO_2 and CO_2) or unchanged (NO_X and CO)

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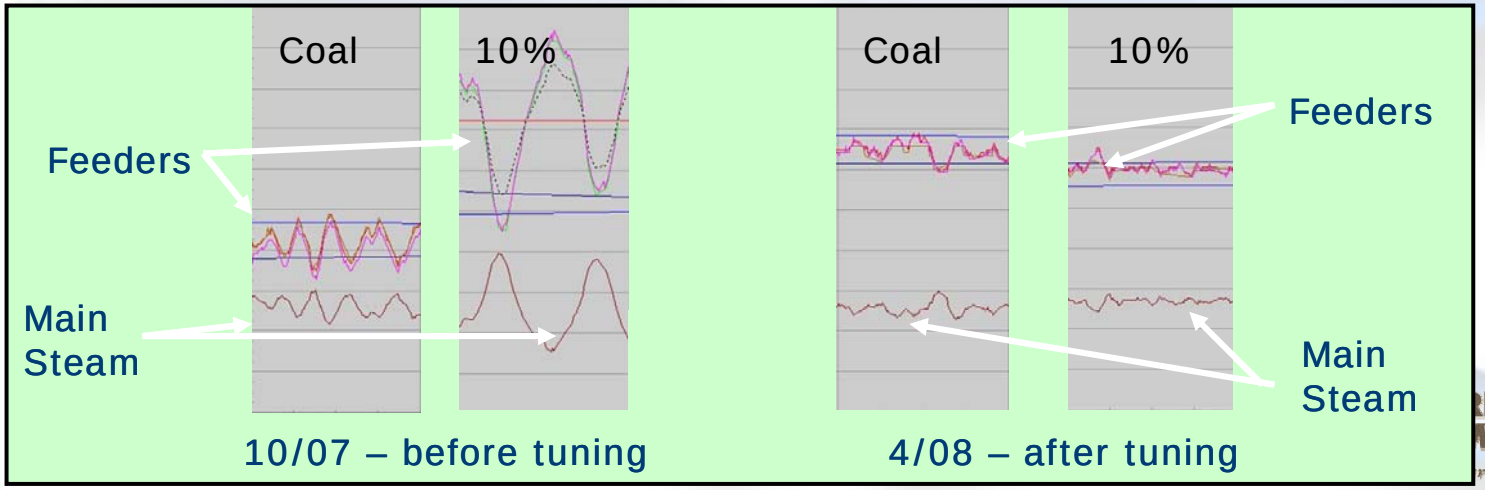
Summary of Results from Gadsden (con't.)

- **Pulverizers**
  - Riffle blockage not observed
  - Amps increased
  - Wood moisture adversely affected mill capacity
- **Automatic controls will require a review of control response**



Small Wood Chips Co-milling

Potential Plant Limitations - Site Specific

- Mill capacity
- Mill motor amps
- Automatic controls
- Pulverizers
- Bunker / silo capacity and feeding
- Feeder capacity
- Conveying capacity
- At Gadsden, limitation was mill capacity – unit derate of 5% load at 5% co-firing by energy input

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Biomass Co-firing Summary

- Switchgrass direct injection demonstrated @ 5 to 10% (by energy)
- Sawdust co-milling demonstrated at less that 1%
- Wood chip co-milling plugged pulverizers
- “Small” wood chip co-milling demonstrated @ 3 to 5%

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Biomass Co-Firing

Remaining Technical Issues

- Effect of switchgrass minerals on NO_x control devices → SCR (Selective Catalytic Reduction) units
- Current ASTM specifications exclude biomass ash-coal ash mixtures for cement

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Questions?
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