

# Reinhold Environmental Ltd.



## 2009 APC Round Table & Expo Presentation

*July 12-14, 2009, in The Woodlands, TX*

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power generation group

***BOP Impacts Panel Session - 2009 APC/PCUG Conference  
July 13, 2009 - The Woodlands, Texas***

***Dry ESP Impacts from Variations  
in Temperature and SO<sub>3</sub>***

***Sam Kumar and Al Moretti***

## ***Impact of Temperature and SO<sub>3</sub> on ESP Operation***

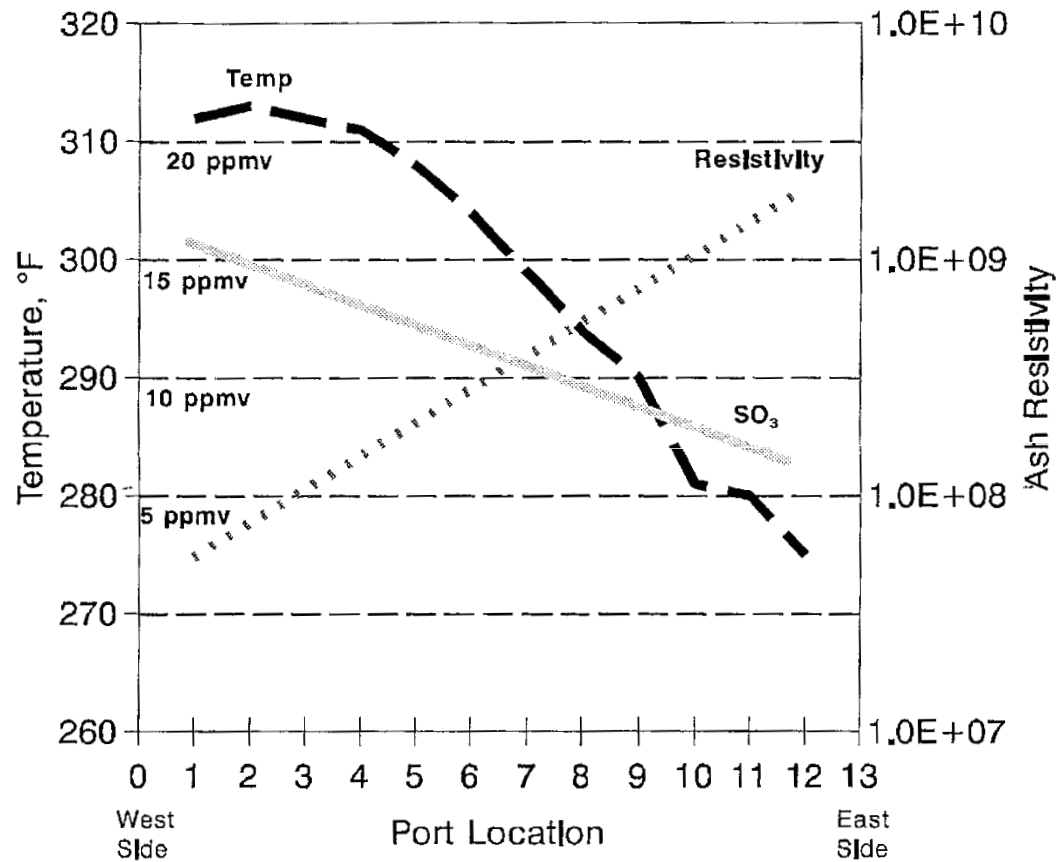
**If operating above acid dewpoint, loss of SO<sub>3</sub> or increase in temperature will raise ash resistivity**

- **Lowers ESP power level**
- **Increases emissions and opacity**

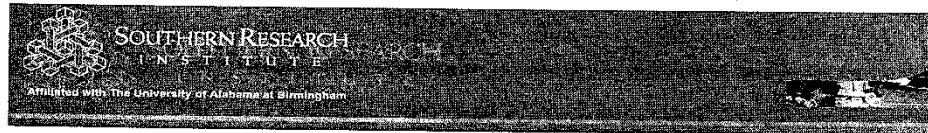
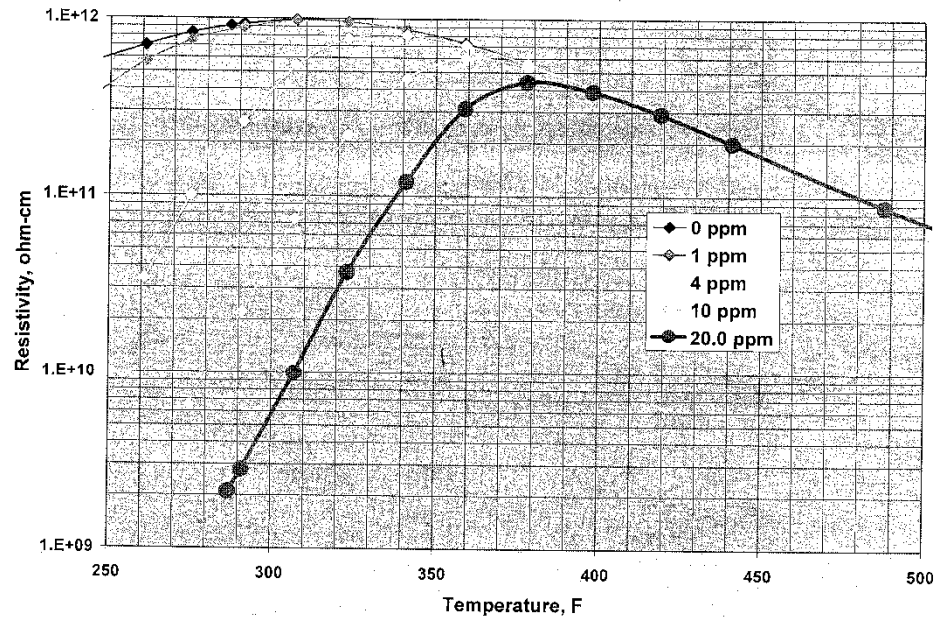
**If operating below acid dewpoint, loss of SO<sub>3</sub> / increase of temperature elevate ash cohesivity, reduce corrosion, and reduce emissions**



# Temperature Stratification Impacts Across the Air Preheater Outlet (Devito)



# $SO_3$ / Temperature Versus Ash Resistivity



**Difficult to condition flyash from bituminous coal**

## ***Overall Emission Impacts***

**Increase of ash resistivity from 10E9 ohm.cm to 10E12 ohm.cm can elevate flyash stack emissions by a factor of 10, and increase stack opacity by at least factor of 5**

- **Fuel switching from high sulfur to difficult Appalachian low sulfur coals or PRB coals have raised stack opacities from 5% to 50% !! At many plants, for various coals, the opacity impacts have varied about this range**
- **SO<sub>3</sub> gas conditioning has been the common solution to restore ESP performance**
- **Because of negative implications on mercury removal across ESPs due to SO<sub>3</sub> interference, non-SO<sub>3</sub> ESP performance enhancements solutions are being sought**