

# **REINHOLD ENVIRONMENTAL Ltd.**



## **2012 APC Round Table & Expo Presentation**

July 16-17, 2012, in Baltimore, MD / Hosted by Duke Energy, Entergy,  
FirstEnergy, Southern Company & TVA

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power generation group

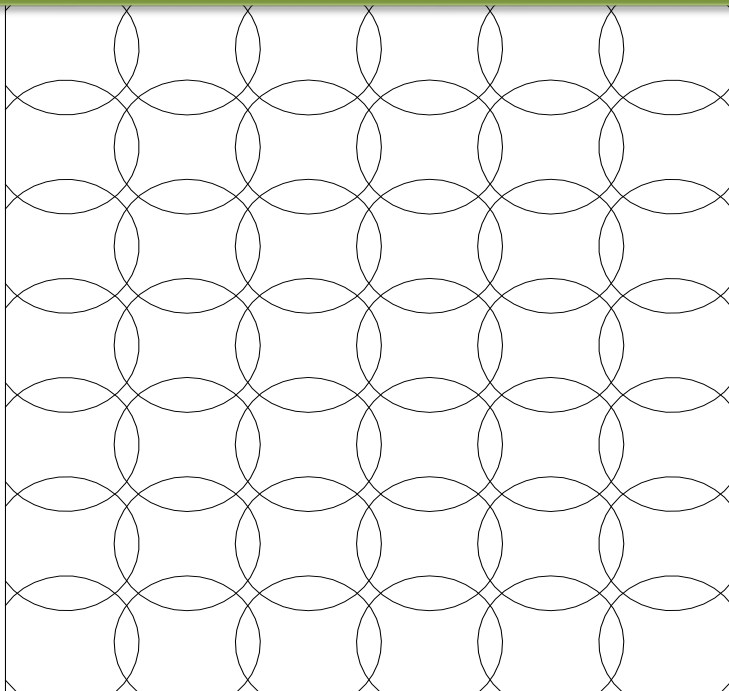
# WFGD Lessons Learned

*APC Round Table  
July 16, 2012*

***Greg Bielawski  
Manager, Environmental Aftermarket Services***

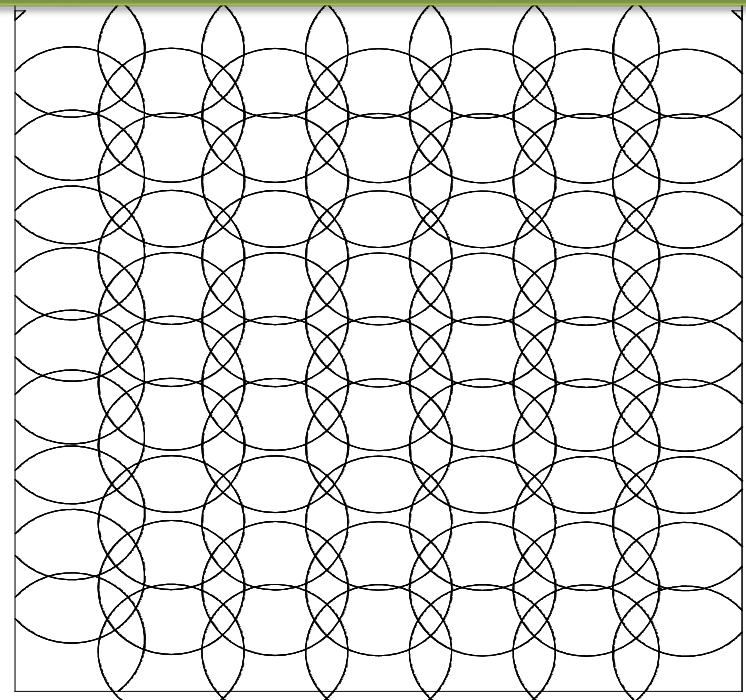
# More Spray Nozzles are Needed

**Original Absorber Spray Pattern**



**42 Total Spray Nozzles per level**

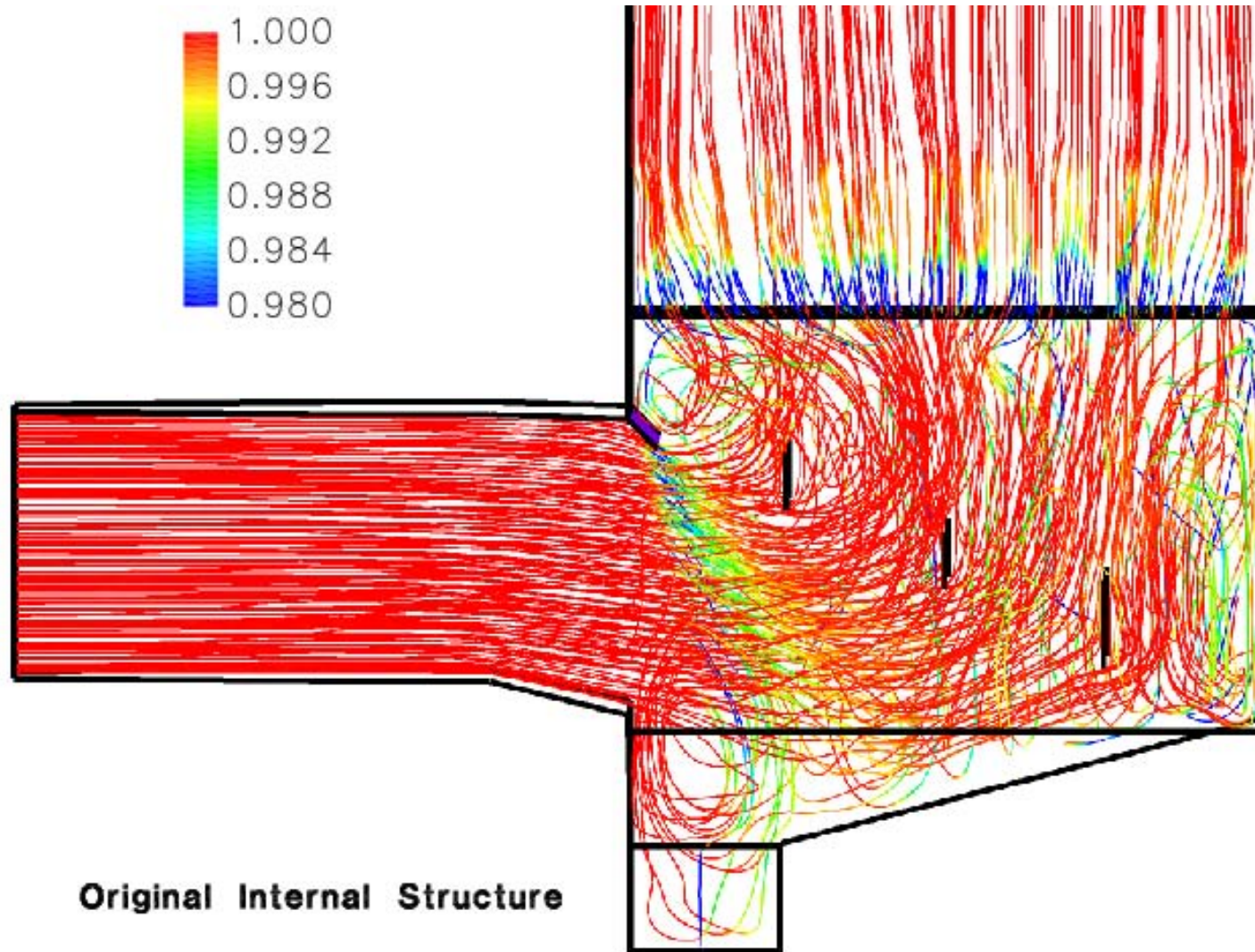
**Upgraded Absorber Spray Pattern**



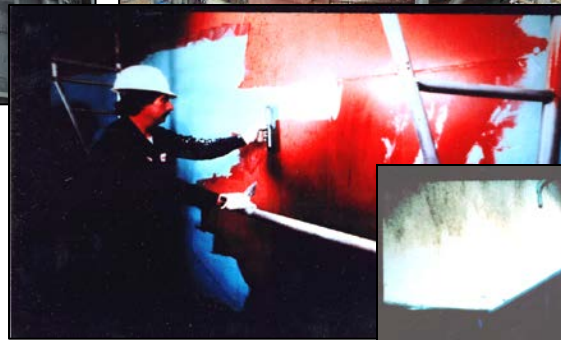
**70 Total Spray Nozzles per level**

# ***CFD is a Inexpensive, Useful Tool***

## ***Lesson Learned: Do It First***

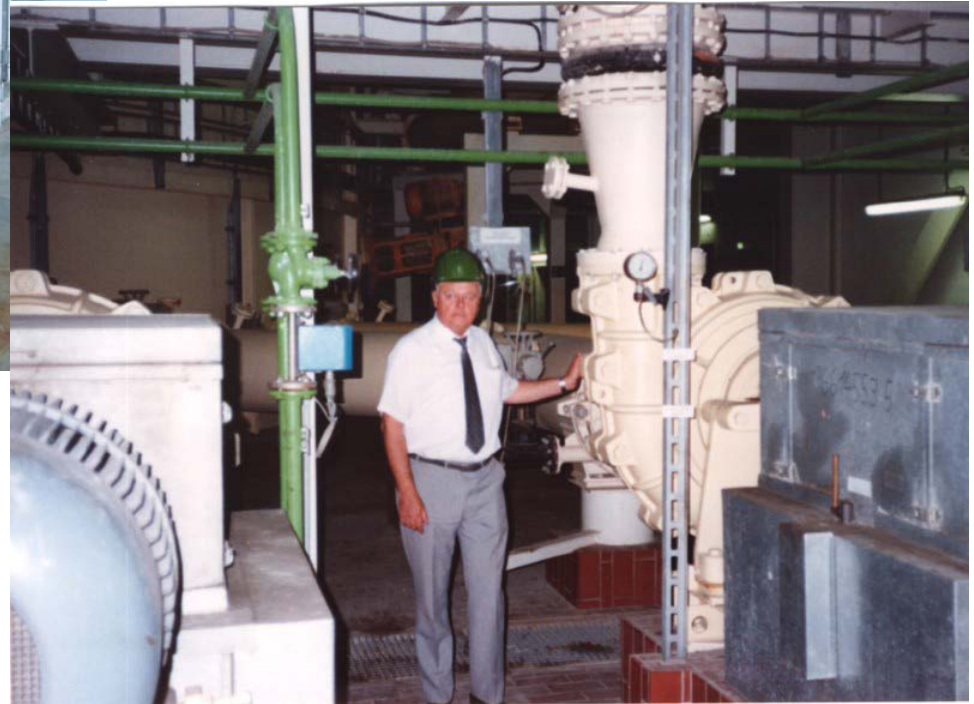


# *Have We Learned Our Lessons Yet on Absorber Materials of Construction?*



# *Absorber Recycle Pumps*

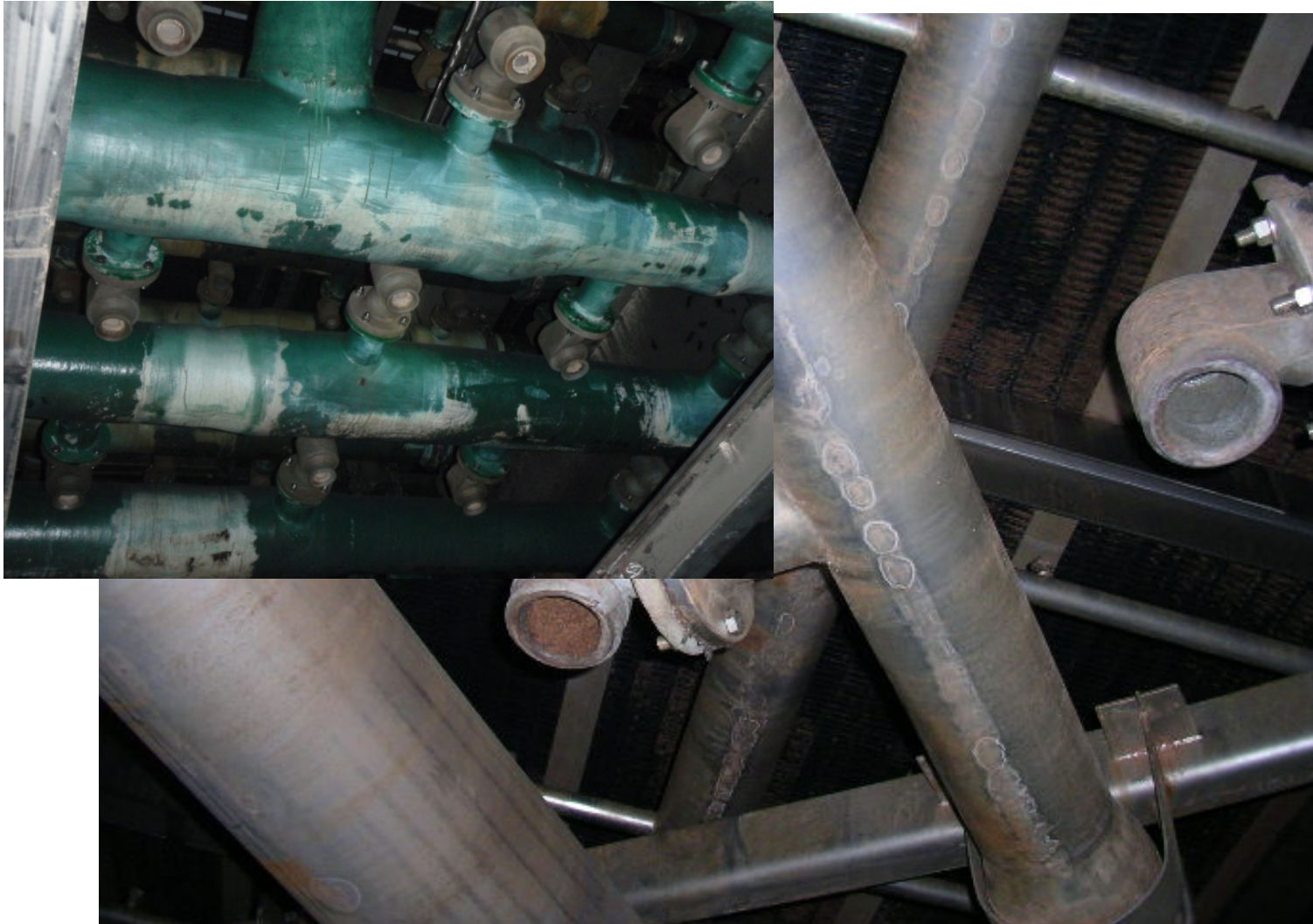
**Are they as rugged  
as the mining  
industry pumps  
used 20+ yrs ago  
in WFGD?**



# *Slurry Piping: CS/RL or FRP?*



# ***Spray Headers: FRP or Alloy?***



# ***Best Absorber Recirc Pump Suction Valves?***



Slide Courtesy of  
City of Lakeland, FL

# ***Best Valve for General Slurry Service?***



# *Mist Eliminators*

**Original Mist Eliminator Design**



**New Modern Mist Eliminator Design**



# ***ME Wash Strainer: Critical!***



# ***Have We Learned Our Lessons on Wet/Dry & Process/Chemistry Issues?***



# ***pH Measurement/Control***



# ***Who Heard of ORP 10 yrs ago?***



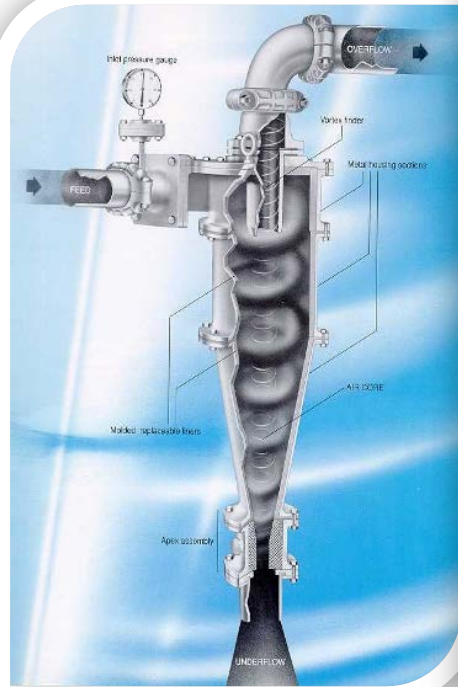
# ORP & Phase Partitioning of Chemical Species

## ORP will affect the oxidation state of the slurry constituents

- Oxidation state often controls solubility
- ORP will impact phase partitioning of many species
- General trends are shown in the table below:

<i>ORP</i>	<i>Mercury</i>	<i>Selenium</i>	<i>Manganese</i>
High	Hg <sup>+2</sup> Soluble	Se <sup>+6</sup> Soluble	Mn <sup>+4</sup> ↓ Precipitate
Low	Hg <sup>+2</sup> Soluble	Se <sup>+4</sup> ↓ Precipitate	Mn <sup>+2</sup> Soluble
Very Low	Hg <sup>0</sup> ↑ Vaporous	Se <sup>+4</sup> ↓ Precipitate	Mn <sup>+2</sup> Soluble

# Dewatering Hydroclones



Primary Hydroclone Bank



Secondary (Purge) Hydroclone Bank

# ***Belt Filters are the Way to Go***



# ***What Wet FGD Modifications Can be Made to Improve Reliability and Reduce Maintenance?***

- ▶ **Use latest inlet awning design - reduce inlet buildup**
- ▶ **Modernize Mist Eliminator system, ME's and spray system – reduce cleaning during outages**
- ▶ **Change out mixers to modern design, more pumping for same motor – reduce buildup in tanks**
- ▶ **Change absorber pumps from glands to mechanical seals – reduce fresh water consumption**
- ▶ **Replace absorber pumps – more capacity for same HP, reduce maintenance**
- ▶ **Convert to forced oxidation – reduce volume for landfill or produce marketable product**
- ▶ **Increase gas flow through existing modules, reduce bypass and/or number of modules in service – reduce rotating equipment in service, reduce maintenance**



***Thank you!***

***Questions?***