

# Worldwide Pollution Control Association

WPCA-Entergy  
“Increasing Energy Efficiency of Existing Units” Seminar  
January 22, 2014

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# ***“Approaches to Improve Air Preheater Thermal Efficiency”***

Sterling Gray, URS Corporation  
Louis Bondurant III, Alstom Air Preheater

*WPCA – Entergy Seminar  
Increasing Energy Efficiency of Existing Units  
January 22, 2014*

# Workshop Outline

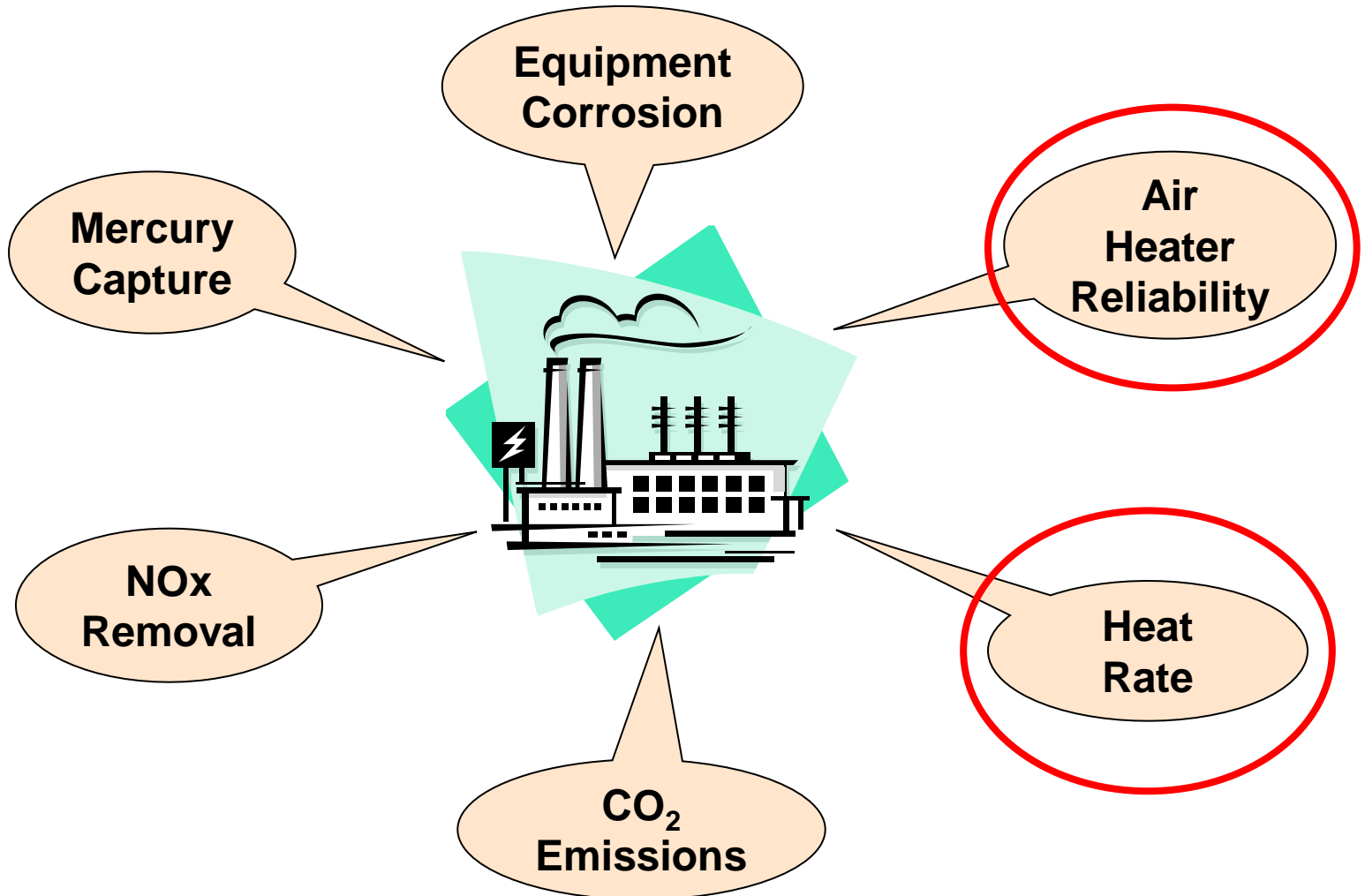
- SO<sub>3</sub> Impacts
- Air Heater Operation Strategy
- Co-Benefits
- SO<sub>3</sub> Control Technology

I

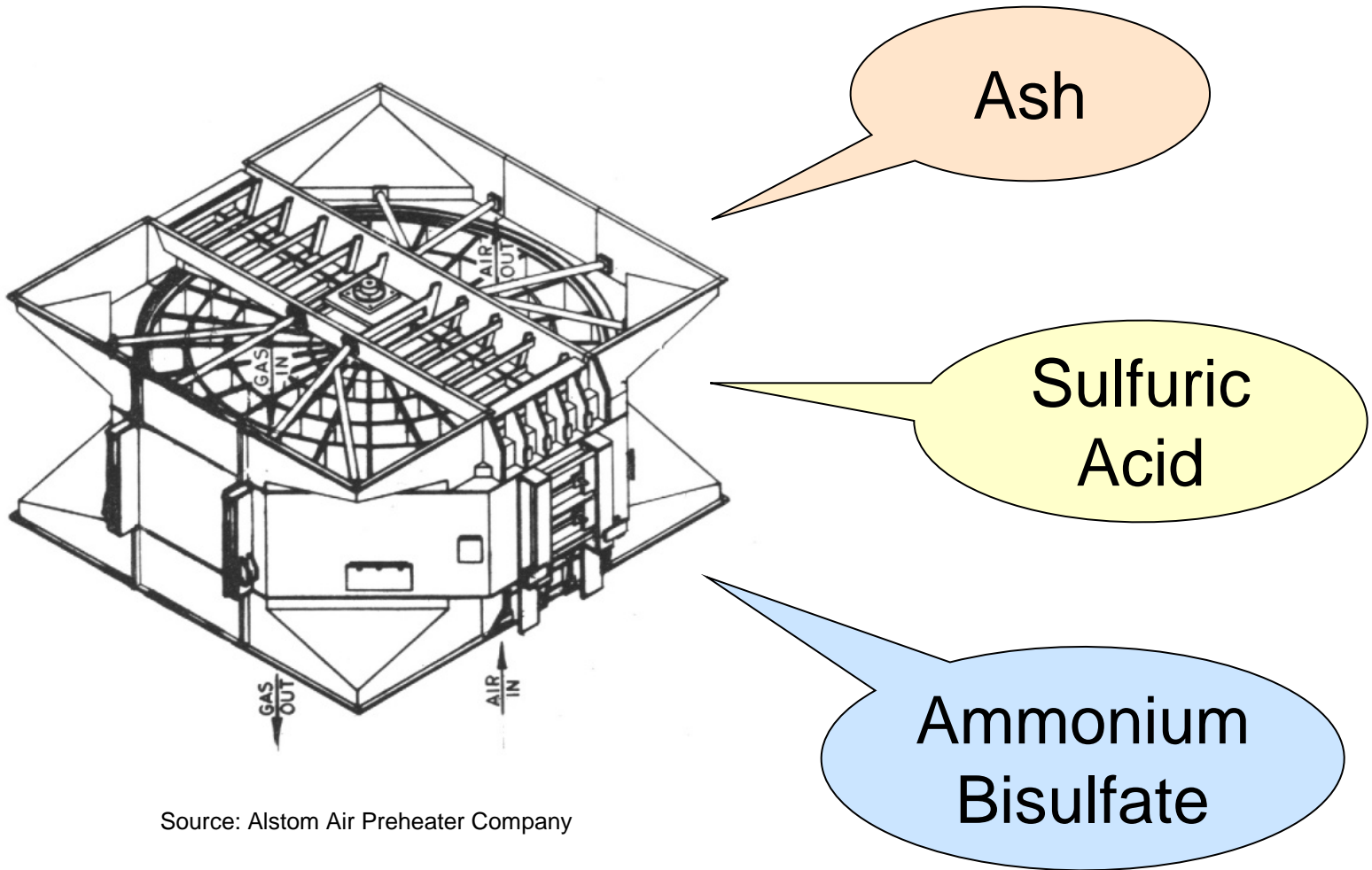
- 
- APH Research Program
  - Pilot Demonstration Results
  - APH Upgrade Approaches
  - Summary

II

# SO<sub>3</sub> Adversely Impacts ...

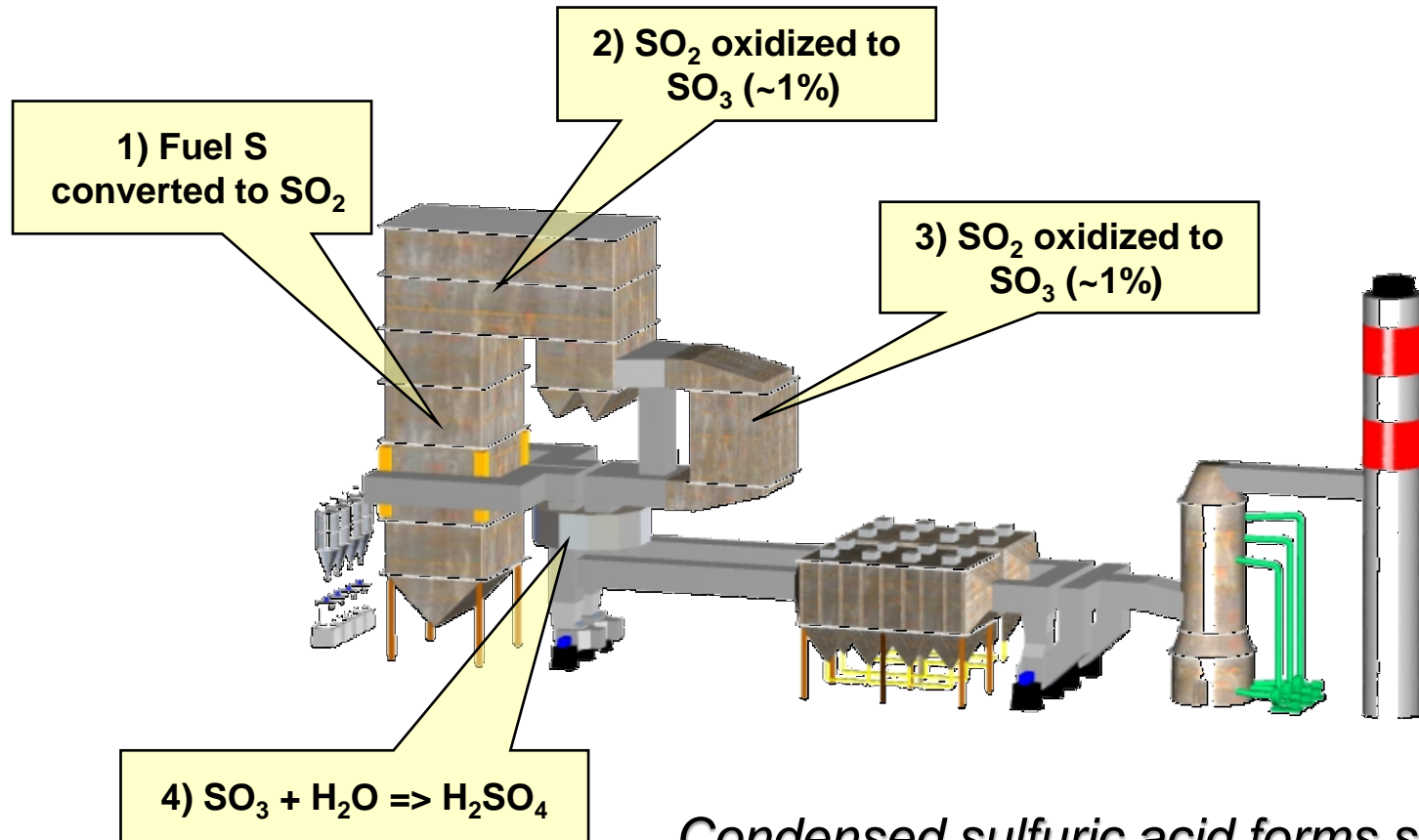


# Air Heater Fouling Agents



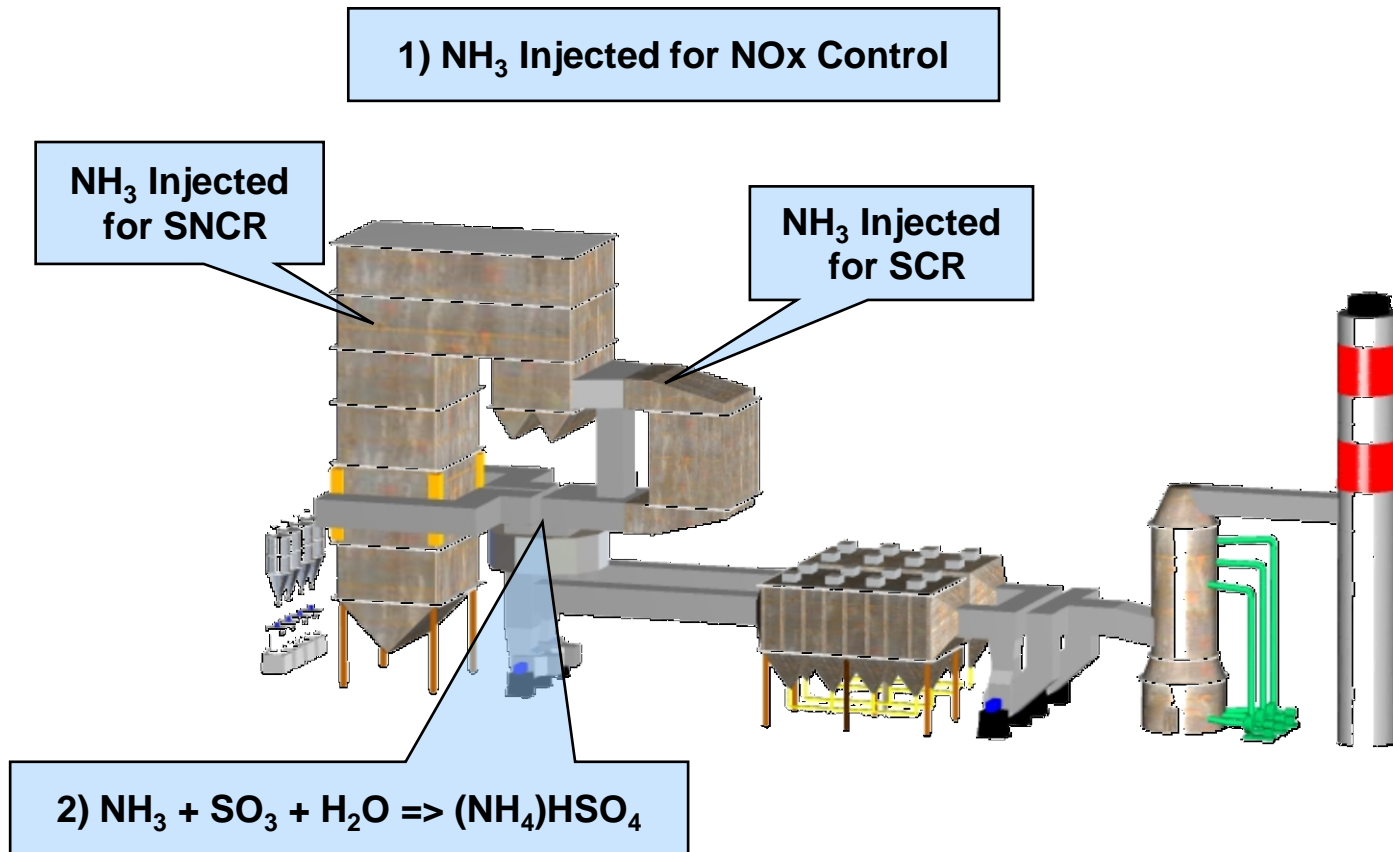
Source: Alstom Air Preheater Company

# Sulfuric Acid Formation



*Condensed sulfuric acid forms sticky, corrosive deposits in “cold-end” of APH*

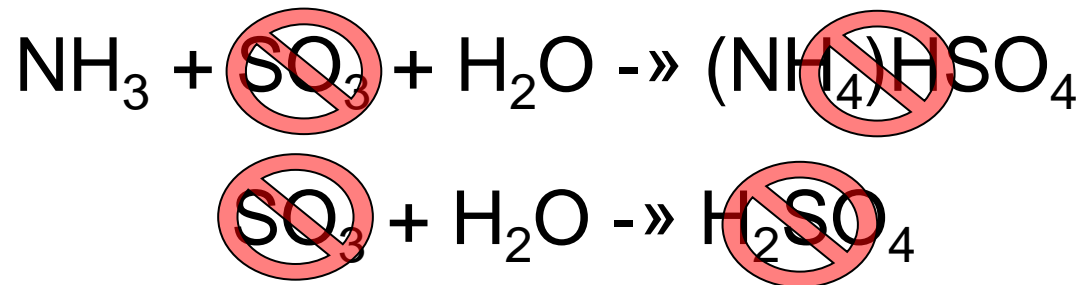
# Ammonium Bisulfate (ABS)



*Condensed Ammonium Bisulfate forms sticky, corrosive deposits in "middle" of APH*

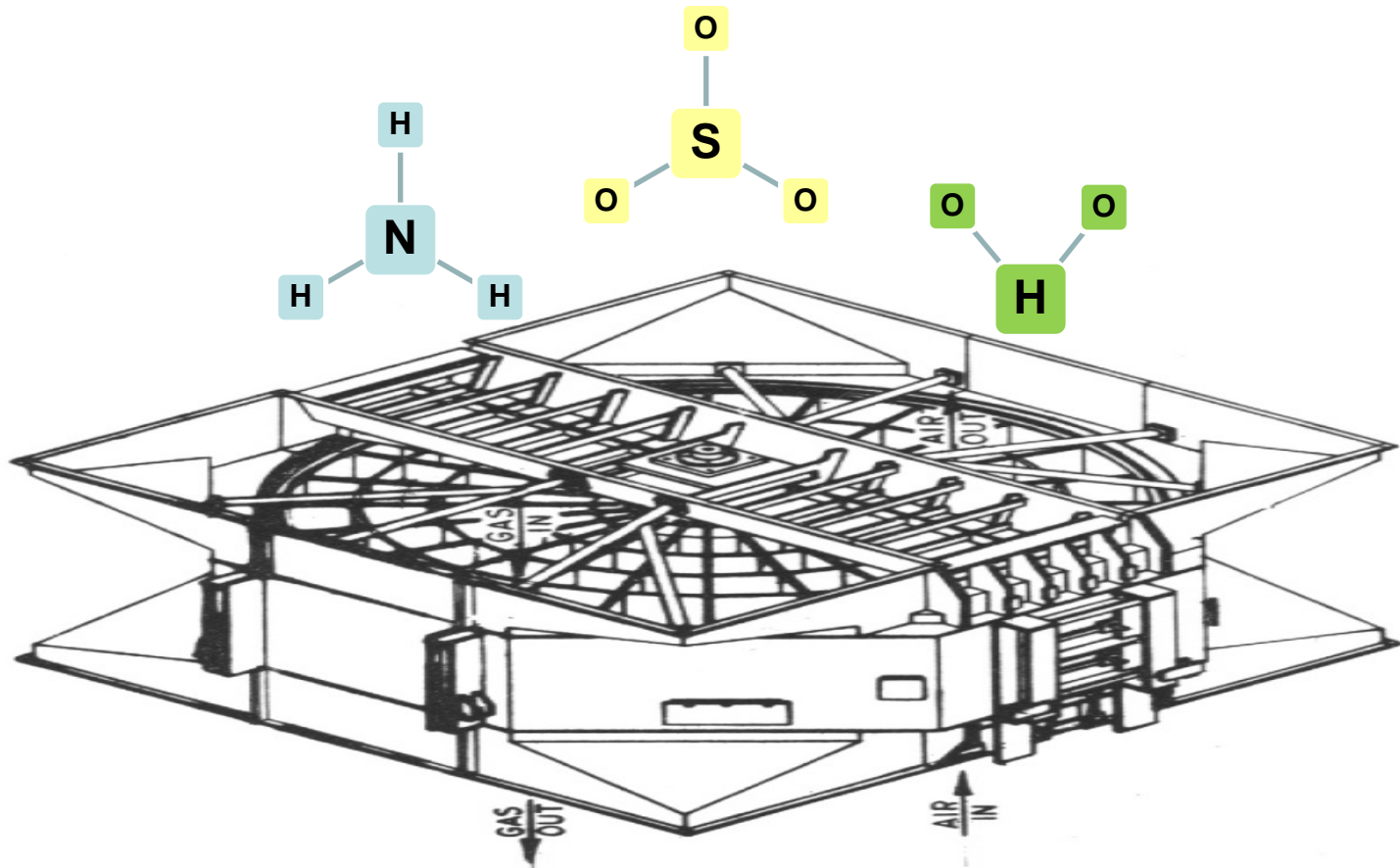
# Strategy: APH Performance

1) *Inject Sorbent to Remove SO<sub>3</sub> Prior to Air Heater*



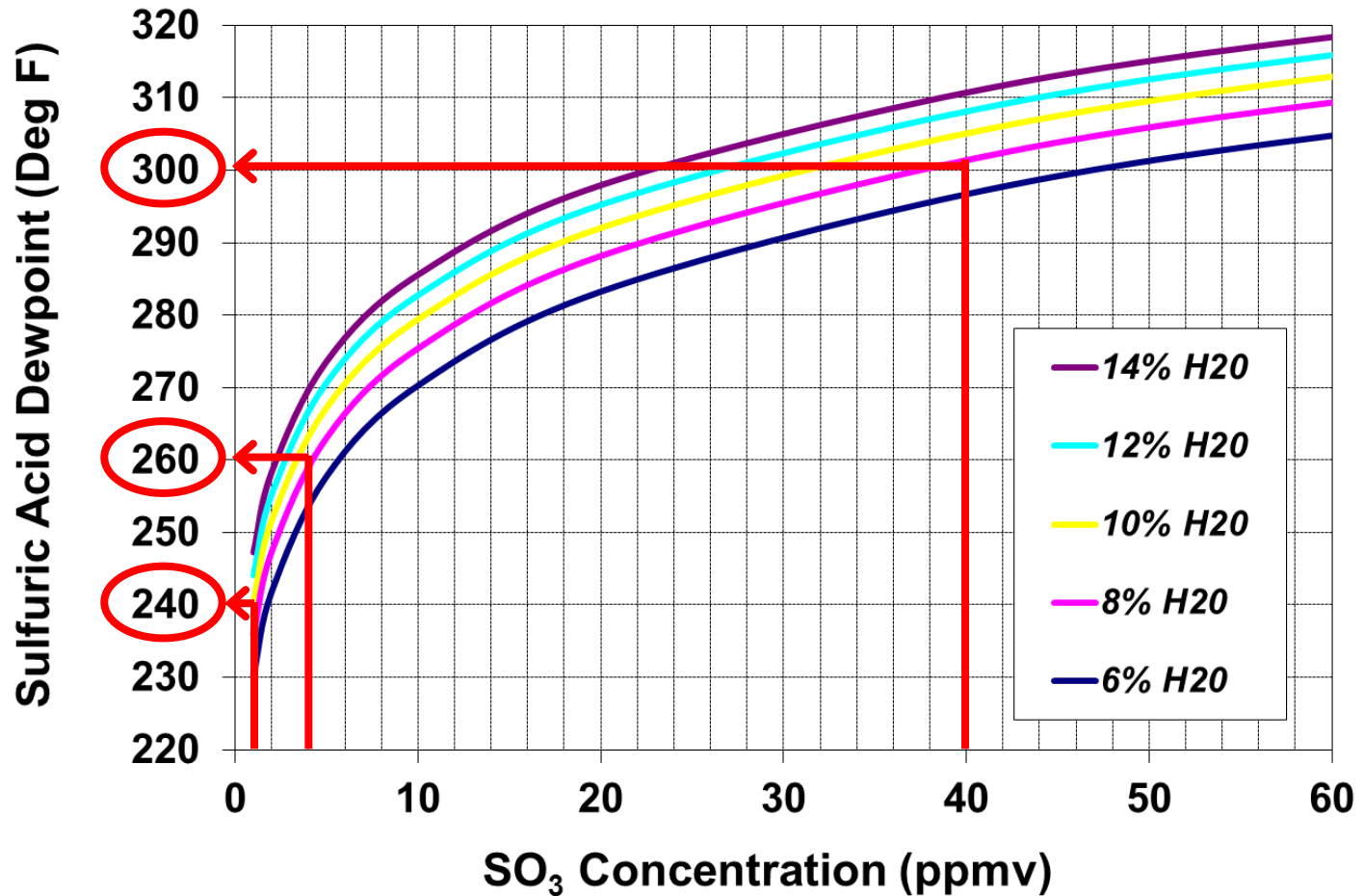
2) *Reduce Exit Gas Temp from Air Heater*  
*(Part II of Workshop)*

# Strategy: Step 1

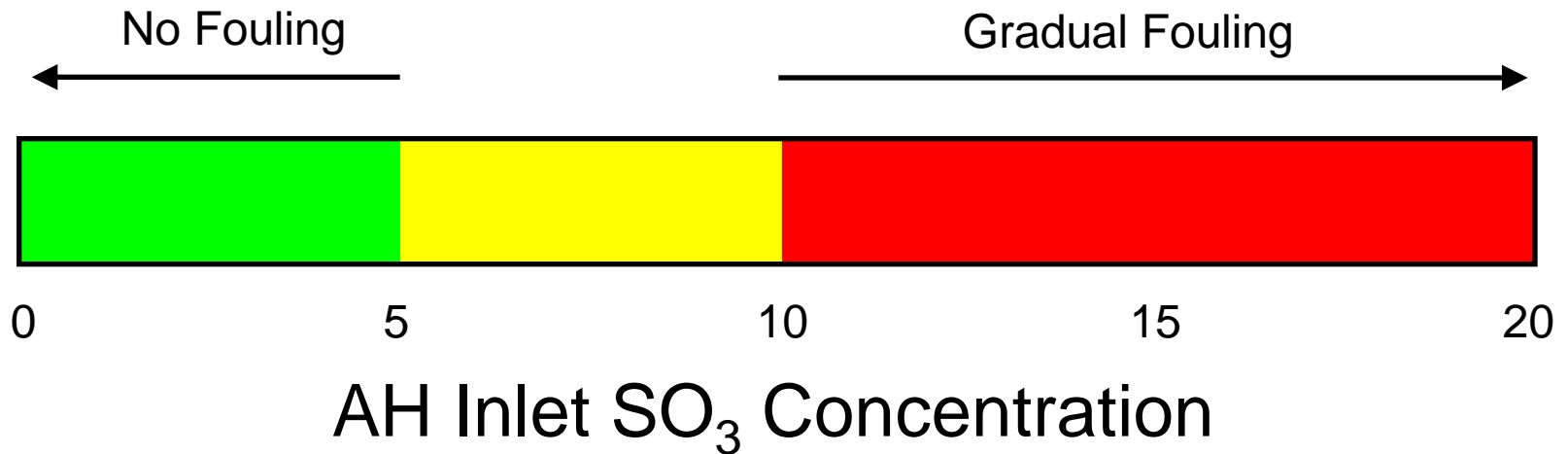


***Result: No Fouling of Air Heater***

# Strategy: Step 2

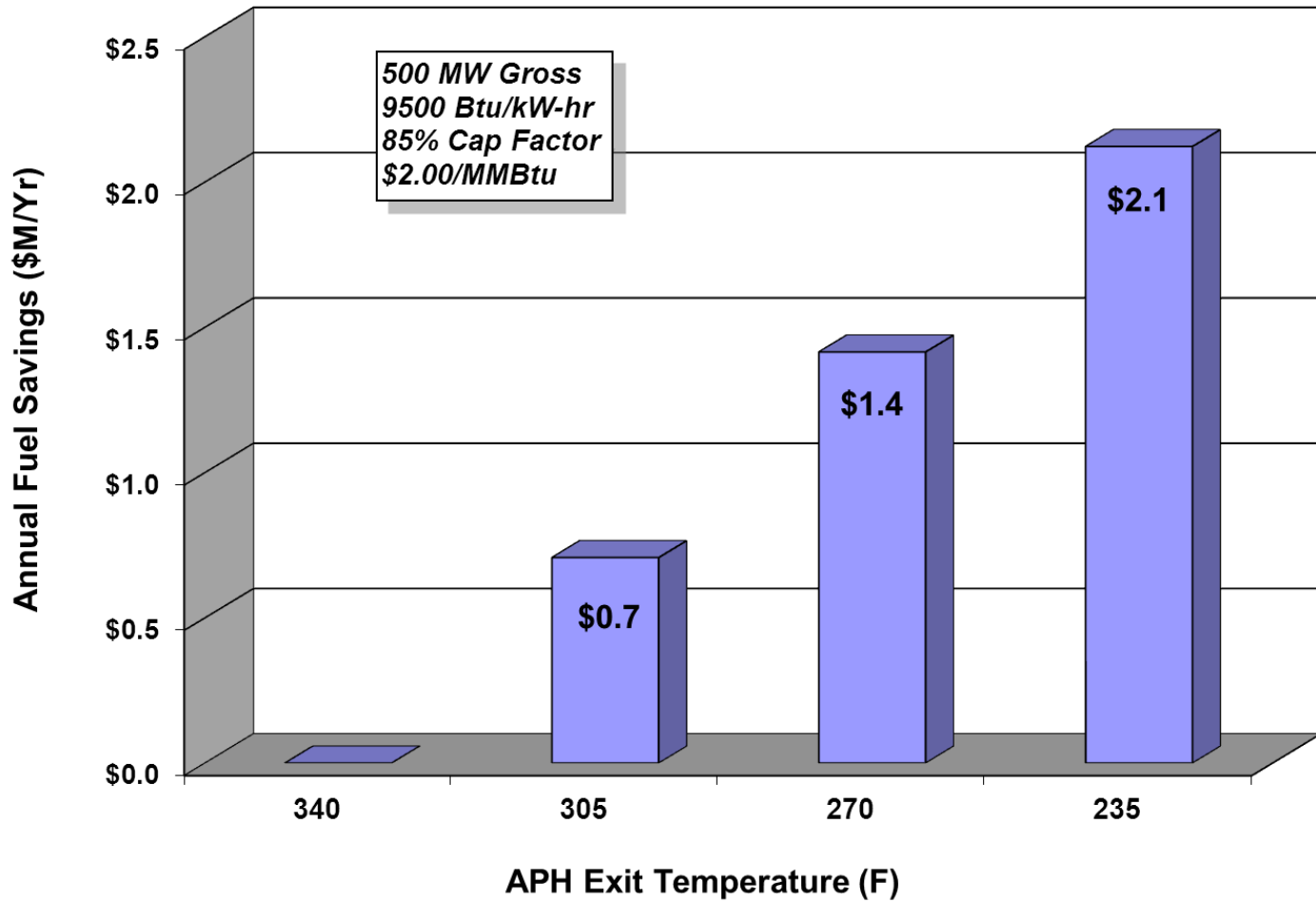


# Air Heater Fouling Impact



*Goal: Control  $\text{SO}_3$  to 5 ppm or less at AH inlet*

# Strategy: Heat Rate Benefit



# Strategy: Other Co-Benefits

- Reduced CO<sub>2</sub> Emissions
  - higher unit energy efficiency
- Enhanced Mercury Capture
  - greater carbon absorption capacity
  - less SO<sub>3</sub> interference
- Enhanced ESP Performance
  - lower gas volumetric flow (higher SCA)
  - lower ash resistivity (temp and SO<sub>3</sub> effect)
- Reduced Gas Path Pressure Drop

# SBS Injection Installations

URS

- Installation List
  - 24 Boilers
  - 11 Plants
  - 15,000 MW
- Since 2005...

# Questions?

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