Worldwide Pollution Control Association

WPCA-Entergy

"Increasing Energy Efficiency of Existing Units" Seminar

January 22, 2014

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URS

"Approaches to Improve Air Preheater Thermal Efficiency"

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

Workshop Outline

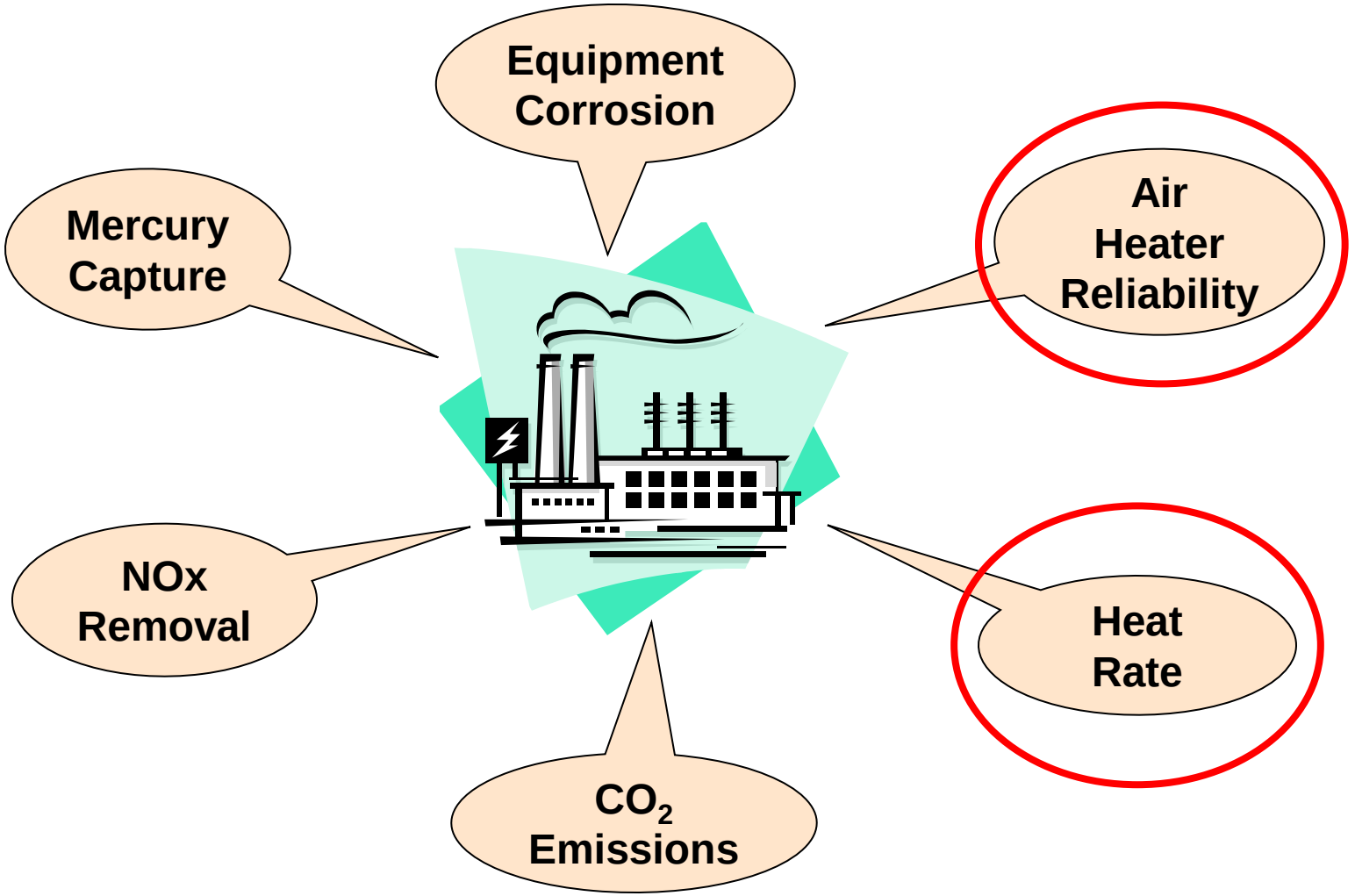
- SO_3 Impacts
- Air Heater Operation Strategy
- Co-Benefits
- SO_3 Control Technology

I

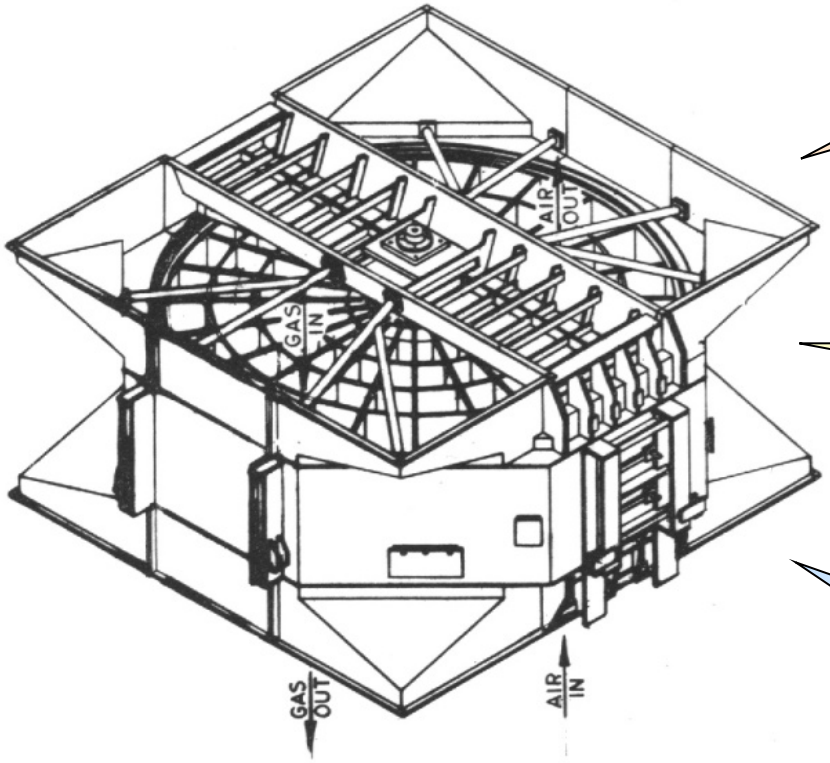
- APH Research Program
- Pilot Demonstration Results
- APH Upgrade Approaches
- Summary

II

SO_3 Adversely Impacts …



Air Heater Fouling Agents



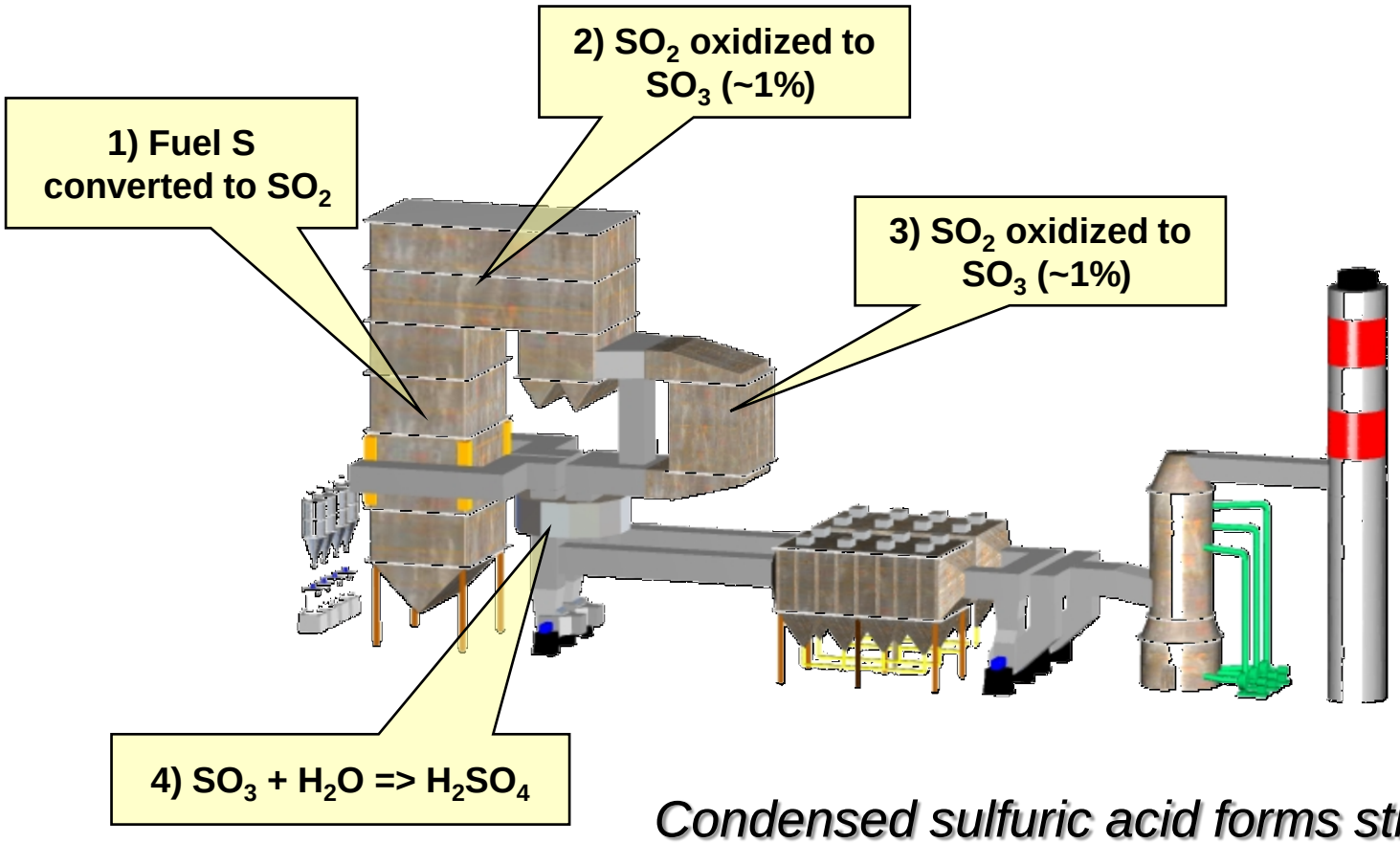
Source: Alstom Air Preheater Company

Ash

Sulfuric Acid

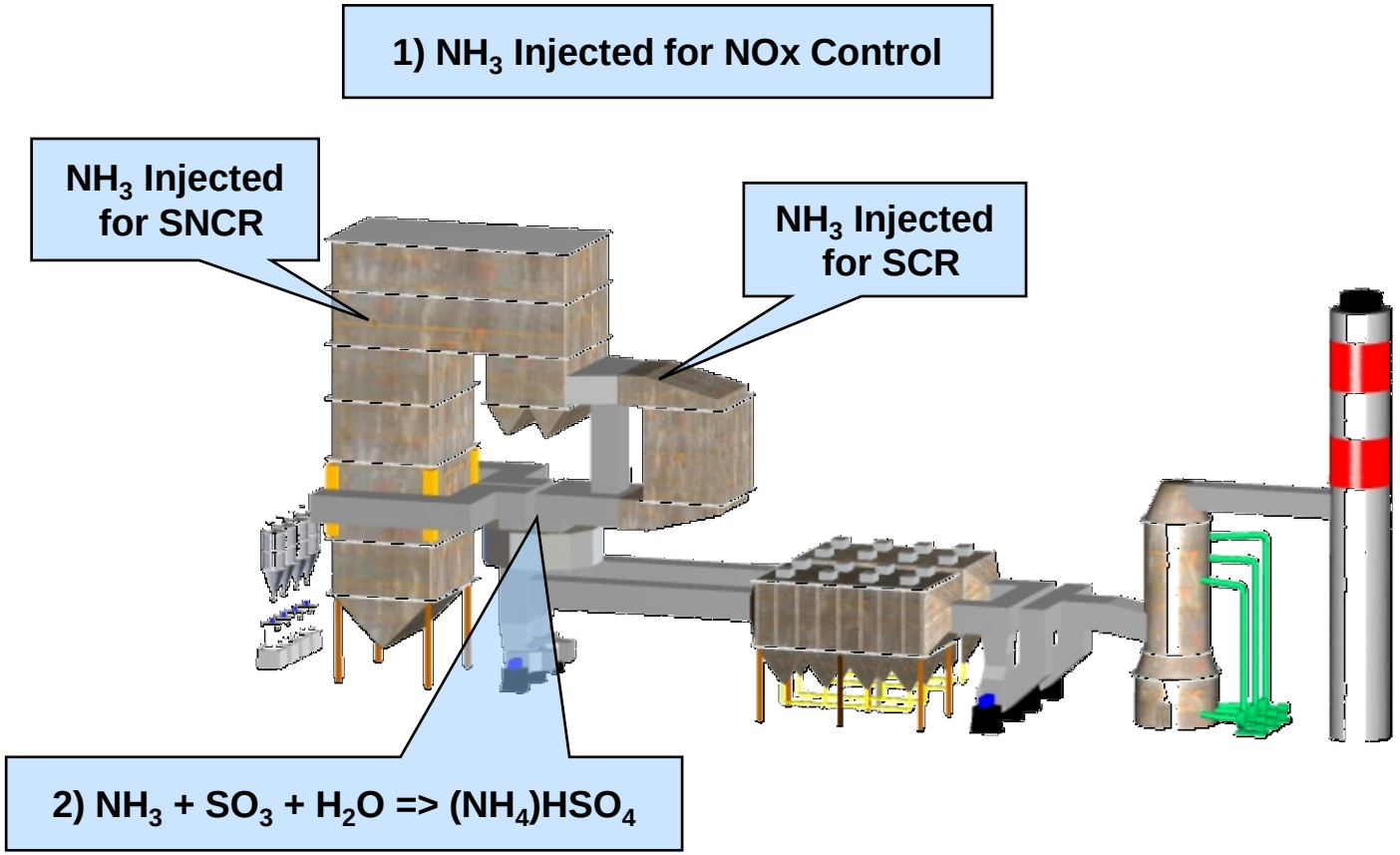
Ammonium Bisulfate

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

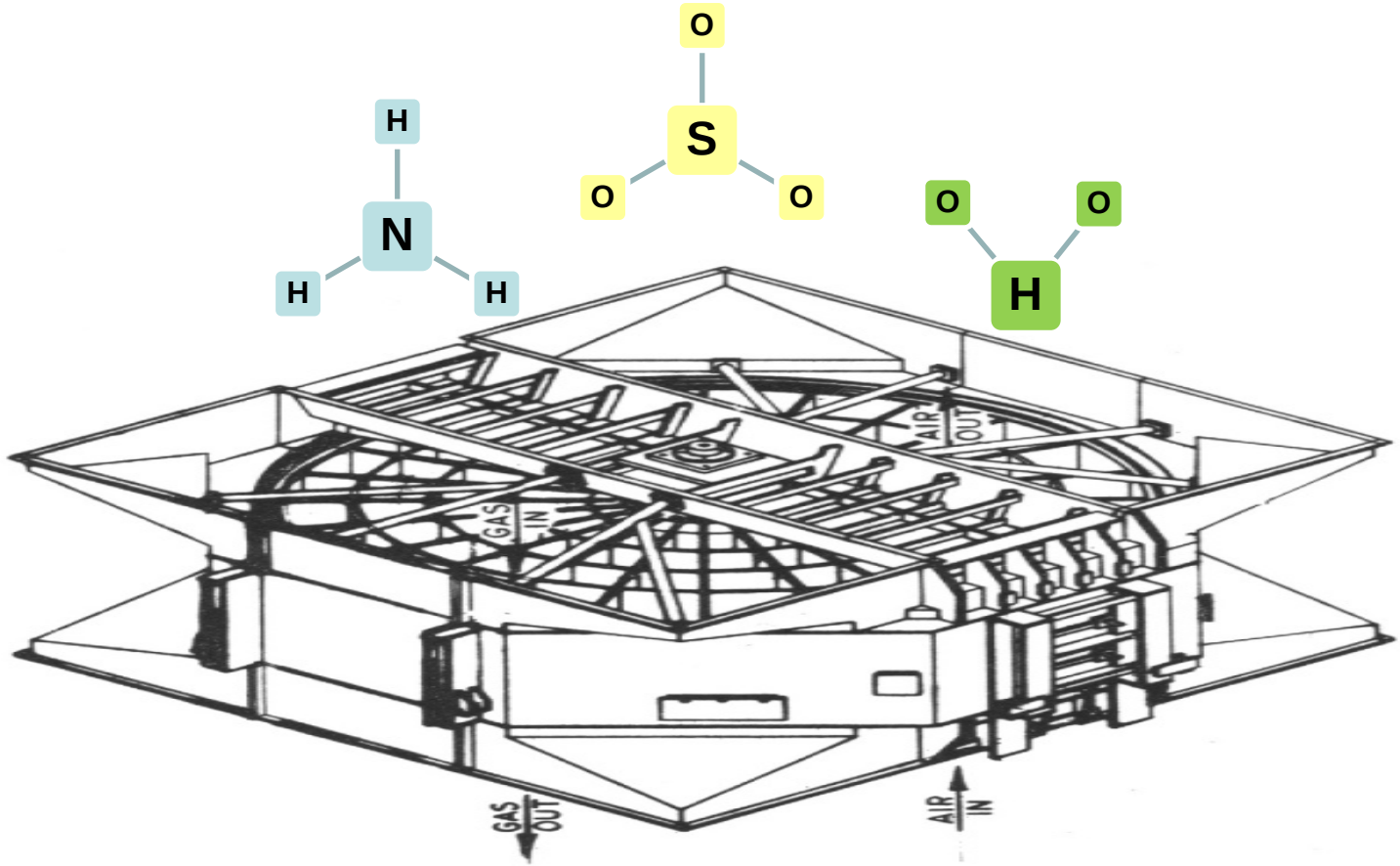
1) Inject Sorbent to Remove SO_3 Prior to Air Heater

$$NH_3 + SO_3 + H_2O \text{ -» } (NH_4)HSO_4$$

$$SO_3 + H_2O \text{ -» } H_2SO_4$$

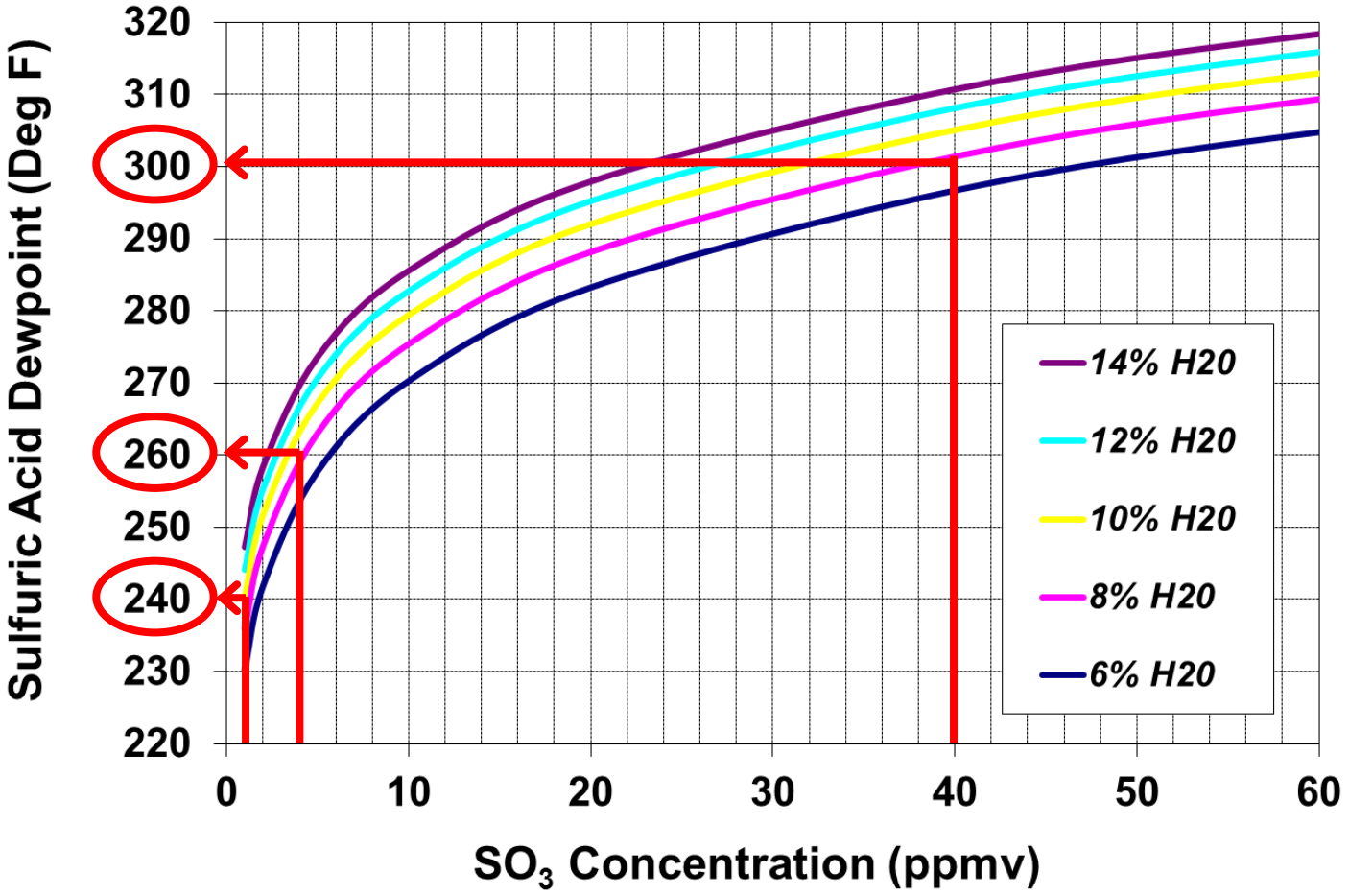
2) Reduce Exit Gas Temp from Air Heater
(Part II of Workshop)

Strategy: Step 1

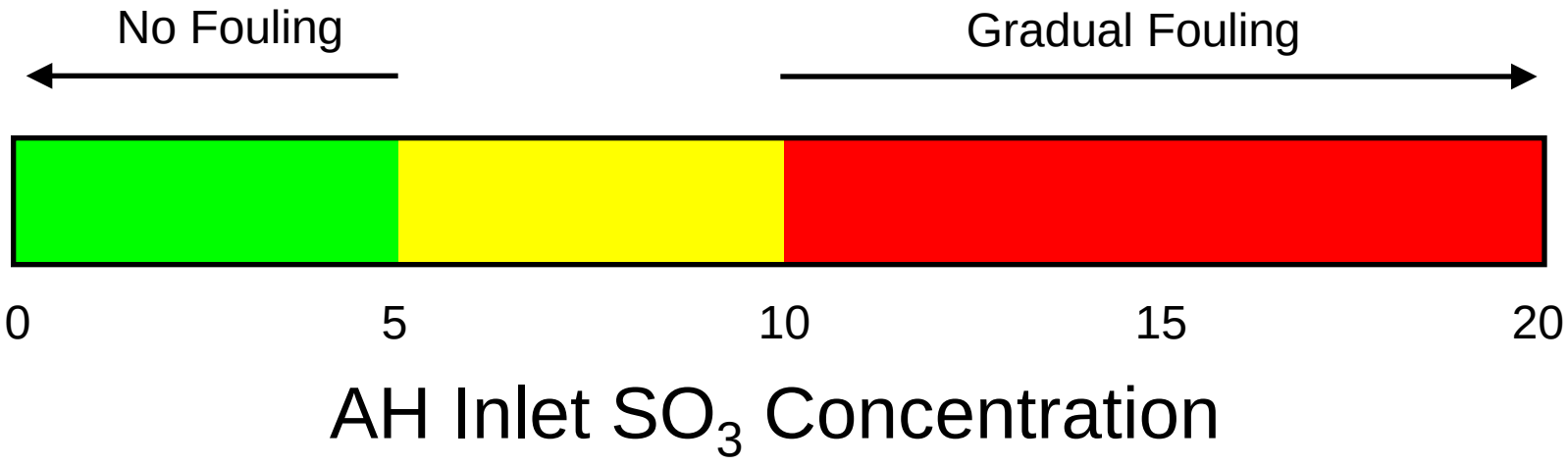


Result: No Fouling of Air Heater

Strategy: Step 2

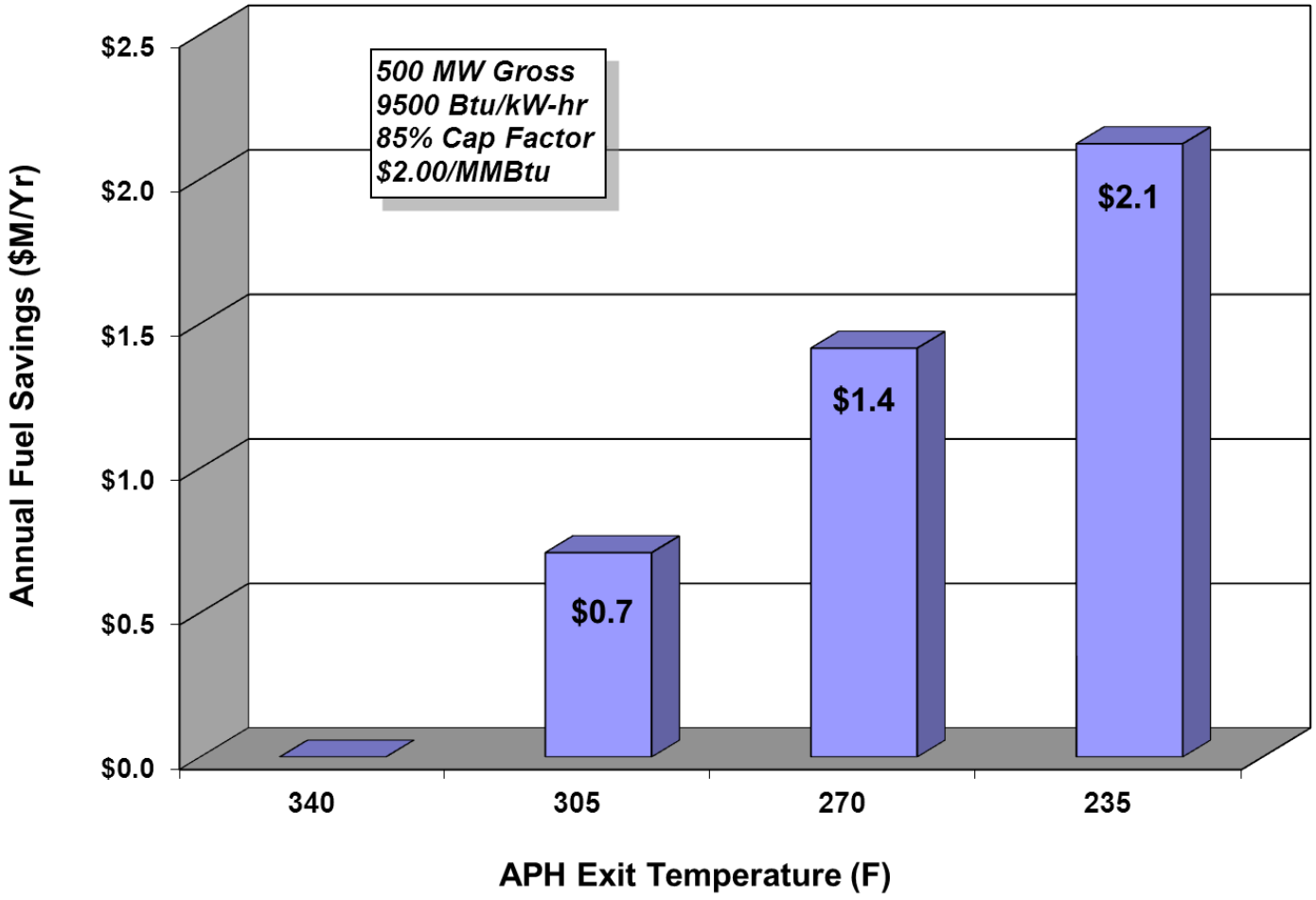


Air Heater Fouling Impact



Goal: Control SO_3 to 5 ppm or less at AH inlet

Strategy: Heat Rate Benefit



Strategy: Other Co-Benefits

- Reduced CO_2 Emissions
  - higher unit energy efficiency
- Enhanced Mercury Capture
  - greater carbon absorption capacity
  - less SO_3 interference
- Enhanced ESP Performance
  - lower gas volumetric flow (higher SCA)
  - lower ash resistivity (temp and SO_3 effect)
- Reduced Gas Path Pressure Drop

SBS Injection Installations

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

Questions?

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