URS

"Strategy to Improve Air Preheater Performance via SO_3 Control"

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McIlvaine Hot Topic
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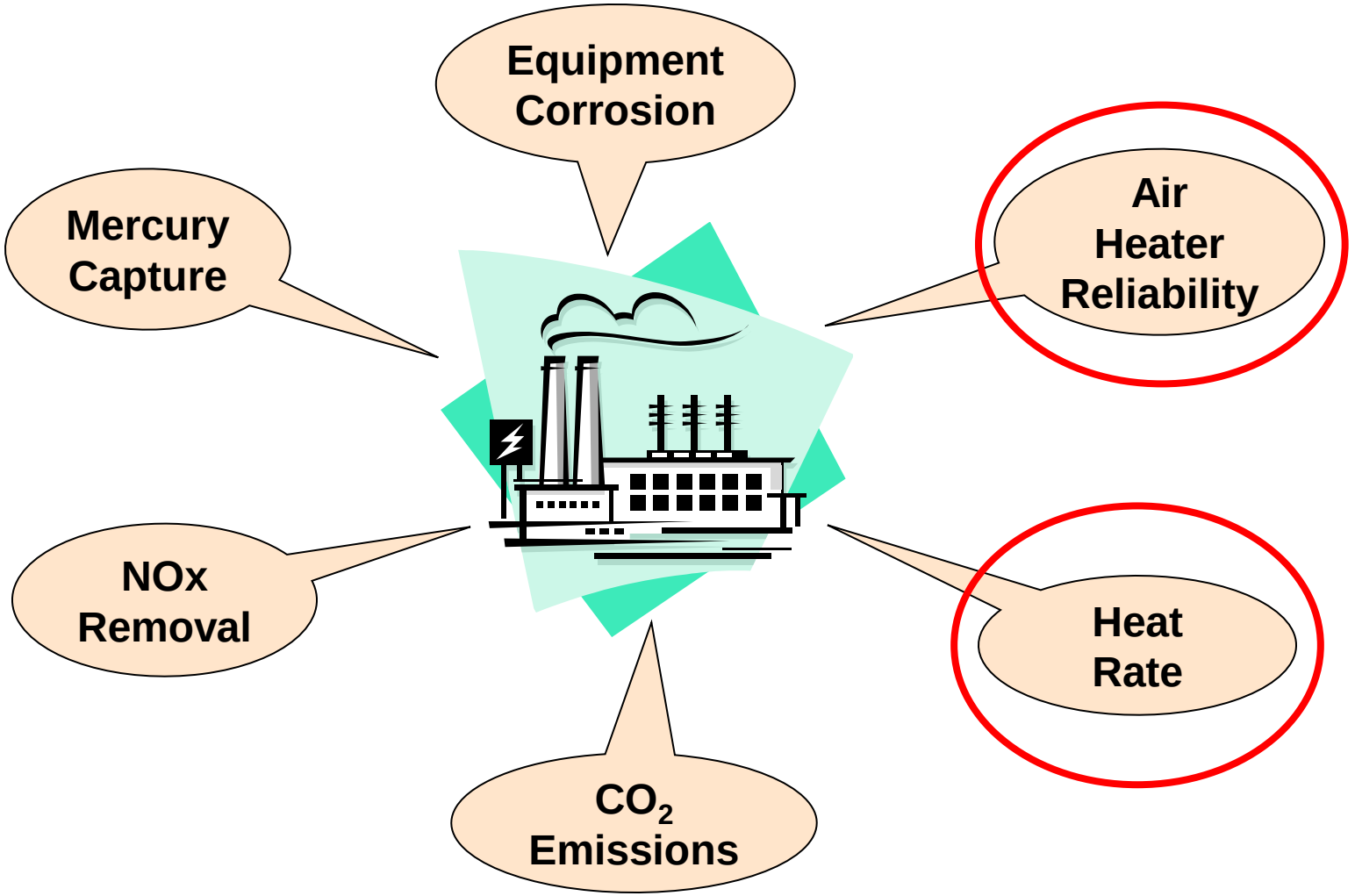
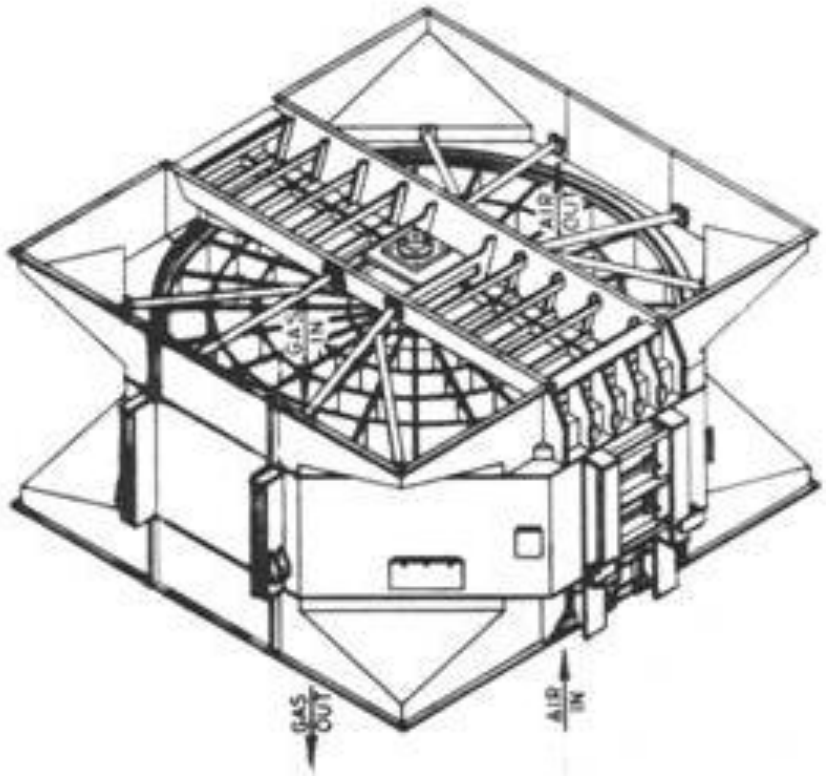
Outline

- SO_3 Impacts
- APH Fouling Mechanisms
- APH Performance Strategy
- Pilot Demonstration Results
- Economic Analysis
- Other Co-Benefits

SO_3 Adversely Impacts …



Air Heater Fouling Agents



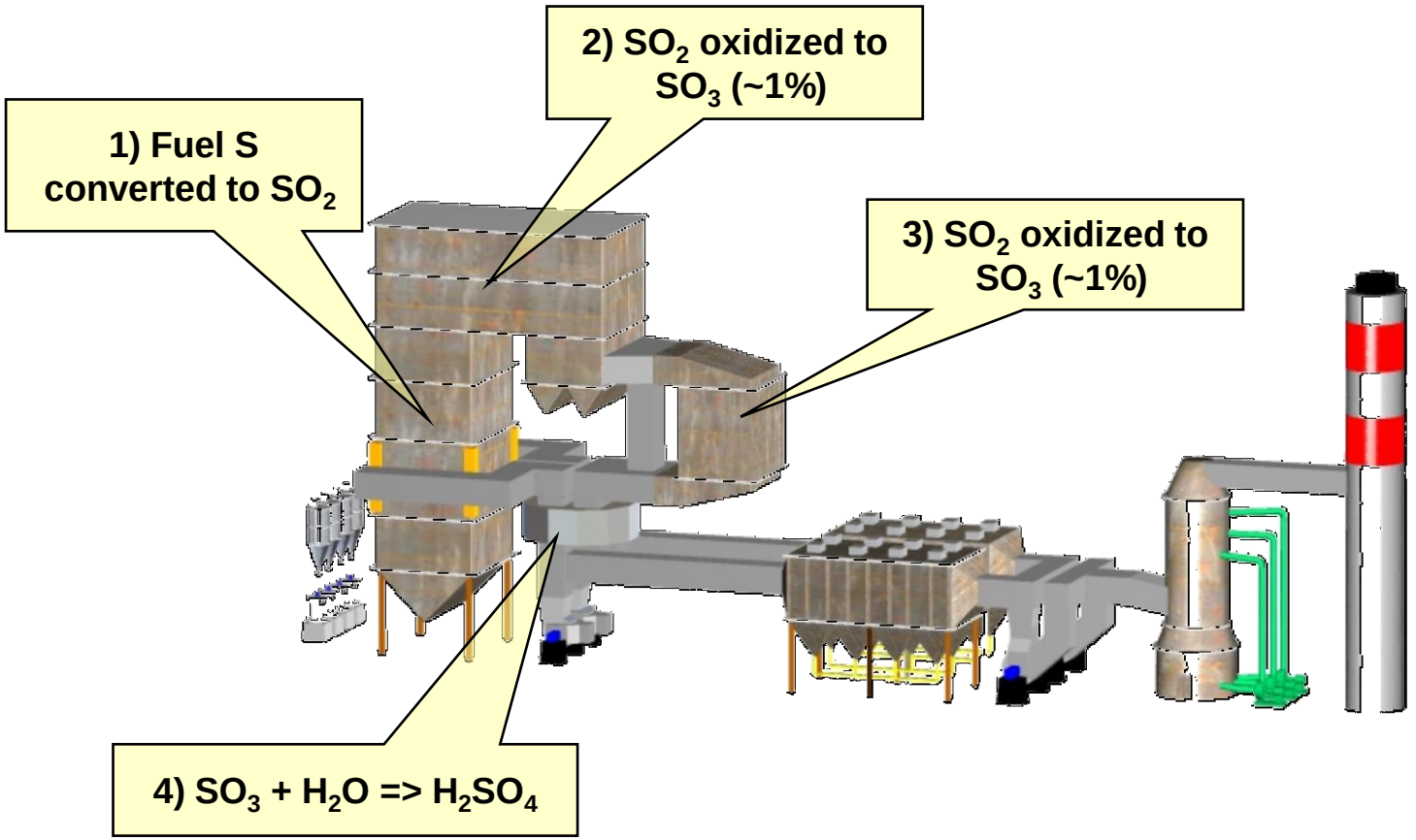
Source: Alstom Airpreheater Company

Ash

Sulfuric Acid

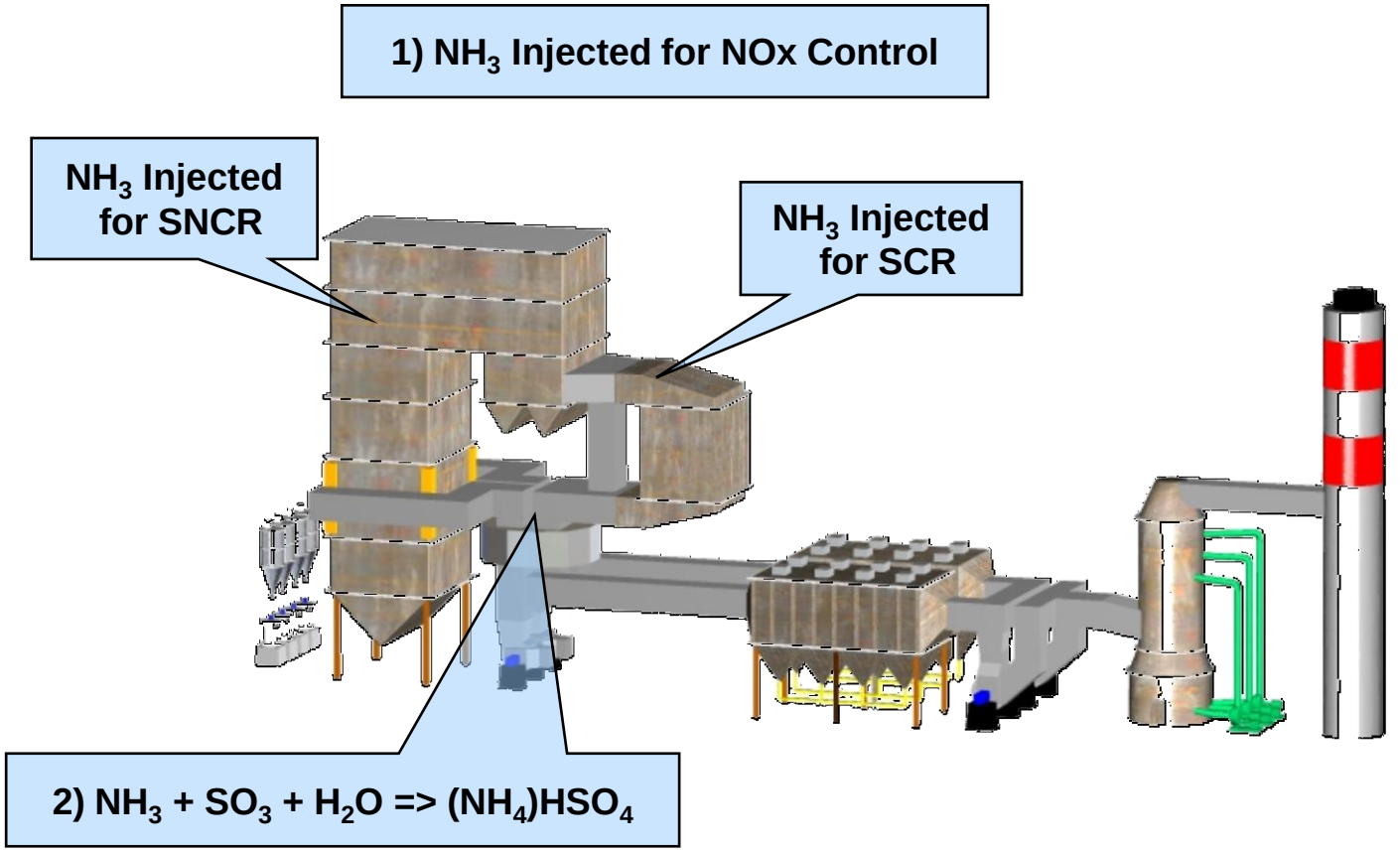
Ammonium Bisulfate

Sulfuric Acid Formation



Condensed sulfuric acid forms sticky, corrosive deposits in "cold-end" of APH

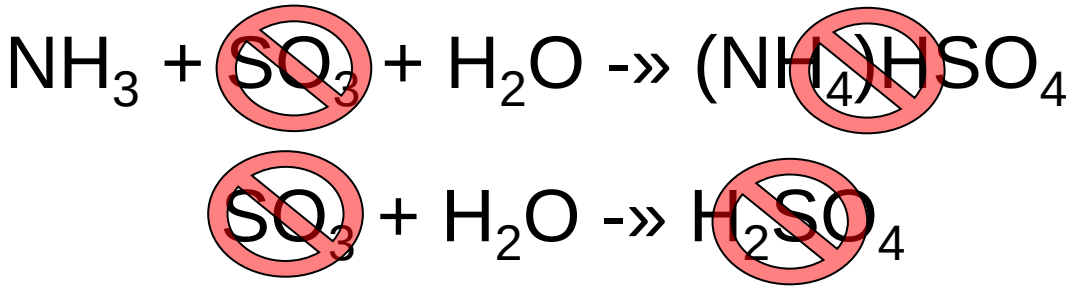
Ammonium Bisulfate (ABS)



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

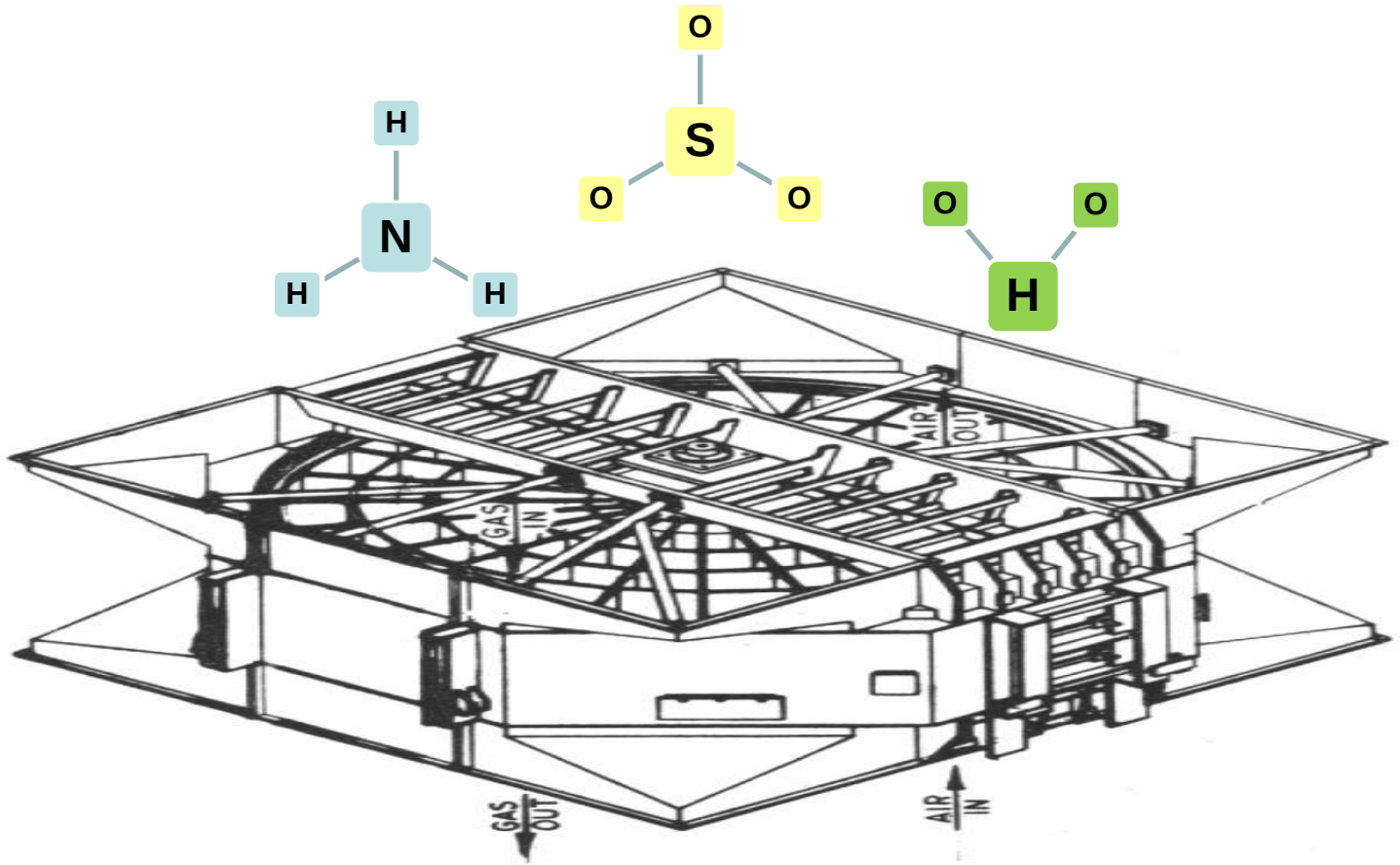
Strategy: APH Performance

1) Inject Sorbent to Remove SO_3 Prior to Air Heater



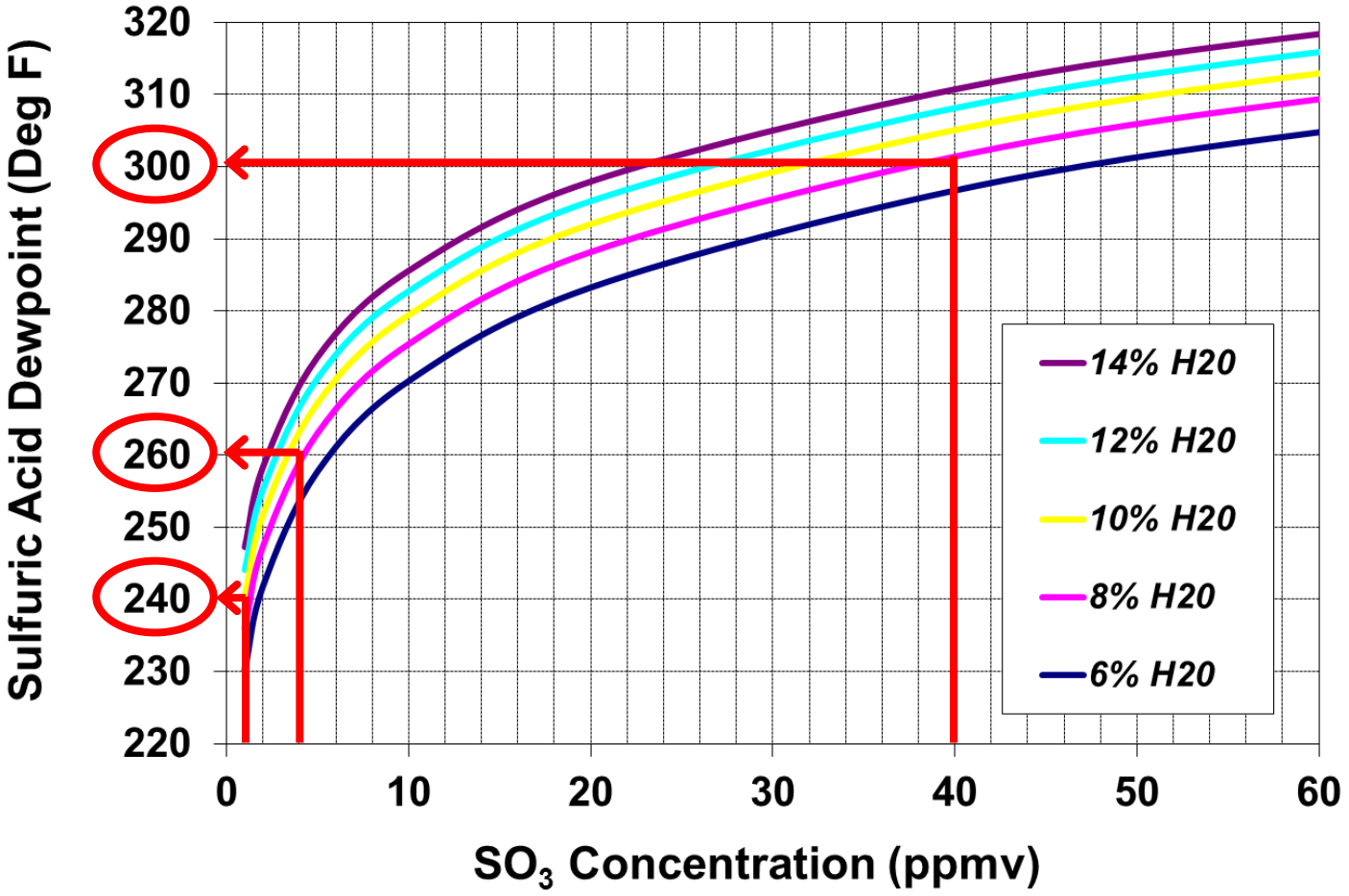
2) Reduce Exit Gas Temp from Air Heater

Strategy: Step 1

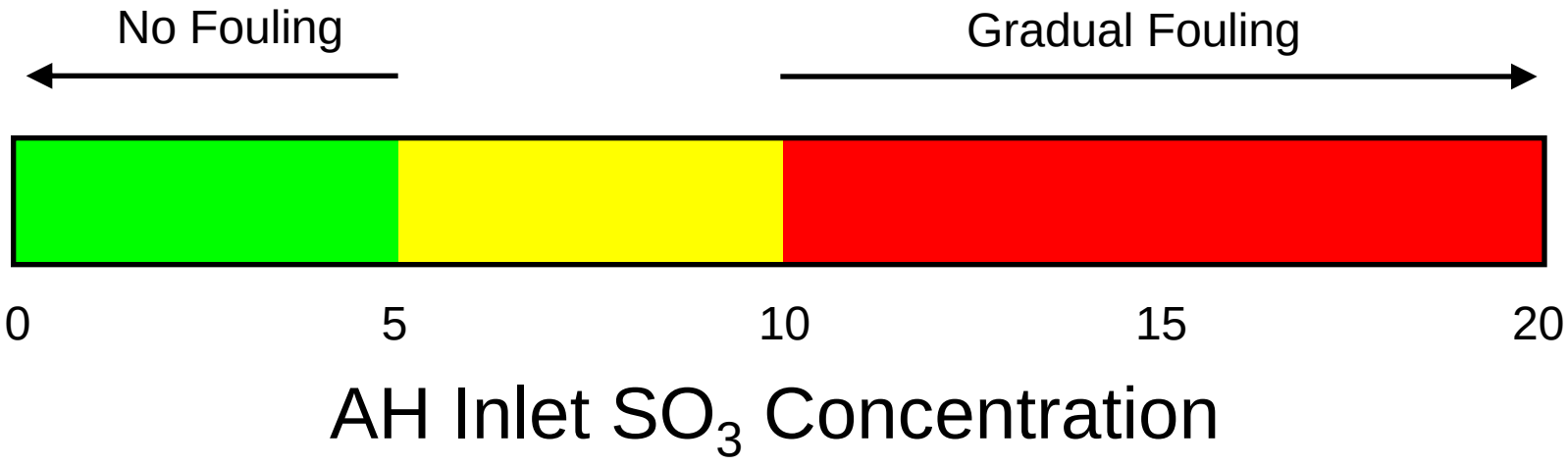


Result: No Fouling of Air Heater

Strategy: Step 2

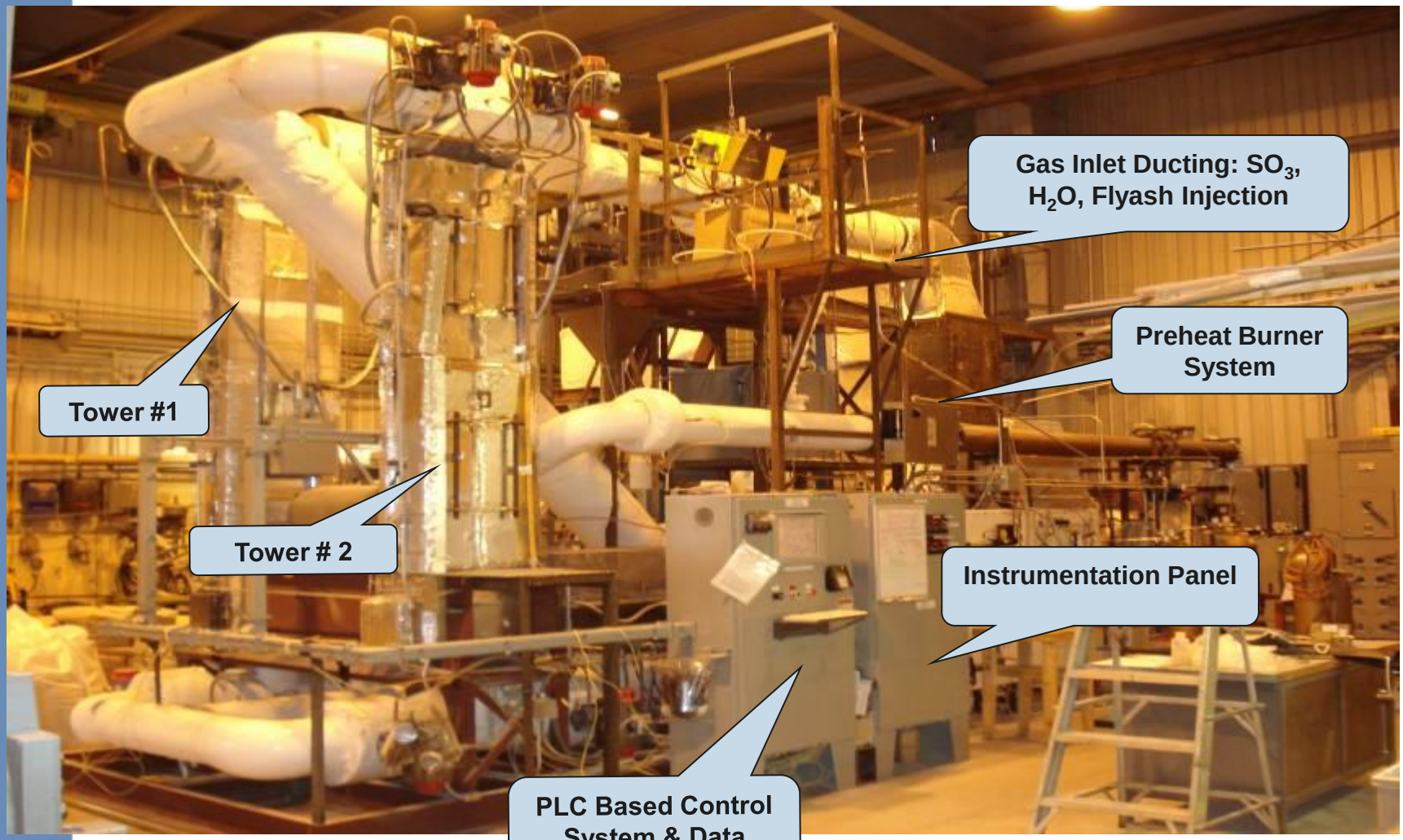


Air Heater Fouling Impact



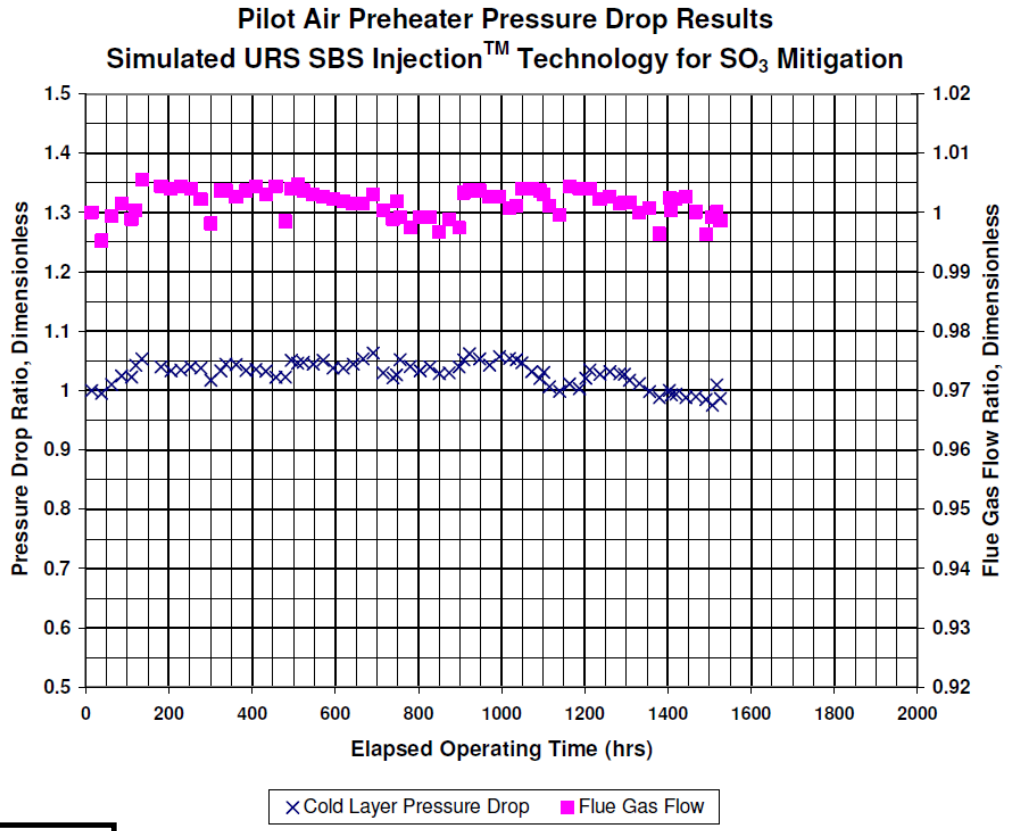
Goal: Control SO_3 to 5 ppm or less at AH inlet

Alstom Pilot APH Test Facility



Alstom Low-T AH Pilot Testing

- Sodium in Ash
- 5 ppm SO_3
- Operated 24/7
- 220 F gas out
- Typ. Soot-blowing
- 1500 hrs total
- No dP rise

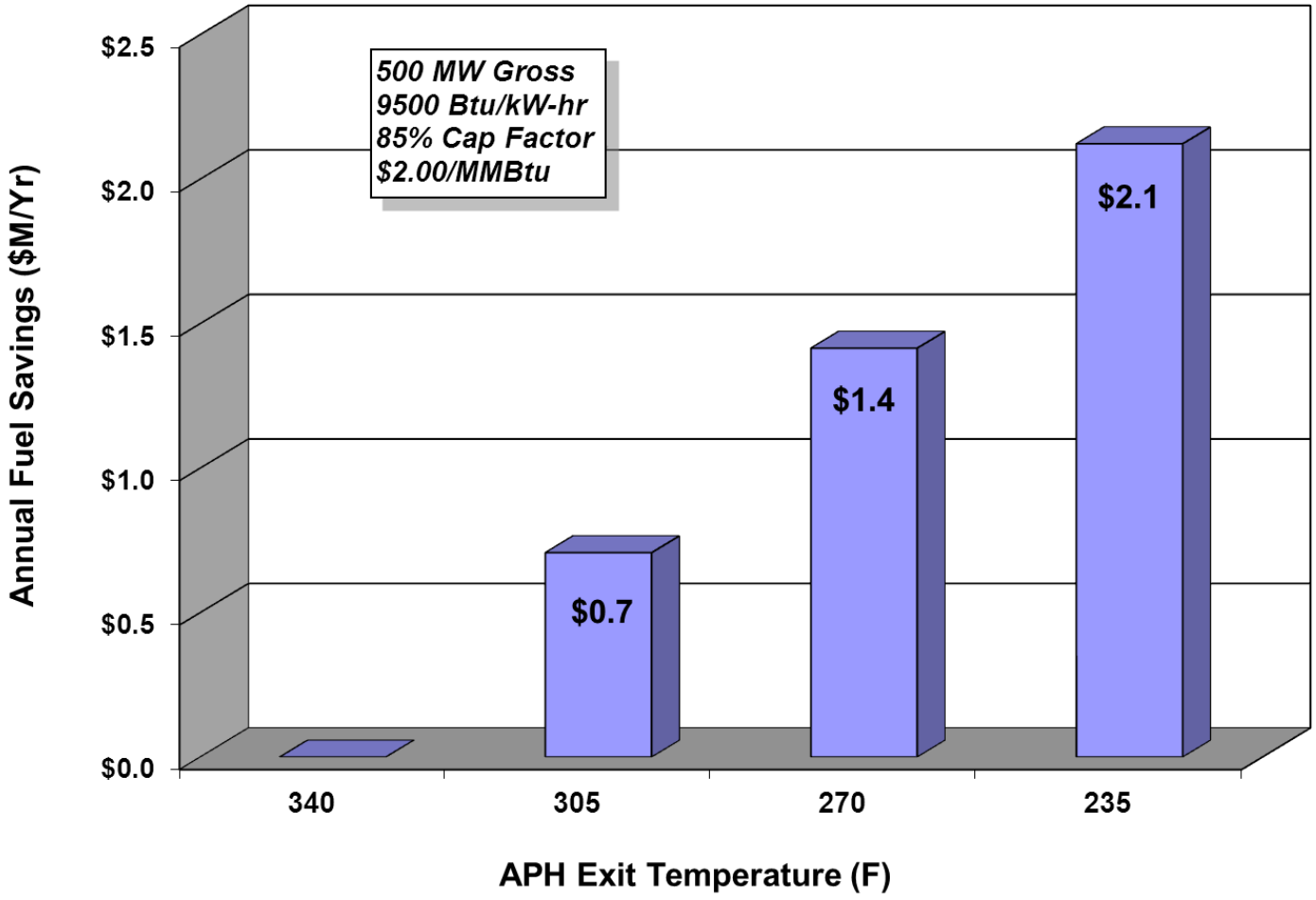


Full-scale implementation planned at SBS site in 2014

Simulated SBS Injection (220°F)

No Significant Deposit Thickness Was Found

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

Questions?

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