SBS Injection™ Technology and Benefits

Sterling Gray, AECOM

McIlvaine Hot Topic – Direct Sorbent Injection

April 9, 2015

LJUNGSTRÖM | ARVOS GROUP

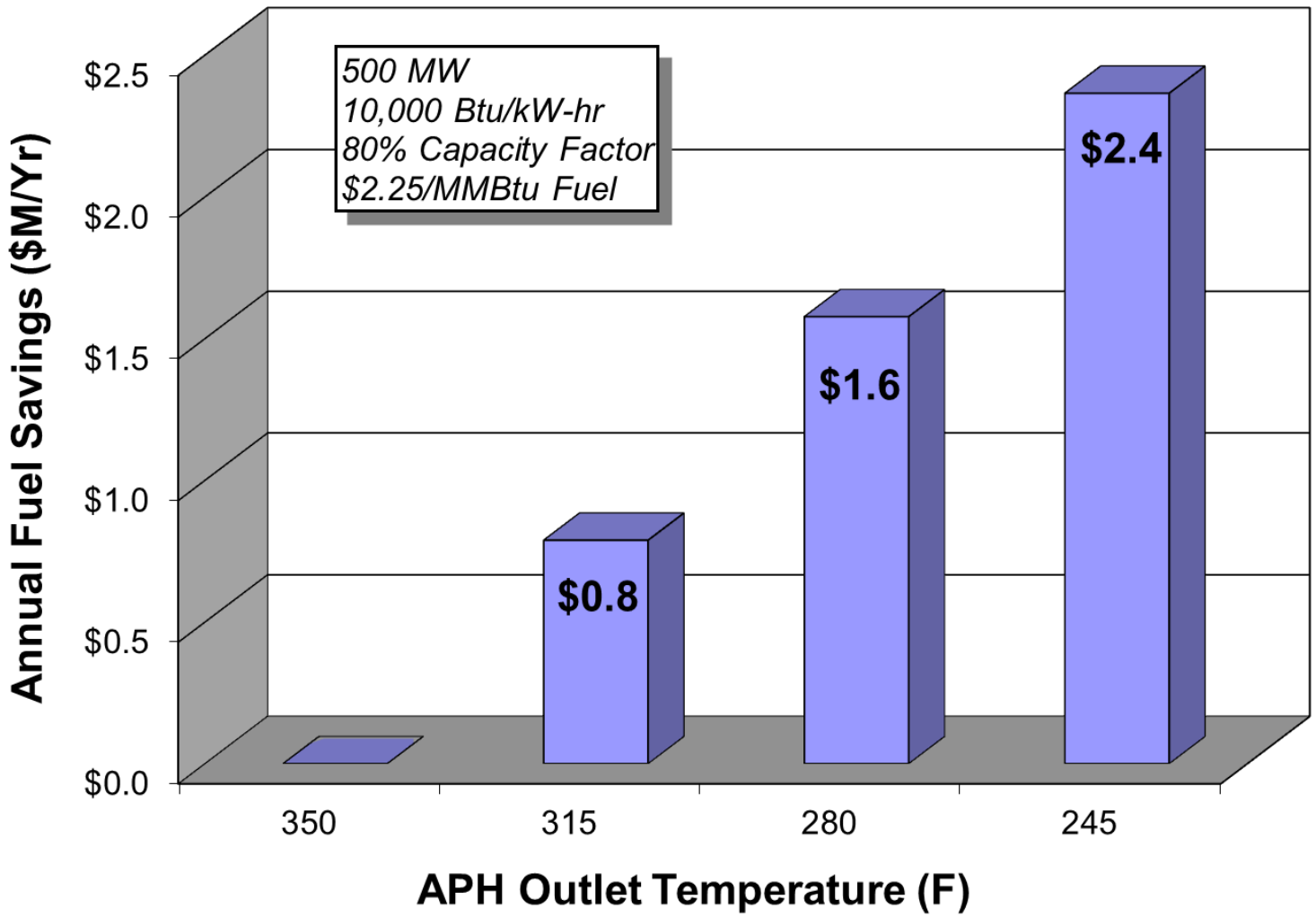
AECOM

Technology Overview

- Injection of “Sodium-Based Solution”
- Produces very small reactive sorbent particulate
- Achieves uniform dispersion and mixing of sorbent
- Captures nearly all SO_3 prior to APH
- Allows operation of APH at lower temperatures
- Improves unit efficiency and reduces fuel costs
- Captures HCl and Se to lesser extent

AECOM

Heat Rate Benefit



AECOM

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 Fan Aux Power Consumption
  - reduced gas flow and gas path pressure drop
- Reduced WFGD Water Consumption
  - cooler inlet flue gas temp
- Reduced Unit Derates
  - higher PA temp and greater fan margin

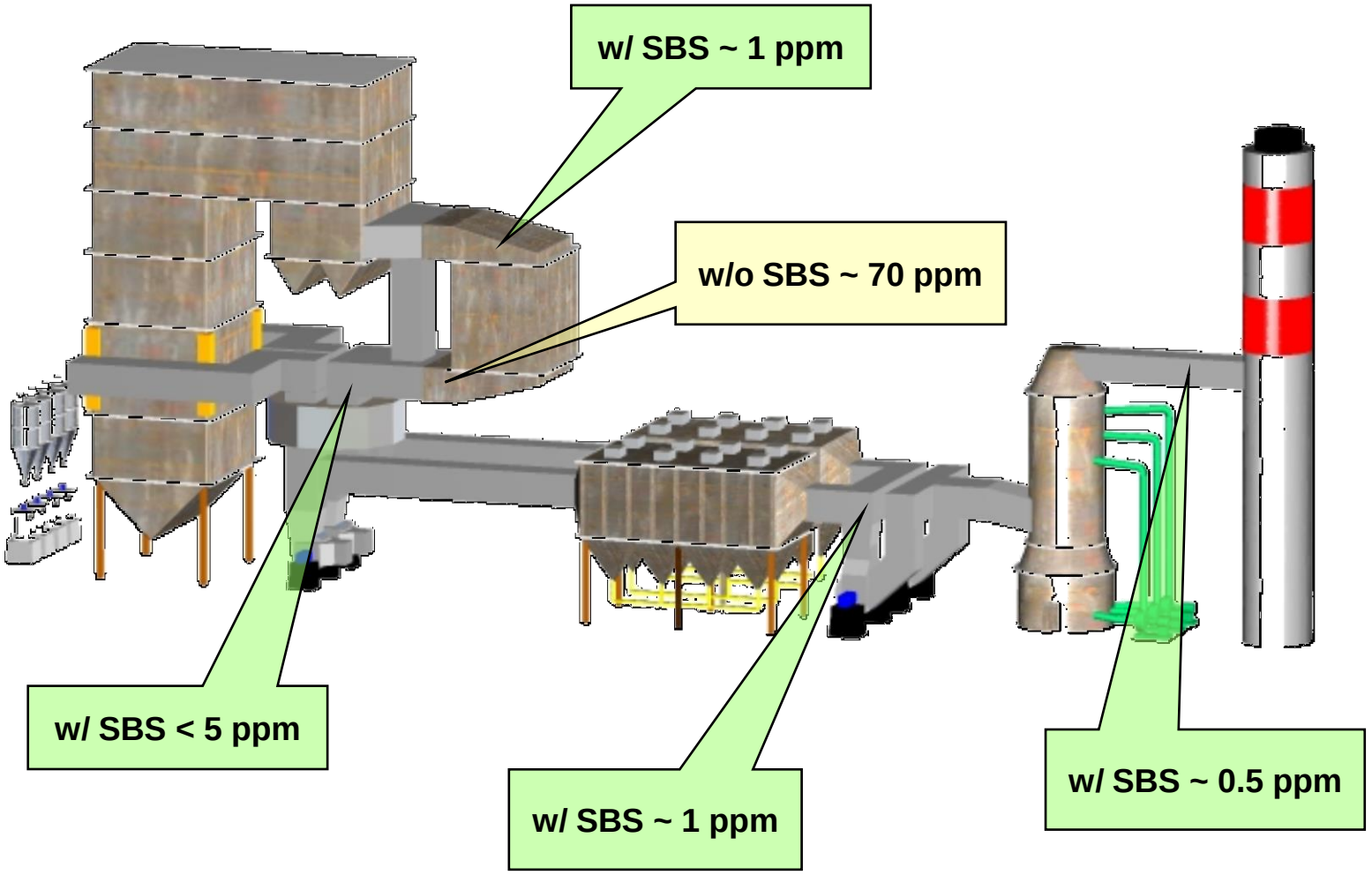
AECOM

Midwestern Power Plant

- 500 MW
- SCR-APH-ESP-WFGD
- Illinois Basin Fuel
- 5 lb SO_2 Fuel
- 40-70 ppm SO_3
- SBS Injection (2012)
- APH Upgrade (2014)

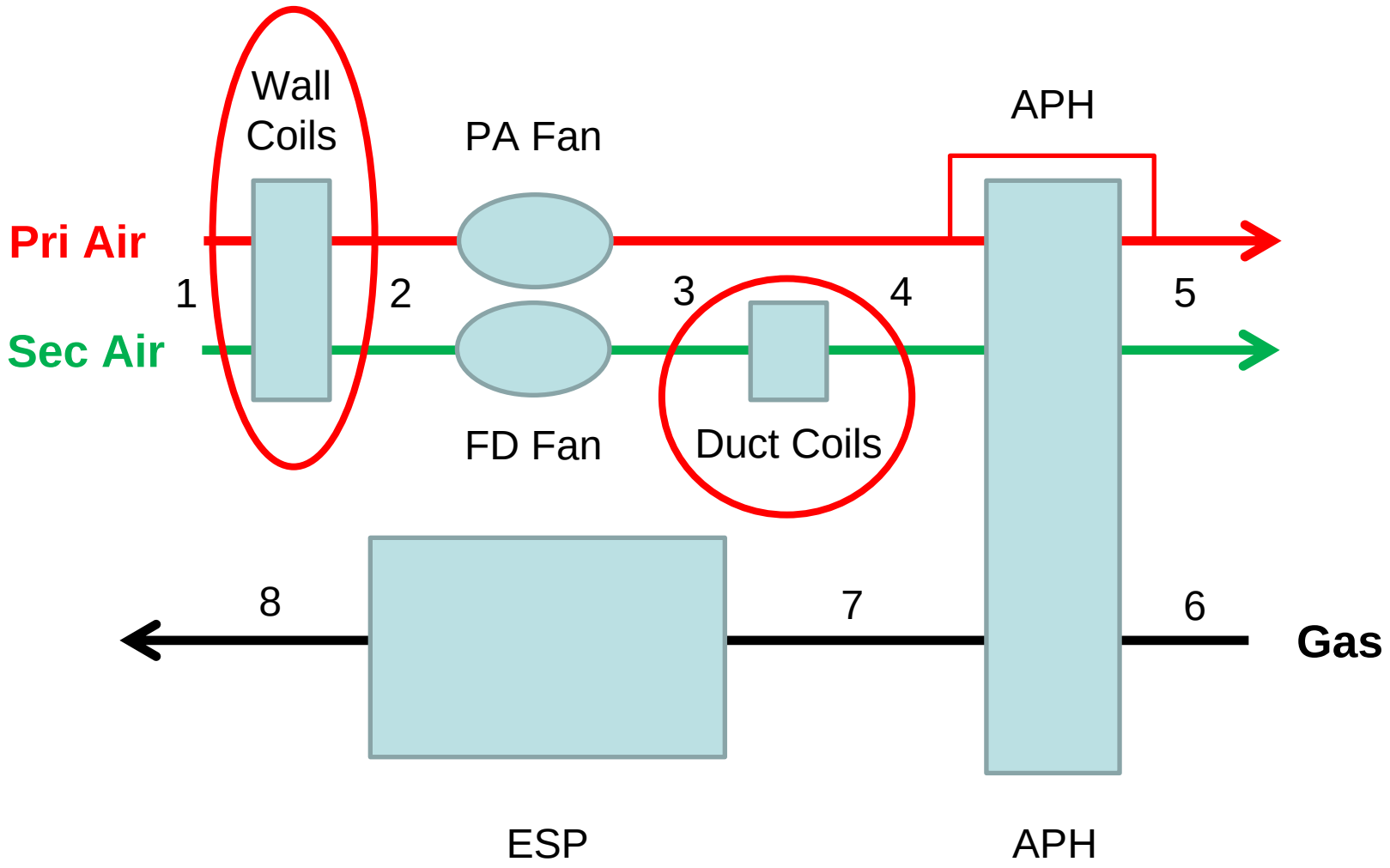
AECOM

Relative SO_3 Levels Thru Gas Path



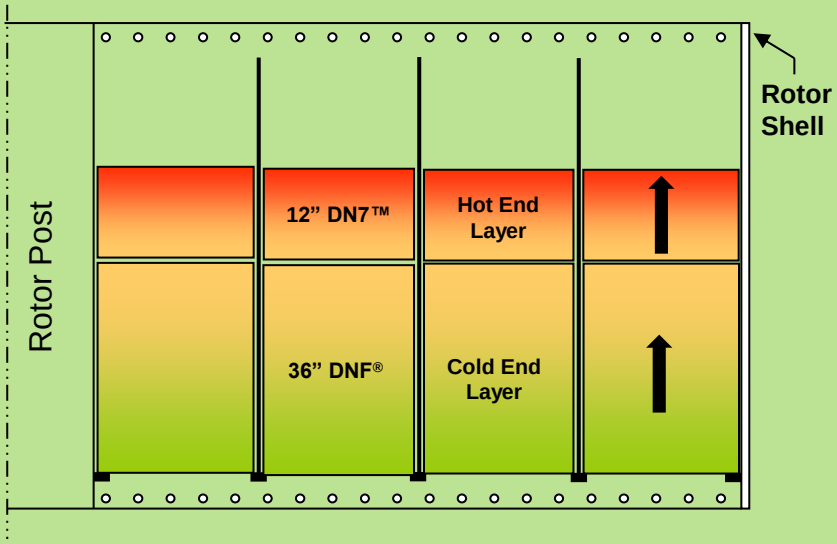
AECOM

APH Configuration and Operation



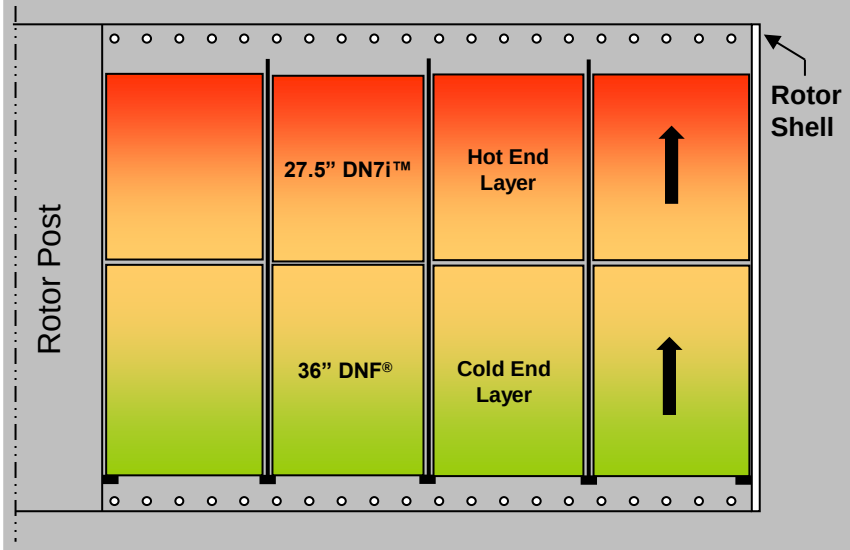
APH Upgrade Modifications

Old Configuration



Total heat transfer surface depth 48”

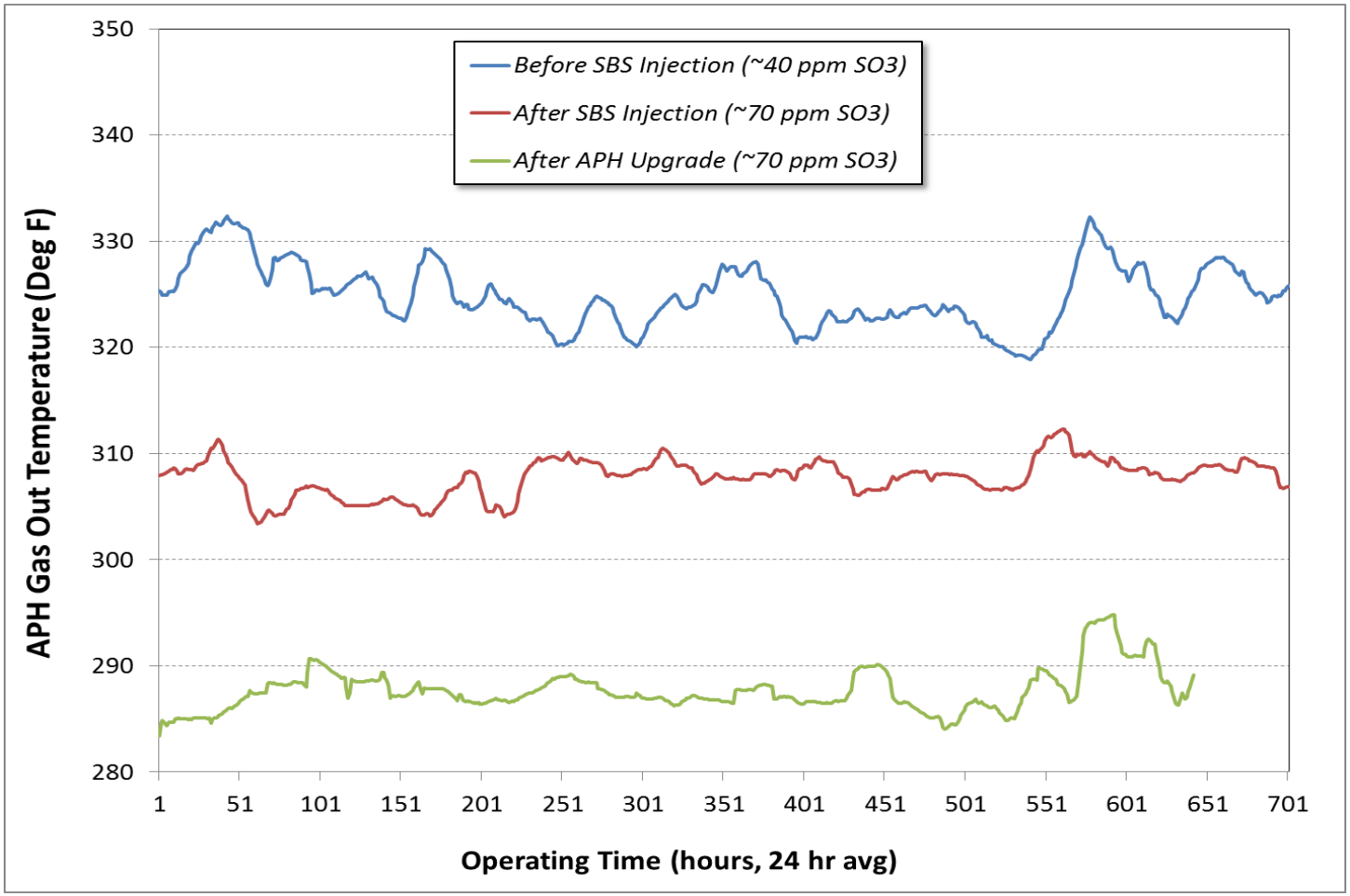
New Configuration



Total heat transfer surface depth 63.5”

AECOM

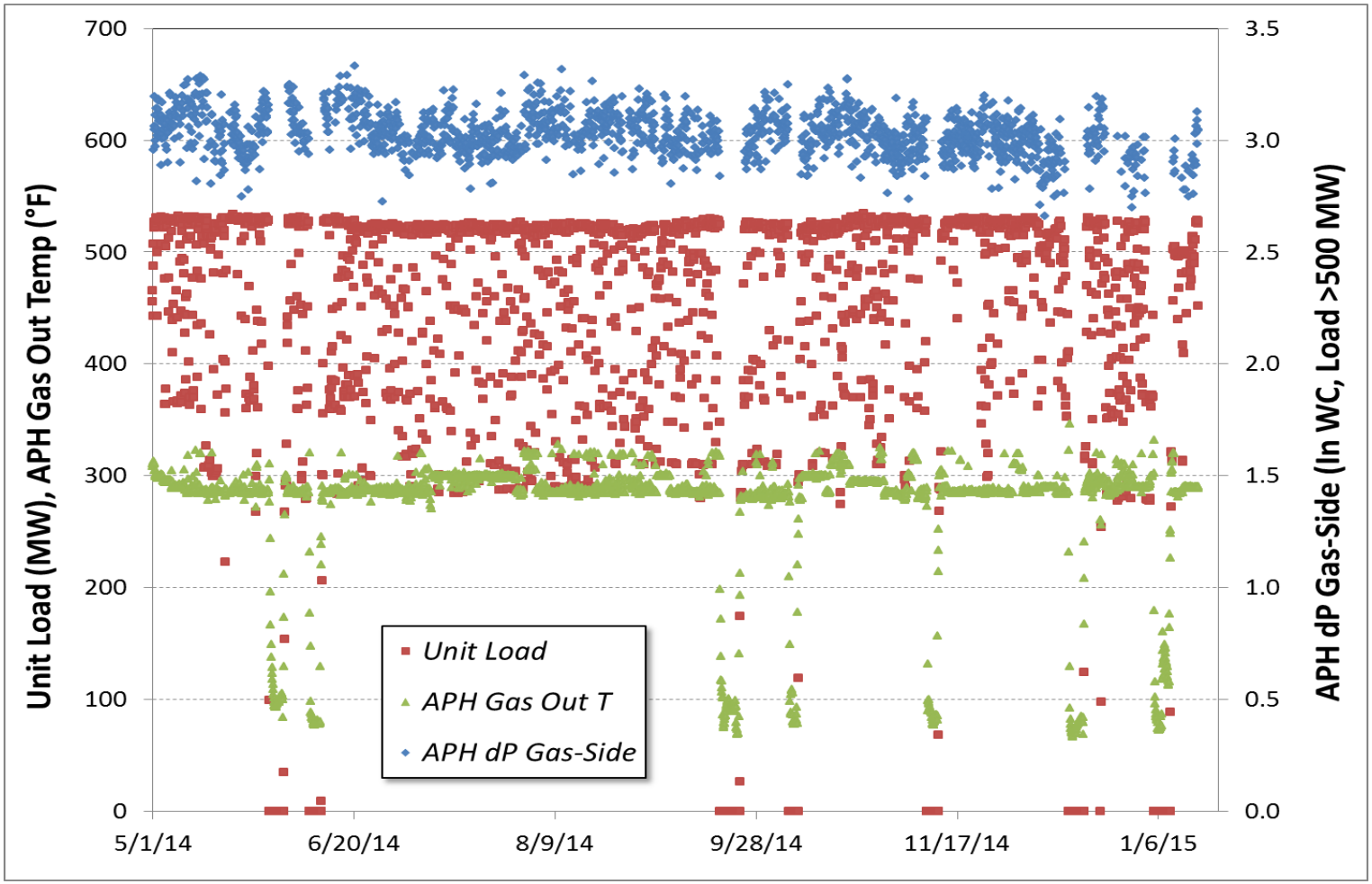
APH Temperature Changes



SO_3 Mitigation Allows Lower APH Op Temps

AECOM

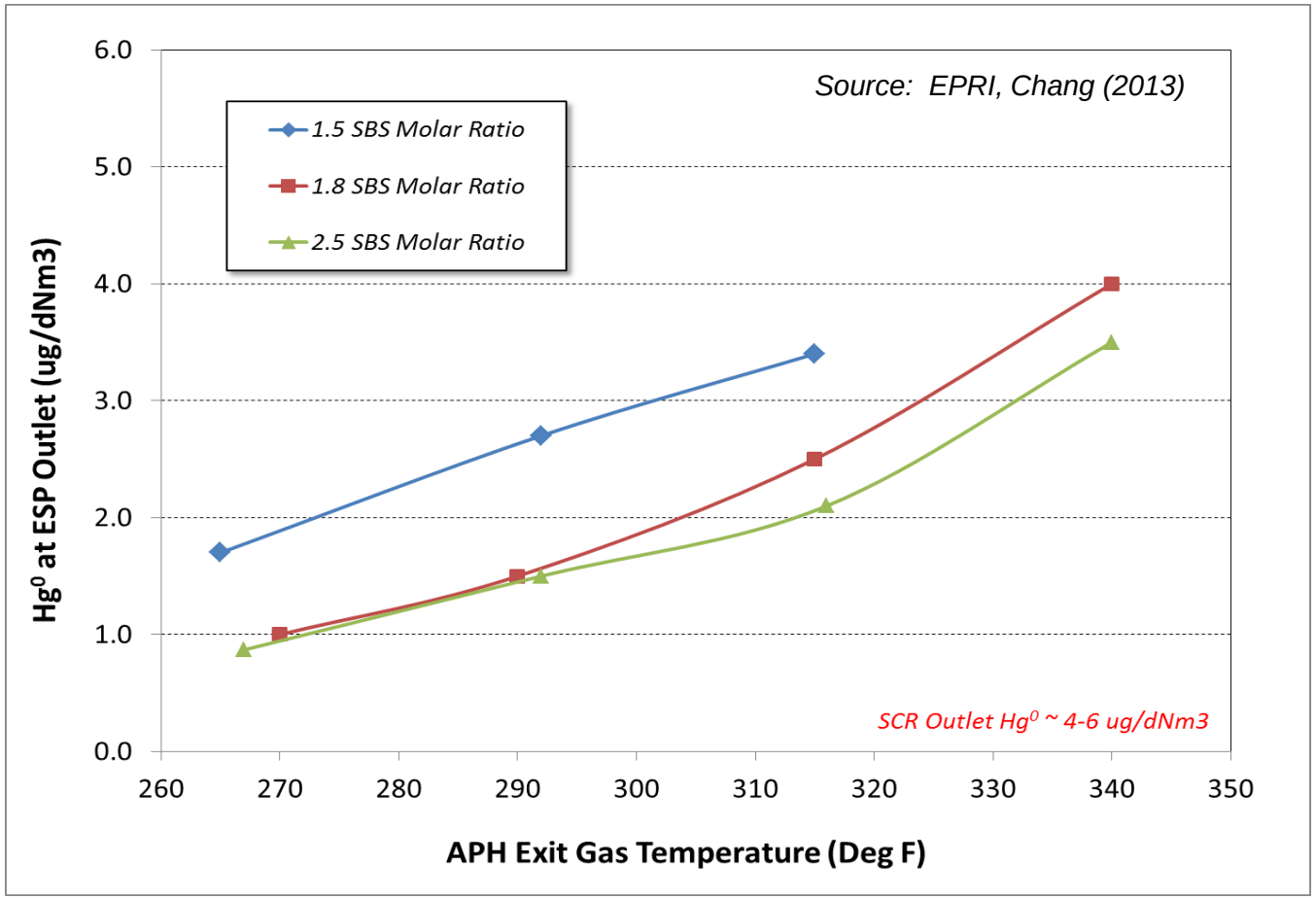
APH Upgrade Operating History



No APH dP Increase Over 8 Months Operation

AECOM

Impact on Mercury Capture



Lower APH Exit Temp = Lower Mercury Emissions

AECOM

Long-Term APH Demonstration

- Utility Drivers / Benefits
  - Heat Rate Improvement (O&M Savings)
  - CO_2 Reduction (Clean Power Plan)
  - Enhanced Mercury Capture (MATS)
  - Consider More Efficient APH Upgrade on 2nd Unit
- Approach
  - Conduct During Winter (lower ambient temp)
  - Reduce Fan/SAH Inlet Air Temp
  - Lower APH Gas Exit Temp Incrementally
    - From 285°F to ~ 250°F
  - Monitor Plant Operation & Performance
    - APH dp, Heat rate, Aux power, Opacity, Stack Hg

Anticipate Reporting Results in Summer 2015

AECOM

Thank You

sterling.gray@aecom.com
512-633-4975

LJUNGSTRÖM | ARVOS GROUP

AECOM