



## UCC Dry Sorbent Injection HCl Removal



UCC Dry Sorbent Injection

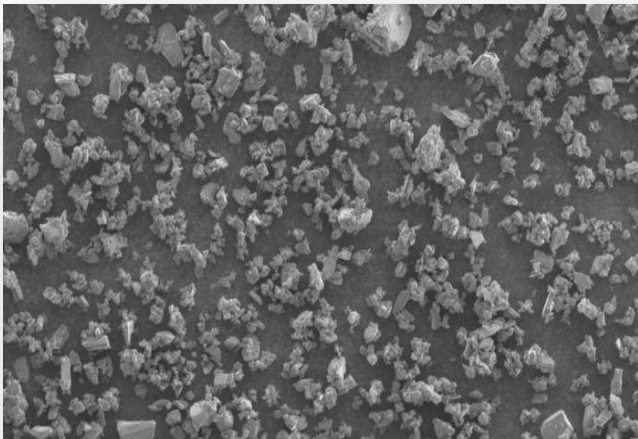
# SORBENT CHOICE

# HCl Removal – Sorbent Choice



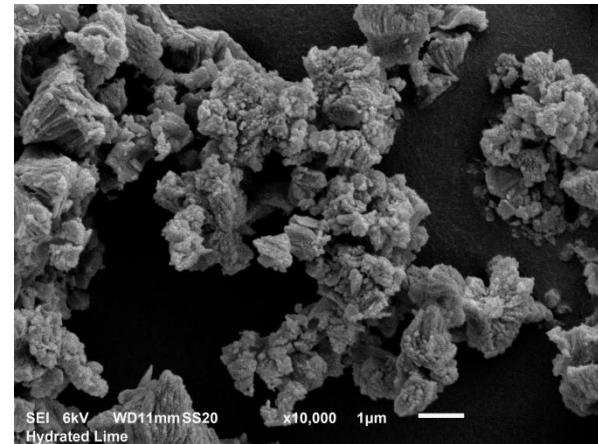
## Trona/SBC

- Use when:
  - When also need  $\text{SO}_2$  removal
  - Need very high removals ( $> 95\%$ )
  - ESP can't handle hydrated lime without a particulate increase
  - Ash sales not a concern



## Hydrated Lime

- Use when:
  - Most economical choice when don't also need  $\text{SO}_2$  removal – selective
  - Need to preserve ash sales

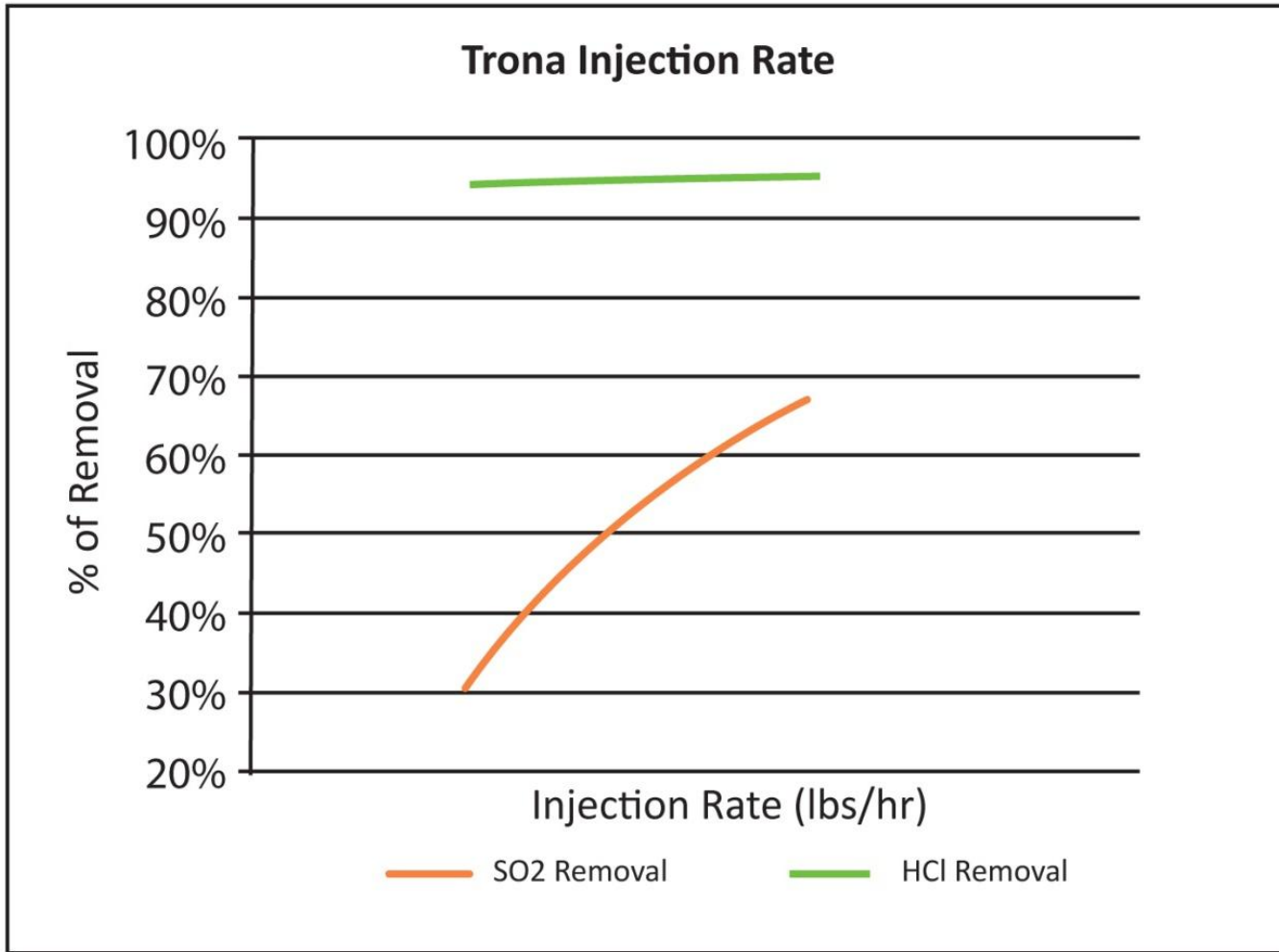




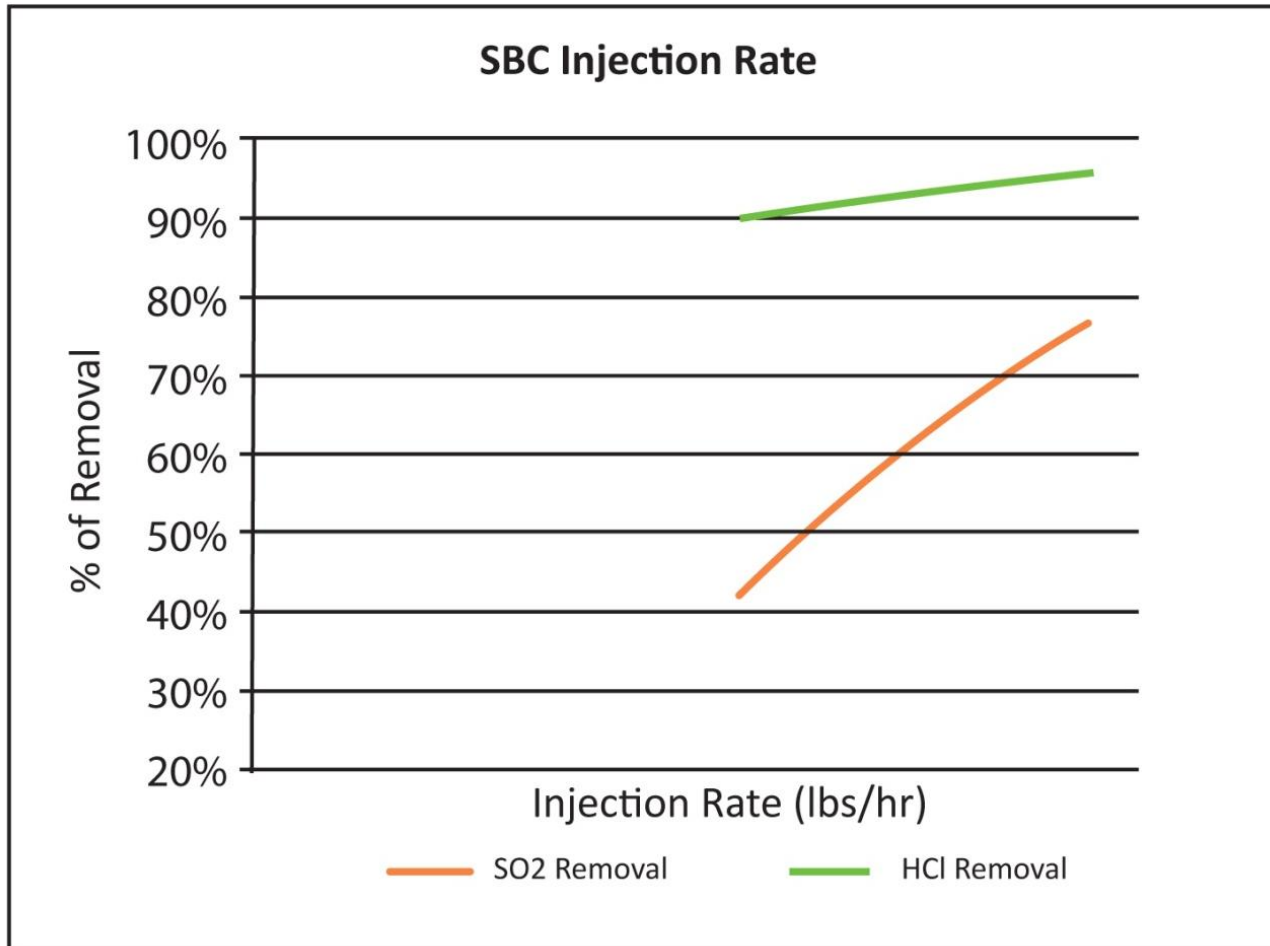
UCC Dry Sorbent Injection

# HCL REMOVAL WITH TRONA/SBC

# HCl Removal with Trona for Eastern Bituminous



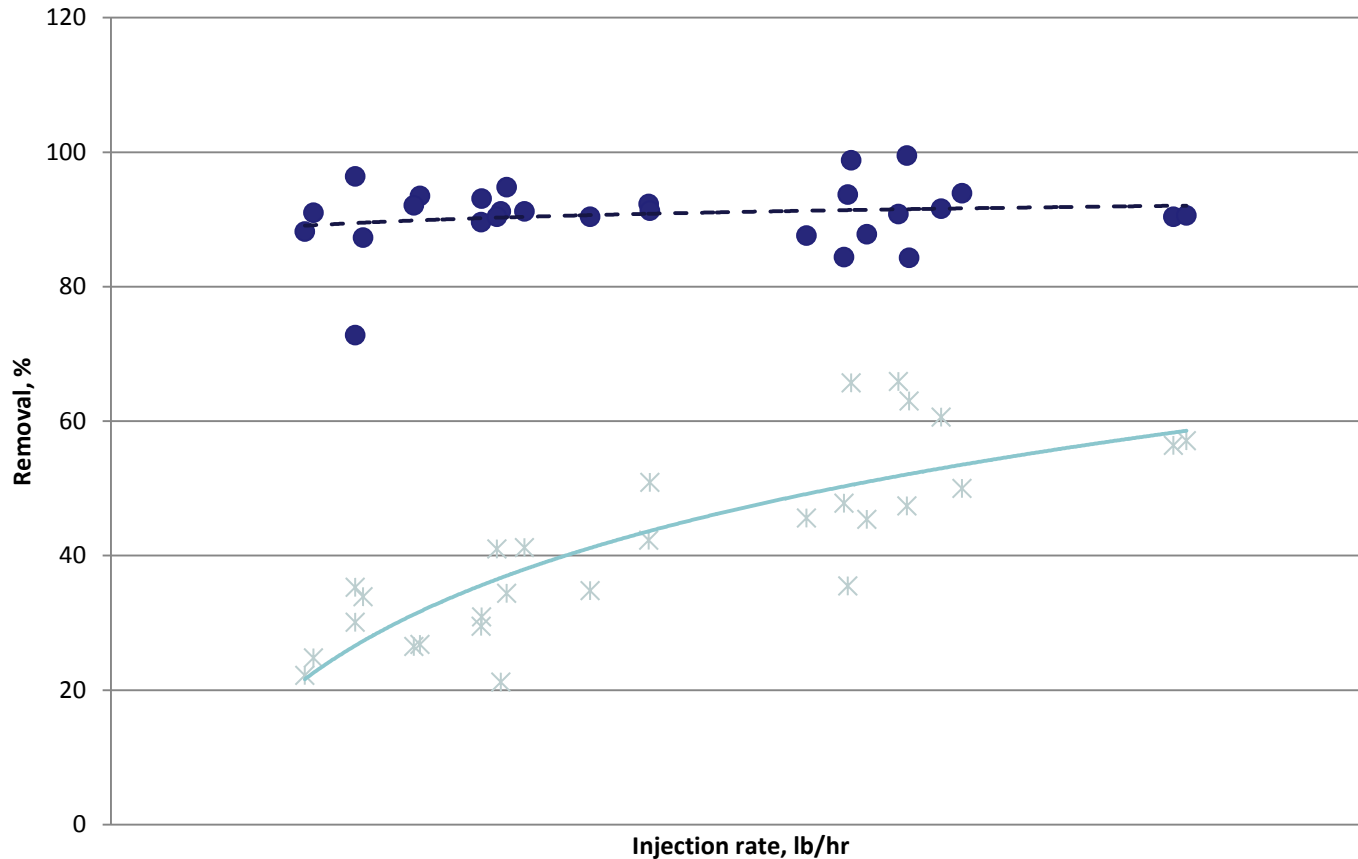
# HCl Removal with SBC for Eastern Bituminous



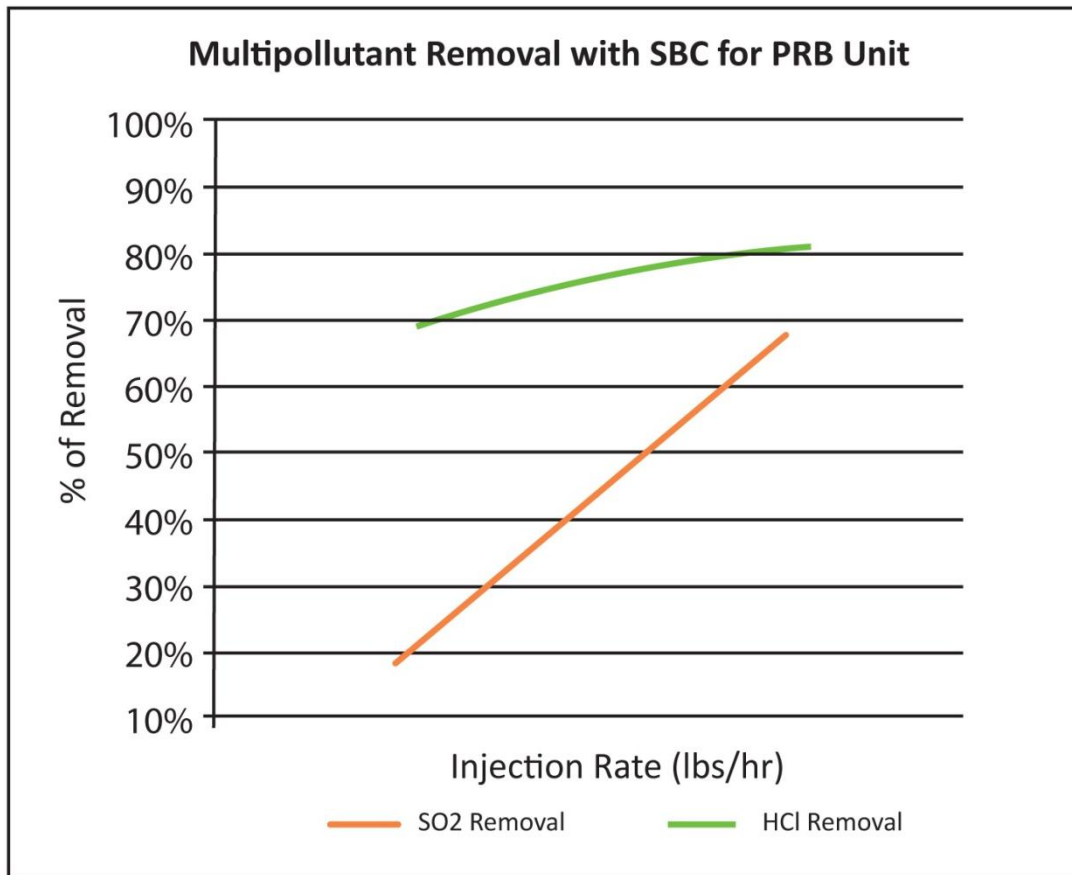
# HCl removal with Milled Trona for PRB



## HCl versus SO2 Removal with Milled Trona



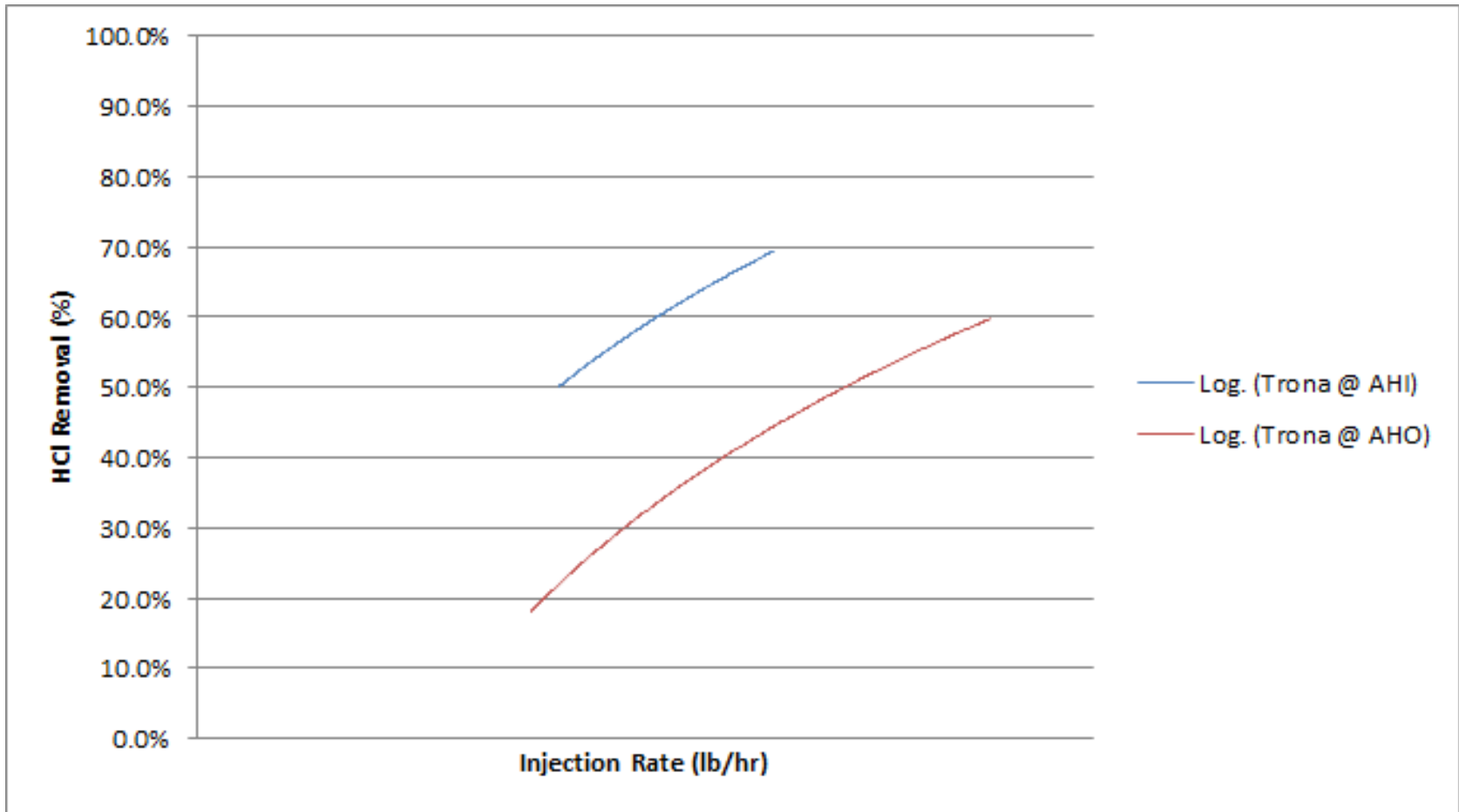
# Multipollutant Removal with SBC for PRB





# HCl Removal with Milled Trona, PRB Unit

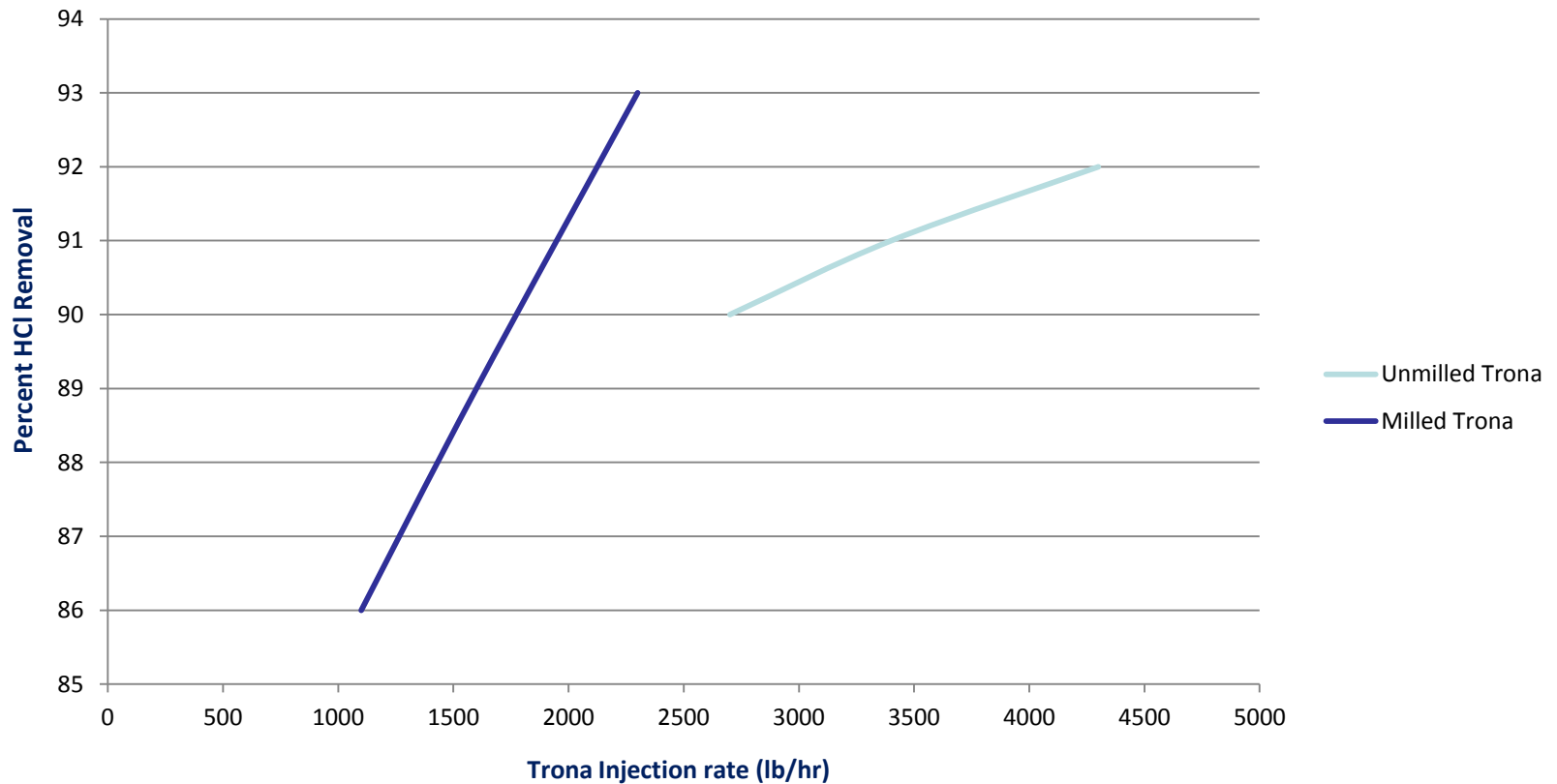
## Effect of Injection Location



# HCl Removal with Trona – Effect of Milling



## Trona Injection for HCl Removal PRB Unit



# Increasing Performance with Milling

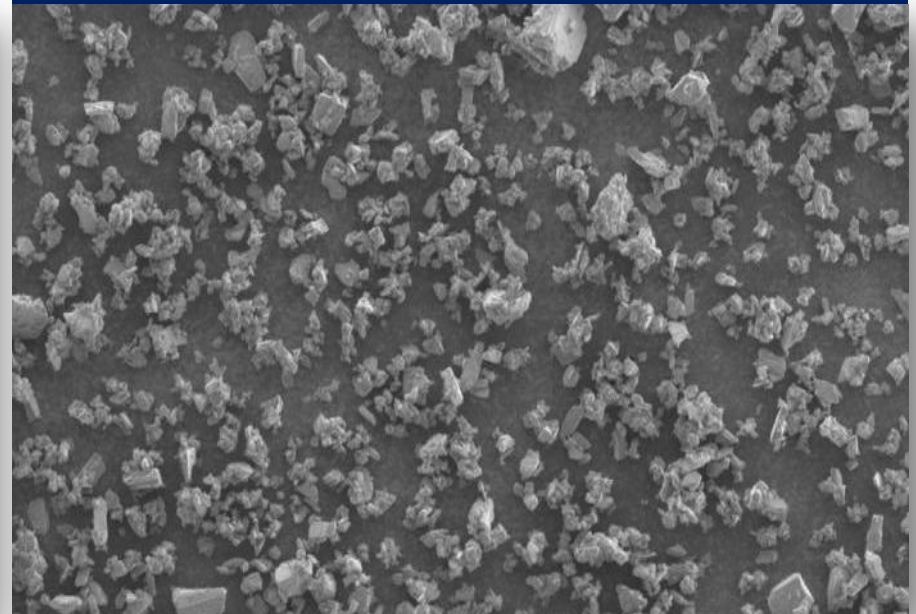


Unmilled Trona



30-50  $\mu\text{m}$

Milled Trona



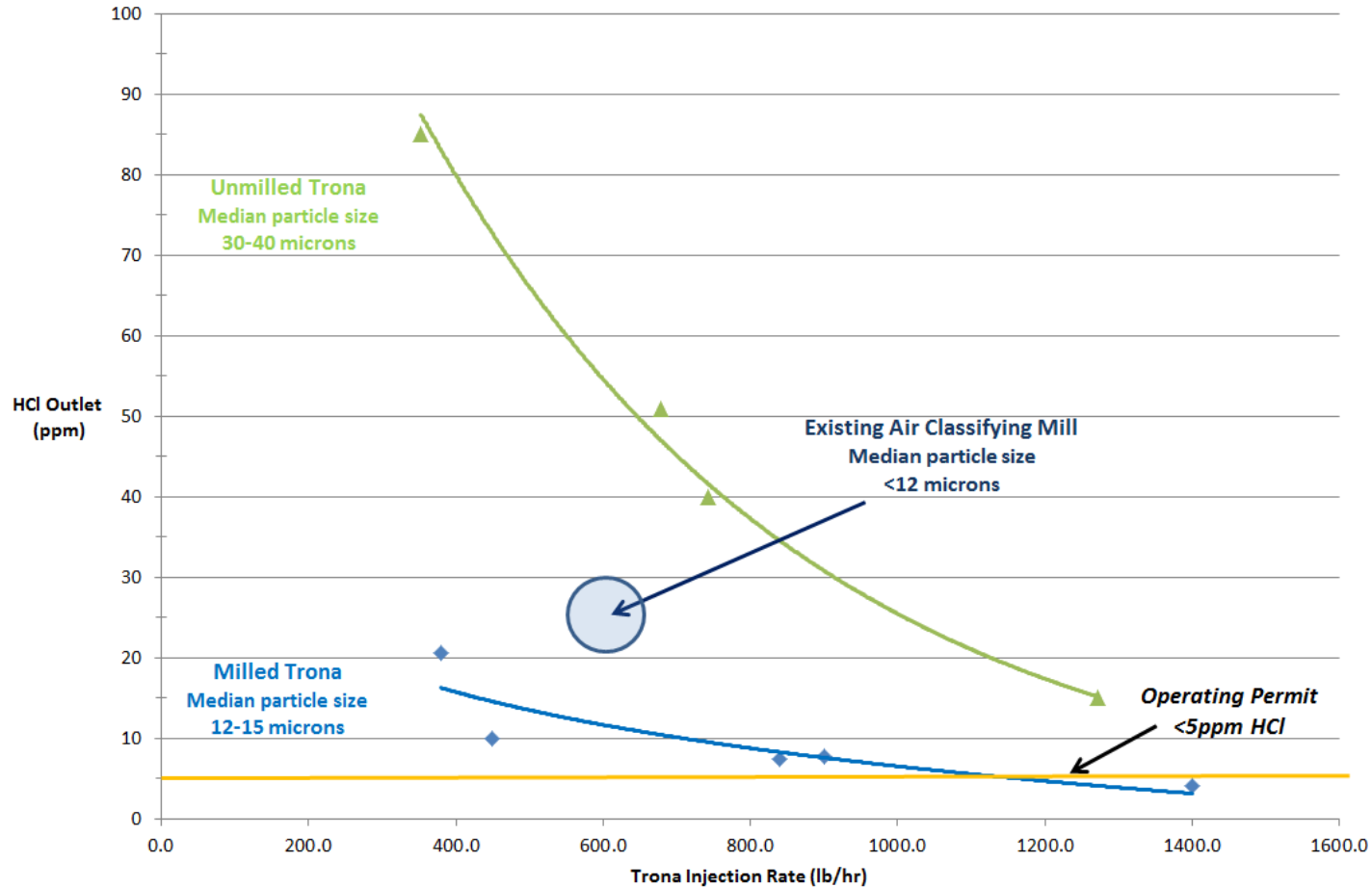
9 -15  $\mu\text{m}$

# HCl Removal with Trona on a Biomass CFB



### HCl Concentration vs. Trona Injection

Unmilled and Single Pass Mill vs. Air Classifying Mill



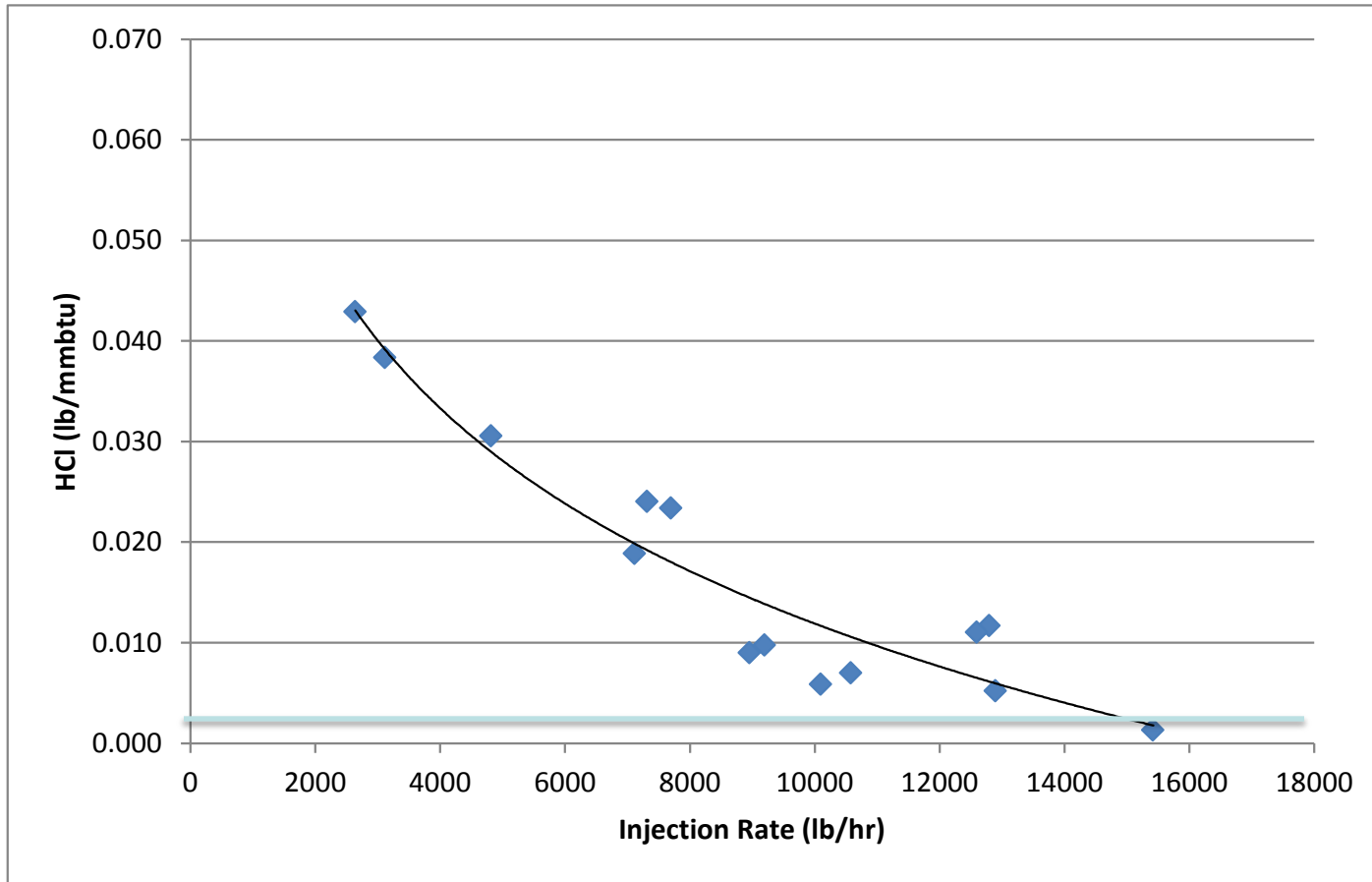


UCC Dry Sorbent Injection

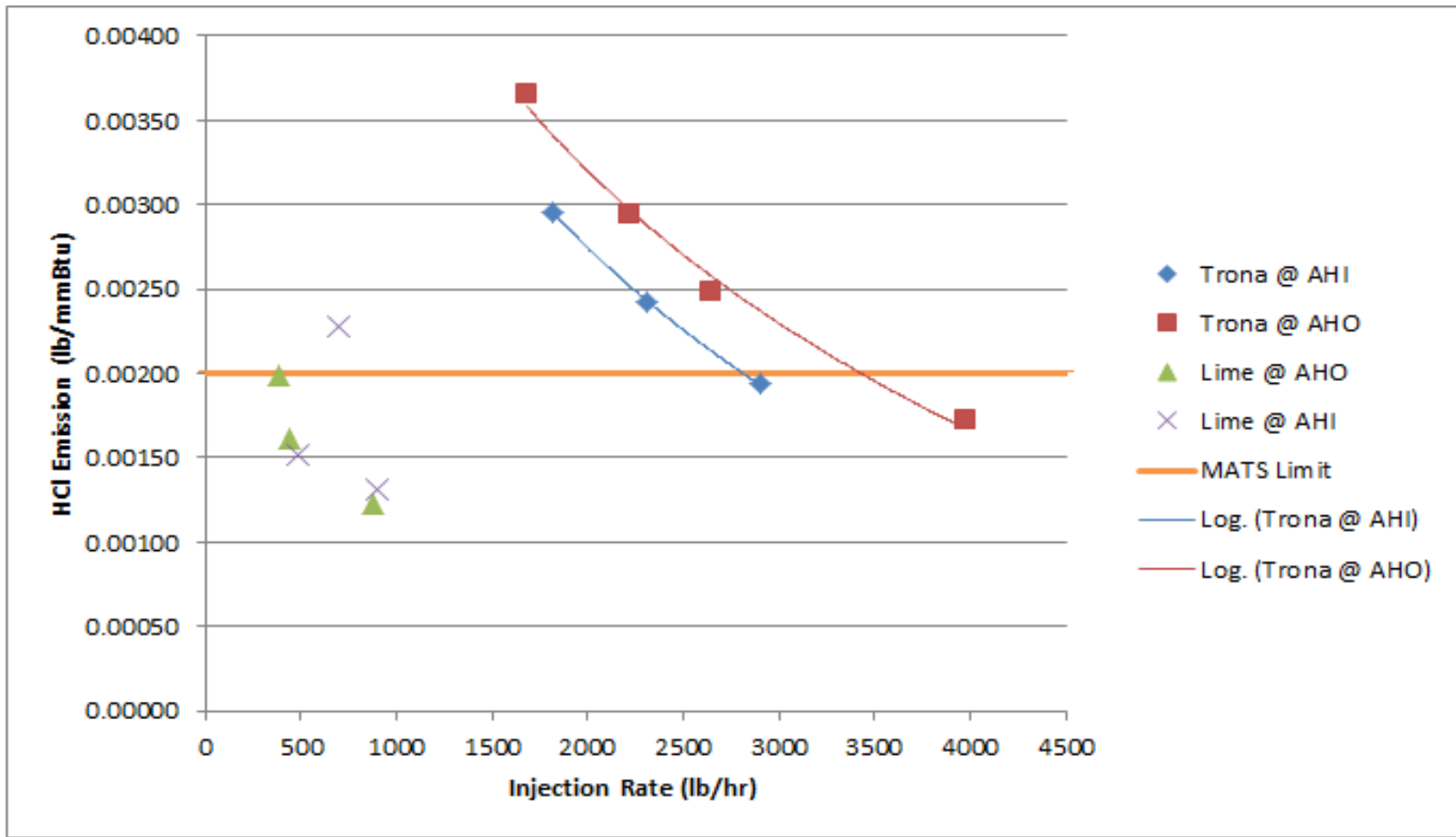
# HCL REMOVAL WITH HYDRATED LIME

# HCl Removal with Hydrated Lime on E. Bituminous

ESP



# HCl Removal with Hydrated Lime and Trona on PRB





UCC Dry Sorbent Injection

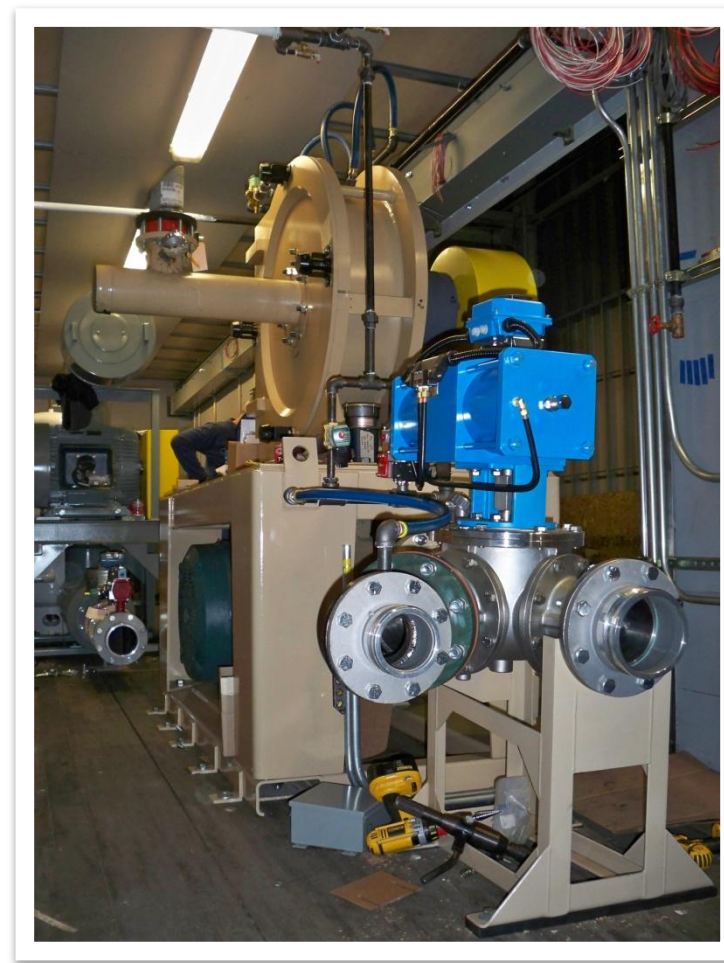
# SUMMARY





## Summary – HCl Removal with Trona/SBC

- When trona or SBC used, very high (>95%) HCl removal achieved
  - Injection rates determined by primarily by sulfur content of fuel
  - HCl removal 30 to 60% higher than SO<sub>2</sub> Removal
- For PRB, generally low rates needed since low HCl baseline and low sulfur
- For eastern bituminous, higher rates needed due to higher HCl baseline and higher sulfur levels
- In-line milling with VIPER Mill<sup>®</sup> shown to reduce trona use by 30 to 50%
- Trona more effective at air heater inlet



# Summary – HCl Removal with Hydrated Lime



- Very effective for PRB
  - Lower injection rates than trona/SBC since little reaction with  $\text{SO}_2$
- Demonstrated to achieve very high removals for eastern bituminous
  - High rates needed with ESP, much lower with fabric filter





# UCC Dry Sorbent Injection

Dry Sorbent Injection Systems for SO<sub>3</sub>, SO<sub>2</sub> and HAP Reduction

