

Mercury Control Technology Using Sorbent Enhancement Additives

Marcus Sylvester

VP Sales

Midwest Energy Emissions Corp

The Company – ME₂C

- * Commercialization of UND- EERC Technology
- * Provide Technologies that Meet New EPA MATS Standards
 - * With the Most Effectual Approach (Meet Emission Reduction Goal)
 - * Most Economical Manner (Meet Plant Capital and O&M Budgets)
 - * Least Balance of Plant Disruptions (Reduce MW-hr Costs)
- * Develop and Deliver Cost Effective Mercury Capture Systems
 - * 19 Patents – US, Canada, China, & Europe
- * Strong Focus on Continuous Innovation - EERC

ME₂C's Technology Development

Since 2000, our Total Mercury Control™ was developed with over \$60M spent by ME₂C, EERC, DOE, Utilities

All coal types, various boiler designs & operational configurations



ME₂C Field Unit

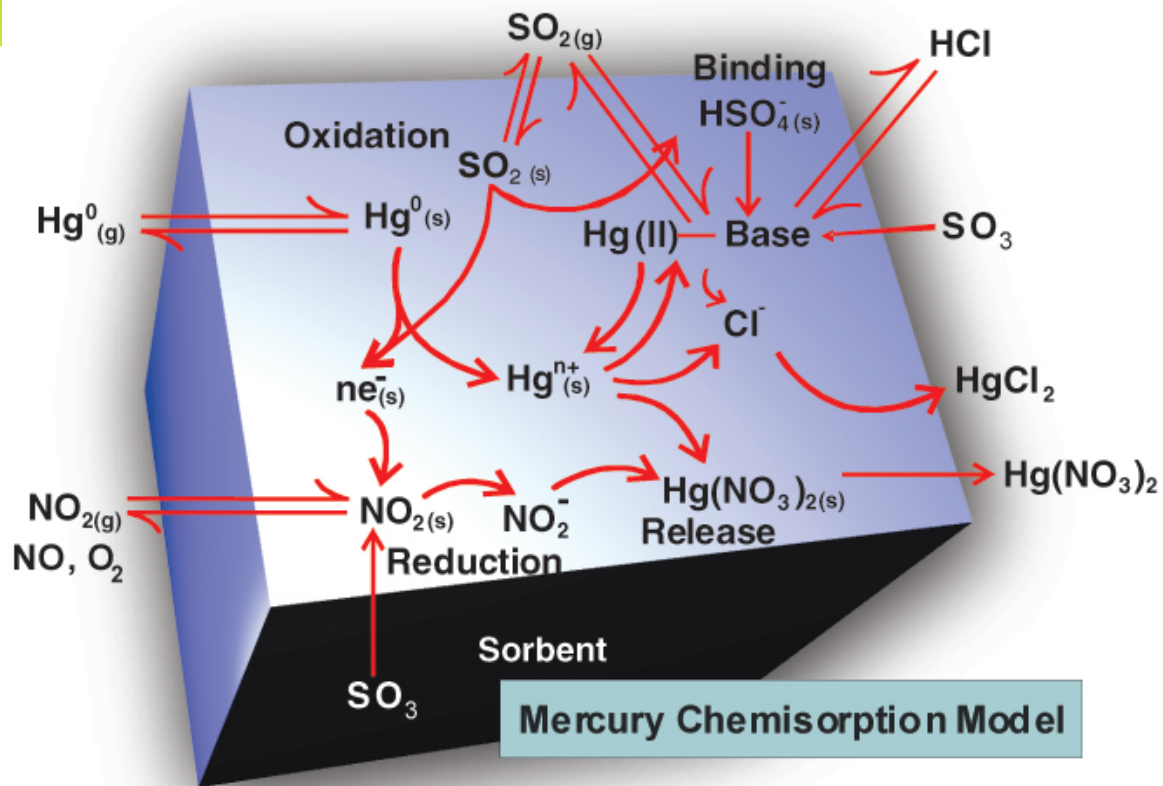
ME₂C has partnered with EERC for its testing & demonstrations last 6 years

Commercially proven at 15 utilities (~\$15M)



ME₂C Field Technicians

Mercury–Sorbent Interactions



The EERC's chemisorption model for mercury–flue gas interactions with sorbents is both descriptive and predictive.

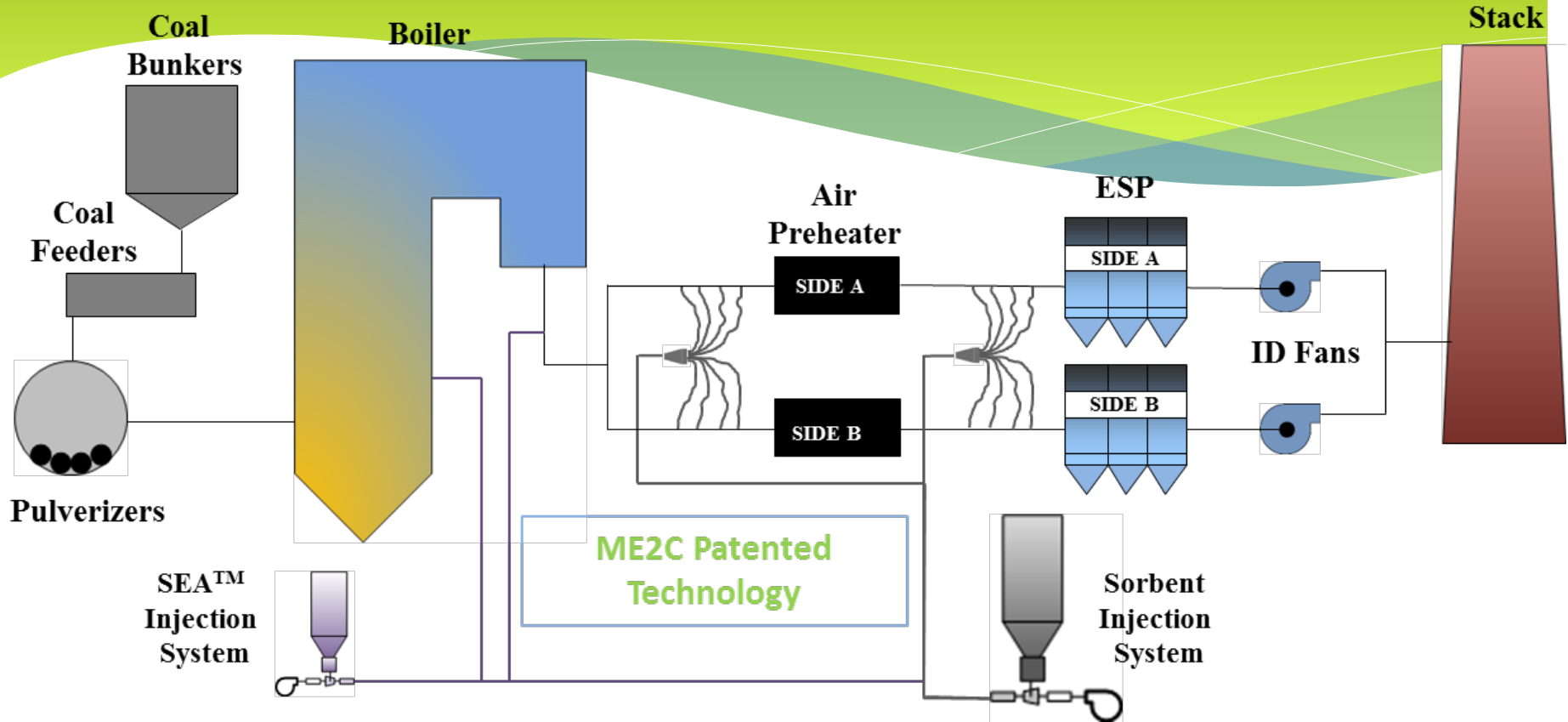
Based on years of CATM research and empirical data, it shows the interactions involved in mercury capture by sorbents. Understanding flue gas interactions is critical.

EERC JP19645 B&W.A1

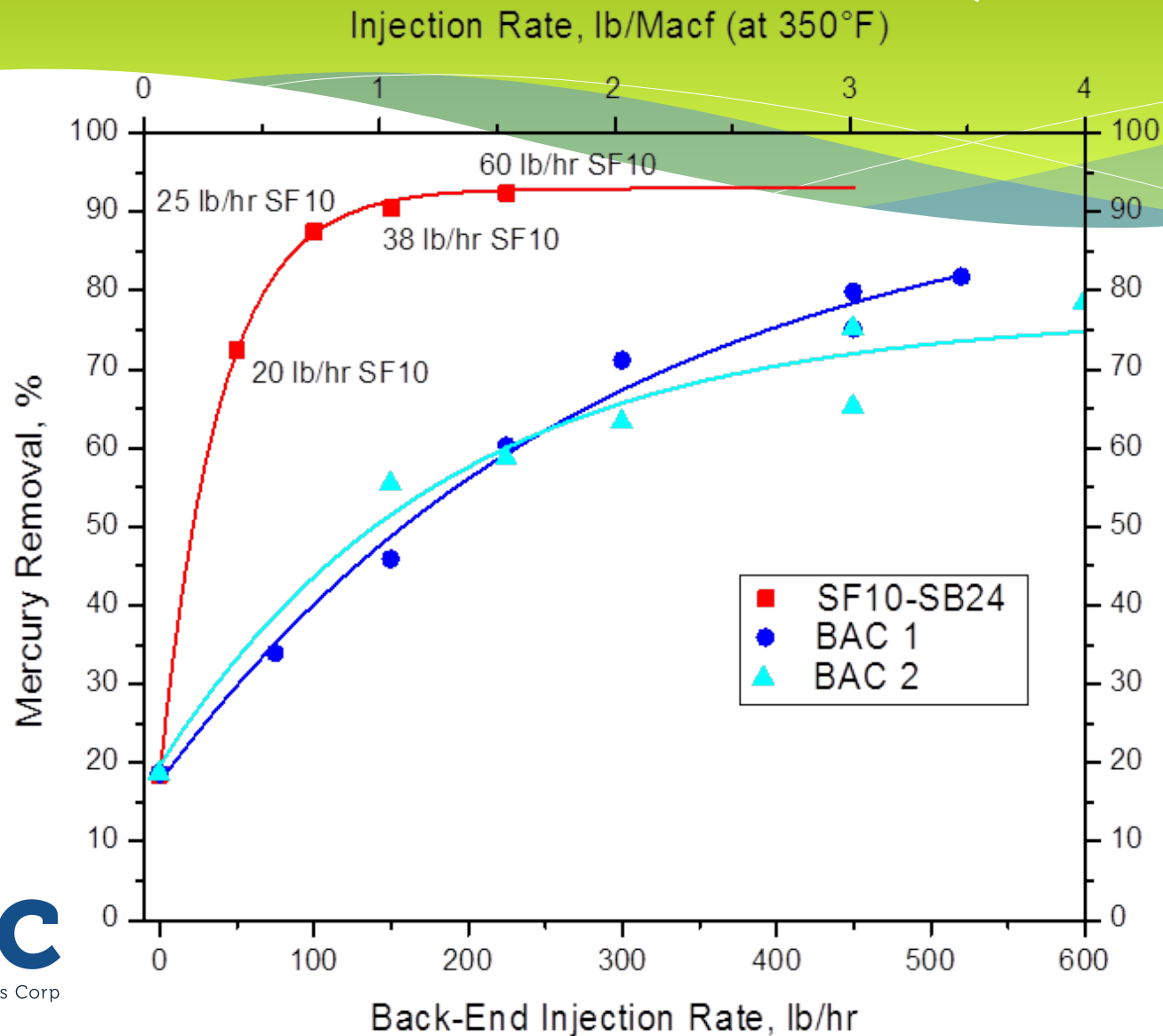
ME₂C Total Mercury Control Program

- * A tunable (2 Chemical) approach to mercury capture
- * **Sorbent Enhancement Additives** (Front End)
 - * Proprietary Chemicals
 - * Designed to Promote and Protect activated sites
 - * Distribute chemical throughout furnace system
- * **Sorbent** (Back End)
 - * Proprietary Chemicals
 - * Provide active capture sites for mercury adsorption
 - * Protect activated capture sites

Injection and Sampling Locations



Demonstration Results (2009)



Demo Summary at 700 MW Unit

* BAC

- * Not able to achieve 90% - economically
- * 80% Capture Rate
 - * 475#/hr
 - * 3.2#/MACFM
- * Killed Fly Ash Sales
- * LOI >3.5% (adjusted)

* Midwest Energy Emissions:

90% Capture Rate

- * SEA @ 52#/hr
(0.3#/MACFM)
- * Sorb @ 178#/hr
(1.2#/MACFM)

80% Reduction

- * SEA @ 23#/hr
(0.15#/MACFM)
- * Sorb @ 84#/hr
(0.7#/MACFM)

Flyash <0.8% (adjusted)

SEA Chemical Feeder



Blower Cabinet



SEA Injection Points

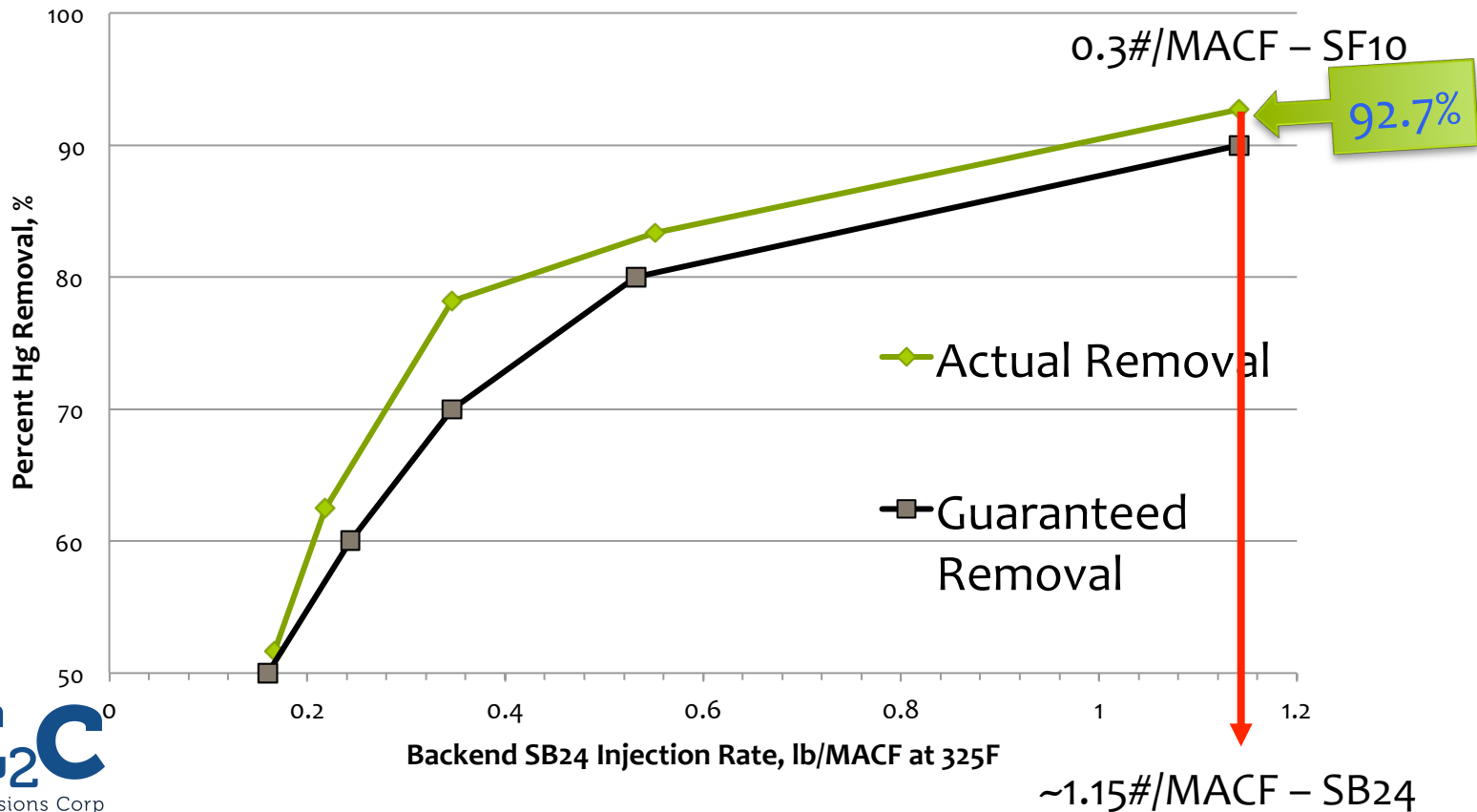


Sorbent Feed System



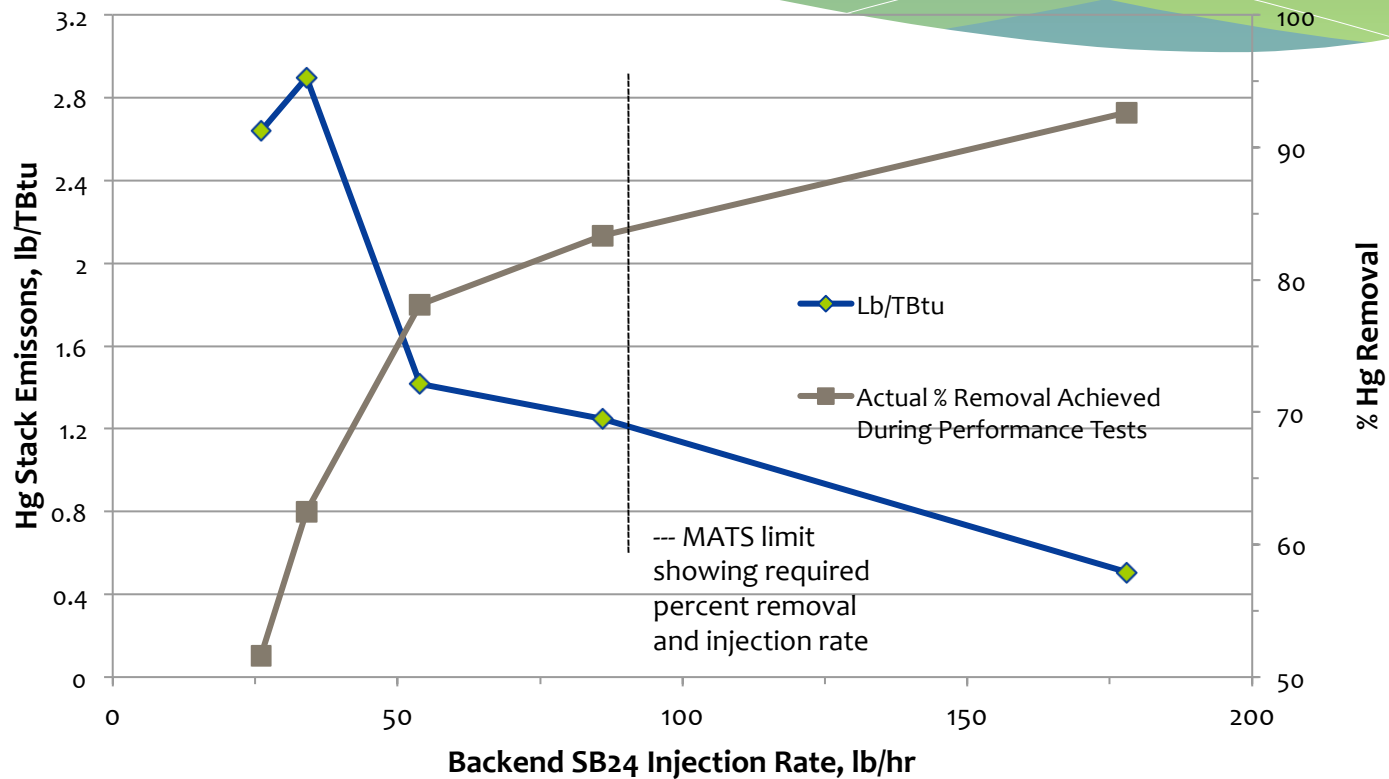
Commercial Program Performance (as MACF)

Commercial Unit #2
Mercury Removal Performance Curve



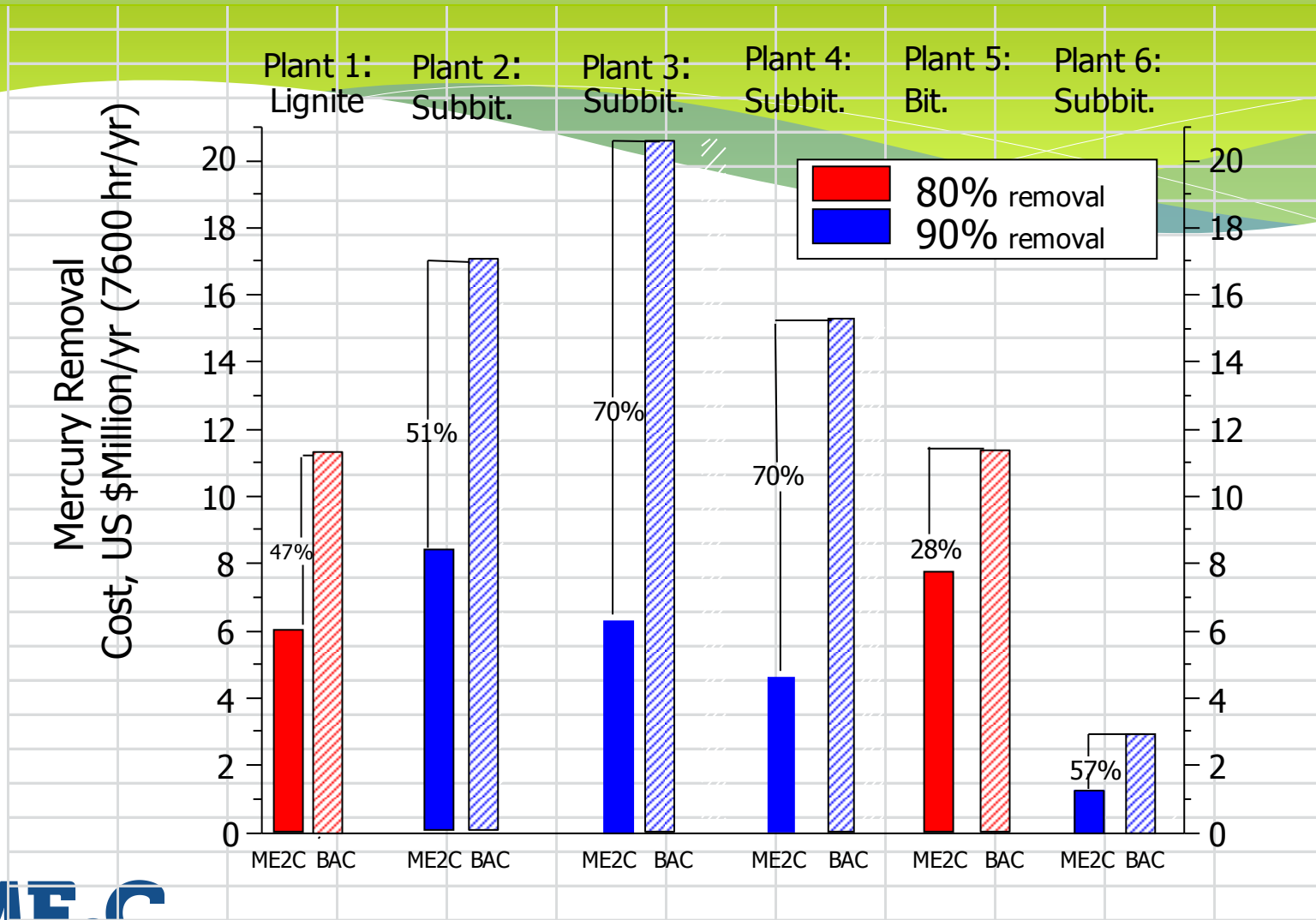
Commercial Program Performance (lb/Tbtu)

Commercial Unit #2 Mercury Removal Performance Curve



Economic Summary

ME₂C vs. Brominated Activated Carbon (BAC)



Next Steps for Utilities

- * Cost estimates on any specific units
- * Cost-share demonstration (7 days)
- * Site visit of ME₂C installations
- * Open invitation to EERC

Thank You

Marc Sylvester

msylvester@midwestemissions.com

(480) 235-0974