

Influence of SO₃ on Mercury Removal with Activated Carbon: Full-Scale Results



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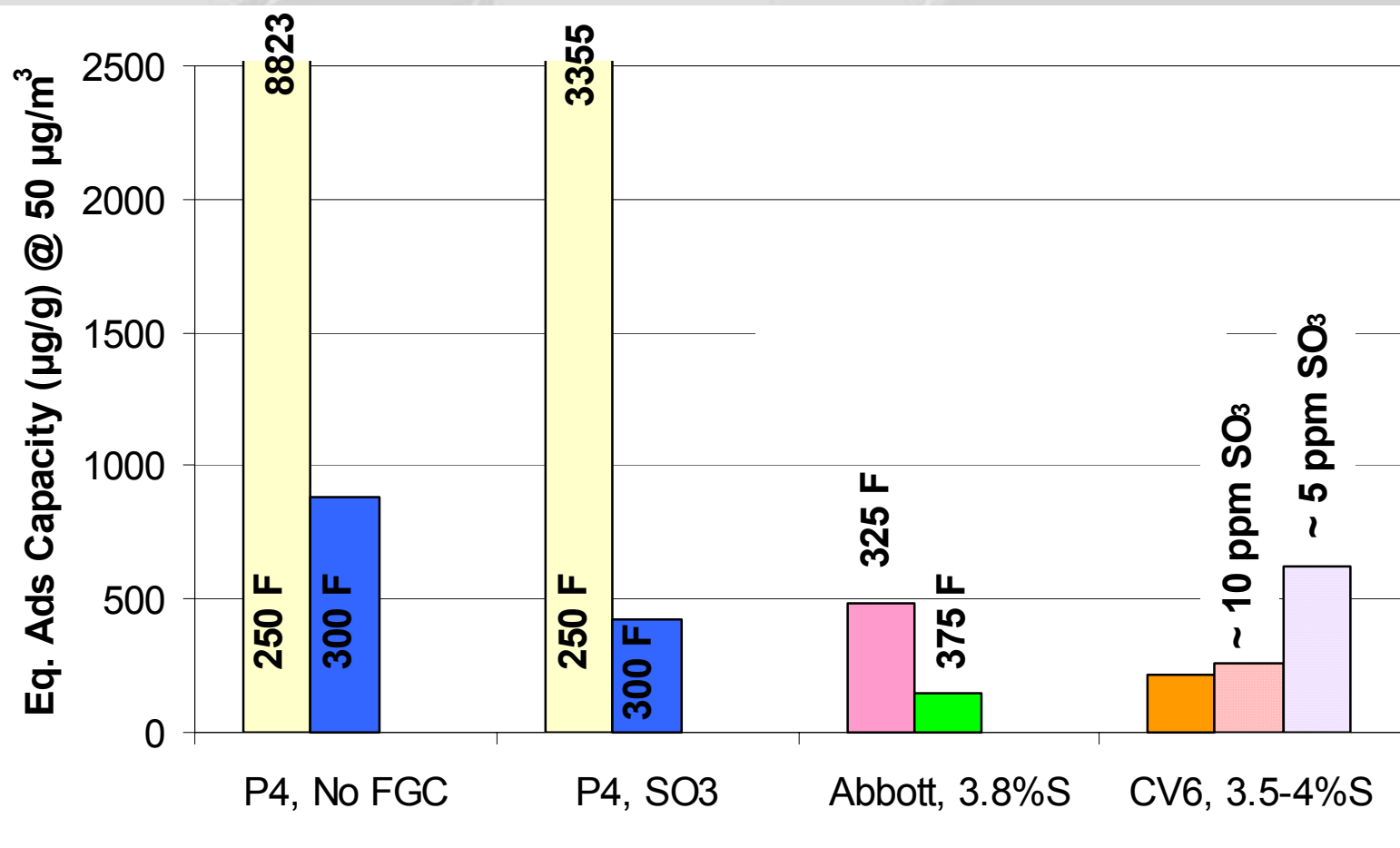
Outline

- Background – Native Mercury Removal
- Impacts on Powdered Activated Carbon Performance
 - Sulfur content in coal
 - SO₃ injection
 - High SO₃ from SCR
- Options to improve PAC Performance
 - Specialty carbon blends
 - Co-injection with alkali materials
 - Injection location

Native Mercury Capture

- Sulfur (from coal or FGC) impacts native removal
 - Data indicates native removal across ESPs decreases with sulfur content in coal
 - Native removal typically lower on units using SO₃ conditioning than similar units without conditioning
- Some data suggests sulfur content can negatively influence the formation of oxidized mercury

Effect of SO₃ on Sorbent Capacity: Fixed-bed results



PAC Performance

Model Results for 3.4 to 4% S Coal

Predicted Hg Removal

DARCO Hg at 10 lb/MMacf (n=1)	22.3
Lower Reactivity (n=0.5)	9.1

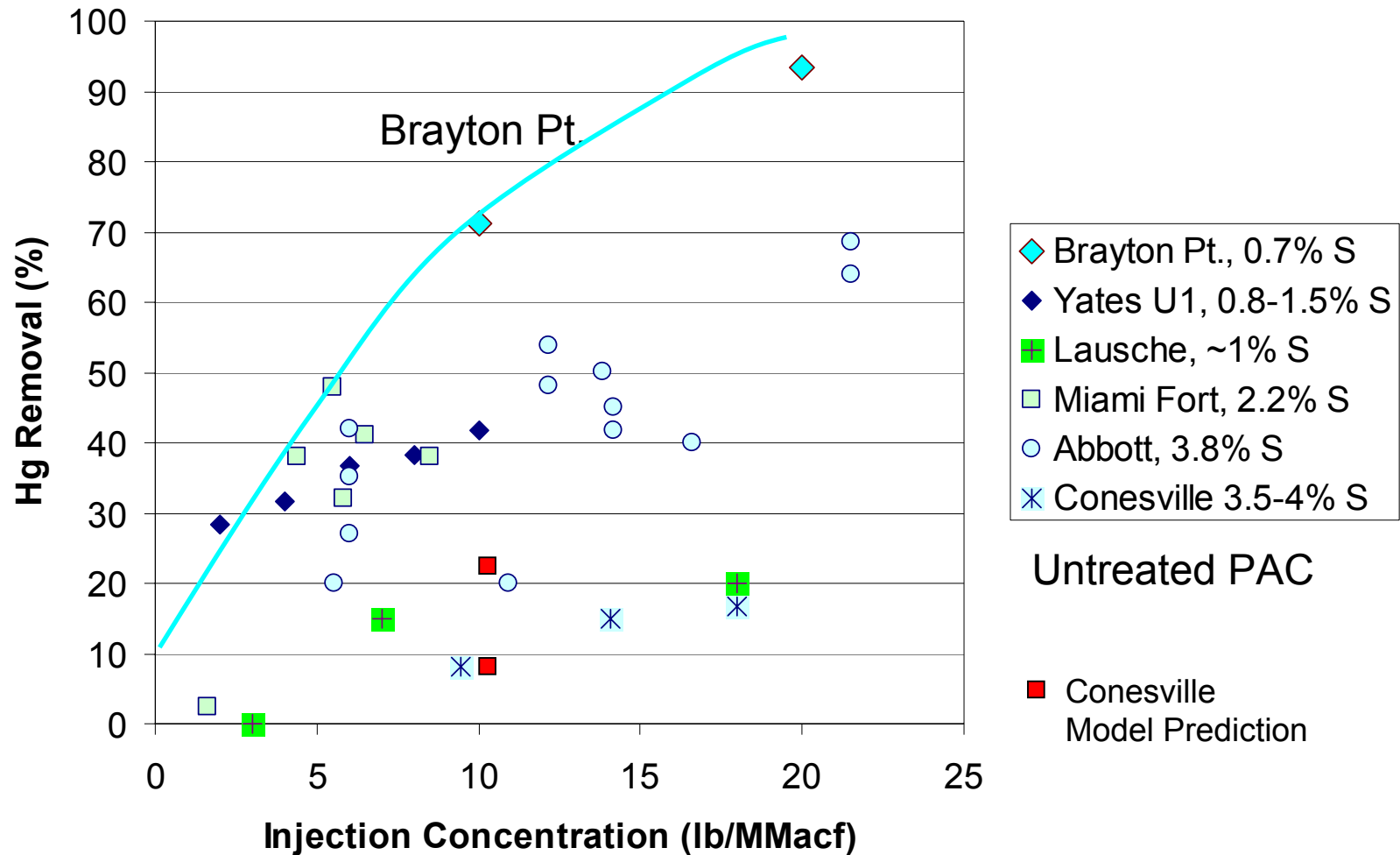
Model uses Freundlich Isotherm

$$W^* = [1/K](C^*)^{1/n}$$

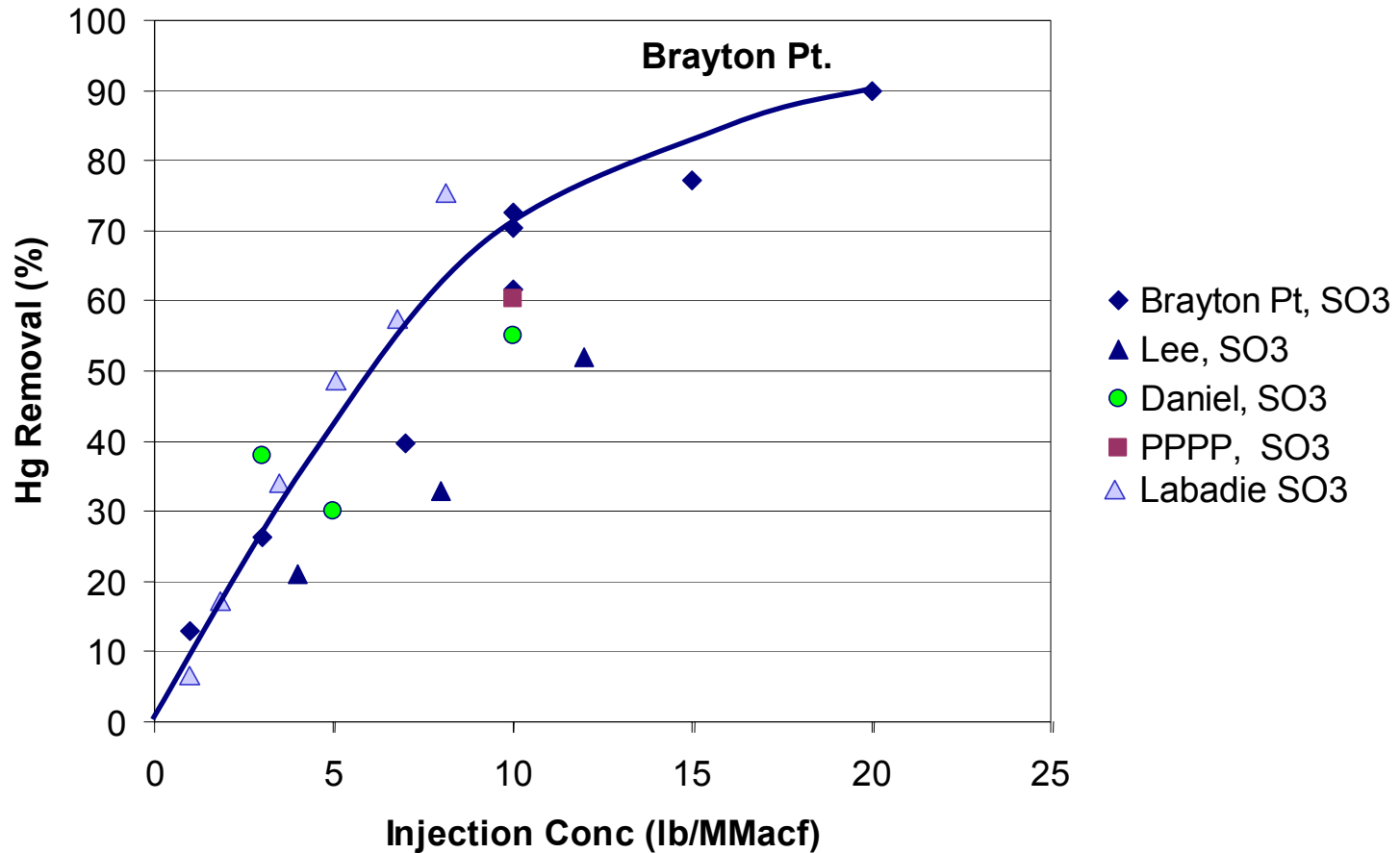
Model conducted by REI



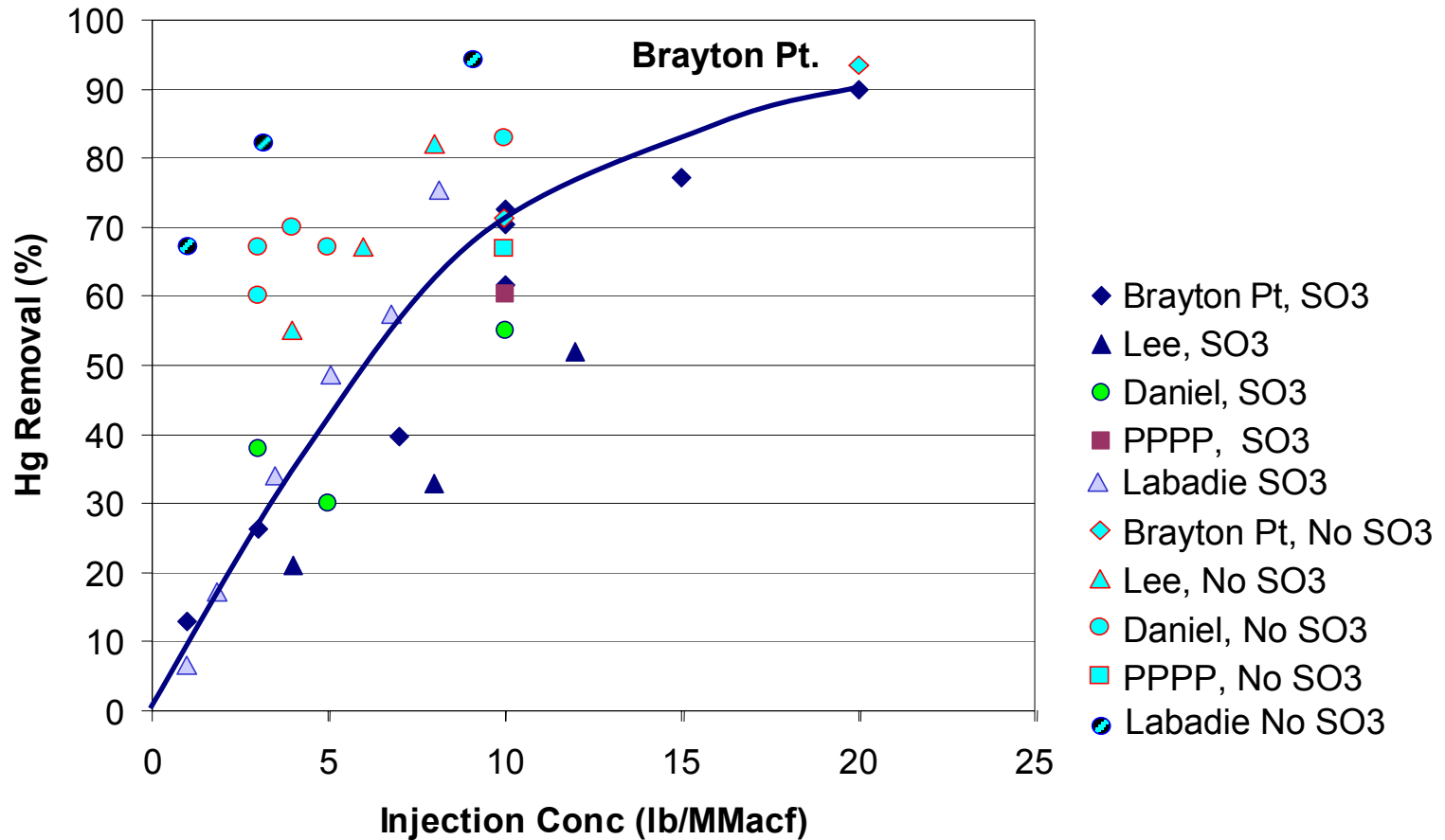
PAC Performance, Bituminous Coals



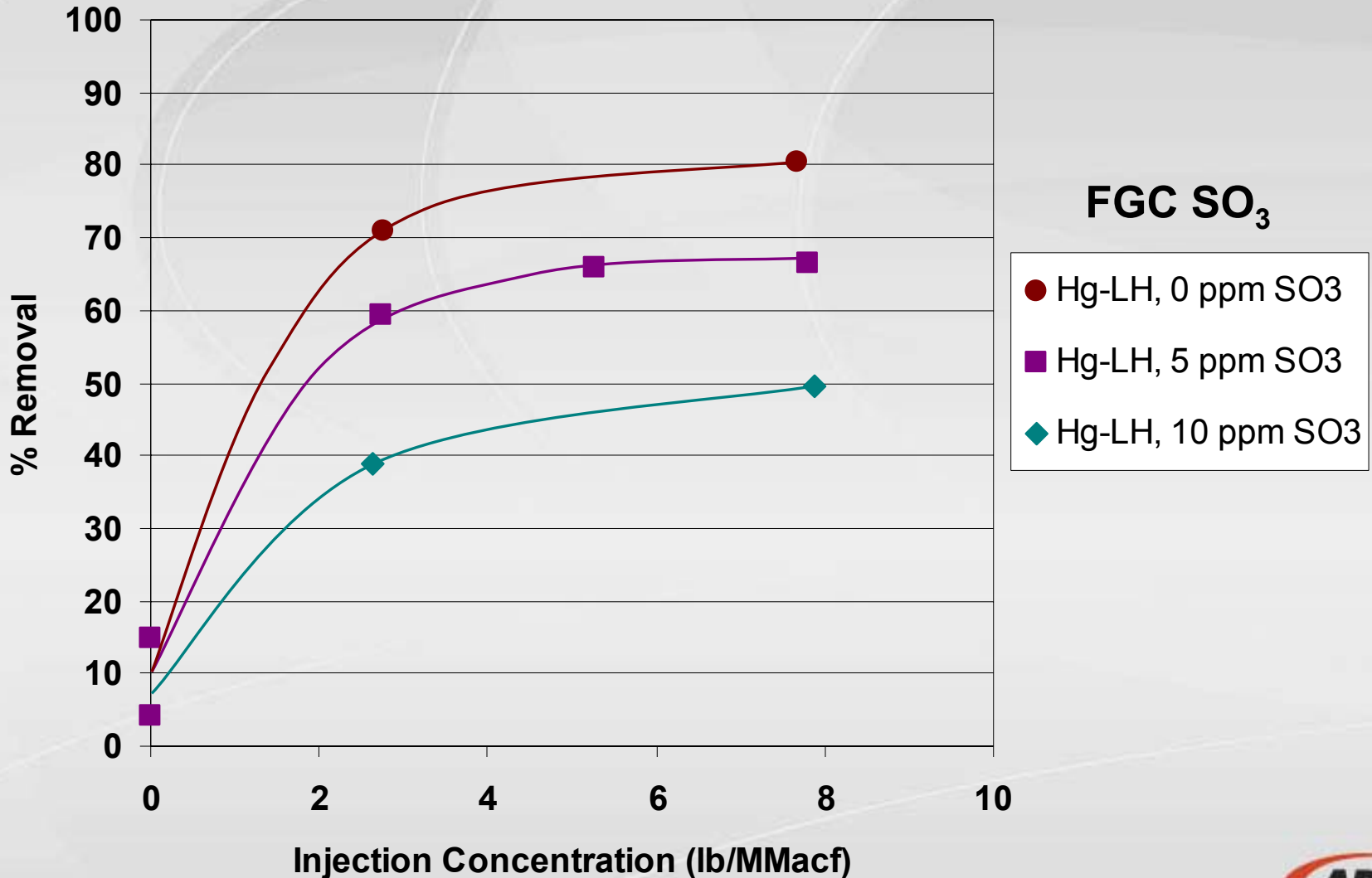
Impact of SO₃ Injection on Hg Removal



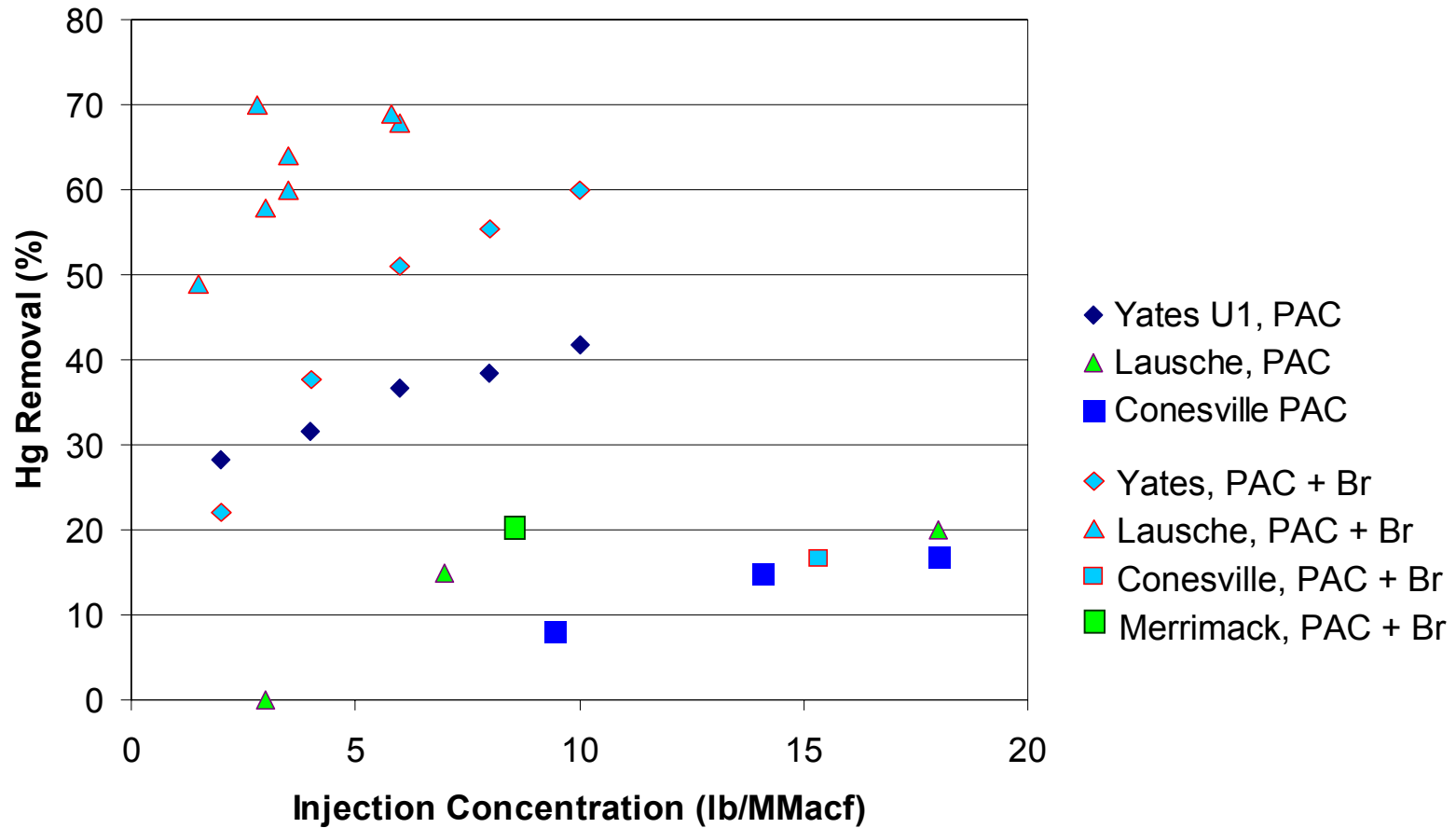
Impact of SO₃ Injection on Hg Removal



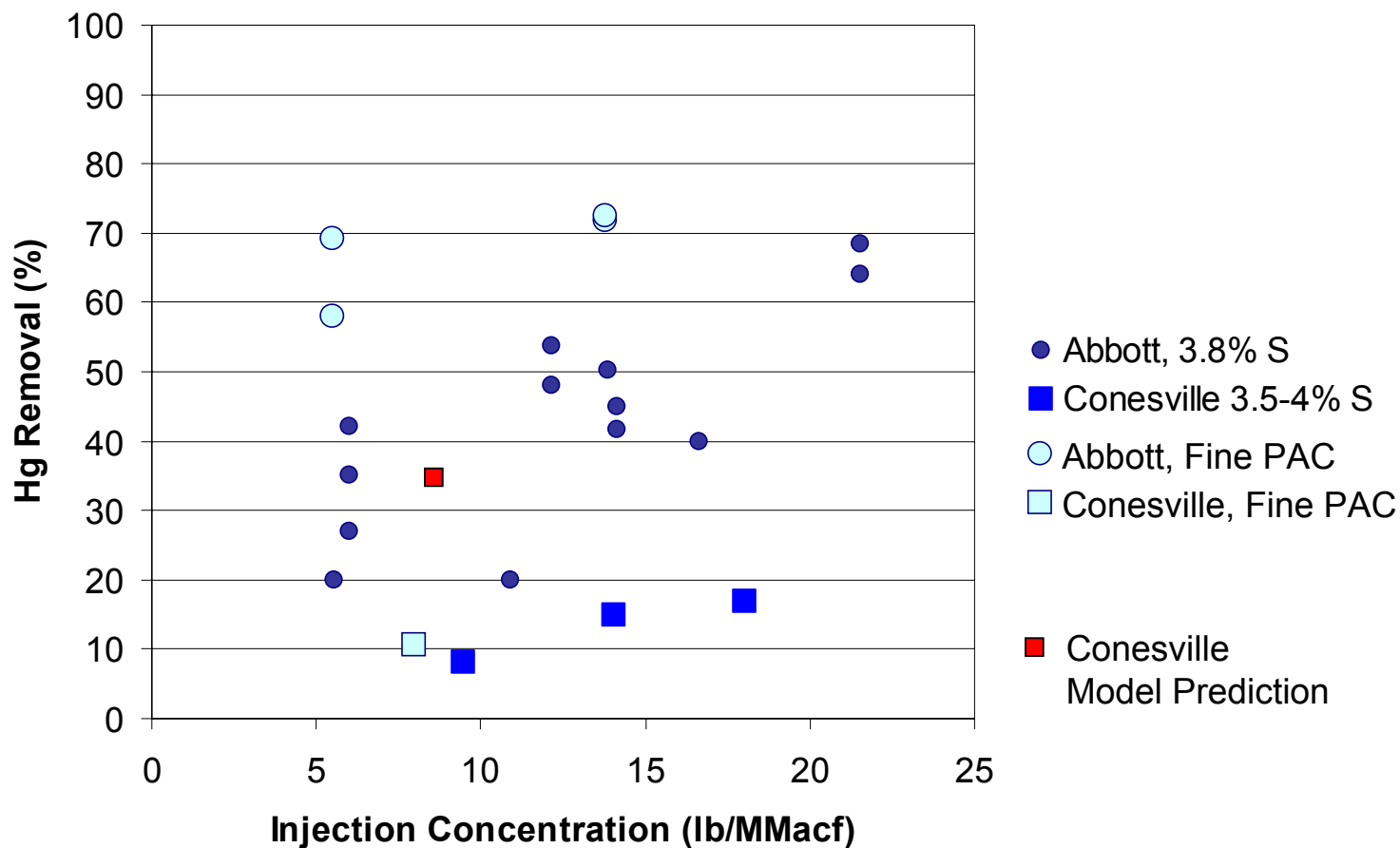
Impact of SO₃ Concentration on PAC



Enhancements with Treated PAC

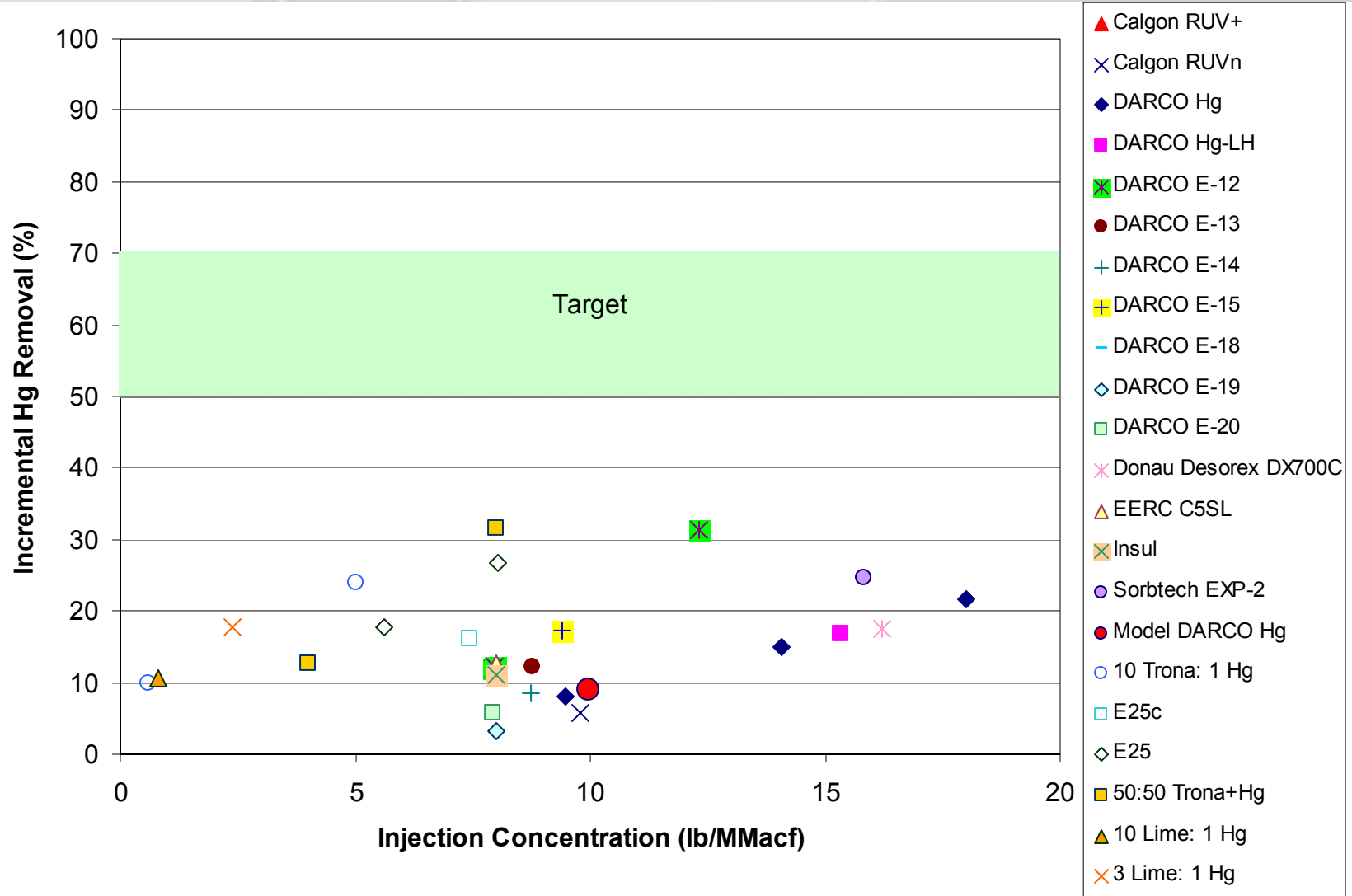


Enhancements with Fine PAC

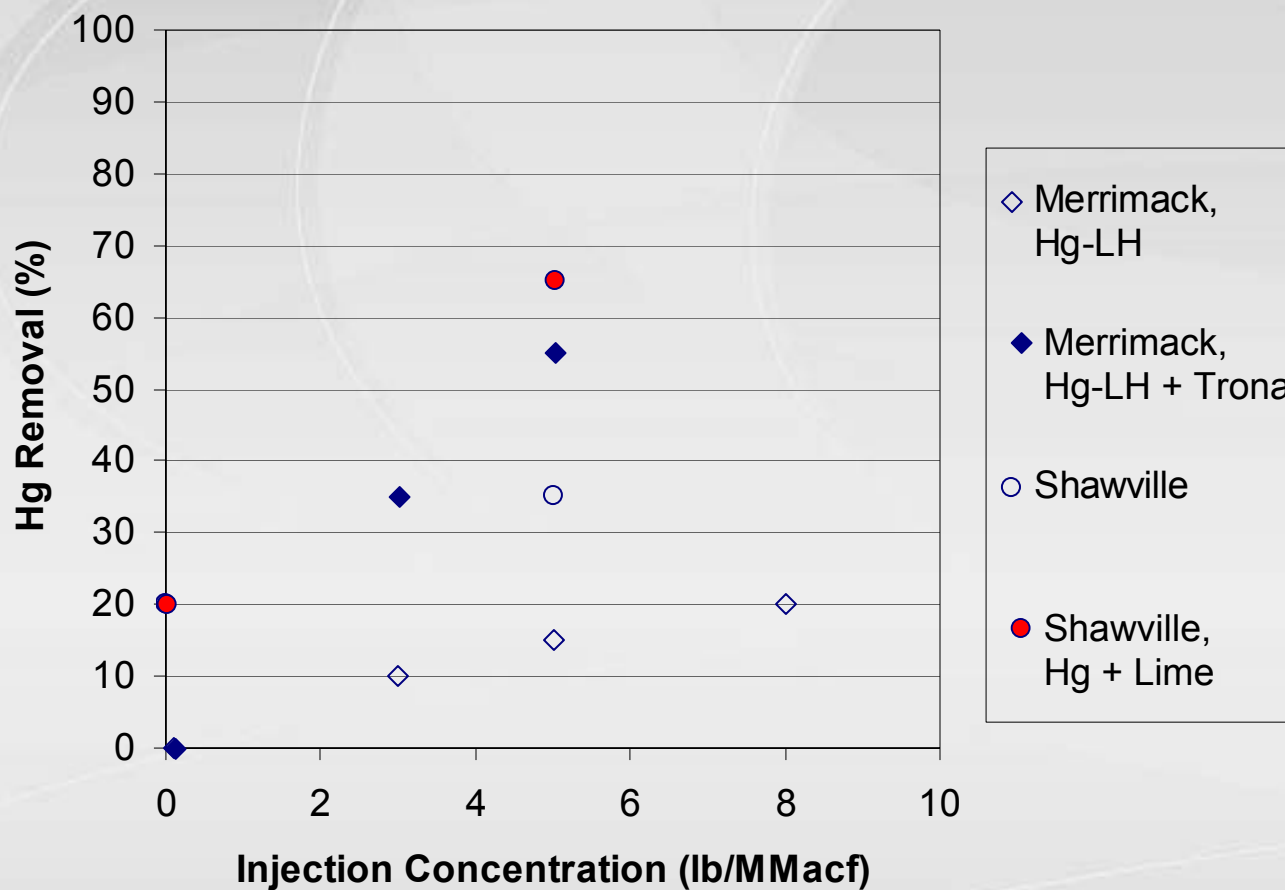


Specialty Carbons and Blends

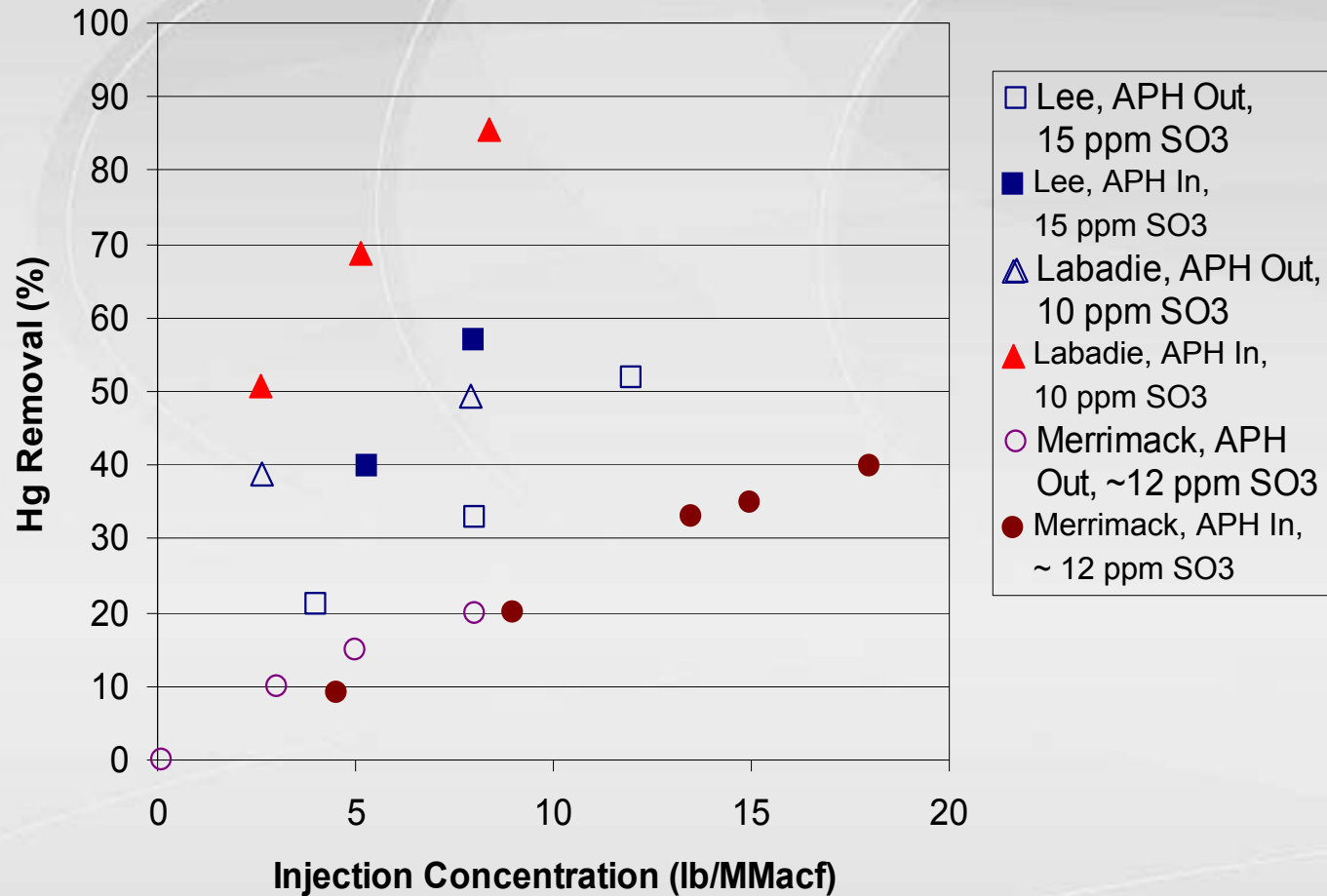
Conesville Full-Scale Parametric Results



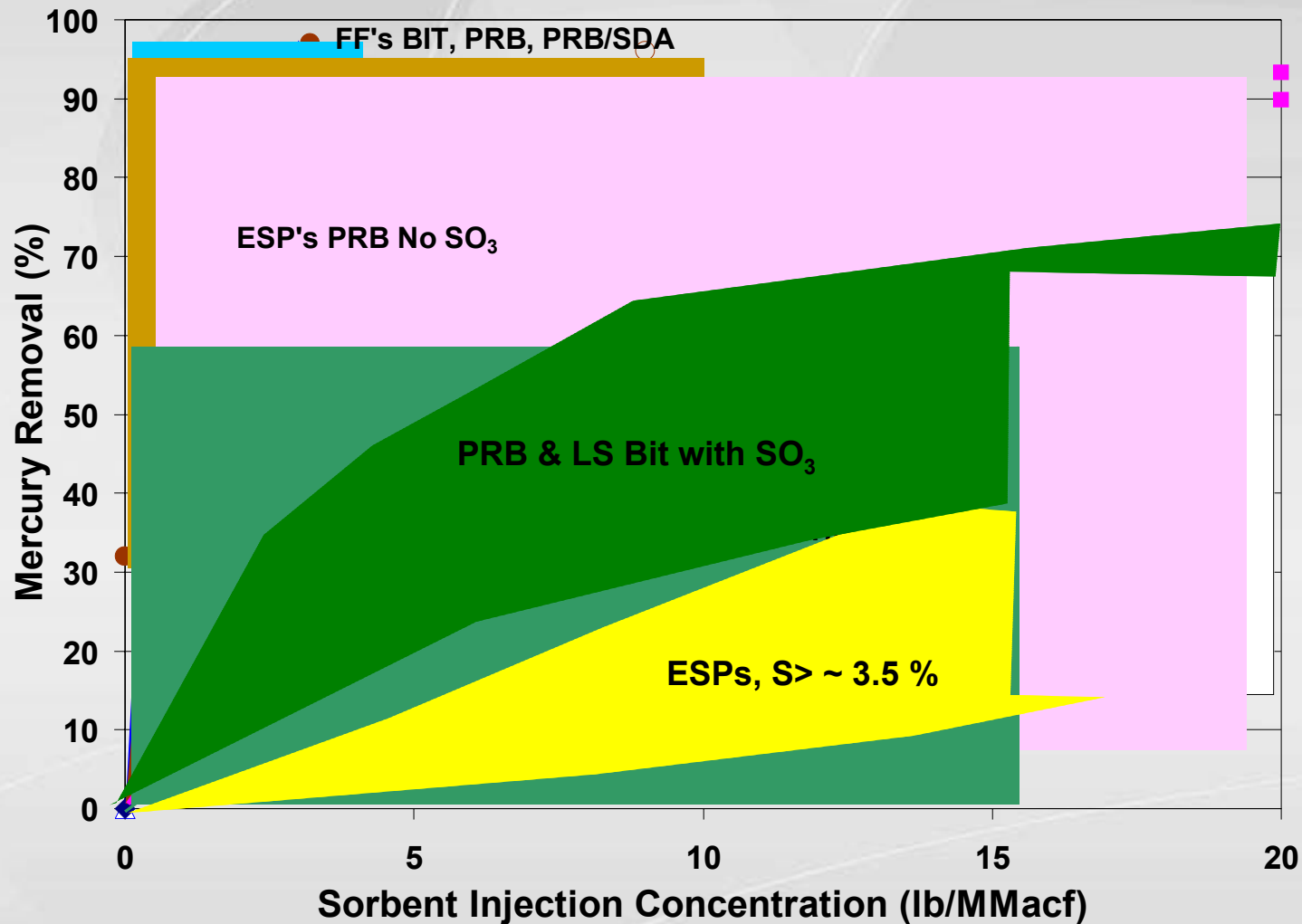
Co-Injection with Alkaline Sorbents



Influence of Injection Location



Mercury Reduction Trends with ACI on FF's and ESPs



Conclusions

- SO_3 significantly reduces the effectiveness of PAC
- Options for improving performance
 - Improved sorbents
 - Control SO_3
 - Inject PAC upstream of APH

Ongoing Testing

- Ameren's Labadie Power Plant
 - PRB coal
 - ESP
 - SO₃ FGC
- PSNH Merrimack Power Plant
 - E. Bit Coal
 - SCR + ESP

Questions?

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