Alstom's Mer-Cure™ Technology for Mercury Emissions Control

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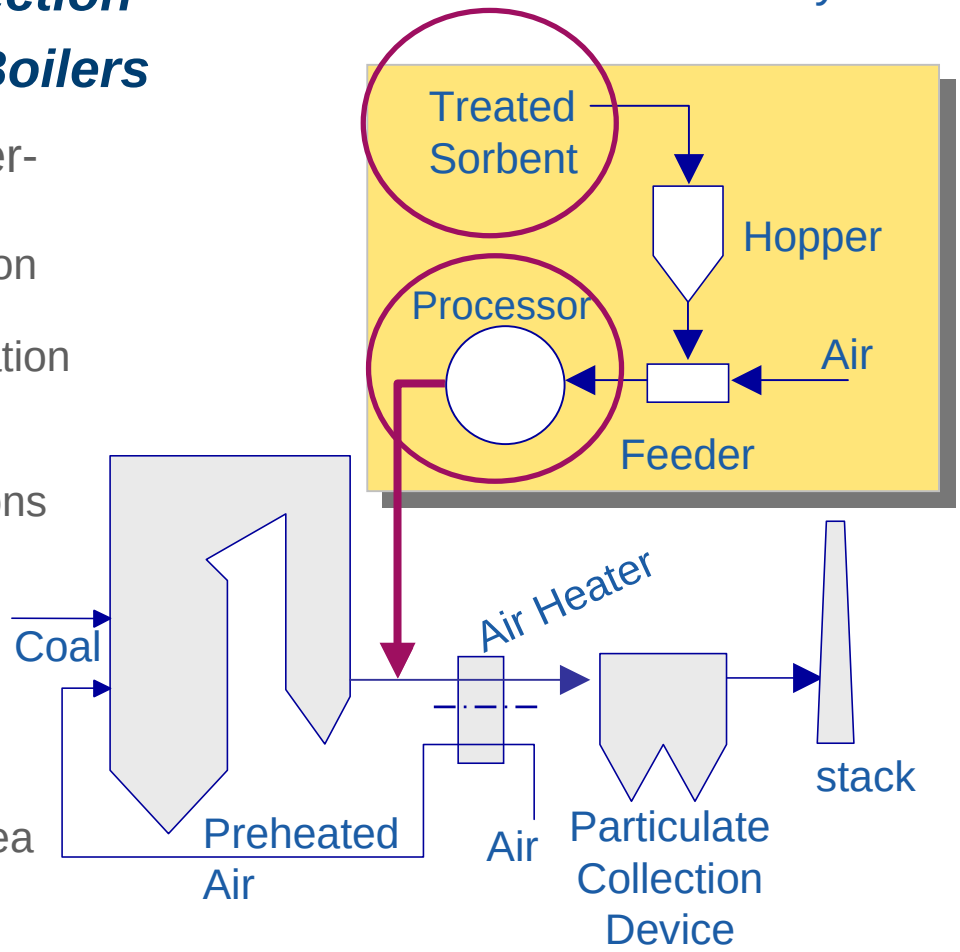
Mer-Cure™ System Architecture

Carbon-based Sorbent Injection Technology for Coal-fired Boilers

1. Proprietary sorbent design – Mer-Clean™
   - Treated with halogen formulation to accelerate oxidation/capture
   - Prepared for high-temp application
2. On-line processing of sorbent
   - Maximize surface area
   - Remove mass transfer limitations
3. Injection upstream air heaters
   - Uniform dispersion into gas stream
   - High temperature supports chemical kinetics
   - Longer residence time
   - More duct and A/H surface area for oxidation to occur

Patented Mer-Cure™ system



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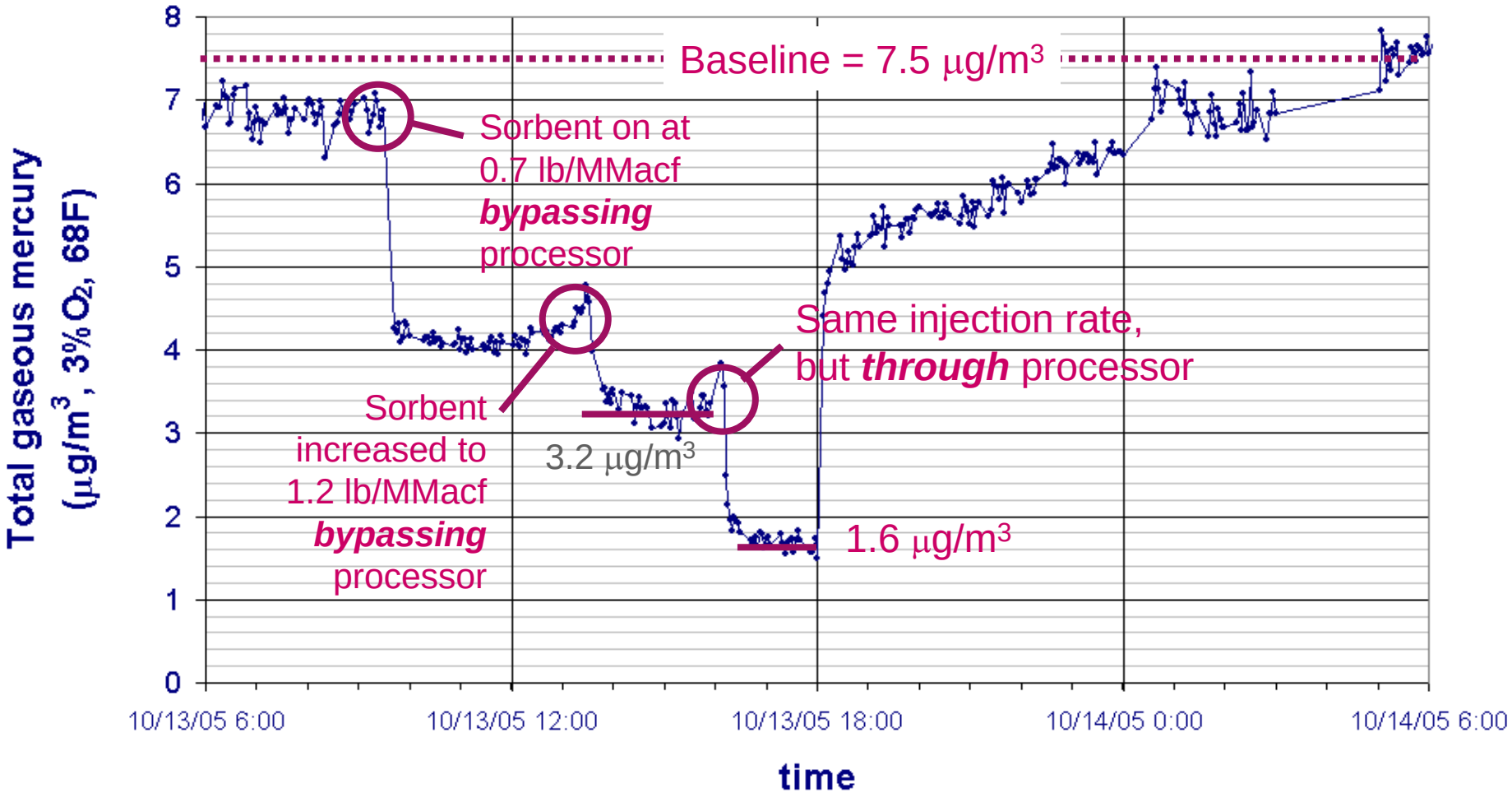
Parametric Testing– Effect of On-line Processing



Processor enhances sorbent performance

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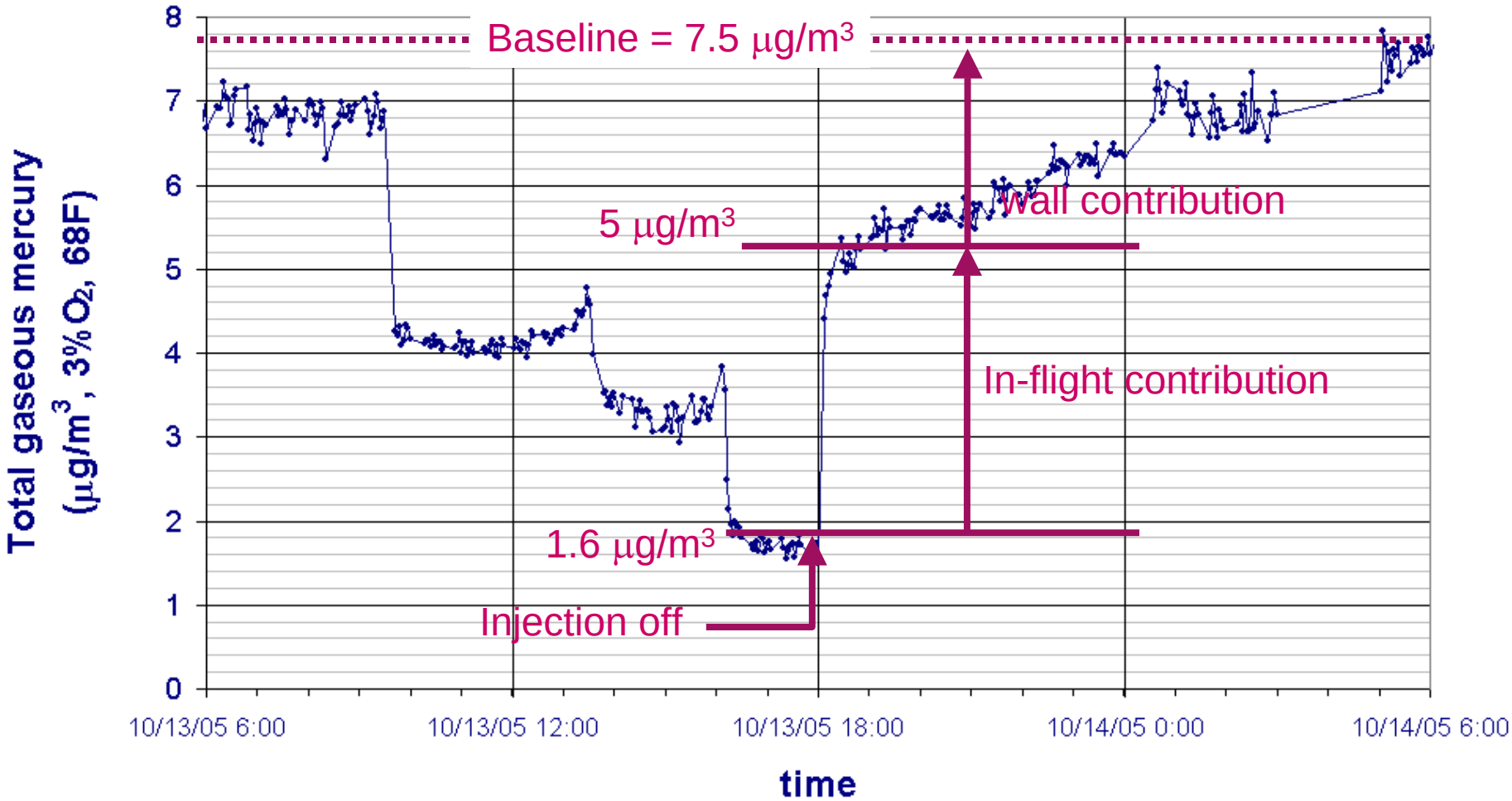
Parametric Testing– Wall vs. In-flight



Wall contribution is 40% of total removal

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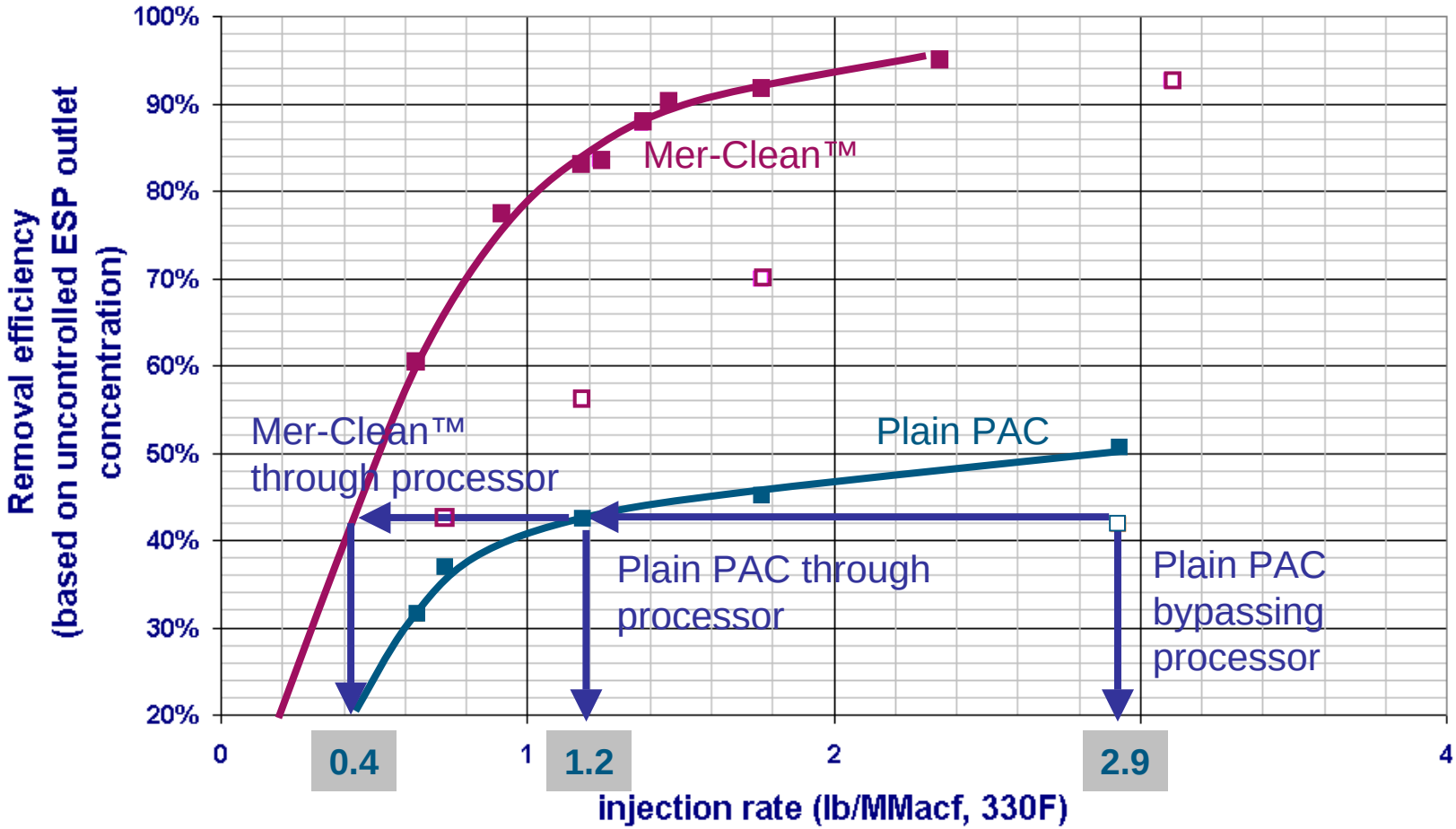
LOS1 - Mer-Clean™ Performance Vs. Plain Activated Carbon



90% removal at 1.5 lb/MMacf and 95% at ~2.2 lb/MMacf

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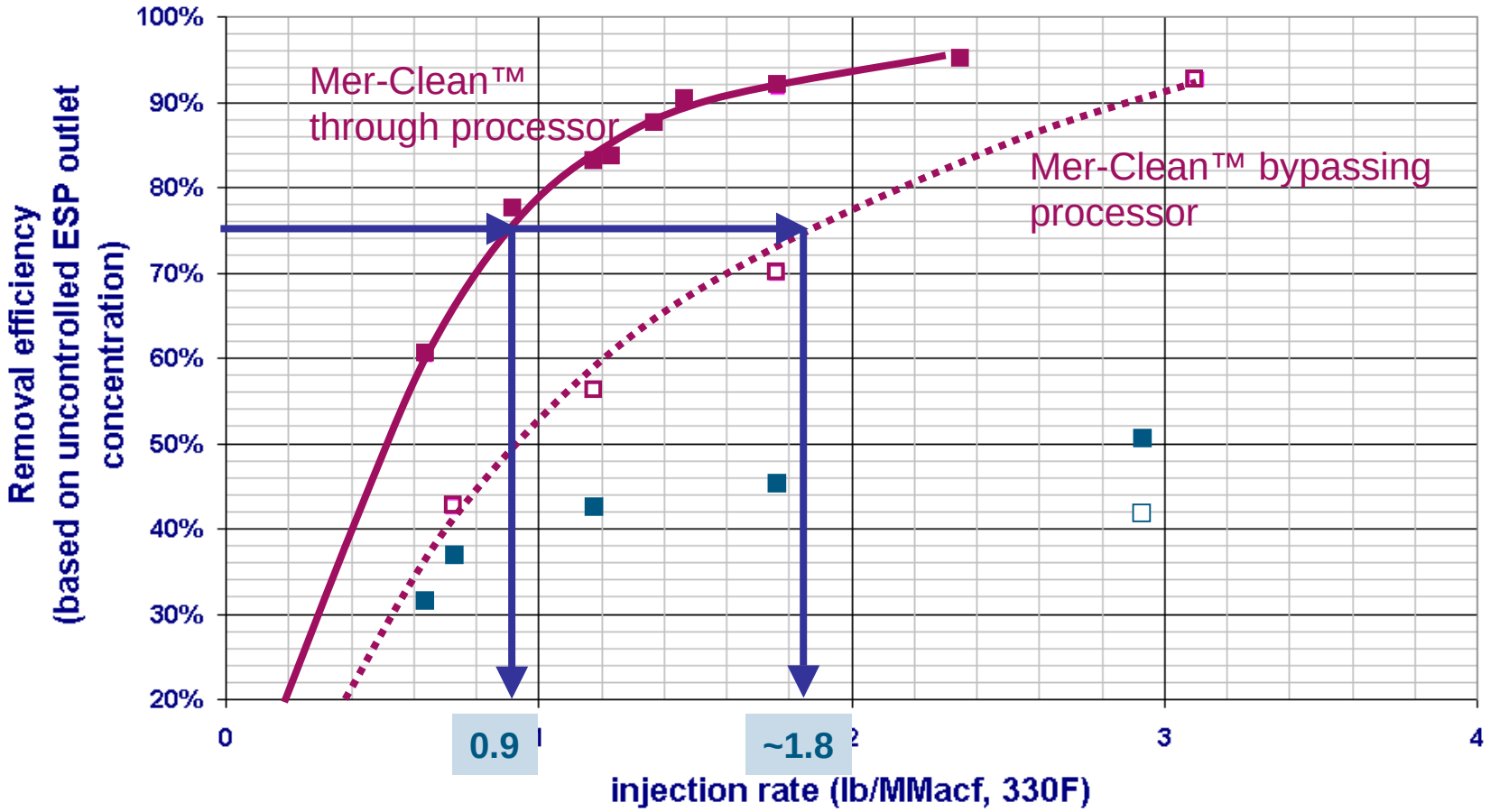
LOS1 Performance – Effect of Processor



Mer-Cure™ hardware reduces sorbent consumption by half

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Performance Summary

- Mer-Cure™ system – effective mercury control solution:
  - Upstream injection with processor
  - Increased chemical kinetics
  - Increased surface area
  - Increased residence time
- Performance summary (DOE and commercial testing)
  - PRB coal - 90% removals at 0.6 to 2 lb/MMacf
  - Lignite coal - 90% removals at 1.5 lb/MMacf
  - Eastern US Bituminous coal – 90% removals at approximately 7 to 8 lb/MMacf
- Several sorbents tested
- Mercury captured in ash found to be non-leachable, safe for landfills
- Ash Utilization – yes, with some limitations
- SO_3 tolerant sorbent – further development
- Medium term system operation successfully demonstrated

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Commercial Development

- Minimize overall cost of mercury removal > minimize sorbent usage
- Minimize equipment cost > minimize injection rate
- Commercial demonstration testing and systems being offered
- All coals (PRB, lignite, E. bituminous tested to date)
- Focus currently on cold ESP's, but also pursuing other configurations
- Test other sorbents with the Mer-Cure™ System hardware
- Equipment lead times

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