ADA Environmental Solutions

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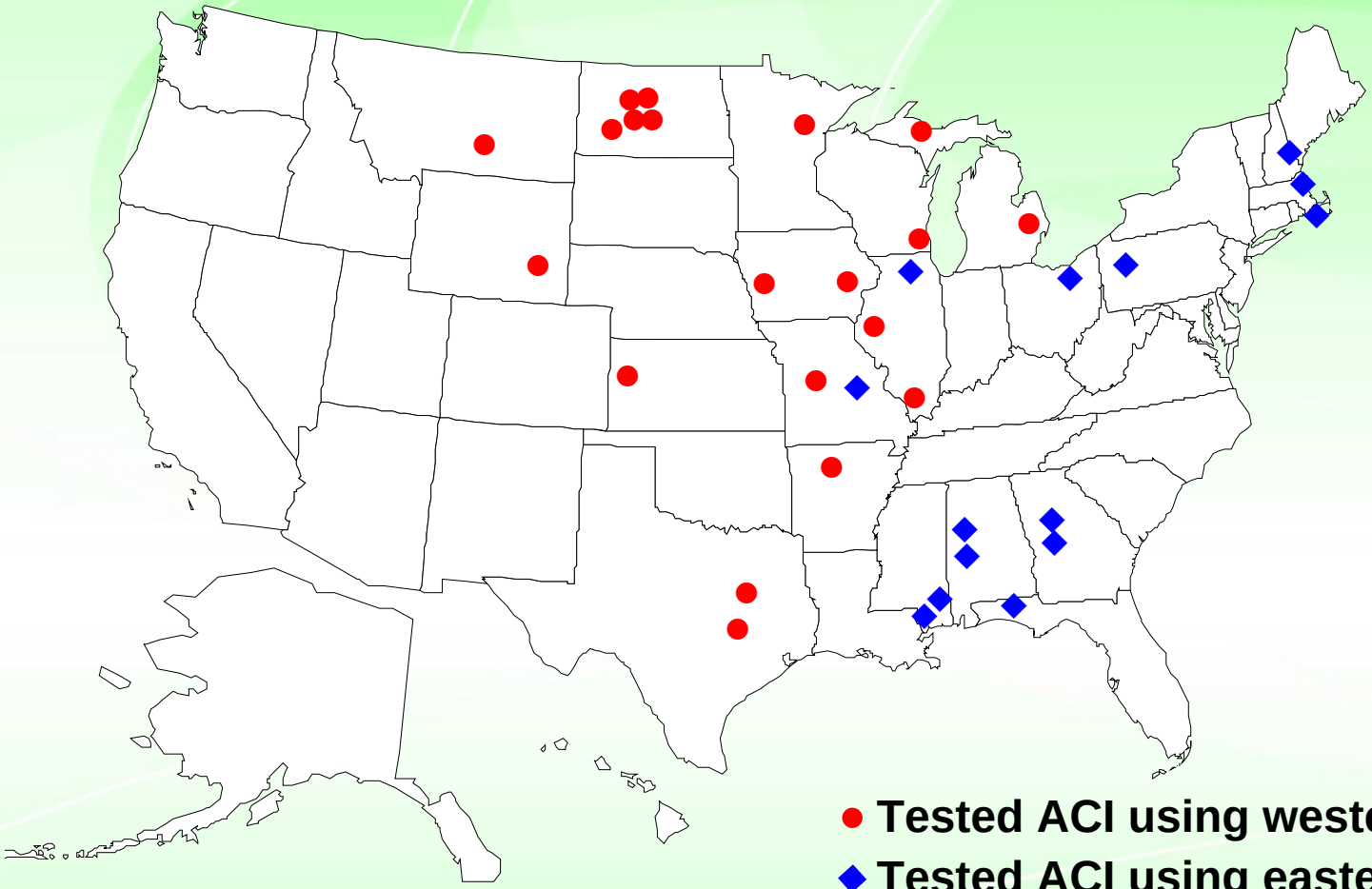
ADA's Plans for Supplying Sorbent for the Mercury Control Market

DOE/NETL's
2007 Mercury Control Technology Conference
Pittsburgh, PA
December 11, 2007

Outline

- Analysis of AC Demand
- Plans for New Production of AC
- Interim Supply Plans
- QA/QC for Mercury Control Sorbents

Full-scale Test Results from a Number of Different Power Plants



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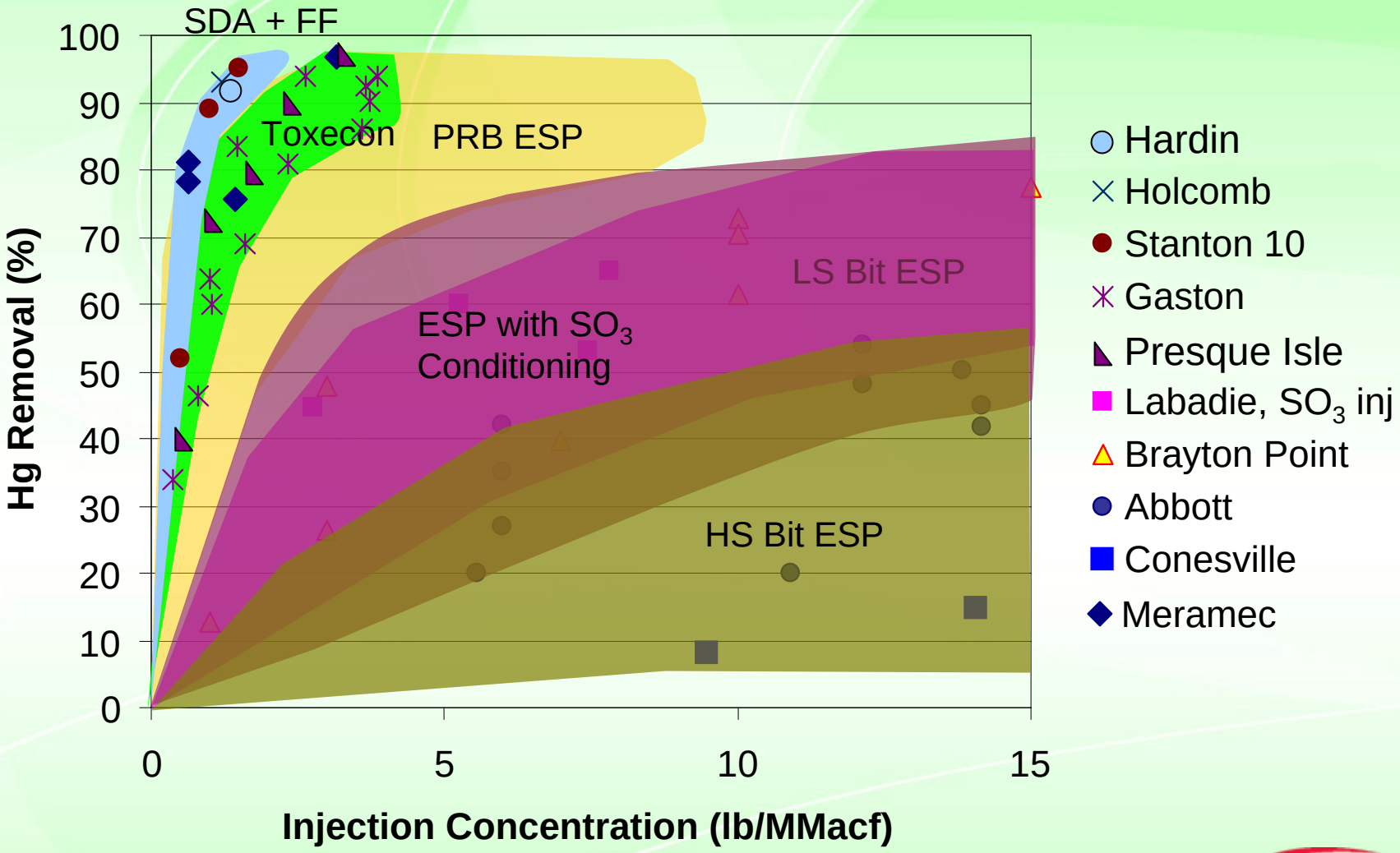
PAC Injection – Summary of Results



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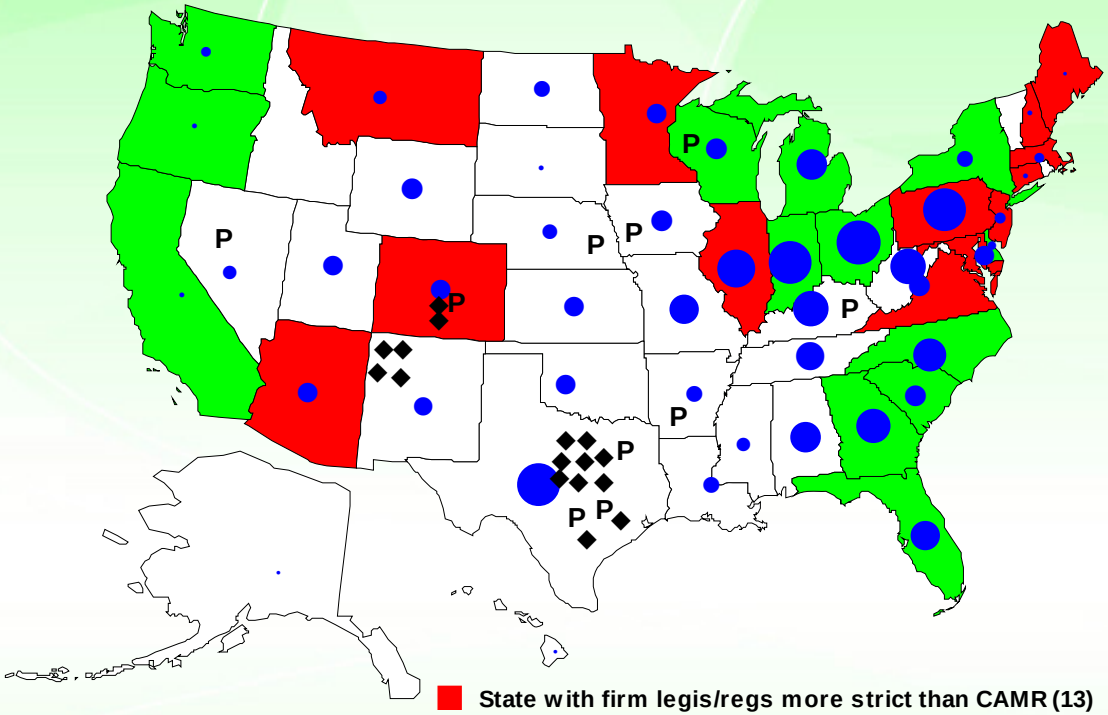
Market Drivers: Regulations for Hg Control



Total Existing Coal-Fired Capacity MW

- 24,000
- 12,000
- 2,400

- State with firm legis/regs more strict than CAMR (13)
- State with proposed legis/regs more strict than CAMR (13)
- State currently accepting CAMR (24)
- P Planned plant that has ordered mercury control system
- ◆ Plant with consent decree limiting mercury emissions

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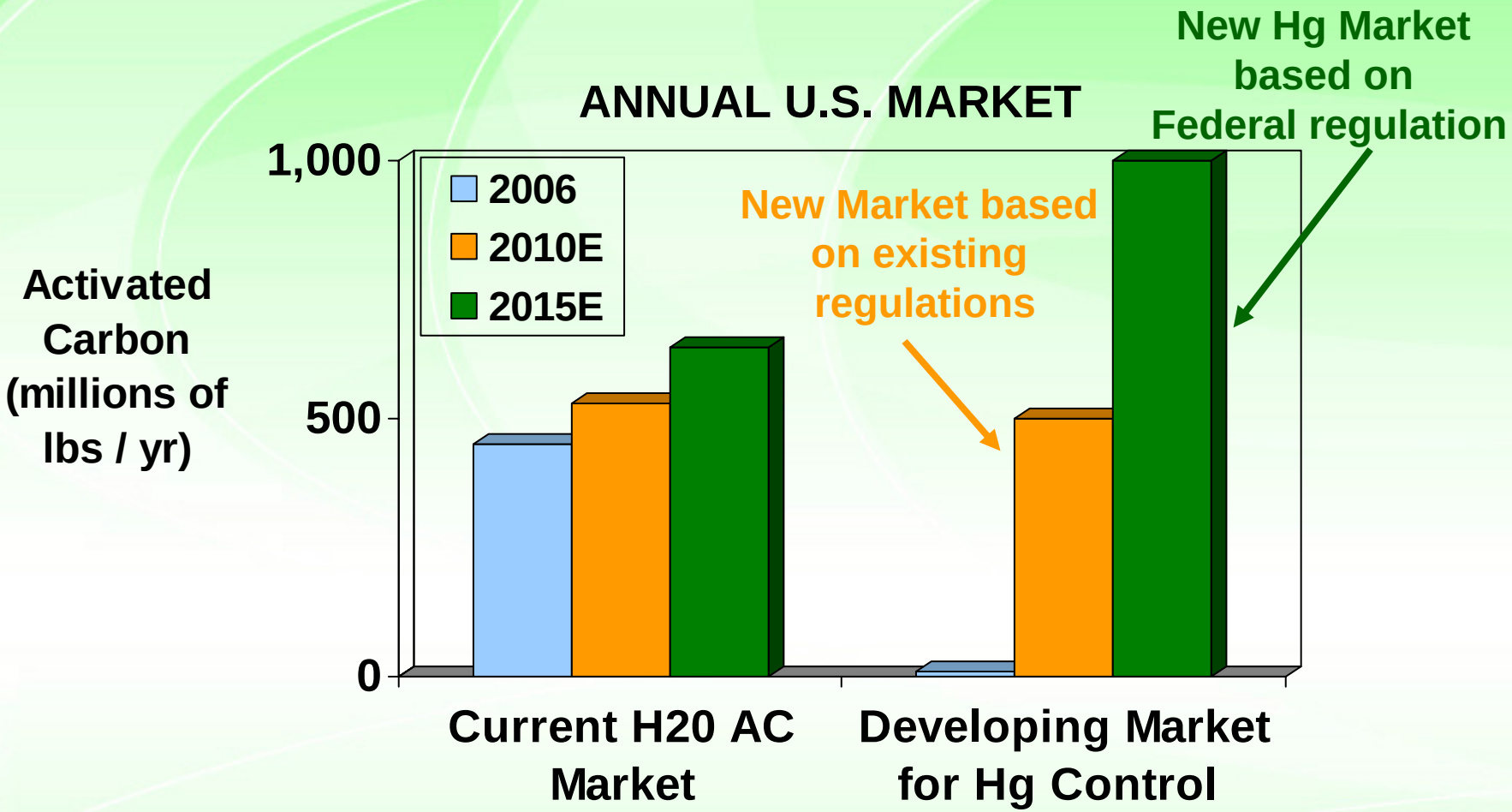
Analysis of AC Market for Mercury Control

- Bottoms Up approach for all 1100 plants
  - Coal
    - Bituminous (sulfur content)
    - PRB
    - Lignite
    - Blending
  - Equipment
    - ESP vs. FF
    - SO_3 Conditioning
    - Scrubbed vs. Unscrubbed
    - SCR
  - Regulations
    - CAMR
    - State
    - New Source
    - Consent Decrees
- Calculate AC demand based upon current regulations (2008-2011)
- Predict AC demand with a more-stringent Federal rule (2012-2015)

New Market for Activated Carbon Created for Mercury Control



Significant production gap identified

ADA-ES New Activated Carbon Production

- Largest AC plant(s) in North America
- Capital cost: approx. >$260mm per production line
- Annual production approx. 125 to 175 Million pounds of AC
- 4-6 year process:
  - Test products
  - Secure lignite feedstock
  - Design plant
  - Select site
  - Permits filed and pending
  - Purchase equipment
  - Permits issued/Construction
  - Startup late 2009

ADA's current stage

Permitting AC Plants at Three Lignite Mine-Mouth Sites (Two Lines per Site)

1. Adjacent to Red River Mine in NW Louisiana
2. Adjacent to Falkirk Mine near Bismarck, ND
3. Alternate ND site to be announced

ADA's Interim Supply Plans

- The goal is to put together a supply of AC of 30-40 million pounds per year to provide to the market in 2008/2009
- Sourcing
  - Contracting with smaller US suppliers and brokers of foreign sourced carbons
- Storage and Treatment (grinding and bromination)

AC Costs from New Production Facilities

- A new AC production plant is similar in scale and costs to a new coal-fired power plant
- Power plant costs have tripled in the past 20 years
  - Higher costs of steel
  - Higher costs of labor
  - Higher costs of engineering
  - More extensive emission controls (SO_2, NO_x, Particulates, Hg, and CO_2)
  - Higher costs for coal
- However, a new large-scale production facility can benefit from efficiencies of production

Development of AC Specifications

- ADA is working to develop a draft list of PAC characterization tests specific for utility needs
  - Effort is conducted under the DOE/We Energies demonstration program at the Presque Isle Power Plant
  - Coordinating with industry-wide program being established by EPRI
- Separate tests into categories
  - Sorbent Properties
  - Balance of Plant Issues
  - Performance
- Identify tests for special situations (TOXECON™, high temperature applications, etc.
- Identify tests for process troubleshooting

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Characterization Tests - Examples

- **Sorbent Properties**
  - Density
  - Iodine Number
  - Particle Size Distribution, etc.
- **Balance of Plant**
  - Abrasion
  - Hardness
  - Corrosivity
  - Flow Characteristics (PAC and PAC/ash mixture)
- **Performance Screening**
  - Site-specific Sorbent Screening

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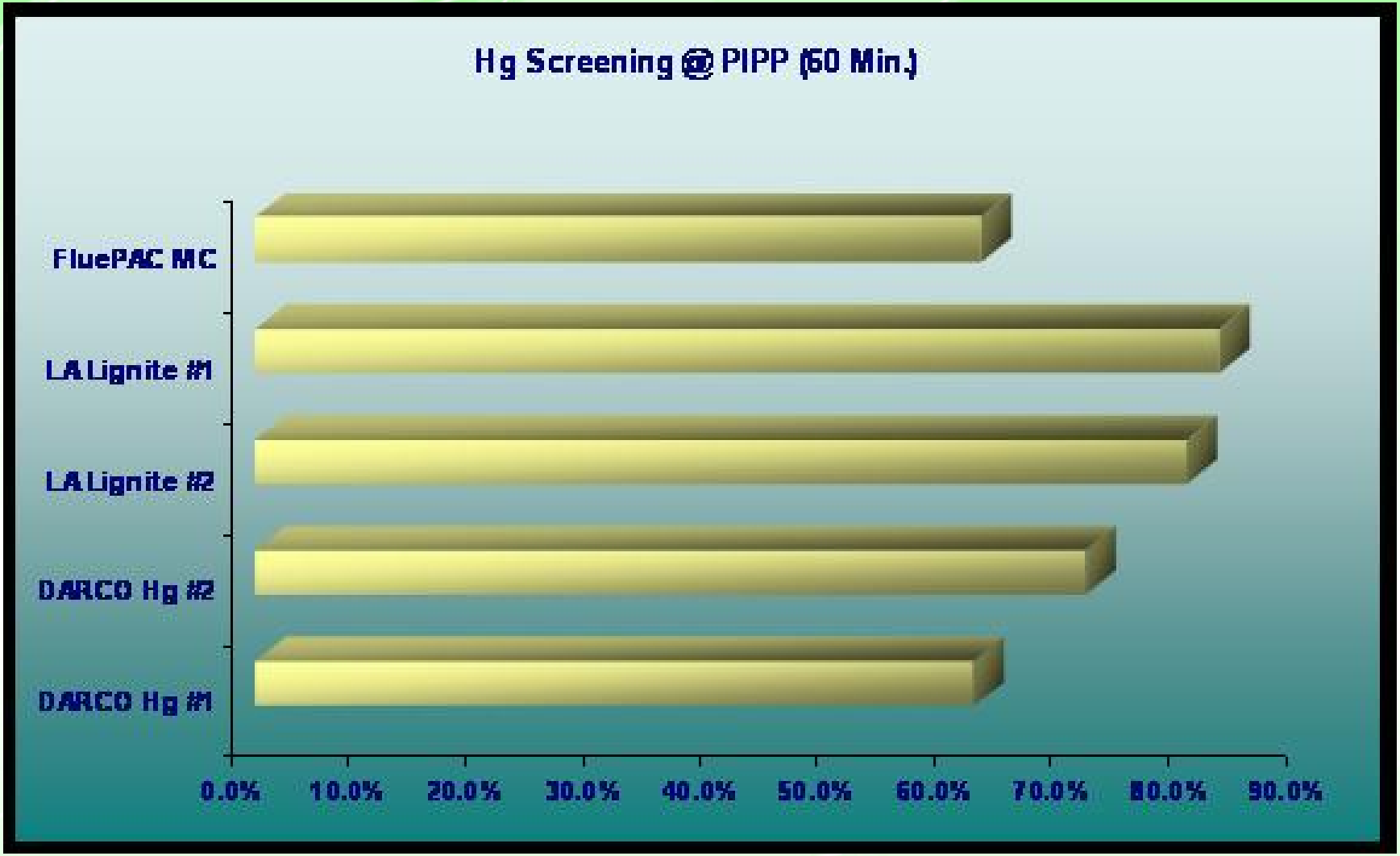
Example Screening Results



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Overall Approach for Developing Carbon Specifications - EPRI