

# EPRI Mercury R&D Program



Presented to:

**DOE/NETL Mercury Control  
Technology R&D Program Review  
Meeting**

by

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# Mercury – Issues

- **Current emissions & measurement capabilities**
- **Sustainable performance, cost, balance-of-plant impacts of control options**
  - **With FGD in place or on the horizon**
    - **Wet FGD or spray dryer**
  - **Without FGD in plans**
  - **With or without SCR**
  - **E. Bit, PRB, lignites, blends**
  - **Cold-side ESP, hot-side ESP, baghouse, scrubber**
- **Lower cost options/variants**
- **Impacts on combustion products – disposal or use**



# Acknowledgments

- Many programs co-funded by DOE; e.g.,
  - Full-scale tests ( $\sim 1/2$ )
    - ACI
    - SCR/FGD co-benefits
  - Sorbent development
  - Oxidation catalysts
  - Fundamental understanding, etc.
- Active technical and financial support by many EPRI members
- Emphasize team approach among host, contractors, and funders



# Mercury Characterization & Measurement



- Analysis of ICR data (10/00); re-analyzing
- Tests on variability
- Tests at plants with SCR/FGD
- Baseline tests at controls development sites
- Evaluating CEMS (with EPA)
  - Developed accurate R&D continuous monitor
  - Helping vendors develop reliable systems
  - Developed sampling conditioning systems
  - Developing simplified CEMS (QuickSEM™)

# Mercury Controls for Scrubbed Sites



- Evaluating “co-benefits” of SCR/FGD
  - Seems best for E. Bit
  - Continuing to assess performance, aging, fuel (flue gas) differences, catalyst
- Addressing “re-emissions” of captured oxidized mercury as elemental mercury
  - Key concern for units that seek very high removals
  - Available data inconsistent
  - Combined lab, field pilot, and full-scale tests
    - Need transportable FGD simulator

# Mercury Controls for Scrubbed Sites (concl.)



- **Developing other solutions:**
  - **Oxidation catalysts for sites with FGD and western or low-oxidation eastern coal**
    - **Insert into back end of ESP**
    - **Long-term test on ND lignite underway; starting in May at PRB site; DOE proposal for E. Bit compliance coal**
  - **Chemical additives injected into furnace or flue gas**
    - **Become oxidizers in the back end**
    - **Many questions, but probably least cost approach**
- **Exploratory R&D searching for Hg<sup>0</sup> “getter”**

# Mercury Controls for Unscrubbed Units

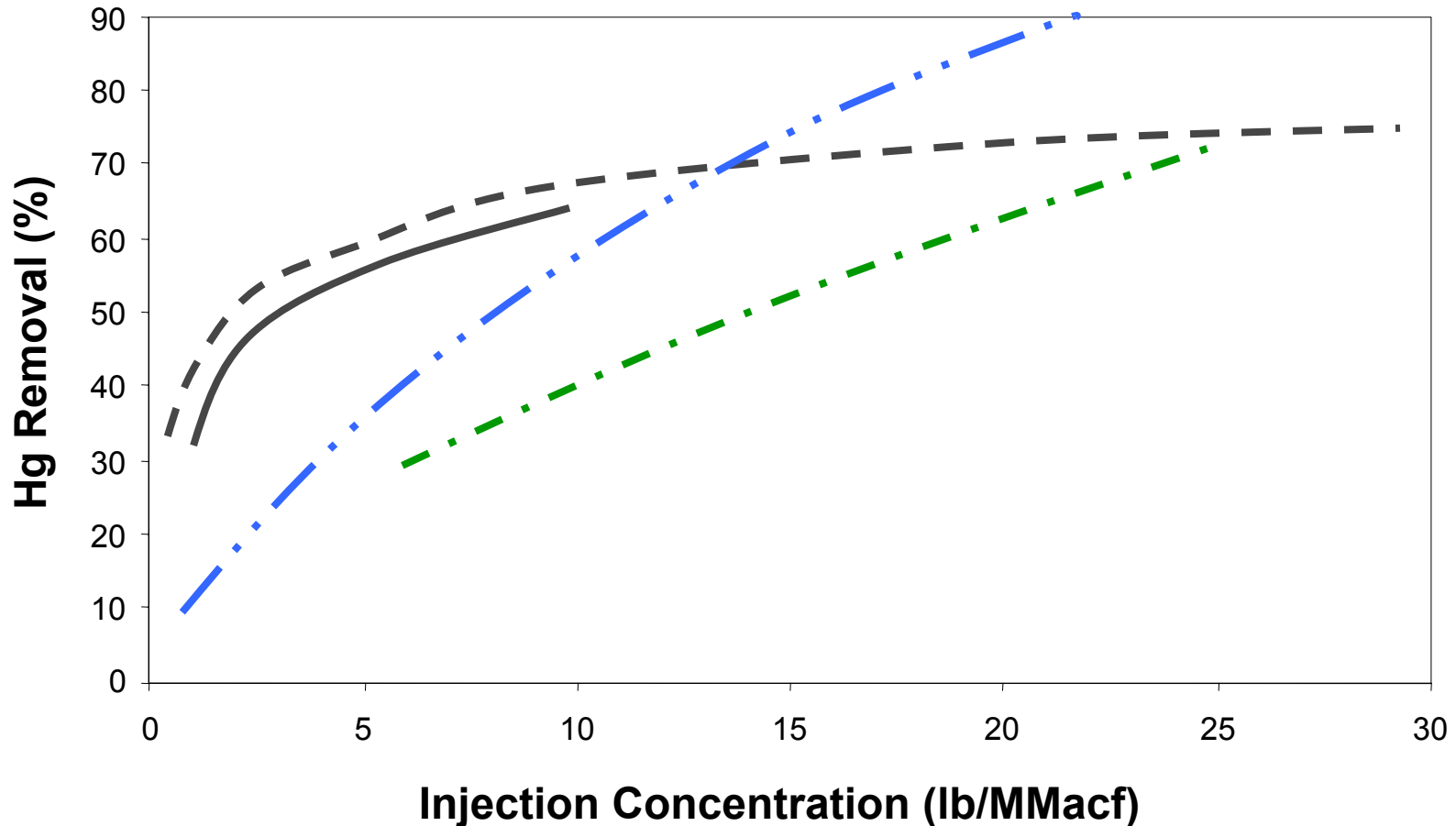


- **Focus is on sorbent injection**
  - **Determining:**
    - **Sustainable performance, costs for a variety of coals, particulate controls**
    - **Balance of plant impacts and fixes**
    - **Impacts on combustion product use and fixes**
  - **Developing lower cost options**
  - **Evaluating supplier offerings**
  - **Developing solution for western coals**
- **Developing fixed structure alternative – no consumables, waste**

# Mercury Removal in ESPs

-Which line is correct?

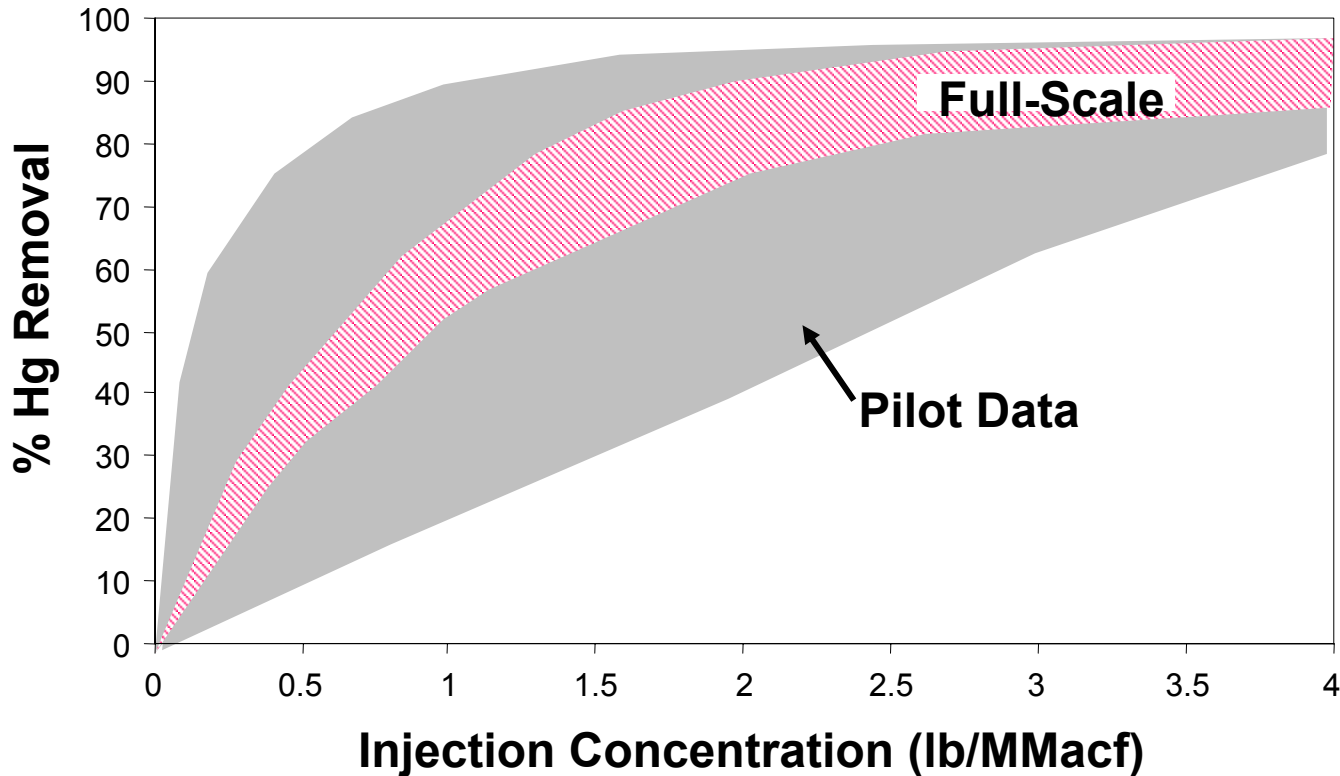
-Is each unique or representative of a category?





# Mercury Removal by TOXECON™

- How sustainable?
- Applicable to all coals?
- Baghouse size needed?
- Filter fabric design?
- PM2.5, multi-pollutant benefits?

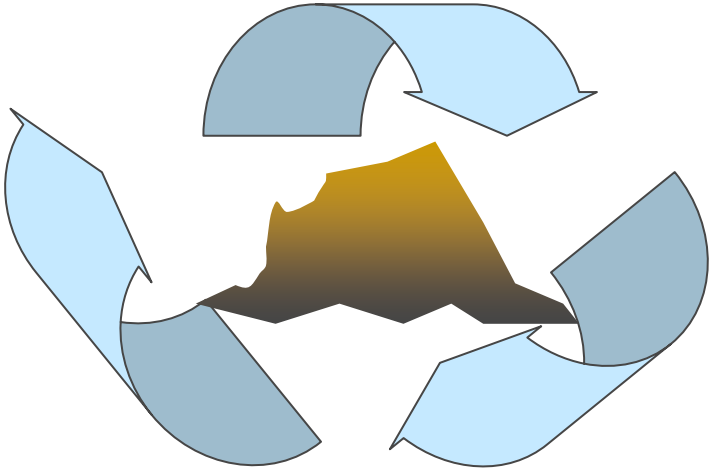


# Meeting the Monitoring Challenge



- **Develop, evaluate, demonstrate continuous mercury monitor for:**
  - Compliance
  - Troubleshooting, process control, and testing for compliance planning
- **QuickSEM™ a low-cost, accurate, cumulative measurement approach**

# Impacts of Mercury Control on Coal Combustion Product Use



- **Measure fate of Hg in ash, gypsum use**
  - Disposal, agricultural uses of ash, gypsum
  - Concrete curing
  - Higher temperature uses of ash
  - Wallboard (lab; possibly full-scale)
- **Seek/demonstrate mitigation measures where needed**

**Questions?**