GEOENERGY
A DIVISION OF
A.H. LUNDBERG ASSOCIATES, INC.

Wet ESPs for Particulate Control Enhancement from Utility Boilers

presented to

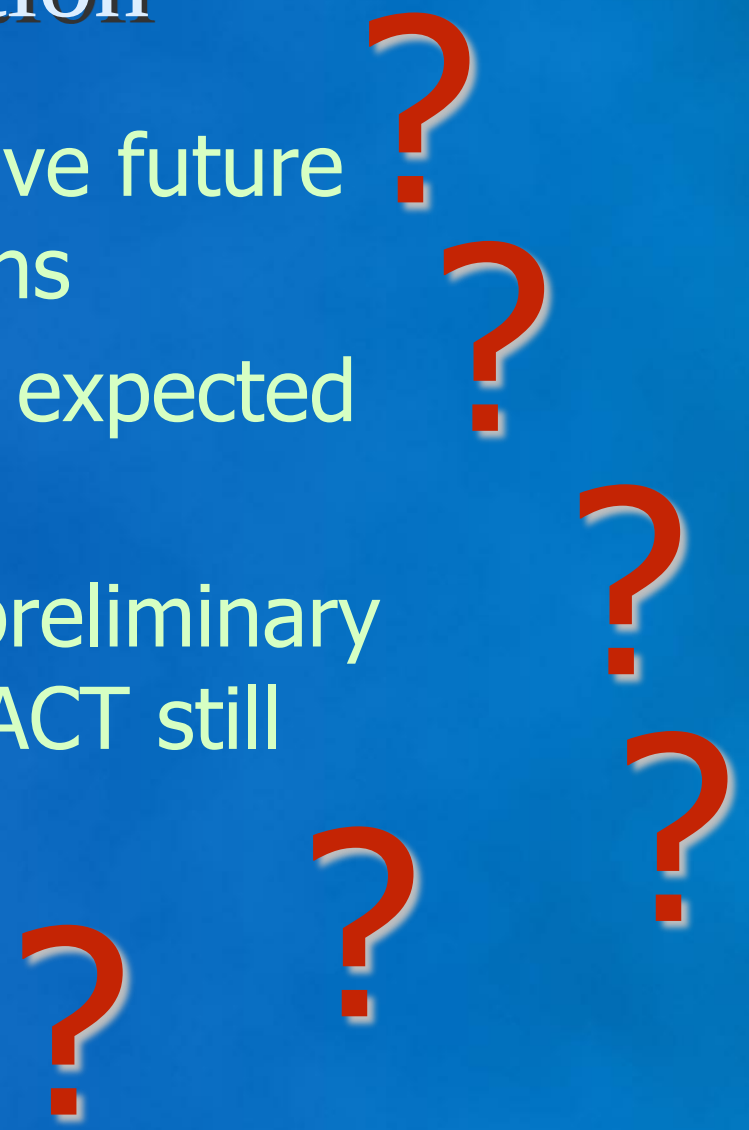
McIlvaine Hot Topics Web Seminar
January 20, 2011

by

Geoenergy Division of A.H. Lundberg Associates, Inc.

Regulatory Situation

- Regulations will drive future technology decisions
- Utility Boiler MACT expected March, 2011
- EPA providing no preliminary direction; Boiler MACT still unresolved
- Great uncertainty



Possible (Probable?) Challenge

1. Coal-fired boiler with wet FGD

2. Emissions above "best 12%" MACT mandate

Define the Problem

- Possibilities
  - Dry particulate escaping from dry ESP
  - Solids laden mist
  - Acid mist

Approaches

- Improve dry ESP
  - Gas flow improvements
  - Rapping improvements
  - Gas flow distribution improvements
  - Advanced power supplies and pre-charging
- Add-on to FGD
  - Improve mist eliminators
  - ***Add wet ESP***

Wet ESP Advantages

- Proven technology
- Little added pressure drop
- Little added parasitic load
- No gas flow barrier
- Excellent performance on all particles, liquid or solid
- Install off line; tie in during brief outage

Wet ESP Performance

Power Off

Power On

Off/On Side by Side

Utility Wet ESP Experience

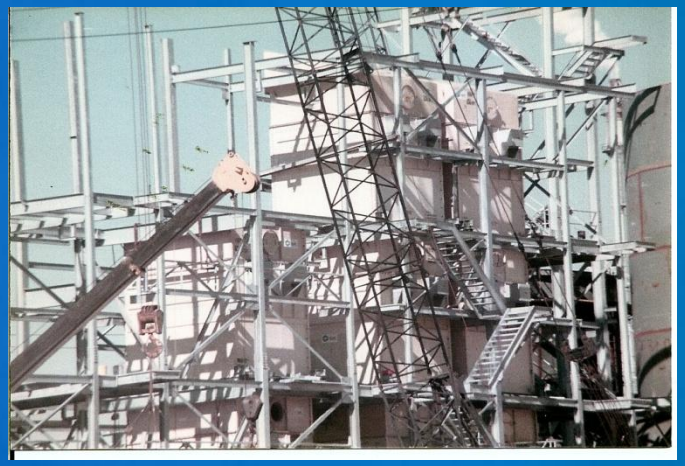
- 6 units in operation on NA major utility sources
- 2 large systems in construction on utility projects
- Many in operation on industrial boilers

First Energy Burger Station

- 50 MW capacity
- Installed/operated as demonstration unit by Powerspan for multi-pollutant process
- Operated 2004 through 2010
- Excellent reliability and performance

AES Deepwater 1985

- 150 MW capacity
- Operating since 1986
- Petroleum coke fired
- Designed to control sulfuric acid mist



Conclusion

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