PROJECT facts

U.S. Department of Energy
Office of Fossil Energy
National Energy Technology Laboratory

Environmental and Water Resources

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Mercury Control for Plants Firing Texas Lignite and Equipped with ESP-Wet FGD

CONTACTS

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Background

The 2005 Clean Air Mercury Rule will require significant reductions in mercury emissions from coal-fired power plants. One promising mercury control technology involves the use of sorbents such as powdered activated carbon. Full-scale sorbent injection tests conducted for various combinations of fuel and plant air pollution control devices have provided a good understanding of variables that affect sorbent performance. However, many uncertainties exist regarding long-term performance, and data gaps remain for specific plant configurations.

Sorbent injection has not been demonstrated at full-scale for plants firing Texas lignite coal, which are responsible for about 10 percent of annual U.S. power plant mercury emissions. The low and variable chlorine content of Texas lignite may pose a challenge to achieving high levels of mercury removal with sorbent injection. Furthermore, activated carbon injection may render the fly ash unsuitable for sale, posing an economic liability to plant operators. Alternatives to standard activated carbon, such as non-carbon sorbents and alternative injection locations, have not been fully explored.

Texas Genco's Limestone Steam Generating Station

PARTNERS

URS Group

EPRI

NRG Energy

TXU Energy

AEP

Apogee Scientific

ADA-ES

PERIOD OF PERFORMANCE

04/10/2006 to 05/09/2008

COST

Total Project Value

$2,468,772

DOE/Non-DOE Share

$1,745,563 / $723,209

ADDRESS

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Primary Project Goal

The goal of this project is to evaluate sorbent injection for mercury control at a Texas lignite-fired power plant equipped with a cold-side electrostatic precipitator (ESP) followed by a wet flue gas desulfurization unit (wet FGD). Project results will identify promising sorbents and operating conditions necessary to achieve significant mercury removal.

Objectives

- Conduct parametric tests at a Texas lignite-fired power plant using three different sorbents at four different injection rates.
- Assess impact of sorbent on fly ash properties and its suitability as a concrete additive.
- Perform long-term mercury control testing using the most promising sorbent and injection rate combination identified during parametric testing. Testing will last for at least 60 days.

Accomplishments

The project is still in the initial planning stages.

Benefits

This test program will provide mercury control data necessary to address the following critical gaps:

- The effects of sorbent injection on the chemical and physical properties of FGD solid by-products.
- Low ash impact methods of sorbent injection (such as Toxecon II).

Planned Activities

- Phase I parametric testing of three sorbents at four different injection rates at NRG Energy's Limestone power plant.
- Phase II parametric testing of the two most promising sorbents and the most promising injection rate identified in Phase I. Each sorbent will be tested in three different injection configurations (e.g. upstream of ESP, between ESP fields, and staged injection).
- Long-term testing of sorbent injection over a period of 60 days using the best sorbent, injection rate, and pollution control device configuration identified during parametric testing.
- Seven days of additional testing involving a blend of Powder River Basin and lignite coal.