

Pilot Testing of Mercury Oxidation Catalysts for Upstream of Wet FGD Systems

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This paper will present and discuss progress on Cooperative Agreement DE-FC26-04NT41992, "Pilot Testing of Mercury Oxidation Catalysts for Upstream of Wet FGD Systems," during the time-period July 1, 2005 through November 30, 2006. The objective of this project is to demonstrate at pilot scale the use of solid honeycomb catalysts to promote the oxidation of elemental mercury in flue gas from coal combustion, and the use of a wet flue gas desulfurization (FGD) system downstream to remove the oxidized mercury at high efficiency. The project is being co-funded by the DOE/NETL, EPRI, Great River Energy (GRE), TXU Generation Company LP, the Southern Company, Salt River Project (SRP) and Duke Energy. URS Group is the prime contractor.

The mercury control process under development uses honeycomb catalysts to promote the oxidation of elemental mercury in the flue gas from coal-fired power plants that have wet FGD systems. Oxidized mercury is removed in the wet FGD absorbers and leaves with the byproducts from the FGD system. The current project is testing previously identified catalyst materials at pilot scale and in a commercial form to provide engineering data for future full-scale designs. The pilot-scale tests will continue for approximately 14 months or longer at each of two sites to provide longer-term catalyst life data. A new, third site will test catalysts for a period of 12 months. Pilot-scale wet FGD tests are being conducted periodically at each site to confirm the ability to scrub the catalytically oxidized mercury at high efficiency.

During this period, project efforts included operation of catalyst pilot units at all three sites. The first site is TXU Generation Company LP's Monticello Steam Electric Station, which fires a blend of Texas lignite and Powder River Basin (PRB) coal. Pilot unit operation there began in January 2005 and ceased in August 2006. The second pilot unit is at Georgia Power's Plant Yates, which fires low sulfur Eastern bituminous coal. Pilot unit operation began there in December 2005 and will continue operation into the spring of 2007. The third pilot unit is at SRP's Coronado Station, which fires PRB. That pilot unit began operation in March 2006 and will continue in operation through March 2007. Testing at two of the three sites has included short-term pilot wet FGD tests to measure removal of catalytically oxidized mercury across the scrubber. Pilot wet FGD tests will be conducted at the third site later.

Results presented include mercury oxidation across the catalysts as a function of time in service, as measured by mercury SCEM, mercury removal across the pilot wet FGD by mercury species, and flue gas pressure drop across the catalysts. Also presented will be results of Ontario Hydro relative accuracy tests conducted at each site concurrent with mercury SCEM measurements, and the results of additional gas characterization measurements. Finally, preliminary process economics will be presented, for a case where oxidation catalyst technology is used on a plant that fired PRB coal, has a hot-side ESP for particulate control, sells its fly ash, and has an existing wet FGD system.

The projected path for commercialization of the process will be discussed. Key to this path is a planned DOE/NETL co-funded demonstration of the technology at 200-MW scale. The demonstration will be conducted starting later in 2007 at the Lower Colorado River Authority's PRB-fired Fayette Power Project, Unit 3, which is located outside LaGrange, Texas.