Testing of Mercury Oxidation Catalysts Upstream of a Wet FGD System

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This presentation will present and discuss progress on Cooperative Agreement DE-FC26-06NT42778, "Full-scale Testing of a Mercury Oxidation Catalyst Upstream of a Wet FGD Systems," during the time-period December 2006 through December 2007. The objective of this project is to demonstrate at full scale the use of a solid honeycomb catalyst 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, the Lower Colorado River Authority (LCRA), Johnson Matthey, Great River Energy (GRE), the Southern Company, Salt River Project (SRP), TVA, Westar, Ontario Power, and URS Corporation. URS Group is the prime contractor.

The Cooperative Agreement was awarded in July 2006 and is co-funding a 200-MW-scale demonstration of the technology at the LCRA's Fayette Power Project Unit 3, a 460-MW unit that fires PRB coal. The station is located outside of LaGrange, Texas, about halfway between Austin and Houston. The oxidation catalyst will be installed upstream of one of three wet FGD modules on Unit 3, Module C. The unit normally operates with two modules in service and one in standby, and with a small amount of flue gas bypass. Thus, each FGD module treats flue gas from about 200 MW of generating capacity. The Unit 3 wet FGD system uses limestone reagent and is forced oxidized. It produces gypsum as an FGD byproduct that is used by the cement industry.

The oxidation catalyst would likely be installed in an ESP outlet nozzle if the flue gas from an entire unit were being treated. At Fayette, where the flue gas to only one absorber module is being treated, the catalyst is being installed directly upstream of that module. This has required revisions to the ductwork to lower the flue gas velocity through the catalyst and to support the weight of the catalyst. During the past year, the design of these ductwork revisions was completed and subcontracts were issued to fabricate the new ductwork section, remove the existing ductwork run, and install the new section. The fabrication and demolition efforts have been completed and installation of the new duct section is currently underway. The installation should be essentially complete by the time of the contractors' meeting.

Also during the year, the gold-based catalyst for this installation was ordered from team member Johnson Matthey. The catalyst is expected to be delivered to the site by the end of March 2008, but possibly as early as the beginning of February 2008. The catalyst will be delivered in 36 modules that will be installed as three layers in the new ductwork section. Sonic horns are being installed upstream of each of the three layers to help prevent fly ash buildup in the catalyst during operation.

Once the catalyst is installed, a demonstration period of up to two years will begin. Process characterization measurements over that period will include mercury oxidation across the catalysts as a function of time in service, mercury removal across the wet FGD absorber by

mercury species, and flue gas pressure drop across the catalysts. Measurements will be made across the other absorber in service to collect “baseline” (no catalyst) mercury oxidation and removal performance data. Ontario Hydro relative accuracy tests will also be conducted periodically at each flue gas measurement location.