

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

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This presentation summarizes progress on Cooperative Agreement DE-FC26-06NT42779, “Mercury Control for Plants Firing Texas Lignite and Equipped with ESP-wet FGD”. The objective of this sorbent injection program is to determine the level of mercury removal achievable for a plant firing Texas lignite fuel and equipped with an ESP. The host site for this program is NRG Texas’ Limestone Electric Generation Station Unit 1, located in Jewett, Texas. The plant fires a blend of Texas lignite and Powder River Basin (PRB) coal. Full-scale tests were conducted to evaluate the mercury removal performance of powdered sorbents injected into the flue gas either upstream of the ESP (traditional configuration) or between electric fields within the ESP (TOXECON™ II configuration).

The test program consisted of three short-term parametric test phases followed by a 60-day continuous operation test. Selected mercury sorbents were injected to treat one quarter of the flue gas (e.g., approximately 225 MW equivalence) produced by Limestone Unit 1. Several sorbents were evaluated during the first phase of parametric tests in which sorbent was injected upstream of the ESP. These sorbents included a standard activated carbon (Norit Americas’ DARCO Hg), brominated activated carbons from three different vendors (Norit Americas’ DARCO Hg-LH, Sorbent Technology’s B-PAC and C-PAC, and Calgon’s Flue PAC MC Plus), and a low-ash impact sorbent from BASF.

Based on the initial parametric test results, DARCO Hg and DARCO Hg-LH were selected for further testing in the TOXECON II configuration. TOXECON II is an EPRI patented technology that involves injection of mercury sorbent material in between electrical fields of the ESP. The sorbent and captured mercury are removed across the downstream fields of the ESP while the fly ash captured in the upstream fields is not contaminated by the sorbent.

Results from these sets of parametric tests were used to select the best combination of sorbent and injection location for a two-month performance evaluation. Norit Americas’ DARCO Hg-LH was injected at 2 lb/Macf upstream of the ESP. During this continuous-injection test, mercury removal performance and variability were evaluated as the plant operated under normal conditions. Additional evaluation was made to determine any balance-of-plant impacts of the mercury control process, including those associated with ESP performance and fly ash reuse properties.