



Novinda Environmental Services Case Study

Novinda Environmental Services (Novinda) provided mercury (Hg) monitoring services for the Texas Municipal Power Agency (TMPA) Gibbons Creek Steam Electric Station (GCSES) located in Carlos, Texas. The GCSES will be subject to the federal Mercury and Air Toxics Standards (MATS), which limits emissions of Hg and other hazardous air pollutants (HAP) from coal-fired power plants. The GCSES is a pulverized coal-fired boiler fired with Powder River Basin (PRB) coal, which utilizes cold-side electrostatic precipitators (ESP) and wet flue gas desulfurization (FGD) scrubbers to remove HAP.

With Novinda's expertise TMPA conducted an extended trial to evaluate technologies for achieving compliance with the MATS Hg limit of 1.2 pounds Hg per trillion British thermal units (lb/TBtu) heat input. TMPA plans to limit Hg emissions using a fuel additive injection (FAI) Hg oxidation technology and a wet scrubber additive (WSA) technology to sequester captured Hg.

Novinda's professional services supported TMPA's Wet Scrubber Additives (WSA) evaluation phase of the project. The scope of services entailed the installation and operation of two (2) Novinda mobile continuous mercury monitoring systems (CMMS) and three (3) EPA Method 30B sorbent trap sampling systems.

Novinda installed a CMMS for monitoring Hg in flue gas in the duct exiting the east air heater and another to monitor Hg at an inlet duct to the east wet flue gas desulfurization (FGD) module. The on-site testing schedule spanned from July 6, 2015 to August 24, 2015. Each CMMS monitored and recorded both vapor phase elemental Hg (Hg₀) and total Hg (Hg_T). The CMMS primarily monitored changes in flue gas Hg concentration in response to step changes in unit load and control process changes.

Novinda also conducted EPA Method 30B Hg sorbent trap sampling at each CMMS and at the stack regulatory Hg continuous emissions monitoring system (Hg CEMS) as an additional quality control measure in accordance with TMPA's sampling schedule. EPA Method 30B, found in Title 40 of the Code of Federal Regulations, Part 60 (40 CFR 60), Appendix A, is often used as the reference test method for measuring Hg in coal combustion flue gas. Hence, Method 30B results provided the benchmark results for the trial. Novinda engineers analyzed all Hg sorbent traps on site with their thermal desorption sorbent trap analyzer.

TMPA selected three WSA products for this trial. The Hg oxidant used was calcium bromide (CaBr₂) brine solution, and the wet FGD system then removed the resulting oxidized Hg. TMPA sequentially tested the three WSAs for 10-day periods to determine effectiveness of the best performing additive.

Conclusions

Two of the three WSAs successfully removed some degree of Hg₀ entering the FGD modules and prevented more Hg₀ exiting the scrubber. These WSAs also either maintained or enhanced oxidized Hg (Hg₂₊) removal compared to baseline conditions (no injection of WSA). One WSA performed sufficiently well that FAI material rate could be reduced.

The trial significantly lowered reduced load Hg emissions such that rolling average Hg emissions easily met the Mercury and Air Toxics Standard (MATS) Hg 30-day rolling average.