

NOx Limits Met with Ammonia-Free SCR Solution

NRG Energy Center San Francisco supplies energy-efficient district heating services to more than 170 customer buildings in a two-square mile area within the central business district of San Francisco, Calif.

Steam is used for space heating, domestic hot water, air conditioning and industrial processes, representing more than 37 million square feet of space.

PROBLEM

NRG's central district heating plant housed two (2) 55,000 lb/hr (71.4 MMBtu/hr) natural gas-fired Keeler boilers that were required to comply with the Bay Area Air Quality Management District's (BAAQMD) Reg. 9 Rule 7 NOx emission requirement of 9 ppm (a total reduction of 90% at all conditions).

Overall, the project requirements included an easy to operate and energy efficient space saving solution.

SOLUTION

A single Ammonia-Free CataStak SCR system that utilized Combustion Components Associates' (CCA) TRIM-NOX LT urea injection system was supplied by Nationwide Boiler.

The SCR system used a common and readily available 32 percent urea solution called DEF (diesel exhaust fluid), providing NRG with confident SCR performance without the use of ammonia. To meet the constraints of the tight boiler room configuration, Nationwide Boiler also designed and supplied a rail hoisting system which helped expedite the entire installation process.

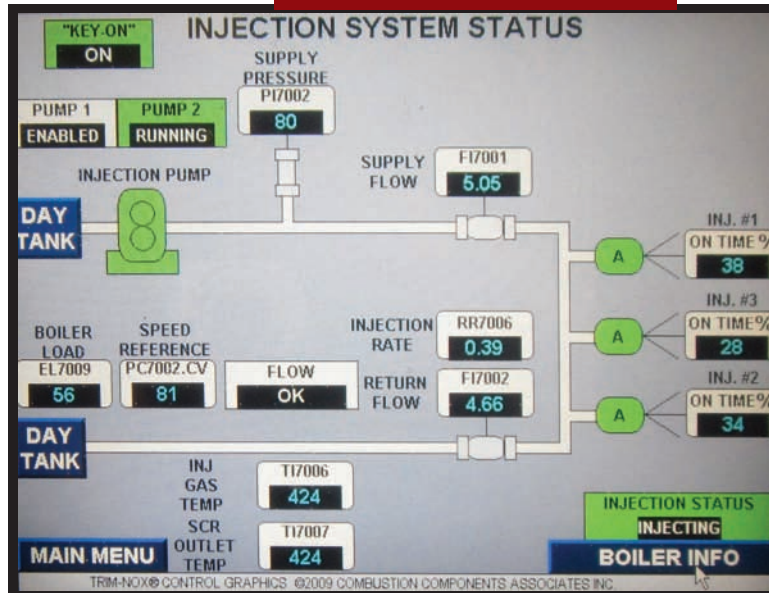
RESULTS

The Ammonia-Free CataStak SCR system easily reduced NOx emissions from 30 ppm and was tested at 1 ppm NOx throughout the firing range. The system was also optimized from 20 percent to 65 percent load (65 percent is full load). The system remains to operate dependably without any performance issues or concerns about meeting future NOx emission limits, providing the customer with hassle-free operations and confident, efficient performance.

Working closely with CCA engineers and performing actual fire testing on package boilers, Nationwide Boiler proved that CCA's technology can be supplied for both package firetube and watertube boilers.

This technology enables a cost effective, ammonia-free SCR

A typical HMI screen shot for one of the injection systems operating three airless return flow injectors. Reagent is circulated by the injection pump from the day tank through the supply meter, over to the injectors and returned through the return flow meter and back to the day tank. When the day tank level falls low, a solenoid opens and the tank is refilled from bulk storage. Photo courtesy of Nationwide Boiler



Two TRIM-NOX(R) urea injection skids with the day tanks, flow meters and control panels with HMI operator touch screens. Each of the two boilers had its own injection system and each injection system controlled three injectors. Photo courtesy of Nationwide Boiler



system to achieve up to 95 percent NOx reduction at a very low capital and operating cost. Additionally, boiler owners and operators can economically obtain the performance of SCR technology and not be limited to the poor operating and energy intensive performance of 9 ppm burners. **pe**