

## **NOxTECH, a Novel Process for NO<sub>x</sub> Reduction**

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### **Summary**

NOxTECH, Inc. has developed an advanced process for controlling NO<sub>x</sub> emissions from utility, industrial, and waste-to-energy-boilers. NO<sub>x</sub> emissions are reduced by gas-phase reactions at temperatures of 1400-1550°F using a liquid chemical reagent. The flue gas temperature is controlled by a unique fuel injection system. The fuel and chemical are introduced using a grid arrangement of injection nozzles within the convective section of a boiler. Using no catalytic surface, only 0.2 seconds of residence time is needed in existing boiler cavities to reduce NO<sub>x</sub> by 95% or more, and NH<sub>3</sub> slip does not exceed 2 ppm.

The reaction temperature is controlled reliably with as little as 50-100°F of flue gas heating in the cavity. This temperature control in the cavity greatly decreases CO, unburned hydrocarbons, and particulate matter. The flue gas heating can replace about 3% of the boiler fuel which increases furnace O<sub>2</sub> by about 0.6%. The higher furnace O<sub>2</sub> decreases ash LOI, while equivalent combustion in the cavity maintains normal stack O<sub>2</sub> levels. The existing steam reheater, economizer, and air preheater recover the heat released in the convective section, so the NOxTECH process does not decrease the boiler efficiency or load rating.

The NOxTECH system is proven commercially on a 2.8 MW diesel electric generator at the Pebbly Beach Generating Station of Southern California Edison Company. For more than two years, the system has maintained BACT emissions compliance troublefree. Based on this long-term success in a prime power, base load application, the NOxTECH system is ready for demonstration on a coal-fired boiler. This first boiler demonstration can be performed full-scale on a small boiler or as a pilot-scale project using a slipstream from a larger boiler.

A demonstration project is proposed to confirm the applicability of the NOxTECH process to coal-fired boilers. Based on the current test results and commercial performance, the NOxTECH process removes significantly more NO<sub>x</sub> than SNCR and controls NH<sub>3</sub> slip lower than SCR while concurrently reducing CO, unburned hydrocarbons, and particulate matter. Unlike catalytic processes, NOxTECH performance does not degrade with time, and NOxTECH generates no hazardous by-

products. The liquid chemical is readily available at low cost, and the system components are commercially proven. The NOxTECH system can be retrofitted to boilers with minimal downtime in comparison with SCR and multi-level SNCR.