80-HP PLASMA-ASSISTED CATALYST SYSTEM

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NO_X reduction in lean exhaust is accomplished using plasma-assisted catalysis (PAC). Plasma's role in lean exhaust is to oxidize NO, PM, and CO. The oxidized products of nitrogen are then reduced in a presence of suitable hydrocarbon and a catalyst to nitrogen.

Under the current work sponsored by DOE, Noxtech is developing a cost-effective and practical PAC system to reduce the oxides of nitrogen from the lean exhaust of diesel engines. Currently, Noxtech has demonstrated 73 percent NO_x reduction on an 80-hp PAC system that is sulfur tolerant and has very broad temperature capability (see attached figure). Propene was used as the reductant.

Noxtech's advanced PAC system is comparable to the current muffler size -- only 14" X 40" tall with a system pressure drop of only 22" of H_2O. Noxtech's advanced PAC system is a non-thermal plasma reactor operating in series with a catalytic reactor to treat diesel exhaust from a 1988 Cummins diesel genset. A Nicolet 550 FTIR analyzer was used to measure exhaust constituents before and after treatment by the PAC system.

A 1-kW solid-state power supply is under construction to replace the current Thyratron-based power supply used for demonstrating and characterizing the 80-hp PAC system will pave the way for a practical PAC system. A system for converting diesel fuel as the reductant is under test currently. In addition, a design for a preliminary 200-hp PAC system is underway.