Ultra Low NO$_x$ Burner Upgrades

Retrofit existing burners for 40-60% NO$_x$ reduction

Fuel Tech’s proprietary components upgrade existing burners to high efficiency Low NO$_x$ burners. Fuel rich and lean zones are developed at the burner outlet to deeply stage combustion for low NO$_x$ control.

Typical reductions range from 40% to 60% with minimal impact on flyash LOI.

Coal Burner Upgrade
A homogeneous coal and primary air stream penetrates the Internal Re-circulation Zone (IRZ) at the burner outlet. Coal devolatizes in a low O$_2$ zone to force the fuel-bound nitrogen to N$_2$ instead of NO. Secondary air mixes further downstream to complete burn out and limit impact on unburned carbon.

The Hardware: Typically three components: a Low NO$_x$ Swirler, a Low NO$_x$ Coal Nozzle and a Low NO$_x$ Distribution Disk, are all that are needed to upgrade original OEM or Low NO$_x$ Burners. Components are fabricated from wear resistant alloys for extended life.

Coal T-Fired Burner Upgrade
Fuel Tech’s Separated Over-Fire Air (SOFA) system for Tangentially- Fired boilers utilizes a high energy nozzle design that eliminates the need for Yaw and tilt control. The system controls airflow from the secondary air ducts to evenly distribute flow through ports above the top elevation of burners.

The Hardware: Typically three components, a Low NO$_x$ fuel/air bucket, Coal Nozzle Insert and Distribution Disk, are all that are needed to upgrade original OEM or Low NO$_x$ burners. Components are fabricated from wear-resistant alloys to provide extended life.

Features Include:
- Ease of operation
- Patent pending five (5) zone burner
- Balanced perimeter airflow
- Homogeneous coal flow
- “Clean release” nozzle
- Accurate secondary airflow measurement
Gas & Oil Upgrades

Gas Burner Upgrade
Thermal NOx increases exponentially as a function of peak flame temperature. Lowering the peak flame temperature 190° F can reduce NOx 50%. Split flames are produced from the burner upgrade to stage combustion and reduce peak flame temperature.

The Hardware: Typically, only two components are needed to upgrade a single zone burner to a low NOx, high efficiency burner—a curve bladed swirler and gas pokers. Each are made from 310 SS for long life in a high temperature environment.

Oil Burner Upgrade
Oil spray from Fuel Tech’s Low NOx atomizer devolitizes in a fuel rich zone at the burner outlet. This zone inhibits the conversion of fuel-bound nitrogen to NOx. Oil droplets are controlled in a tight size range to ensure complete burnout and limit opacity. Computational Fluid Dynamics (CFD) modeling is used to validate designs prior to fabrication.

The Hardware: Typically only two components are needed to upgrade a single zone burner to a low NOx, high efficiency burner—a curve bladed swirler and Low NOx Atomizer. Each are made from 310 SS for long life in a high temperature environment.

State of the art components provide control over the following:

- NOx Emissions
- Flame Shaping
- CO Emissions
- Burner Eyebrows
- Flyash LOI
- Furnace Slagging

Gas Burner Upgrade

Temperature comparison in degrees Fahrenheit from non-Low NOx Burner (top) and our Low NOx Burner (bottom)

- Proven Low NOx Designs
- Stabilize Low NOx Flames for Low Excess Air Operation and Consistent Flame Scanning

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