

## LOW NOx PERFORMANCE WITH BLAST FURNACE GAS

### SITUATION

Deregulation of the electric utility industry is creating many new opportunities for industrial cogeneration. The ability to produce on-site electricity and process steam while lowering fuel cost is attractive to many industrial plants. Wheeling-Pittsburgh Corporation in Steubenville, Ohio is a steel production facility that previously flared their excess Blast Furnace Gas (BFG). Collecting and flaring the BFG is an environmentally approved method but an economical waste of energy. Wheeling-Pitt decided to reduce overall plant power cost and eliminate the flaring by combusting the excess BFG.

<b>Name:</b>	Wheeling-Pittsburgh Steel Corp.
<b>Location:</b>	Steubenville, Ohio
<b>Boilers:</b>	Qty (4) Cerrey 42A15-42
<b>Capacity:</b>	130,000 PPH Each
<b>Burner:</b>	Coen "DAF-42 w/BFG Scroll"
<b>Fuels:</b>	Blast Furnace Gas (BFG) Natural Gas (NG)
<b>Pressures:</b>	< 31" w.c. BFG; 10 psig NG
<b>Limits:</b>	(BFG + 5% NG) 0.06 lb/mmBtu NOx 0.045 lb/mmBtu CO (100% NG) 0.15 lb/mmBtu NOx 0.04 lb/mmBtu CO (Both Cases) 0.05 lb/mmBtu VOC 0.5 lb/mmBtu PM

Coen has hundreds of installations worldwide utilizing alternative fuels. We understand the economics of burning readily available off-gases and have designed special burner equipment to handle these opportunity fuels.

### SOLUTION

The plant will realize operational savings from a new Air Liquide 30 megawatt cogeneration plant. The innovative design includes **four (4) Coen Low NOx Fyr-Compak packaged burners** firing low pressure BFG into four (4) 130,000 PPH Cerrey 42A15-42 packaged boilers. The BFG is the main fuel with natural gas as a back-up. Coen supplied the **Low NOx DAF burners with low pressure (BFG) interzone scrolls and high pressure (NG) external header spud assemblies, throat tile, and Coen BMS-3000 flame safeguard systems.**



Fig. 1 Coen DAF-42 Low NOx Burner

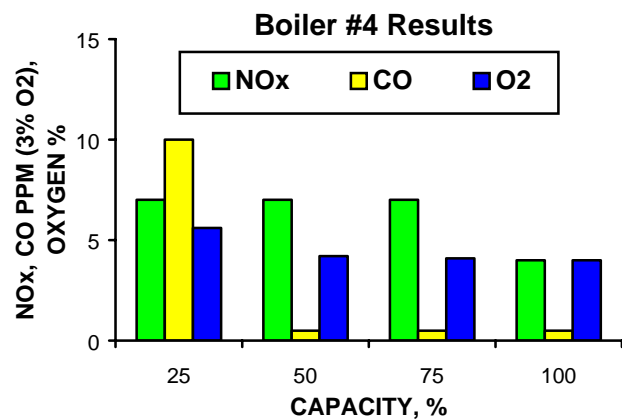
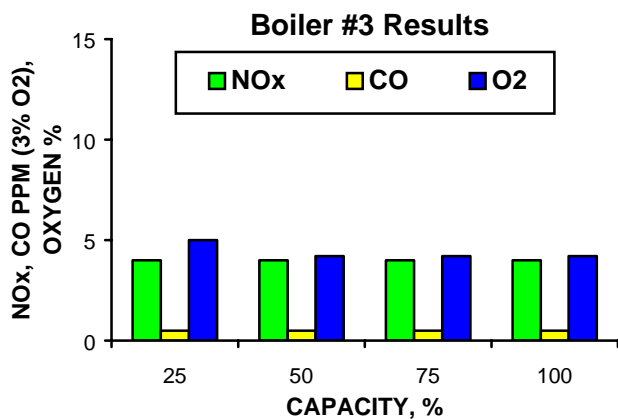
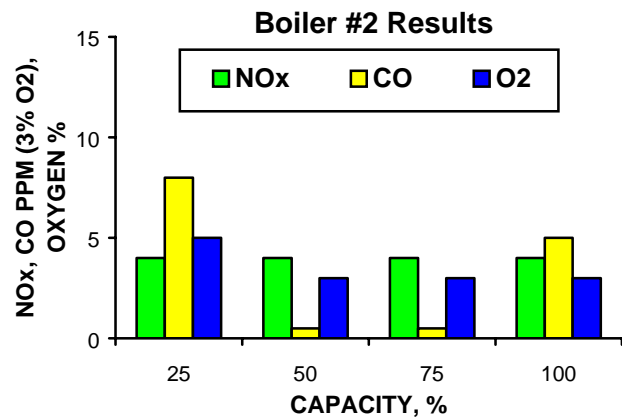
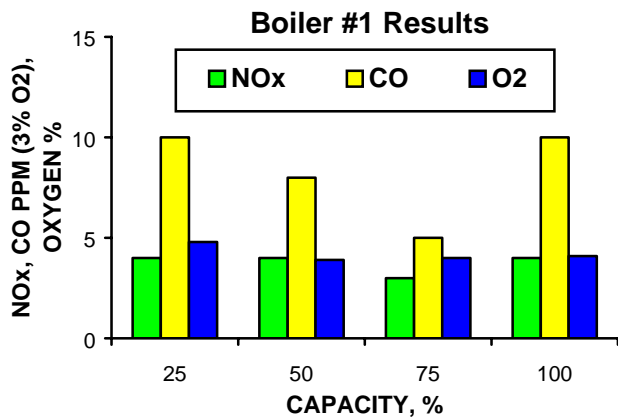


Fig. 2 Large 72" BFG supply line to boiler house

### RESULTS

The start-up produced the following better than expected results:

- LOW NOx** -- NOx remained below 7 ppm throughout the firing range **without the use of FGR**
- LOW CO** -- CO consistently measured below 10 ppm over a 4:1 turndown
- LOW O<sub>2</sub>** -- Oxygen levels were set at 4% to account for swings in BFG supply pressure
- LOW GAS PRESSURE** -- BFG supplied to the Coen scroll burner at 31" w.c. (only ~1 psig) avoiding additional compression costs



CUSTOMER NEEDS	OPERATIONS	AIR QUALITY
✓ Meet Emission Limits	✓ No FGR Required	✓ 3 - 7 ppm NOx
✓ Low Operating Cost	✓ Good Turndown	✓ 1 - 10 ppm CO
✓ Quick Startup	✓ Safe Continuous Operation	✓ Met VOC Levels
✓ Factory Support	✓ Low Gas Pressure Supply	✓ Met Particulate Levels
✓ Back-up Fuel Capability	✓ 100% Capacity Achieved	

Strict Federal air pollution regulations trickling down to the district level are creating great economic challenges to remain competitive in a fierce global environment. It is no longer an option, but a necessity for industry to pursue and implement the latest technology that provides economic and environmental benefits.

Coen Company, producers of combustion equipment for over 85 years, understands this trend. Coen Company is providing the latest in combustion and emission control technology to meet the needs of industry in utilizing alternative fuels like Blast Furnace Gas.

