

QLN-ULN STEAM FLOOD BURNER READILY MEETS SINGLE DIGIT NOx

SITUATION

Oil field steam flood units in the Bakersfield, California area need to meet the San Joaquin Valley Unified Air Pollution Control District's new emission requirements (Rule 4306) of 15 ppm NO_x and 400 ppm CO. An oil producing company near Bakersfield decided to retrofit a steam flood generator with COEN's new **QLN-ULN** burner. The user wanted a burner that would meet strict NO_x levels with minimal or no Flue Gas Recirculation (FGR) while operating with low excess air levels and using conventional burner controls.

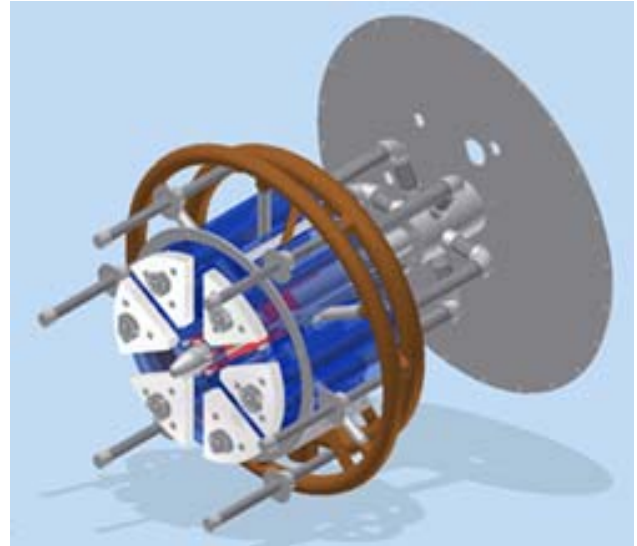
Location:	Bakersfield, California
Capacity:	62,500,000 Btu/hr
New Burner:	New COEN Model QLN-ULN
Fuels:	Natural Gas and Casing Gas
Limits:	15 ppm NO _x ; 400 ppm CO

SOLUTION

COEN engineered and delivered a **QLN-ULN** burner as a complete integrated package. The design combined the proven energy efficient QLN burner with innovative COEN Ultra Low NO_x "ULN" technology. The **QLN-ULN** burner delivered low NO_x performance with low excess air, low FGR rates, and used conventional burner controls.

The primary benefit of the **QLN-ULN** burner is that it can meet the 15 ppm NO_x requirement using low excess air and no flue gas recirculation. Low FGR rates and low excess air mean increased thermal efficiency and reduced overall operating costs.

Another important benefit of the **QLN-ULN** burner is the compatibility with conventional control systems. COEN's "ULN" technology enhances the overall stability of the burner, making it equivalent to a conventional (non low-NO_x) burner. The existing combustion controls were utilized, making the burner solution economical for a retrofit installation.



COEN **QLN ULN** Burner For Steam Flood

RESULTS

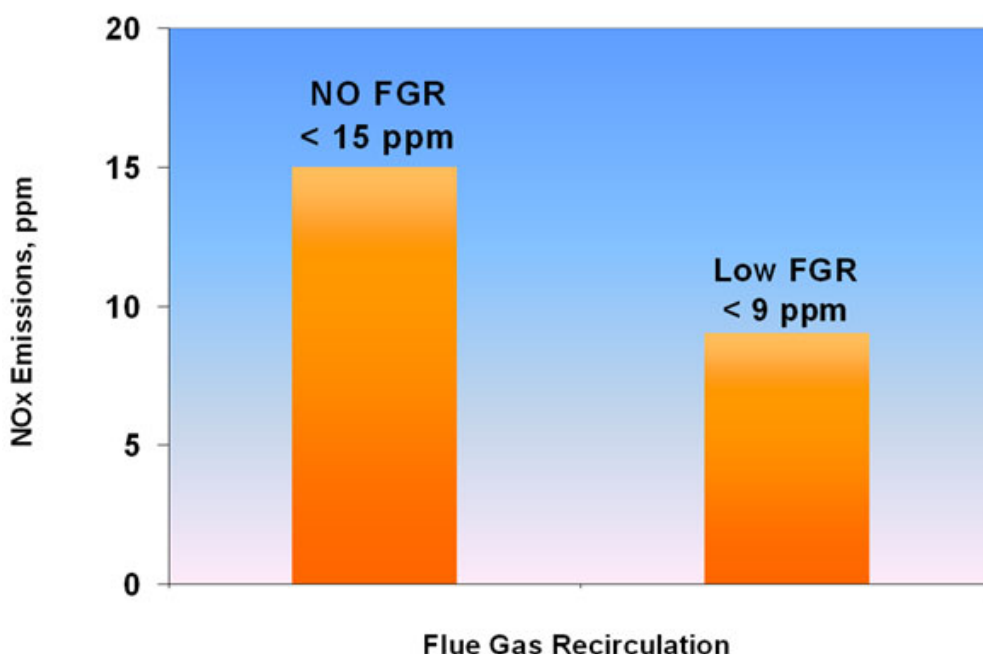
The startup results were substantially below the new emission regulated limits of 15 ppm NO_x and 400 ppm CO after only two days of commissioning.

The conversion resulted in:

- ✓ **LOW NO_x** - NO_x was easily set for less than 15 ppm over the operating range and demonstrated as low as 7 ppm (corr. to 3% O₂).
- ✓ **LOW CO** - CO emissions were less than 5 ppm over the operating range (corr. to 3% O₂).
- ✓ **LOW EXCESS AIR** – NO_x and CO emissions were easily met with 15% excess air or lower.
- ✓ **LOW FGR RATE** - 9 ppm NO_x required just 12% FGR and if the supplementary fresh air fan is not used, 15 ppm NO_x can be achieved without FGR (both with 15% excess air).
- ✓ **CONVENTIONAL CONTROLS** - Emissions were met using customer's conventional PLC based control system. No proprietary controls were required.

QLN-ULN STEAM FLOOD

NOx Emissions at Low Excess Air



LOW NOx LESSONS LEARNED FROM THE QLN-ULN

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|-----------------------|----------------------|--------------------|
| ✓ Met Emission Limits | ✓ Low FGR | ✓ Single-digit NOx |
| ✓ Easy Retrofit | ✓ Low Fan BHP | ✓ Single-digit CO |
| ✓ Quick Startup | ✓ Low Operating Cost | ✓ Low Excess Air |
| ✓ Local Supply | ✓ High Efficiency | |
| ✓ Simple Controls | | |

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, engineers and manufacturers of combustion equipment since 1912, understands this trend. Coen Company is committed to providing the latest in combustion and emission control technology to meet the needs of the oil production, refining and related industries.



QLN-ULN 6/04