Magna-Flame™ G-LE

Sub -10 ppm NOx and undetectable CO without the use of FGR

Situation

A Kern County, CA, oil producer recently added a new 50,000 lb/h steam generator to his facility.

To meet the steam generator permit requirement of 30 ppm NOx with a conventional gas burner would require the use of flue gas recirculation (FGR), incurring additional capital cost and operating expense of approximately $12,000 annually.

Conventional inline blower and burner arrangement

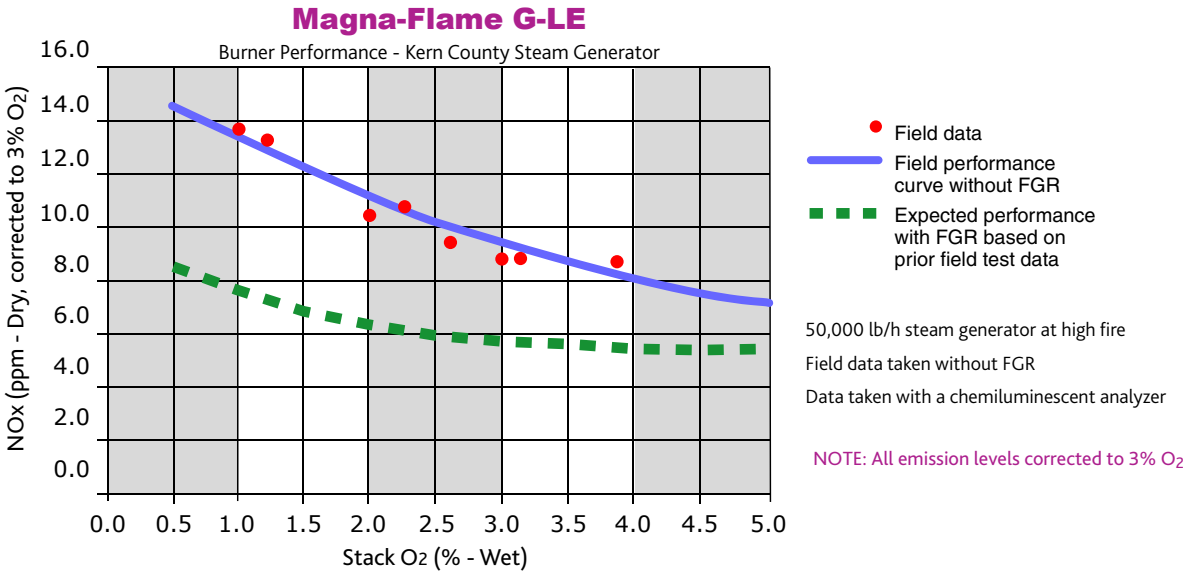
Solution

A 62.5 MM Btu/h Magna-Flame G-LE Ultra-Low NOx burner was provided by North American. This burner uses a lean premix primary zone and dilute secondary combustion to achieve less than 10 ppm NOx without the need for FGR.

While many other gas burners require the use of exhaust O_2 levels above 4% to achieve even 12 ppm NOx, the Magna-Flame G-LE can reach that level at less than 2% O_2. This reduced need for excess air to achieve low NOx provides efficiency gains which can lead to utilities savings exceeding $15,000 annually.

In many low emissions gas burners, CO and VOC emissions increase as NOx emissions decrease. In contrast, the Magna-Flame G-LE's lean premix technology provides simultaneously low NOx, CO, and VOCs.

The flame envelope of the Magna-Flame G-LE for this application is approximately 6 feet in diameter and 18 to 20 feet in length—ensuring highly effective radiant heat transfer.



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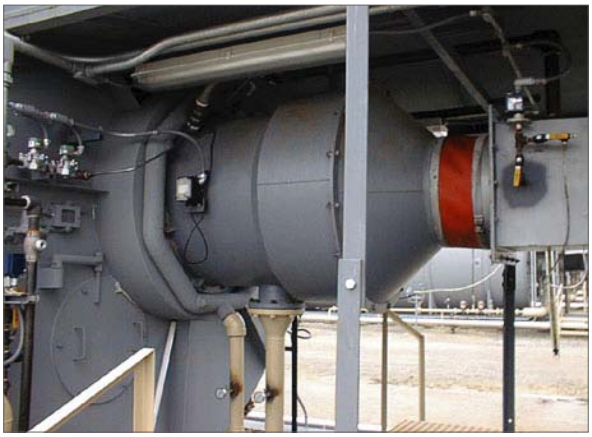
Results

Certified laboratory testing of this Magna-Flame G-LE over a 3:1 turndown range, with an energy efficient 1-2% exhaust O_2 level, showed NOx emissions of 11-13 ppm as shown on graph on first page.

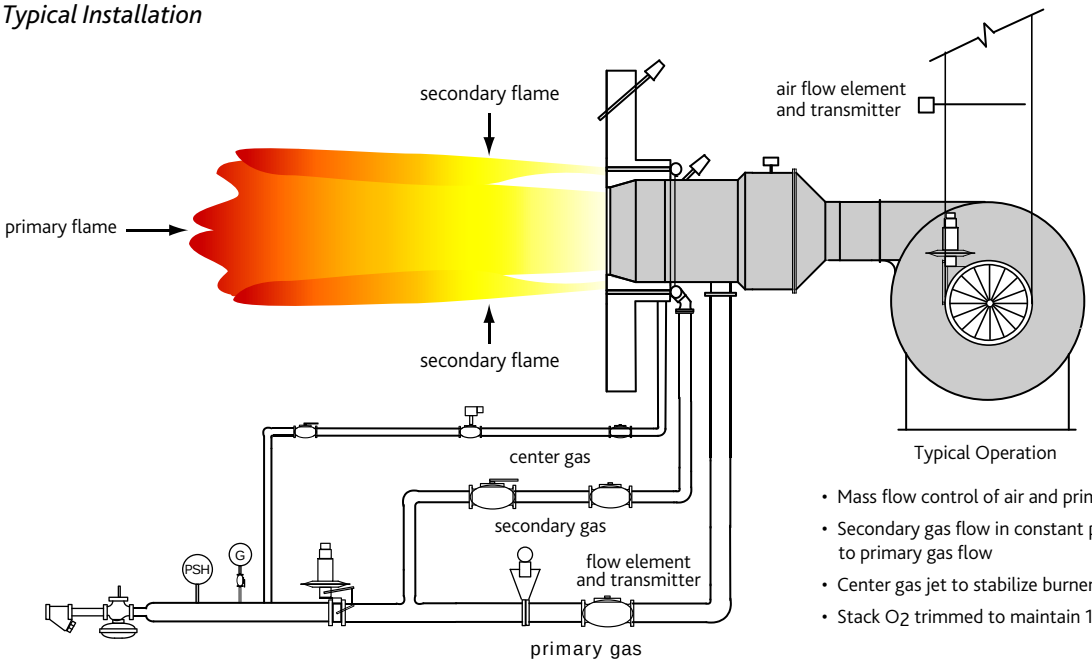
NOx emissions below 10 ppm were achieved at 3% exhaust O_2 and above.

Throughout the test period, CO emissions were undetectable on a 0-10 ppm scale.



Magna-Flame G-LE burner mounted on steam generator

Typical Installation



Typical Operation

- Mass flow control of air and primary gas
- Secondary gas flow in constant proportion to primary gas flow
- Center gas jet to stabilize burner at low fire
- Stack O_2 trimmed to maintain 1%

NOTE: Required main gas train per NFPA standards not shown

NOTE: All emission levels corrected to 3% O_2

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