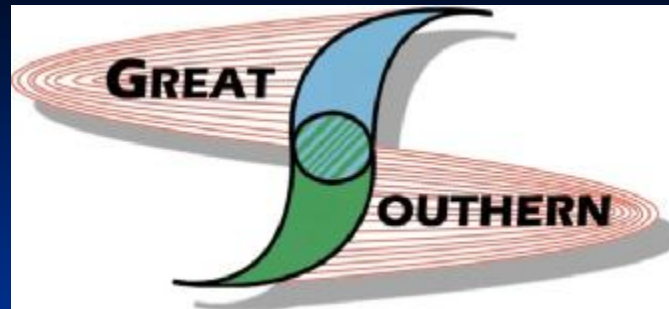


**IFRF MEMBERS CONFERENCE**

**FLAMELESS COMBUSTION  
WORKSHOP**

**June 10, 2009 Boston, MA**





# GREAT SOUTHERN FLAMELESS "GSF"

A Conventional Refinery Heater  
That Can Also Be Operated in the  
Flameless Mode

(patents pending)

# GSF Flameless Combustion Key Design Features

- 🔥 Double Fired Radiant Coil (vertical or horizontal tubes)
- 🔥 Conventional balanced draft air preheat system
- 🔥 Patent Pending Textured Wall Surface to hold the circulating flue gas against the heater wall and provide more even heat transfer to the double fired coil

# GSF Flameless Combustion

## Key Design Features

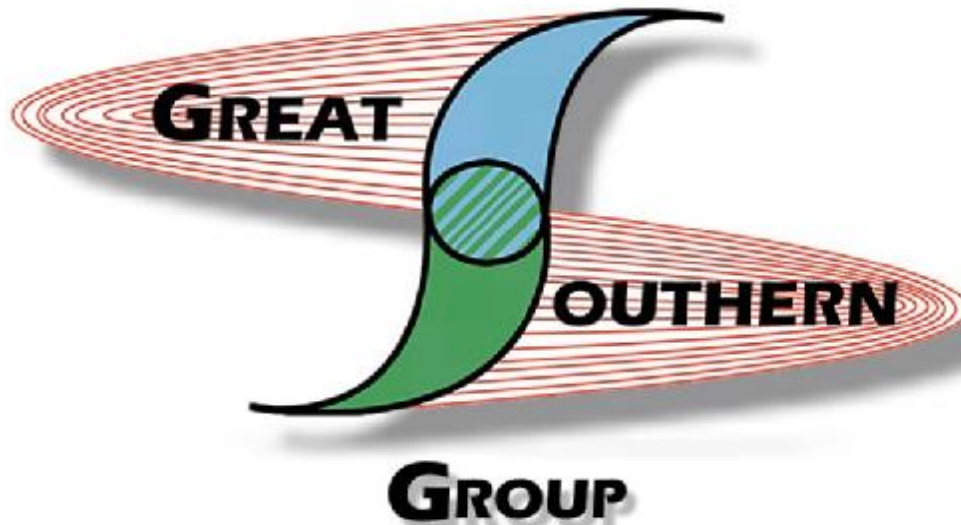
- 🔥 Move the fuel gas away from the air when changing from conventional to flameless combustion
- 🔥 Burner management system with patent pending, automated, 3-way valves to monitor and control conventional, staged fuel and flameless combustion
- 🔥 GSF technology is applicable for any size of heater or heater service

# GSF Flameless Combustion

## Key Design Features

- n 4 years of HAZOP, heater design and computer simulations to guarantee performance of a conventional heater that can be operated in the flameless mode and can achieve 50% turndown while remaining in the flameless mode
- 🔥 GSF technology can be retrofitted to any existing fired heater
- 🔥 GSF is ready to accept an order and guarantee performance

# Questions and Answers



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