

ClearSign Reports Further 37% Reduction in NOx From 8PPM to Below 5PPM

Novel Duplex Burner Architecture Combines Features That Could Result in Major Savings and Increased Profits for System Operators

SEATTLE, WA -- (Marketwired) -- 05/07/13 -- ClearSign Combustion Corporation (NASDAQ: CLIR), an emerging leader in combustion and emissions control technology for industrial, commercial and utility markets, reported today that it has measured and documented a further 37% reduction in emissions of Nitrogen Oxide (NOx), down to less than 5 parts per million (PPM) from the previous level of 8PPM announced in early April. This most recent test was performed using a prototype burner based on ClearSign's novel Duplex™ burner architecture, again in a furnace operating at a temperature of up to 1600 F with O2 concentrations ranging from 2.5% to 3.2%.

"A few weeks ago, when we first reported that we had reduced NOx to 8PPM, we stated that our goal was to achieve emissions of fewer than 5PPM NOx by the end of the current quarter," said CEO Rick Rutkowski. "Having achieved this major milestone nearly two months ahead of schedule, we are now targeting NOx emission levels of 2PPM or lower by the end of 2013."

According to ClearSign, strict new NOx control regulations are being implemented over the next two years in several regions of the country including Texas and California. California's South Coast Air Quality Management District's Rule 1146.1 requires that burners produce less than 9PPM of NOx no later than July, 2014. Additionally, 75% of larger industrial boilers of between 20 and 50 mmBtu/h must reduce NOx emissions to 5PPM or below by January 1st, 2014, and 100% of boilers of this size must meet this strict limit by no later than January 1st, 2016. Industry groups anticipate that these limits will soon be required in other areas of the country, with national standards to follow.

"We continue to hear both a sense of urgency and a great deal of uncertainty as the new regulations raise the specter of costly new challenges for combustion system owner operators," Rutkowski continued. "To address this challenge, some burner and combustion system manufacturers have been able to develop systems that can achieve the NOx targets, but inherent design tradeoffs impose high costs to energy efficiency that become prohibitive at these very low emissions levels, even with natural gas at historically low prices."

"The biggest cost associated with Low- and Ultra-Low NOx burners has been the significant loss in energy efficiency and/or process throughput that results," explained ClearSign Chief Technology Officer, Joe Colannino. "The combined effect of recirculating flue gas and increasing excess air to cool the flame along with a loss of turndown because of flame instability can result in increases in fuel consumption of as much as 20-30%. Poor flame pattern and long flames in Low-NOx burners for process heaters can lead directly to production constraints that can cost millions of dollars in lost production annually as heater capacity must be reduced to accommodate the elongated flames. Refinery process heaters are particularly sensitive to this problem."

In spite of these weaknesses, according to Rutkowski, the market has long preferred low NOx and Ultra-Low NOx burners to post-combustion treatment alternatives such as Selective Catalytic Reduction (SCR) systems that are more costly to install, complex to operate and consume considerable quantities of hazardous materials such as anhydrous ammonia.

"However, with the new regulations on the horizon and the inability of conventional Low-NOx burners to meet the new emissions criteria cost effectively," Rutkowski said, "many operators are being forced to consider SCR. We believe that the market will be at an inflection point over the next two to five years that makes the timing of our innovation especially good."

"In the longer term," Colannino added, "we believe that our Duplex burner architecture may be able to reduce NOx to levels that are not attainable using conventional technology. We are already close to exceeding even the most aggressive environmental standards for NOx control in the world, and we are continuing to push this number even lower. Moreover we are achieving these results without the costly compromises in fuel efficiency that have historically plagued Low-NOx designs."

According to the Company, the Duplex™ burner architecture may enable significantly reduced flame length (by as much as 80%) improving flame pattern, while dramatically reducing NOx emissions. The Duplex architecture may be highly extensible and could have significant implications across a broad range of commercial applications that utilize a variety of burner sizes and types. Key features of the duplex architecture include:

Ultra low NOx emissions - 5PPM demonstrated with a target of 2PPM or lower.

Short flame - allows for maximum utilization of available heater capacity enabling increased process throughput for high-value applications such as refinery heaters. Short flames are not possible with currently available technology without increasing NOx. The loss of heater capacity can represent an annual cost of tens of millions of dollars annually at an average refinery.

No External FGR - Currently available Low- Ultra-Low NOx burners often require recirculation of up to 35-40% of flue gas. Reheating this gas is inefficient. This loss in energy efficiency is compounded by the requirement to provide power for large fans to recirculate the gas.

Low O2 (excess air) of 2-3% - Currently available LNBs and ULNBs often require significant increases in excess air (in extreme cases up to as much as 8 to 10%). This imposes a penalty to energy efficiency as the cool inlet air continuously dilutes furnace gas.

High turndown ratio - Unlike currently available LNBs and ULNBs, the Duplex™ burner architecture may support very high operating ranges allowing for maximum energy efficiency under variable operating conditions and requirements.

A new video and datasheet with more information on the ClearSign Duplex burner architecture can be found on our website www.clearsign.com

About ClearSign Combustion Corporation

ClearSign Combustion Corporation designs and develops technologies that aim to improve key performance characteristics of combustion systems including energy efficiency, emissions control, fuel flexibility and overall cost effectiveness. Our Electrodynamic Combustion Control™ (ECC™) platform technology improves control of flame shape and heat transfer and optimizes the complex chemical reactions that occur during combustion in order to minimize harmful emissions. For more information about the Company, please visit www.clearsign.com

Cautionary note on forward-looking statements

This press release includes forward-looking information and statements within the meaning of the Private Securities Litigation Reform Act of 1995 and the provisions of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. Except for historical information contained in this release, statements in this release may constitute forward-looking statements regarding our assumptions, projections, expectations, targets, intentions or beliefs about future events that are based on management's belief, as well as assumptions made by, and information currently available to, management. While we believe that our expectations are based upon reasonable assumptions, there can be no assurances that our goals and strategy will be realized. Numerous factors, including risks and uncertainties, may affect our actual results and may cause results to differ materially from those expressed in forward-looking statements made by us or on our behalf. Some of these factors include the acceptance of existing and future products, the impact of competitive products and pricing, general business and economic conditions, and other factors detailed in our Quarterly Report on Form 10-Q and other periodic reports filed with the SEC. We specifically disclaim any obligation to update or revise any forward-looking statement whether as a result of new information, future developments or otherwise.

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