ClearSign Combustion Corporation

Milestone Update: ClearSign Reports Unprecedented 90% Reduction In NOx Emissions With Proprietary Ultra Low NOx Duplex Burner In Boiler Demonstration

Company says its Duplex™ architecture may set new cost/performance benchmark for NOx control for most types of combustion systems

SEATTLE, Nov. 11, 2013 /PRNewswire/ -- 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 adapted a conventional commercially available burner using its proprietary Duplex burner architecture to successfully demonstrate a 90% reduction in NOx emissions (from 50ppm to 5ppm) in a system designed to closely resemble a standard commercial firetube boiler.

The test was performed at commercial scale, with a heat release of 1.1 MMBtu/h, with virtually no CO and O2 in the stack at 3%.

ClearSign says that they are not aware of any Ultra Low NOx burner (ULNB) currently in the market, or in development, that can achieve this low level of NOx emissions without the addition of costly Flue Gas Recirculation (FGR) and Selective Catalytic Reduction (SCR) technologies.

ClearSign estimates that there are 34,000 large commercial and industrial firetube boilers installed in the US alone today, averaging 21 MMBtu/h each, some 60% of which are located in air quality 'non-attainment' regions. Many of these systems are required to emit no more than an extremely low 9ppm of NOx and, beginning in the Los Angeles region over the next year, no more than 5ppm of NOx, with other regions of the country expected to follow.

"It is hard to overstate the importance of this achievement," said ClearSign CEO, Rick Rutkowski. "We believe ClearSign's Duplex combustion technology will support the long-sought goal of near-zero emissions of both NOx and CO, while offering the most compelling combination of performance and ownership costs of any technology on the market. As NOx emissions standards have become more stringent, the costs of installing and operating NOx control systems, with their substantial penalties to energy efficiency, have steadily escalated and in many cases become prohibitive.

"Below 9 or 10ppm we have seen further acceleration of these cost increases driven by a reluctant shift to the use of expensive catalytic systems that also often require hazardous chemicals. This has been a worrisome trend to industry because in many cases the economics simply aren't sustainable."

"Achieving 5ppm NOx performance today typically requires a combination of Ultra-Low NOx burners (ULNB), Flue Gas Recirculation (FGR) and Selective Catalytic Reduction (SCR) technologies, working in combination.

"In most cases, either the entire boiler burner system needs to be replaced, or a Selective Catalytic Reduction (SCR) system must be added. The 5-year cost of ownership of these ranges from between $300,000 to over $600,000 for each of the tens of thousands of boilers impacted.

"By contrast, we have demonstrated that ClearSign's Duplex Architecture may replace all of these costly, complex and in some cases, dangerous technologies with a solution that will be far more cost-effective for operators -- all within the burner."

Southern California is one of the largest markets in the country for NOx control technology and has also, according to Rutkowski, been a reliable indicator of future regulatory trends for other regions.

He notes, however, that, even in areas where operators are not yet facing the imminent threat of looming regulatory deadlines, they may choose to install ClearSign's Duplex system because it would be significantly less costly to own and operate than conventional ultra low NOx burners. Rutkowski points out that replacing or upgrading an existing ULNB or SCR system with ClearSign's Duplex technology could provide a payback in less than 24 months, purely based on its superior economic performance. As importantly, it would also allow the operator to avoid the need for ongoing upgrades in the future.

"Historically, the trend in regulatory compliance has been to only install what is necessary to meet the minimum requirement," he explained, "and to wait until it absolutely must be installed -- but that's only because lower NOx has always implied higher cost. When you reverse that trend, the incentives change radically and installation of NOx controls becomes more like any other capital purchase decision. You make the investment not simply to meet regulatory minimums, but because it reduces costs and improves productivity and profitability to provide a good economic return. We believe that, in a large number of cases installing or

upgrading to a Duplex burner will simply make good business sense because it may save millions of dollars if not tens of millions of dollars over the life of a system."

The Company announced that it intends to scale the package boiler configuration over the next several quarters from its current 1.1 MMBtu/h, first to 2 MMBtu/h and then to 3.4 MMBtu/h, which is the average burner size found in over 110,000 US-based units in the commercial market segment. The Company then expects to scale the novel burner design to achieve thermal output of over 10 MMBtu/h, positioning it for entry into the industrial and large commercial boiler market segment, in which there are more than 36,000 large units. For up-fired refinery burner applications, the company will scale first to 5 MMBtu/h and then to 10 MMBtu/h.

ClearSign is actively pursuing strategic partnerships and responding to rapidly growing interest in both categories in the US and globally including Japan, China and the Middle East.

The company will elaborate on this and other recent developments in its quarterly investor call, scheduled for today at 4:30 PM Eastern Time. To listen to the conference call, you should dial 1-800-860-2442 (international: +1-412-858-4600) five to ten minutes before the scheduled start time and request to be connected to the ClearSign Combustion Corporation conference call. Click here to listen to the call online.

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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