RSCR® SYSTEM TO REDUCE NOX EMISSIONS FROM BOILERS

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ABSTRACT

Babcock Power Environmental (BPE), a Babcock Power Inc. company, has developed a new, innovative, high-efficiency NOX reduction technology designed to greatly reduce the NOX emissions from waste to energy (WTE) boilers at relatively low cost. This “tail-end” system uses Selective Catalytic Reduction (SCR) to achieve the high reduction performance. Conventional SCR catalyst cannot be used in the traditional “high-dust” location, downstream of the economizer because constituents in the ash would poison the catalyst quickly, rendering it useless. Thus, the Regenerative Selective Catalytic Reduction (RSCR®) system is designed to operate at the end of the plant before the flue gas is discharged to the stack. The process utilizes a reactant (usually aqueous ammonia) to be added to the flue gas stream upstream of the RSCR to reduce NOX to harmless reaction products, N2 and H2O.

The RSCR combines the efficient heat recovery, temperature control, reactant mixing, and catalyst into a single unit and provides the maximum NOX reduction and heat recovery practical. The paper will describe the overall predicted performance of a typical WTE boiler plant using this new technology. The paper will also provide actual operating data on the RSCR, which has been retrofitted to four existing biomass-fired units.

INTRODUCTION

There is a need for today’s power plants to meet the growing demand for electricity while, at the same time, achieving efficient combustion, low emissions, and no net CO2 releases into the environment. Waste to energy (WTE) boilers achieve relatively low NOX emissions with new combustion techniques to below that achieved by conventional selective non-catalytic reduction (SNCR) systems. However, to achieve even lower emissions, a new, proven emissions control device has been developed to significantly reduce NOX and CO, thus enabling the industry to meet the challenge of higher energy demands and lower emissions.

A new system for the reduction of NOX emissions to levels hereby unheard of for US WTE boilers has been developed and commercialized. Emissions are controlled using a system called the “RSCR”, which is a regenerative selective catalytic device achieving NOX reductions of >80%, applied to the relatively cold gas (after the boiler and scrubber/particulate removal equipment) prior to its discharge to the stack. This paper will provide actual operating data on the RSCR, which has been retrofitted to four existing biomass-fired units. The technology is covered by US patent # 7,294,321.

RSCR® TECHNOLOGY FOR EFFICIENT NOX REDUCTION

The conventional technology for attaining NOX reductions of >80% from a combustion process is Selective Catalytic Reduction (SCR). Hundreds of coal and gas fired plants worldwide have had “conventional” SCRs installed between the