INDIGENOUS FLUE GAS CONDITIONING

Dr. Henry V. Krigmont, QEP
Allied Environmental Technologies, Inc.

ABSTRACT

Flue Gas Conditioning (FGC) of fly ash involves addition of trace amounts of SO_3 into flue gas stream to control the electrical resistivity of dust and improve particulate collection in an electrostatic precipitator (ESP). FGC makes it possible to significantly improve precipitator collection efficiency at a cost considerably less than that of other alternatives.

Typically, SO_3 is formed by the catalytic conversion of gaseous sulfur dioxide (SO_2). The SO_2 usually comes from an "external" source (feedstock) by either evaporating liquid sulfur dioxide or by burning molten or solid sulfur. Conventional flue gas conditioning systems have two major drawbacks: they require an external continuous supply of feedstock, and in the process of operation, these systems slightly increase SO_2 emissions.

Another approach to creating SO_3 is to utilize "native" SO_2 formed during combustion of sulfur contained in fossil fuels as a feedstock for its subsequent conversion to SO_3. The Indigenous Flue Gas Conditioning (iCON™), concept consist of withdrawing a portion of flue gases containing sulfur dioxide (SO_2) generated by a combustion process, passing it through the catalyst bed where a portion of the SO_2 is converted into sulfur trioxide (SO_3), and returning the carrier gases with the additional SO_3 to a location ahead of the electrostatic precipitator. The process of generating the SO_3 for the FGC and subsequent carrier gases delivery, distribution and mixing is very simple and straightforward.

The iCON™ (patent pending) design substantially improves in situ flue gas conditioning technology by providing a simple, yet reliable system to furnish ‘on-demand’ virtually instantaneously the required amount of sulfur trioxide for efficient electrostatic precipitator operation, without adding additional sulfur oxides to the system and in a fully controlled manner. The iCON™ system design involves no moving parts inserted into the flue gas stream, and no alteration of the flow of the boiler flue gas stream. It required no external feedstock nor any sulfur moving or metering equipment.

The paper will discuss this novel iCON™ technology and review its benefits for the end-user.