

Gas Phase Ammonia Slip Mitigation

Jared Cannon¹, Rafic Y. Minkara, PhD, P.E.²

¹Southern Research Institute, 2000 Ninth Avenue South, PO Box 55305, Birmingham, AL 35255-5305; ²Headwaters Energy Services, 204 Lakeside Drive, Kennesaw, Georgia, 30144

KEYWORDS: SCR, SNCR, Ammonia Slip

ABSTRACT

Proof-of-concept experiments were conducted to determine the feasibility of ammonia slip mitigation in the flue gas prior to deposition in the air pre-heater or on the fly ash. Chemical oxidants were injected into an ammonia-laden stream of air to study its ability to mitigate ammonia at post SCR conditions. A MKS-FTIR ammonia analyzer at the exit of the reaction zone measured gas-phase ammonia concentrations providing real-time removal data. The results of the proof-of-concept test showed that some chemical oxidants have the ability to reduce ammonia levels in the gas stream for temperatures from 350 up to 700 °F, with the removal percentages being higher at lower operating temperatures.

The proposed technology would use a chemical injection system downstream from the SCR catalyst or SNCR reaction zone to remove the gas phase ammonia slip by reacting the ammonia with an oxidizing chemical. It is the objective of this technology to provide commercially viable process that reduces the ammonia slip by chemical oxidation to levels that will not cause downstream equipment fouling, contaminate the fly ash and could additionally improve the overall performance of SCR and SNCR systems installed to control NO_x emissions.

Submitted for consideration in the 2005 World of Coal Ash, April 11-15, 2005, Lexington, Kentucky, USA.