

Characteristics and Performance of CCPs from Sodium Sorbent Scrubbing of SO₂ and SO₃ Emissions from Coal-Based Power Plants

Debra F. Pflughoeft-Hassett¹, Ken Ladwig², David J. Hassett¹, Bruce A. Dockter¹, Loreal V. Heebink¹, Kurt E. Eylands¹ and Janelle J. Hoffarth¹

¹University of North Dakota Energy & Environmental Research Center (EERC), 15 North 23rd Street, Stop 9018, Grand Forks, ND 58202-9018; ²Electric Power Research Institute, 1945 South Parkwood Lane, New Berlin, WI 53151

KEYWORDS: CCPs, sodium sorbents, FGD, SO₂ scrubbing, SO₃ emissions, sulfur emission control

ABSTRACT

Sodium-based reagents are effective in reacting with sulfur dioxide (SO₂) and trioxide (SO₃) and are used to capture these gases from flue gas at coal-based power plants. In using sodium-based reagents to remove SO₂ and SO₃ from the flue gas, sodium sulfite and sulfate are formed, and these solid reaction products are incorporated into the particulate stream and collected with the fly ash in the primary particulate control device (PCD). There is also potential for the sodium-based reagent to react with other components of the gas phase and with ash particulates in the flue gas and in the PCD. All of the products of these reactions have the potential to impact the resulting fly ash and its performance in both disposal and utilization settings. Anecdotal evidence has shown that the fly ash that contains the sodium-based components may have different physical and chemical characteristics than fly ash generated without the addition of a sodium-based sorbent.

Laboratory evaluations are under way at the EERC to characterize the chemical composition, physical and engineering performance, and environmental performance of a variety of samples collected from full-scale facilities utilizing sodium-based sorbents to remove SO₂ and SO₃. Results will be reported.

Submitted for consideration in the 2009 World of Coal Ash Conference, May 4–7, 2009.