The PCO Process for Photochemical Removal of Mercury from Flue Gas

Evan J. Granite [a], Henry W. Pennline [a], and Christopher R. McLarnon [b]

a National Energy Technology Laboratory
United States Department of Energy
Pittsburgh, PA 15236-0940
evan.granite@netl.doe.gov

b Powerspan Corp.
New Durham, NH 03855
cmclarnon@powerspan.com

Abstract

A promising technology has been developed to capture and remove elemental mercury from coal-fired power plants. Powerspan Corp. has licensed the technology and initiated a bench and pilot test program to develop the Photochemical Oxidation, or PCO Process, for commercial application with subbituminous and lignite fuels.

The PCO Process introduces ultraviolet light at a wavelength of 254-nm into the flue gas, resulting in the conversion of elemental mercury to a more readily captured oxidized form. The process has the potential to serve as a low cost mercury oxidation technology that will facilitate the removal of elemental mercury in a downstream scrubber, wet electrostatic precipitator, or baghouse. Powerspan has obtained over 90% removal of mercury from 25-100 scfm streams of simulated subbituminous flue gases in large bench-scale tests. Parasitic power is the major operating cost associated with the process. The parasitic power requirement is estimated to be less than 0.35%. This level of parasitic power leads to very favorable cost estimates for mercury removal. In addition, further reductions in the parasitic power requirements are likely with larger-scale and optimized lamp designs.

Installation of a 2-MW mobile slipstream test unit is being completed at the Ameren Rush Island power plant in Jefferson County, Missouri. Pilot-scale tests will begin in January 2007, with testing to be completed by the end of 2007. Pilot-scale tests of the PCO Process at other power plants, using the same mobile test rig, are planned for 2008.