Effects of Coal Pipe Imbalance on LOI as Determined Using Online Coal Flow Measurement

David Earley
Combustion Technologies Corporation/Air Monitor Corporation
Telephone: (919)367-3647
Fax: (919)363-6738
E-mail: dearly@nc.rr.com

In an effort to meet today's rigid environmental restrictions as well as to improve overall plant efficiency, many utilities today are trying to optimize combustion. More than ever before, there is a desire to be able to measure and control the amount of coal (and air) to each burner. To date, the typical measurement techniques involve extractive sampling, which offers only a snapshot of data for each pipe at any given instant.

Santee Cooper, a major South Carolina Utility, incorporated an online microwave coal flow measuring system into its Jefferies Station units. This system was initially used to reduce in furnace NOx by approximately 20% while also reducing LOI. The NOx reduction was accomplished primarily through the adjustment of secondary airflow to each burner to match the coal flow to each burner.

Continued use of the online coal flow measurement showed that changes to the pipe to pipe coal distribution had dramatic effects on LOI. Through the use of an on-line coal flow measuring device, the plant was able to compare it's daily LOI data to the pipe-to-pipe balance of coal flow. It became obvious that many variables had an effect on the pipe to pipe balance. Some of these variables were: primary air to fuel ratio; coal mill pluggage; coal feeder pluggage; coal moisture content; coal blend and more. Though these many variables had varying effects on the pipe balance and thus the LOI, it was determined that by balancing unbalanced coal pipes, LOI was found to be reduced by as much as 40%.

This paper will review the attempts to balance coal pipes as well as the effects of combustion parameters on coal flow balance. These parameters include mill issues, coal issues, primary air issues and feeder issues.