

Coal Flow Monitoring System

Pulverized Fuel Flow Matching

Proper air to fuel ratio is critical in the efficient operation of coal fired power plants. With older plants being asked to provide cleaner power, design basis alone is not enough information to reliably control combustion. Operators are tasked with simultaneously reducing stack emissions and increasing production and reliability; a challenge, at best.

MISTRAS Products & Systems' Coal Flow Monitoring (CFM) Systems provides the information needed to make informed decisions on the effects of changes in flow or burner nozzle imbalance as part of a patented method.

Based on Acoustic Emission (AE) technology, CFM monitors changes in flow and particle size as it impacts an elbow in the feeder tube and unique, proprietary analysis evaluates the Coal Flow Factor as it changes over time. Unlike other technologies, Coal Flow Factor can detect, identify and differentiate between roping and other adverse changes.

CFM Technology Solution Provides:

- Monitors flow through piping between pulverizer and nozzle
- Real time monitoring of flow on each pipe
- Automated alarms on changes in flow
- Simple, noninvasive sensor installation
- Integration to plant control systems using common networking protocols



CFM: Coal Flow Monitoring System for Pulverized Coal Plants

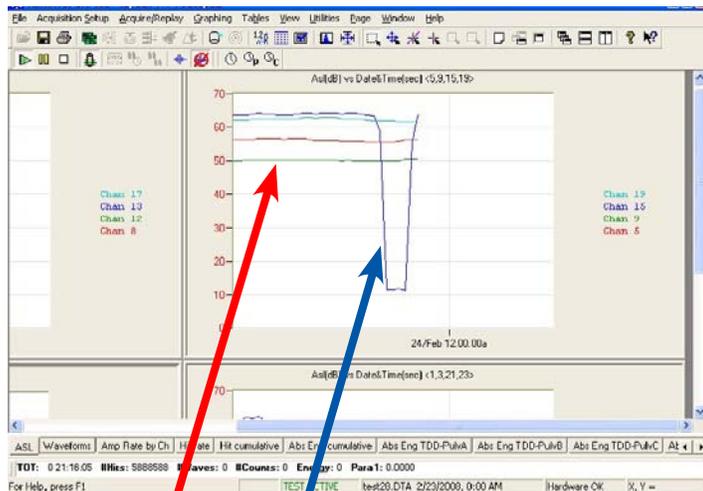
CFM monitors each leg of the fuel supply system from the pulverizers to the fuel nozzles. The system allows your operations to establish the correct flow for each nozzle to minimize total coal used thereby reducing stack pollutant outflow and fuel cost. It also allows the plant engineering team to establish the industry's best practice operating approaches.

By detecting tube malfunctions, actions can be taken to ensure that tube blockages can be removed, reducing NOx and opacity excursions. Additionally when coupled with the proper controls and a specific variable orifice, the added benefits of reduced fuel usage through better burning, fewer tube outages and lower emissions are achieved.

Benefits

Plants utilizing this system report:

- Reduced total fuel usage per megawatt
- Reduced NOx emission and opacity resulting from improper combustion.
- Reduced fines paid to the Environmental Protection Agency for out of specification stack emissions violations.
- Reduced tube failures from flame impingement and fireside corrosion.



Imbalance of coal flow in Coal Feeder Tubes

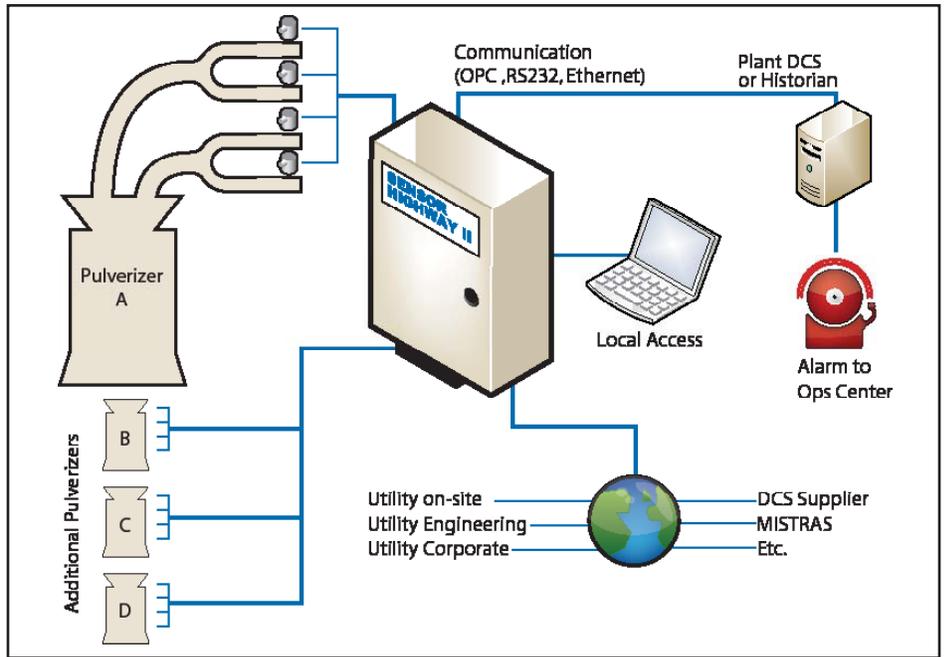
Blockage detected on one of four Coal Feeder Tubes

"Monitoring all pipes from the four pulverizers and taking remedial action, AE was responsible for avoiding over \$5M in fines during 2008" - PNM, New Mexico

DCS Integration or Standalone

The MISTRAS Products & Systems' CFM system can be tied into the plants network allowing seamless integration to a distributed control systems or a data historian via standard protocols such as RS232, OPC and Modbus or analog signals. An advantage of integration is trending Coal Flow Factor against other plant data easily illustrating long term effects of current operating practices to develop long term optimization plans.

Plants may also choose to run a standalone coal flow monitoring system. A dedicated base station can be added to provide alarms and trending analysis as the integrated version. For fleet wide deployment, secure, web-based access is available for analysis by central engineering's remote subject matter experts.



Typical System Configuration

The typical Coal Flow Monitoring System supports 16 integrated channels to cover four feeder tubes from four pulverizers and includes:

- Coal Flow Monitoring technology package licensed per unit
- 16 channel ruggedized monitoring system
- Coal Flow Monitoring Software with alarms on changes in coal flow factor
- 16 integrated preamplifier sensor and cable assemblies
- 16 sensor mounting assemblies for coal feeder tubes
- Networking protocol, as selected by the plant
- Installation, Operation and Maintenance Manuals
- Installation and Commissioning Support available

MISTRAS is a team of skilled researchers, engineers, technicians and manufacturing personnel dedicated to the development of practical and cost saving solutions for your challenging inspection and monitoring needs.

For additional information, please contact our Princeton Junction headquarters at 609-716-4000.



Actual System Installation

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