PROJECT facts

U.S. DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY

Advanced Research

09/2004

SENSOR FOR INDIVIDUAL BURNER CONTROL OF COAL FIRING RATE, FUEL-AIR RATIO AND COAL FINENESS CORRELATIONS

The project's overall objective is the development of a commercially viable sensing system to infer the coal and air flow rates and coal fineness in pulverized coal distribution systems. This eighteen month effort will focus on developments required to transfer the dynamic signature-based measurement system from the laboratory to a field-ready prototype system. The sensing system utilizes an accelerometer attached externally to each coal feeder pipe, producing a very complex signal from the impingement of the coal particles on the pipe wall. A proprietary analysis technique relates signatures of the dynamics of the sensor signal to the flow conditions of interest to the operator through a data-driven calibration process.

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The coal flow instrument system will be applicable to a broad range of flow conditions, including the roping condition seen here in checkout testing with ceramic media at the Coal Flow Measurement Laboratory.

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PROJECT COST

Total $150,000

PROJECT DURATION

10/1/2003 to 3/31/2005

WEBSITES

www.netl.doe.gov/coal

Preliminary laboratory tests will be performed at the Coal Flow Measurement Laboratory, in Livonia, MI, which has been constructed by Airflow Sciences Corporation under funding by the Electric Power Research Institute (EPRI). EPRI is a cost-share partner for this program, and Airflow Sciences Corporation a subcontractor. These tests will answer fundamental questions regarding sensor characteristics and installation requirements, piping configuration, and data collection parameters, as well as basic effects of coal flow, air flow, and coal particle size on the resulting data. This information will form a basis for collecting further calibration data in field testing at working power plants.

At the completion of the project, prototype versions of both a portable system and a permanent installation will be available for final packaging and commercialization by one of the team members. Both types of systems will be marketed to support plant balancing and combustion control for pulverized coal power plants. The benefits sought through the use of this system include improved control of NO_x emissions and optimization of plant efficiency.