

Moore QUADLOG® BMS gives Foster Wheeler flexibility without compromising safety

Foster Wheeler uses this QUADLOG BMS at a facility used for development functions such as burner development, low NOx furnace design evaluation, fuel evaluation, and integrated combustion/emission control.



Foster Wheeler Development Corporation's Combustion and Environmental Test Facility (CETF) in Dansville, New York, USA, was originally built in 1984 to find cleaner ways to burn fossil fuels as air quality regulations become more stringent.

The CETF's furnace was arranged to produce typical operating conditions that closely matched those of commercial equipment. The plant's daily operation, however, is by no means typical.

Since the CETF serves various functions for Foster Wheeler's developmental group, such as burner development, low NOx furnace design evaluation, fuel evaluation, and integrated combustion/emission control, the plant's operation is in a constant state of change. "We're constantly adding and changing equipment to suit our different test programs," says Tony Mosca, Senior Plant Engineer, Foster Wheeler. "All of the equipment we use here has to be flexible without compromising on safety." In addition to the ongoing equipment changes, the control system must endure batch-like operation, as the plant is started up and shutdown on a daily basis.

The CETF initially operated as a direct-fired system (hot-primary-air-swept ball mill) feeding

two 40 million BTU per hour horizontally fired burners, which fire into a refractory lined water-jacketed furnace. The water jacket operates under water-head pressure and uses natural circulation, producing steam that is vented to the air through a steam drum above the furnace. Combustion gases leaving the furnace flow over the horizontal convection tube surfaces (economizer) cooled by forced water circulation. The gases then pass through a two-stage air heater, a baghouse dust collector, an induced draft fan, and then out the stack.

The original operation was equipped with a microprocessor-based, integrated burner management and combustion control system. All the start-stop switches, equipment status indicators, manual-automatic control for significant operating parameters, and analog indicators of significant data were contained in a centralized control console.

In 1995, the CETF went through a major equipment overhaul, including upgrading the original control system with an integrated APACS® combustion control system and QUADLOG burner management system (BMS). The operator interfaces for both combustion control and BMS were seamlessly integrated into two PCs running Moore's MYCROADVANTAGE™ software.

Foster Wheeler contracted G. R. Bowler Company, a member of Moore's PRISM preferred integrator program, to install and configure the new control system. The entire combustion control and burner management system had to be re-engineered for compliance to the latest NFPA 8502 (Standard for the Prevention of Furnace Explosions/Implosions in Multiple Burner Boilers).

"Every time the operating parameters of the boiler change, the burner management system has to be re-configured to properly accommodate these changes," says John Hartman, chief engineer, G. R. Bowler Company. "Compared to the previous control system, which virtually made this impossible, major configuration changes can now be made efficiently without holding up the plant's rigorous test schedule." This is critical considering the plant itself goes through major equipment changes at least three times a year.

The architecture for the APACS combustion control system and QUADLOG burner management system is shown below. It includes:

Controller(s):

Non-redundant Advanced Control Modules (ACM)

Discrete Inputs:

145, Five (5) 115 Vac Input Discrete Modules (IDMs)

Discrete Outputs:

90, Four (4) 115 Vac Output Discrete Modules (ODMs)

Analog Inputs:

None

Analog Outputs:

None



Power Supplies:

Shared-redundant (with APACS) POWERAC 200 Watts

Terminations:

Unterminated I/O cable wired to existing field terminations

HMI:

MYCROADVANTAGE operating on two (2) PCs

DCS:

APACS process control system

Configuration Language:

4-mation™ function block

Communication Link:

APACS MODULBUS

Scan Rate:

133 ms

