

FocalPoint™ Optimization System Successfully Controls Emissions While Improving Heat Rate and Efficiency

PROJECT CASE HISTORY

Plant Name

Longview Power

Plant Location

Maidsville, West Virginia

Situation

After initial commissioning in 2011, this 700 MW advanced supercritical boiler, originally supplied by Foster Wheeler, was later modified to improve operation of its distributed control system (DCS), air quality control system to accommodate high-sulfur coal, and turbine.



To address issues the unit was experiencing with slag control, Longview turned to Babcock & Wilcox (B&W) in 2016 for its Titanium® intelligent sootblowing (ISB) system. The Titanium ISB system uses a detailed boiler performance model to intelligently operate sootblowers based on actual heat transfer in each of the heat traps. The ISB allowed the plant to better control slag buildup and eliminate the large slag falls that would occur, as well as control other variables affecting heat rate such as reheat spray flow.

After the successful implementation of the Titanium ISB system, B&W presented Longview with a proposal to optimize combustion to further reduce emissions and improve heat rate. B&W installed the FocalPoint™ optimization system on the same computer as the Titanium ISB system.

Project Description

B&W's FocalPoint system provides a wide array of performance models, general calculational functions, logic functions, knowledge-based decision algorithms, and optimization algorithms which can be combined as needed to create a customized optimization solution.

The combustion optimization project had the following primary goals:

- Reduce the frequency, severity, and duration of CO spikes
- Keep CO below permit limits and reduce if possible
- Reduce the NO_x level entering the selective catalytic reduction (SCR) system to reduce ammonia usage
- Balance the O₂ across the unit
- Reduce the overall O₂ set point

To achieve these goals, the FocalPoint optimizer was given access to the biases on the following DCS control loops:

- Burner secondary air flow dampers
- Burner windbox flow dampers
- OFA flow dampers
- OFA windbox flow dampers
- O₂ set point

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Results

Plant operators and engineers have observed several improvements since the FocalPoint system has been in service. The system primarily runs in automatic mode, allowing operators time to focus on other operational matters. Results show the combustion optimizer's ability to deliver consistent performance improvements over a range of operating conditions.

CO emissions

- 46% reduction
- Reduced frequency of CO spikes

NO_x emissions

- 5.3% reduction in amount entering SCR, reducing the required ammonia injection rate

Furnace exit gas temperature

- Reduced variation between right and left temperature probes
- Overall average reduction of more than 200F

(Note: only includes data for loads above 700 MW)

Operating O₂

- Decrease of more than 0.5%

(Note: only includes data for loads above 700 MW)

Heat rate and efficiency

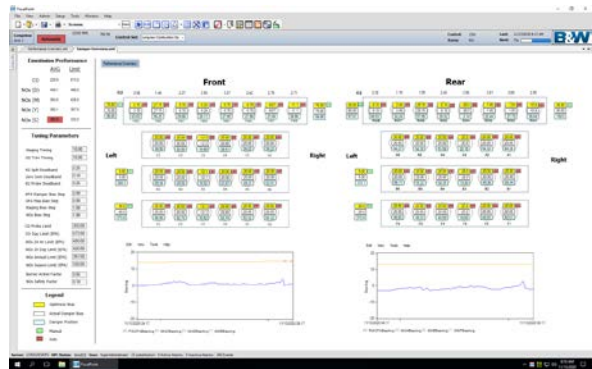
- Calculated heat rate improved by 2.6%
- Efficiency improvement of 0.58%

Summary

Heat rate and efficiency are two important metrics in which to evaluate thermal performance and cost efficiency for a plant. These results at Longview indicate that the FocalPoint system has met the combustion optimization and emissions reduction goals of the project. The heat rate and efficiency improvements are expected to result in fuel savings and reduced maintenance costs while the unit continues to meet all emissions requirements.



FocalPoint performance overview screen.



FocalPoint damper overview screen.

The Babcock & Wilcox Company

1200 E Market Street, Suite 650
Akron, Ohio, U.S.A. 44305
Phone: +1 330.753.4511

www.babcock.com    

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