ZoloBOSS enables Intelligent Soot Blowing

CASE STUDY

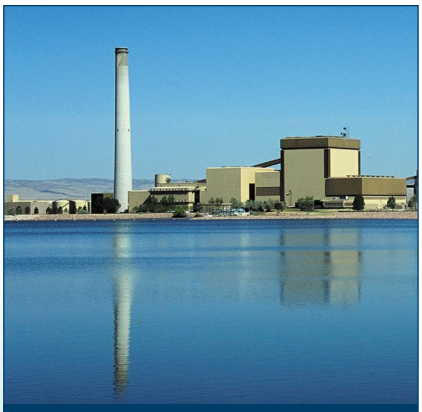
Location

Rawhide Energy Station, Platte River Power Authority,
Wellington, Colorado

Problem

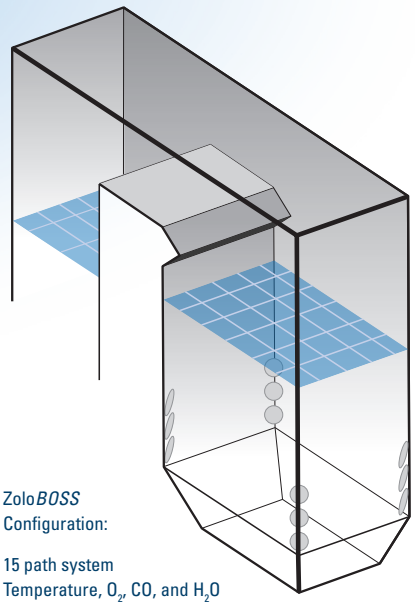
Effective and efficient soot blowing systems deploy when and where they are needed to maximize heat transfer to furnace and convection pass tubes. Excess or unnecessary soot blowing can significantly reduce the boiler tube life and the net efficiency of the plant by wasting high temperature steam. Intelligent soot blowing (ISB) systems automate and optimize this process. ISBs use thermodynamic models along with heat flux sensors and often strain gauges, to determine exactly how much and where soot blowing is required. Key variables in these models are temperature data provided by optical or acoustic pyrometers at the furnace exit and thermocouples at the air heater inlet. The optical and acoustic pyrometers only provide limited sampling of the furnace exit gas temperature (FEGT) and can be unreliable. Without a reliable and representative profile of the FEGT, the ability of the ISB to truly optimize the soot blowing is compromised.

At Rawhide Energy Station, FEGT was traditionally measured using an optical pyrometer that captured a single temperature point just below the bull nose. A failure in the device resulted in a disruption of the ISB system. As a result, the plant had to resort to more labor intensive manual control.



PRPA RAWHIDE STATION DATA

Boiler Manufacturer	Alstom
Burner Configuration	Tangentially Fired
Capacity	274 MW
Coal type	PRB



Zolo*BOSS*
Configuration:

15 path system
Temperature, O_2, CO, and H_2O

OPC Data connection

ZOLO TECHNOLOGIES

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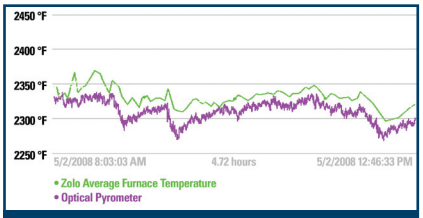

Zolo*BOSS* accurately tracks optical pyrometer

Average of multiple Zolo*BOSS* paths tracks well with historical optical pyrometer data. The optical pyrometer is located 13 feet (4 m) above the Zolo*BOSS* grid.

Solution

A 5 x 4 Zolo*BOSS*™ grid was already installed just below the bull nose to provide combustion optimization information for the plant engineers and operators. Upon the failure of the optical pyrometer, the plant engineer decided to utilize the Zolo*BOSS* average combustion plane temperature data to feed the ISB thermodynamic model and resume automated soot blowing. First, the plant engineer validated that the average combustion plane temperatures measured by the Zolo*BOSS* matched the same data generated by the optical pyrometer using historical information from the data historian as shown in the graph. The slight offset is due to the fact that the Zolo*BOSS* measurement path is 13 feet lower in the boiler and is easily accounted for by the ISB thermodynamic model.

Benefits

The Zolo*BOSS* measures temperature in multiple, well defined and distributed paths across the furnace, whereas the optical pyrometer only samples a single point. With the broader spatial sampling, the Zolo*BOSS* reduces the potential for inaccurate results and improves the thermodynamic model accuracy. In addition, the redundancy inherent in measuring over multiple paths makes the Zolo*BOSS* a more reliable sensor solution.

The plant was able to quickly integrate the Zolo*BOSS* data into the ISB system and return it to automated soot blowing. The plant is once again taking full advantage of the ISB system: improved boiler performance and reduced erosion on the water wall tubes and pendants.

"The ZoloBOSS replaced optical pyrometer data in closed-loop control with more robust, and redundant data"

—Chad Townsend, Sr. Performance Engineer, Rawhide Energy Staion

ZOLO TECHNOLOGIES

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