

# SmartProcess® Unit Response Optimization Improves Plant Efficiency at Constellation Energy's Crane Station

## RESULTS

- 91.37% reduction in average occurrences of exceeding 1050° F operating temperature
- 86.96% decrease in average hours operating above 1050° F operating temperature
- Achieved 7-MW/minute ramp rate with minimal temperature overshoot



## APPLICATION

205-megawatt B&W drum cyclone boiler

## CUSTOMER

Constellation Energy, C.P. Crane Station located in Baltimore, Maryland

## CHALLENGE

C.P. Crane Unit 2 experienced overfiring when ramping up to its full load megawatt target. This overfiring – which ranged from 80-100 degrees Fahrenheit (°F) over the operating temperature of 1050°F main steam and 1000°F reheat – was caused by the inherent lag time in the combustion and steam flow that is ultimately required for the unit to meet its target ramp rate and megawatt production.

Over time, temperature excursions can damage a unit: The excess heat causes metal fatigue that, in turn, results in boiler tube leaks and maintenance outages. A solution was needed to reduce or eliminate overfiring in order to improve plant operations and maintain regulation status.

*“SmartProcess Unit Response Optimization has prevented overfiring in Unit 2, allowing us to greatly reduce equipment wear and tear. We can now operate the plant more reliably and maintain our regulation status, which not only has important implications for this plant, but for the region’s electricity needs as well.”*

**William Soltysiak**

Senior Engineer  
Constellation Energy  
C.P. Crane Station



**SOLUTION**

Emerson provided a Smartprocess® Unit Response Optimization solution (URO) to eliminate overfiring when Crane Unit 2 ramped to its full load megawatt target. The SmartProcess URO is part of Emerson’s comprehensive suite of engineered optimization technologies seamlessly embedded within the powerful Ovation® expert control system.

Unit Response Optimization uses advanced unit analysis and modeling techniques to provide optimal load trajectory and control for improved ramping and overall performance, as well as reduce equipment wear/tear. Based on historical data and parametric testing, the URO models Crane’s process response and unit characteristics, then calculates a variable derivative ramp rate to optimize plant maneuverability and AGC (automated generation control) capabilities, eliminate overfiring and provide a greater degree of unit control precision.

Test results from Constellation Energy’s C.P. Crane Station Unit 2 demonstrated operational improvements using SmartProcess Unit Response Optimization. The 205-megawatt facility operates as a regulating unit to help maintain regional grid frequency. The unit frequently ramps from 100-MW to a full load of 205-MW at a targeted rate of 7-MW/minute. Installation of the URO solution helped the unit achieve the 7-MW/minute ramp rate with minimal temperature overshoots. Other results included:

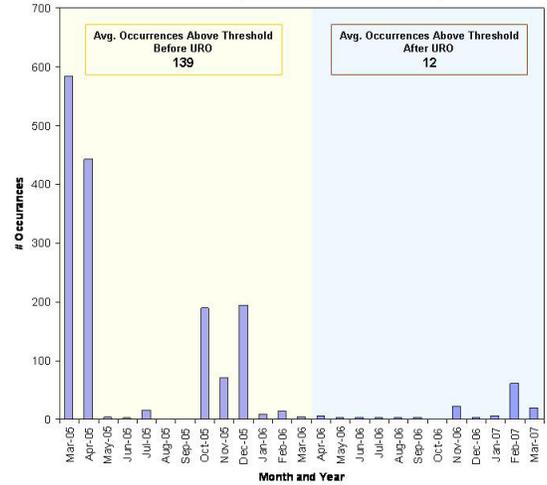
- Reduced average number of operating occurrences over the 1050°F threshold from 139 before installing the URO to 12 incidents after; a 91.37% improvement.
- Decreased the average time spent operating over the threshold from 23 hours before installation of the URO to 3 hours after, providing an 86.96% improvement.

Since its installation in 2006, SmartProcess Unit Response Optimization has eliminated over-fueling and the temperature excursions it causes. The result: reduced fuel consumption, fewer tube leaks and, consequently, less frequent maintenance outages.



For more information:  
[www.EmersonProcess-PowerWater.com](http://www.EmersonProcess-PowerWater.com)

Constellation Crane URO Installation  
 Number of Times Operating Above 1050 deg. Fahrenheit Threshold



*SmartProcess Unit Response Optimization reduced occurrences and hours operating above threshold temperatures at Crane Station by 91.37% and 86.96% respectively.*

Constellation Crane URO Installation  
 Number of Hours Operating Above 1050 deg. Fahrenheit Threshold

