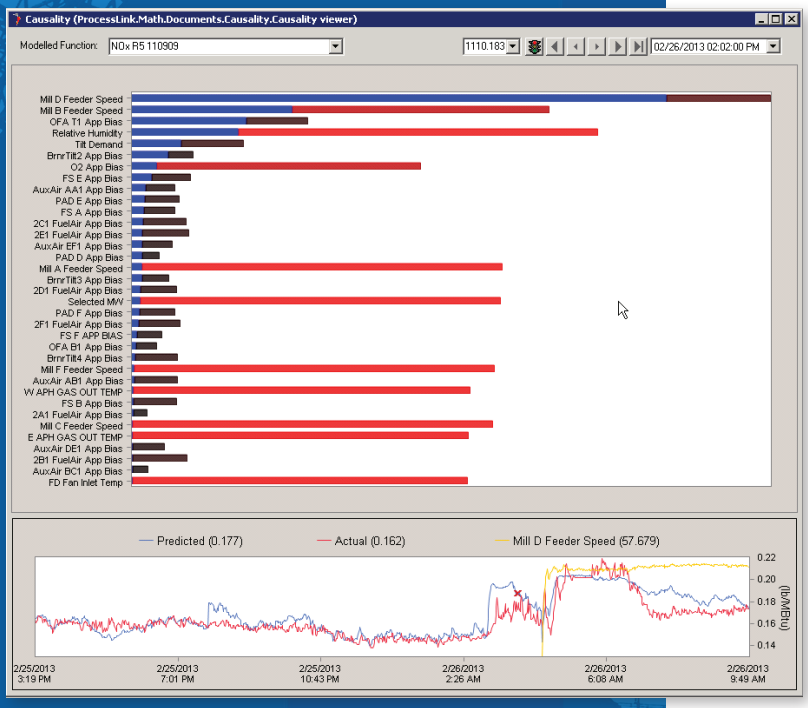
ProcessLink®

CombustionOpt®

Real-Time Fuel-Air Management

Benefits

- Reduces NO_X emissions and reagent costs
- Improves heat rate
- Avoids fouling and slagging
- Improves steam temperature control
- Reduces LOI
- Avoids opacity excursions
- Reduces MATS inspection/tuning/testing costs
- Increases MATS-related outage scheduling flexibility



CombustionOpt's Causality Analysis view is a powerful method for querying models about cause and effect. The causality analysis can be used to determine which inputs had the greatest impact on the model's prediction of a particular event.

Why CombustionOpt?

Even the best operators can't continuously manipulate the many variables needed to achieve optimized combustion 24 x 7. Control systems can help by driving to pre-determined setpoints, but they can't determine what the optimal biasing of setpoints should be at any given time.

CombustionOpt, because it can learn complex process relationships, dynamically determines what the optimal fuel and air setpoint biasing should be and it can make the necessary adjustments to fuel and air variables in real-time.

CombustionOpt is the market-leading combustion optimization solution for reducing NO_X emissions, improving boiler efficiency, and controlling CO, slagging, LOI, and opacity.

How it works

CombustionOpt provides closed-loop optimization of fuel and air mixing by manipulating all relevant fuel and air injection points in order to reduce NO_X and other emissions and improve fuel efficiency. It uses neural network-based optimization, model predictive control (MPC), as well as other technologies to extract knowledge about the combustion process, determine the optimal balance of fuel and air flows in the furnace, and respond to changing conditions. It directly adjusts control system biases to more consistently position dampers, burner tilts, overfire air and other controllable parameters at their optimal settings for current conditions, given applicable objectives and constraints.

Rapid Deployment & Sustainability

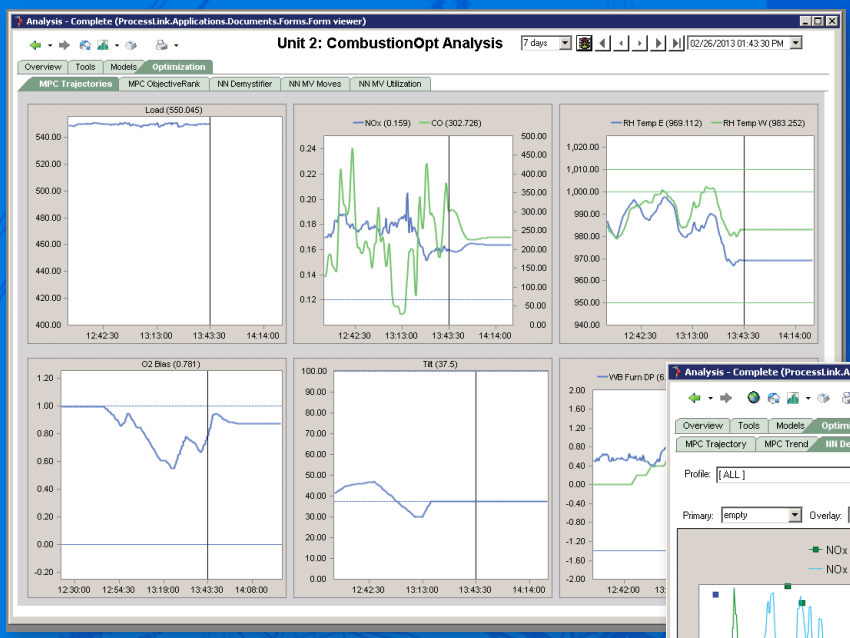
CombustionOpt's unique Online Learning algorithms ensure rapid model training for fast and successful project completion. Since the ProcessLink models are continuously retrained and validated, the system can remain in supervisory control of the plant indefinitely, even in the face of changing fuel quality, mills-in-service, and equipment conditions.

Dynamic Optimization

By integrating neural network models with MPC technology, CombustionOpt is ideally suited for managing situations that demand fast response to changes such as load ramping. It can actively control steam temperatures and sprays on a minute-by-minute basis — optimizing control settings over a trajectory through accurately predicting the response its actions will elicit.

"NeuCo not only improved overall emissions and efficiency at our flagship plant, it reduced our annual ammonia bill by more than 20%."

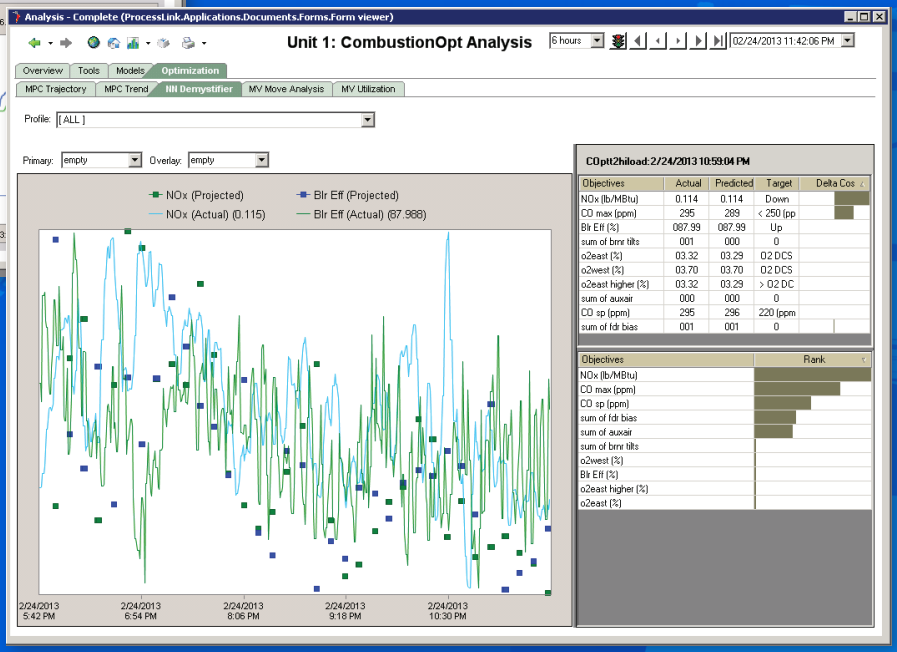
- Vice President Generation, 3 unit, 1800 MW plant



Operators can immediately see why the Optimizer's MPC component made the moves it did.

> *"As part of the financial justification for adding all of NeuCo's newer optimizers at all of our units, we did a rigorous analysis of CombustionOpt's fuel efficiency benefits, and found that over eight years it had improved heat rate by more than 2%, controlling for all other influences."*
>
> - Engineering Manager, 5 unit, 2300 MW plant

> *"CombustionOpt, based on my own tests, reduced NO_x another 20% incremental to that achieved through a proprietary over-fired air system."*
>
> - Plant Manager, 4 unit, 200 MW plant



Operators can immediately see why the Optimizer's neural component made the moves it did.

Visibility into Optimizer Actions

The actions of a closed-loop optimizer are not always intuitive since the system is used to achieve multiple and sometimes conflicting goals within a set of constraints. With the application's analysis screens, the recent moves the Optimizer has made, the reasons for these moves, and the constraints under which it was acting are all displayed so users can have confidence that the Optimizer is carrying out the instructions it's been given.

Scalable & Flexible

CombustionOpt's flexibility allows it to respond to the ever-changing nature of today's power plants. Optimization goals and constraints can be easily modified to incorporate new controls and objectives, or to address additional optimization challenges.

The ProcessLink Modules

CombustionOpt is part of NeuCo's total boiler optimization solution and can be bundled and integrated with **SootOpt®** and **ProcessOpt®**.

CombustionOpt learns complex process relationships, dynamically determines — after taking SootOpt's actions into account — the optimal biasing of the fuel and air setpoints given the unit's goals and constraints, and makes the necessary adjustments to available fuel and air variables in real-time.

SootOpt dynamically determines — after taking CombustionOpt's actions into account — when and what boiler cleaning action to take next so as to optimally balance the unit's reliability, heat rate, and NO_x objectives.

ProcessOpt, by continuously monitoring key process variables, helps plant personnel get a jump on emerging operational issues.

NeuCo
The Optimization Standard™

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