NeuCo
The Optimization Standard™

OPTions

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# CAIR Reversal

## What It Means for the Power Industry and Optimization

*Recently, the D.C. Circuit Court vacated the Clean Air Interstate Rule (CAIR). While in the short-term this decision suspended tightening federal $NO_X$ regulations, it will likely lead to $NO_X$ reduction legislation that will be even more stringent and sweeping than CAIR.*

### The CAIR Ruling

The court case that triggered CAIR's rejection was North Carolina, et al. v. EPA. The court found that CAIR is neither broad enough nor fast enough to be consistent with the Clean Air Act (CAA) and the Clean Air Act Amendments (CAAA). They ruled in favor of the State of North Carolina, which two years ago promulgated state rules stricter than CAIR. The court also found that the EPA erred in relying on or otherwise interfering with the allowance trading system that was established to address acid rain while affirming their own powers to require interstate air pollution abatement to protect human health. The court also decided that in their design of the program, the EPA unfairly credited coal-based utilities. And finally, the court rejected utility claims seeking to exclude Florida and west Texas from CAIR.

### An Uncertain Future Suggests Tighter Regulations

There are several scenarios that could develop. One is that Congress enacts legislation providing EPA the required authority. Another is that individual states could revert to Best Available Reduction Technology (BART). BART can be applied to 48 states and is more stringent than CAIR. By the EPA's analysis BART will, in aggregate, meet the new more stringent 75 PPM 2.5 micron Particulate Matter (PM 2.5) requirement embodied in the National Ambient Air Quality Standards (NAAQS).

States could also quickly promulgate their own $NO_X$ and $SO_2$ regulations, as Maryland and North Carolina did before CAIR. Both of these models exist and could easily be adopted or modified by other states. Another possibility is that the Clean Air Planning Act of 2003 is quickly reintroduced and passed. Because this also

*Continued on page 3,* ***CAIR's Reversal***

## Managing Uncertainty

**by Curt Lefebvre,** *President & CEO, NeuCo, Inc.*

This is NeuCo's 8th year at Coal-Gen, and our 7th consecutive year as a Platinum Sponsor. The power industry has changed significantly since NeuCo first participated in Coal-Gen. Operating costs for coal-fired generators have escalated, plant infrastructure has become more complex, and a mass retirement wave has begun. But what makes 2008 the most different from past years are the impending changes that coal-fired power generators are about to face.

At NeuCo, we call the alignment of these changes "The Perfect Storm." It's a collision of significant new regulations, a loss of talent and expertise due to retirement, and escalating fuel and operating costs. The D.C. Circuit Court's recent overturn of CAIR has raised speculation that near-term $NO_X$ regulations will go even farther than we previously thought.

Optimization can be an important tool for helping power generators to survive this storm. Its ability to improve emissions and fuel efficiency and manage tradeoffs in a rapidly shifting environment has made it a logical choice for proactive power generators. While the timing of new emissions legislation is uncertain, optimization offers immediate benefits, not to mention the value of knowing a unit's baseline performance before new regulations take effect.

These are uncertain times for the industry. But there are a few things of which we can be certain: that emissions legislation will continue to become increasingly stringent; that carbon, mercury, $SO_X$ and $NO_X$ will likely be the focus of those regulations; and that fossil-fired power generators will continue to look for solutions that can help them survive, and even thrive, in an increasingly competitive and complex environment.

ase email us at info@neuco.net

# Announcing Fall Training Programs!

NeuCo and Black & Veatch will be holding two training courses at NeuCo's Customer Center in Chardon, Ohio in September/October 2008. One course will focus on **Power Plant Performance** and the other on **Advanced Plant Monitoring and Diagnostics**. Each program is modular and will be 2.5 days in length.

## Plant Power Performance

Attendees will learn:

- To better understand and apply core thermodynamic principles
- To identify common performance problems
- To understand the potential heat rate and capacity impacts of performance problems
- How to maximize the value of using their PerformanceOpt® system*

## Plant Monitoring and Diagnostics

Attendees will learn:

- How each piece of equipment and instrumentation impacts unit performance
- How various technologies can be used to achieve early identification of equipment and system issues that can result in performance and reliability problems
- How knowledge management technologies can support the diagnosis of problem root causes
- How to maximize the value of using their MaintenanceOpt® system*

*__NOTE:__ it is not necessary to be a PerformanceOpt or MaintenanceOpt user to attend courses

*Seats are limited so sign up early! For dates, rates, and other sign up info, email info@neuco.net or call Jennifer at 617-587-3160.* ■

# NeuCo at 2008 MEGA Symposium

## August 25 – 28, Baltimore, MD

## Focus on SCRs, Carbon, Mercury, and Optimization

From August 25th through the 28th, NeuCo will participate in the 7th annual Air Pollutant Control MEGA Symposium in Baltimore, Maryland. This year's symposium will look at state-of-the-art methods for reducing $SO_X$, $NO_X$, particulate, $CO_2$ and mercury emissions from fossil-fired boilers. NeuCo will present one white paper and two poster sessions.

### Benefits of Combining SCR Systems and Optimization

This paper will examine how optimization can reduce SCR-related costs by reducing ammonia consumption, mitigating negative SCR-related side-effects and simultaneously improving combustion and sootblowing operations. It will present results of combining boiler and SCR optimization at Dynegy's Baldwin Energy Complex.

### Using Low-Cost Optimization Technologies to Reduce the Carbon Footprint

This poster session will discuss how lowered $CO_2$ is being realized at plants using real-time intelligent optimization, particularly ones that combine solutions for soot, combustion, maintenance and performance.

### CCPI Phase 2 Project at NRG Texas' Limestone Station

NeuCo's Clean Coal Power Initiative (CCPI) project at the NRG Texas Limestone Electric Generating Station in Jewett, Texas, will demonstrate the capability to optimize mercury speciation and control emissions at an existing power plant. This poster session will discuss how NeuCo and NRG Texas are combining artificial intelligence (AI) and simulation technologies to prove that mercury speciation and multi-pollutant reduction benefits can be measured, optimized, and controlled while simultaneously improving plant efficiency.

*Let us know if you plan to be at MEGA and are free to join our Crab Dinner at Mo's. Email us at info@neuco.net.* ■

# NeuCo Featured in *Power Engineering Magazine*


The July 2008 edition of *Power Engineering Magazine* includes a full-length article: "Boiler Optimization & SCR Systems: Reducing $NO_x$, Managing Tradeoffs". Authored by Rob James, product manager at NeuCo and Peter Spinney, NeuCo's director of market and technology assessment, the article discusses how boiler optimization can help mitigate SCR-related costs and negative operational side effects while better managing interactions between combustion and post-combustion systems. The article also presents real-life examples of boiler optimization for $NO_x$ reduction and improved SCR effectiveness at OMU's Elmer Smith Station and Dynegy's Baldwin Energy Complex.

*To read the entire article in Power Engineering Magazine, follow the link on NeuCo's homepage, or the link in the Industry Articles section of NeuCo's website.* ■

## CAIR Reversal, *continued from page 1*

addresses mercury and $CO_2$, it would please constituencies concerned about the recent vacating of the CAMR rule for mercury and the lack of federal legislation for $CO_2$ as it concerns climate change. And yet another possibility is that the parties to the litigation that vacated CAIR appeal and settle, overturning the ruling by negotiating the relatively small points each of the parties' litigation was focused on. Whatever model is adopted, it may happen fast. The urgency of fixing the CAIR problem at a federal level was explicitly noted in the Court of Appeals ruling.

So what does this mean for optimization? Both the uncertainty of how long it will take Congress to act and the more stringent nature of what will replace CAIR are strong arguments for adopting optimization now. The flexibility of boiler optimization (e.g. the ability to manage tradeoffs as the value of differing objectives changes), combined with its fuel efficiency benefits suggests that it is a wise investment while the impending $NO_x$ regulations are sorted out.

*This article is based on Peter Spinney's blog post "CAIR's Rejection Ups the Stakes for $NO_x$ Reduction". To read the original article, visit www.theoptimizationblog.com.* ■

# Ask NeuCo: Sootblowing & Expert Systems

**Q: I understand that SootOpt® uses expert systems to optimize sootblowing processes. But how does it know how to do this if there are no cleanliness factors, heat flux sensors, or other important data coming in?**

**A:** One great thing about expert systems is that they model processes opportunistically and flexibly, taking advantage of all the things that various experts know and whatever information is available. In the case of sootblowing optimization where no advanced instrumentation like flux, FEGT, or strain gauges exist, SootOpt is still emulating the thought/decision making process of a super-vigilant operator looking at whatever information is available under those circumstances.

Like an operator, SootOpt looks at current conditions represented by whatever data is available for temperatures, pressures, sprays, and the time since last cleaning. Based on these conditions (called Selection Conditions) a set of necessary and suggested actions are proposed. The proposed actions are then narrowed down based on priority and effectiveness with respect to addressing the current conditions. In some cases the selected proposal may be to take no action.

The information that can be used to represent current conditions and build rules for determining actions is unlimited. Information can include data found in almost all plants, such as steam and exit gas temps, spray-flows, combustion control settings, load etc. It can also include data from more advanced instrumentation such as strain gauges, ash-loading measurements, flux instruments, PerformanceOpt® cleanliness-factors, fuel analysis, operator entered data recording clinker buildup severity, and indications taken from SootOpt's neural network-based scenario mill. Any variable that can be electronically converted can be considered as an input to a rule. And SootOpt can use any rule that can be invented using those conditions in its decision making process.

SootOpt also makes the decision machinery (Propose-Apply) transparent by displaying real-time and historical data, as well as statistical analysis. The result is a machine that we can grow to encode current knowledge about what to do in different scenarios, that we can subject to scrutiny and analysis, and to which we can add new intelligence as more information becomes available. As such, SootOpt is not an instrumentation or control system per se. Instead, it is an expert system that integrates and intelligently leverages the wide variety of available instrumentation and controls.

*Please submit "Ask NeuCo" questions to info@neuco.net.* ■

# COAL-GEN®

## August 13-15, 2008

## Louisville, KY

## NeuCo Booth #1101

This year's Coal-Gen conference marks NeuCo's 7th consecutive year as the Platinum Sponsor. Our continual sponsorship of the event underscores our commitment to developing innovative clean coal technologies that help power generators meet their emissions, efficiency and availability goals.

Stop by Booth #1101 to learn more about how NeuCo's $NO_X$, $CO_2$, sootblowing, equipment reliability, and unit performance optimization solutions can help you successfully navigate through the industry's Perfect Storm of pressures.

### Harley Davidson Giveaway

NeuCo is participating as a Harley Davidson giveaway sponsor. Be sure to stop by our booth to have your ticket stamped for your chance to take home the bike!

### CYBER CAFÉ

Check your email or get online while in the exhibit area. Take advantage of the Cyber Café—compliments of NeuCo.

### Bluegrass Brewing Company Reception

Don't forget to ask about our Bluegrass Brewing Company invite-only reception.

### GPS Giveaway

Stop by our booth for your chance to win a GPS navigation system and other cool storm central prizes.

## NeuCo's Coal Gen 2008 Presentation Schedule:

### ASSET OPTIMIZATION TRACK

*ROOM: 105*

**SESSION: Optimization Efficiency Strategies at the Plant and Fleet Level**

**Date:** Thursday, August 14, 2008
**Time:** 1:00 pm - 3:00 pm

Integration of Performance Modeling with Real-Time Optimization at Rawhide Generating Station.

*Doug Bartlett, NeuCo; Chad Townsend, PRPA*

### EMERGING COAL TECHNOLOGIES TRACK

*ROOM: 109*

**SESSION: Options for Lowering Emissions from Existing Plants**

**Date:** Wednesday, August 13, 2008

**Time:** 1:30 pm – 3:00 pm

Nation's First Completed CCPI Project Addresses Greenhouse Gases and Improves Power Plant Performance

*Peter Spinney, NeuCo; Joe Naberhaus, Dynegy Midwest Generation*

## Join the Conversation at The Optimization Blog


The Optimization Blog is a place for NeuCo, customers, and others who care about asset optimization to connect. It's a place where optimization experts are blogging about everything from optimization applications, emissions regulations, and NeuCo's own product development to trends in the power generation industry. It's also a place where customers can share their thoughts and insights on power industry issues, and talk to NeuCo about their own optimization experience.

Having an ongoing conversation with customers is key for providing solutions that continue to address your most important power plant needs. So join the conversation at www.theoptimizationblog, or click the blog link at www.neuco.net ■

**Comments? Want more info? Visit us at www.neuco.net or email us at info@neuco.net.**