

Looking Back/Looking Forward

Curt Lefebvre, President & CEO

For the power industry, 2008 was a year of uncertainty. Many power generators were in a state of limbo as they waited to hear final word on emissions legislation, while other generators continued to invest and proceed as if new, stricter legislation were inevitable.

Carbon dominated both industry tradeshows and public conversations. But at the end of 2008 plants were still being governed by a patchwork of regional and state CO₂ policies. CAIR legislation promised the most aggressive reduction of NO_x in U.S. history. Half-way through the year the U.S. Appeals Court vacated CAIR, only to reinstate it in late December.

While new emissions legislation was undecided, NeuCo continued to move forward with optimization solutions and projects to address power generation's challenges. In December, NeuCo and the U.S. Department of Energy's (DOE) National Energy Technology Laboratory (NETL) released results from the Clean Coal Power Initiative (CCPI) project at Dynegy's Baldwin Energy Complex. Results included benefits such as reduced NO_x emissions, improved average heat rate, and increased megawatt hours. We're proud to say that this was the nation's first CCPI project to successfully reach completion.

We also continued work on the CCPI II demonstration project at Limestone. A collaborative endeavor between NRG Texas, NeuCo, and the U.S. DOE, the project is designed to improve post-combustion mercury capture and heat rate, and reduce NO_x emissions, and fuel consumption.

With a new presidential administration, some degree of uncertainty with regard to emissions still exists. While we have no answers at this early date, all indications point toward more widespread and increasingly stringent legislation. But one thing is for sure: NeuCo will continue to develop optimization solutions that help power generators address some of their most pressing operational, regulatory, and financial challenges. ■



CAIR Q&A with Bob McConnell and Alison Simcox, US EPA, Region I

Bob McConnell is a NO_x (nitrogen oxide) expert for the US EPA, Region I (New England) and Alison Simcox is a fine-particle expert and regional contact for the Clean Air Interstate Act (CAIR) emissions-trading program for the U.S. EPA, Region I. We sat down with Bob and Alison to talk about NO_x regulations and the December 2008 reinstatement of CAIR and what impact this will have on the power industry.

NeuCo: How significant is CAIR for the power industry?

Bob McConnell: CAIR is certainly more far-reaching than past regulations. The last significant NO_x regulation was the NO_x SIP call, which covered 22 states. CAIR covers at least 27 states and DC (in January 2009 the EPA proposed to stay the effectiveness of CAIR in Minnesota). It also regulates SO₂ (sulfur dioxide) and will require the largest reduction in air pollution in more than a decade.

NeuCo: Could you provide some perspective on progress the power industry has made in terms of reducing NO_x emissions?

Bob McConnell: We've come a long way since 1990, which is when we enacted amendments to the Clean Air Act. At that time NO_x emissions in the U.S. were greater than 25 million tons per year, and power generators accounted for about 26 percent of that output. By 2005, we'd reduced NO_x emissions to less than 19 million tons annually, and power generators contributed to 21 percent of the total NO_x emitted. So we've come a long way in a few years. CAIR will take us even further, and in a much shorter period of time.

NeuCo: What does the CAIR vacatur and the subsequent decision to remand CAIR to EPA mean for power generators?

Alison Simcox: For now, things are just as they were before the Court's vacatur. Power generators should proceed as if CAIR had not been vacated.

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DOE II: CCPI at NRG Texas' Limestone Electric Generating Station

Located in Jewett, Texas, NRG's Limestone Electric Generating station is a large utility coal-fueled steam electric power plant. It is also home to the Mercury Speciation and Multi-Pollutant Control project, a \$15.5M Round Two CCPI (Clean Coal Power Initiative) demonstration project. The project is a collaborative endeavor between NRG Texas, NeuCo, and the U.S. DOE's (Department of Energy) NETL (National Energy Technology Laboratory). This second round of CCPI projects is designed to promote technology advancements for gasification-based electricity production, advanced mercury control, sequestration and sequestration-readiness.

The Limestone project's mission is to prove that mercury speciation and multi-pollutant benefits can be measured, optimized and controlled. To realize this vision, the project team is integrating state-of-the-art measurement devices, advanced controls and optimization technologies. The technology package's modular design and flexible architecture will allow it to be retrofitted into other coal-fired power plants or integrated into new plant designs.

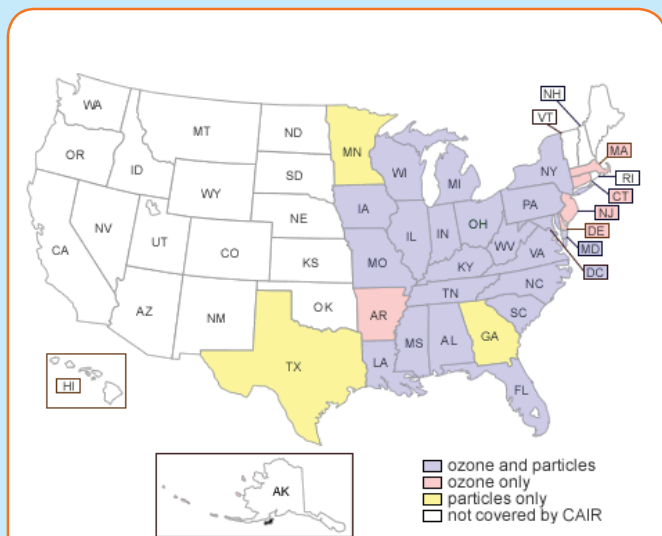
Limestone Electric Generating Station

Owned and operated by NRG Texas, the Limestone plant is equipped with a tangentially fired boiler to supply steam for almost 1,700 MWs of net electric generation. Limestone fires a blend of Texas lignite and PRB (Powder River Basin) coal. The unit is also equipped with a cold-side ESP (Electrostatic Precipitator) and a wet limestone FGD (Flue Gas Desulfurization) system for SO₂ removal. Both devices are capable of removing species-optimized mercury from the unit's flue gas. The Distributed Control System (DCS) is Baily Infi-90.

Project Objectives

The Limestone project is attempting to capture mercury by optimizing speciation through advanced sensors in the boiler, precipitator, FGD and fuel handling/delivery systems, as well as installing artificial intelligence-based optimization technologies. These plant-wide solutions will also be used to reduce mercury emissions by maximizing the ionization and capture of mercury in the flue gas.

CAIR, continued from page 1



The U.S. EPA found that at least 27 states and the District of Columbia adversely affect other states and areas' ability to meet NAAQS. These emitter states will be regulated under CAIR.

NeuCo: Should power generators expect to see any changes with CAIR during its first phase?

Alison Simcox: Well, we have to rewrite the rules and address the Court's concerns, which are described in its July 2008 ruling. We're moving forward with that work now so we can't really say at this point what those changes will be.

We can say that there will be a period of stability in terms of the number of NO_x allowances that have already been recorded by EPA. We expect those allowances to remain stable through 2011.

NeuCo: Any advice for companies who halted their investments in CAIR compliance technologies now that CAIR is back?

Alison Simcox: Power generators should be doing whatever they can now to make sure that they meet their NO_x emissions targets in accord with the CAIR program. In many cases, that means running SCRs year round, doing tune-ups for NO_x burners, and basically making any other improvements needed so they aren't in a position of playing catch-up at year's end. ■

Project objectives include:

- A 40 percent improvement in post-combustion mercury capture through optimized mercury speciation
- A 10 percent reduction in NO_x emissions
- Heat rate improvements of 0.5-2.0 percent
- Increased operating controllability and flexibility
- Reduced fuel consumption by 0.5-2.0 percent, normalized to fuel type and kWh generation
- Reduced capital investment compared to alternative emissions reduction systems

Methodology

The Limestone project has three phases: installation of advanced sensors, installation and integration of optimizers, and validation and demonstration of all control systems and software. The project is currently entering its third phase.

The project's first phase began in 2006, and consisted of installing sensors, designing the optimization application, and establishing the plant's baseline operating metrics.

The Limestone project entered its second phase in December 2007. Work consisted of configuring NeuCo's optimizers for maximum multi-pollutant and mercury removal and increased unit performance. A virtual on-line Hg analyzer was also developed.

Existing NeuCo Optimizers were installed to optimize combustion, sootblowing, unit performance, and equipment reliability. New optimizers were developed to optimize fuel, FGD, and ESP.

"Our goal is to get fuel to stack coverage," explained Rob James, NeuCo's Project Manager at Limestone.

In Phase 2 the team also began running the technology packages in closed-loop, and performing extended mercury and multi-pollutant testing.

The Limestone project entered its third phase on January 1, 2009. During this final phase, the team is continuing to test and demonstrate the technology packages in on-line mode, focusing on optimization tuning and integrating optimizer interactions. ■

"We are excited to apply this cutting edge technology at our plant and see the benefits that it gives our operations staff. It really is designed to be a total plant solution."

— Terry Smitherman, Maintenance Supervisor,
NRG Texas Limestone

Project Technologies Packages:

Intelligent Fuel Management System (FMS)

The FMS is composed of the CombustionOpt, the Ready Engineering Coal Fusion System, and SABIA's coal elemental analyzer.

Mercury Specie Control System

The Mercury Specie Control System includes NeuCo's boiler optimizers (CombustionOpt® and SootOpt®), sensors from Zolo Technologies, PS Analytical, and Triple 5. Mercury emissions are measured through Continuous Emission Monitors (CEMs) by PS Analytical.

Advanced Electrostatic Precipitator (ESP) Optimization

The ESP Optimization System is composed of a Carbon-In-Ash (CIA) virtual online analyzer, a CIA sensor from ABB, and ESP Optimization software.

Advanced Intelligent Soot Blowing (ISB) System

The ISB system is composed of NeuCo Intelligent Sootblowing optimization software.

Advanced Flue Gas Desulfurization (FGD) Optimization System

The FGD Optimization System is composed of FGD Optimization software.

Integrated Optimization

The integrated optimization system will manage trade-offs and arbitrate among the solutions.

Optimizers installed at Limestone:

1. Fuel Management System*
2. Combustion Optimization
3. Sootblowing Optimization
4. ESP Optimization*
5. FGD Optimization*
6. Unit Performance Optimization
7. Equipment Reliability Detection & Diagnosis
8. Unit Tradeoff Management

* Optimizers developed through this project

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NeuCo Booth #523

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February 3-5, 2009 • Albuquerque, NM

Stop by the NeuCo booth in the exhibit hall.

2009 NO_x-Combustion Roundtable & Expo

February 9-10, 2009 • Cleveland, OH

NeuCo Booth #32

Please contact info@neuco.net if you will be attending or would like additional information on presentations at the upcoming shows. ■

Customer Spotlight: APS

NeuCo Awarded 24-Product Deal

APS' Four Corners power plant in New Mexico was the first coal-fired plant to invest in CombustionOpt®, ultimately installing it at all five generating units to reduce NO_x emissions and improve heat rate. APS recently expanded its optimization program at the Four Corners units to encompass NeuCo's full Unit Optimization suite, and also purchased combustion, sootblowing and unit performance optimizers for three units at its Cholla plant. This technology investment is part of APS' corporate "Plant of the Future" initiative to minimize emissions while continuing its longstanding commitment to reduce operating costs and maintain low customer electricity rates. ■



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