



Yes, There is a War on Coal!

But Somebody Has to Keep the Lights On!

Dear Friends,

I recently attended the Power Magazine sponsored Electric Power Conference in Baltimore. Ever since the years of the Bill Clinton administration with Carol Browner as the head of the EPA, I have believed that there has been an active "War on Coal." The events since 1998 or so have proven that yes, my friends, there is a WAR on COAL! As I listened to the speakers in Baltimore and talked with friends, it is now pretty well accepted that the EPA and the Obama administration are aggressively at war with coal and basically all traditional fuels. It truly seems that the administration and most of the tens of thousands of unelected bureaucrats are engaged in a serious effort to damage America's productive capacity. I find this inexplicable when over 90% of America's total energy is provided by traditional fuels of coal, oil, natural gas and nuclear. I am a coal power engineer, but I do keep up with POWER news, remember Yucca Mountain and nuclear waste disposal and what Obama and Harry Reid did for nuclear plants. I could go on and on, but people who receive this newsletter are very well informed on most matters pertaining to America's dysfunctional, foolish and anti-American energy and environmental policies. So, I will stop here.

That is the way it is, and until there is a public understanding of the problem, we just need to keep on doing our best under some very unfriendly regulatory agencies. So what is my point? Those who know me, also know that our team at Storm and myself take pride in promoting cost-effective practical and easy to understand engineering solutions. For this month I thought it would be appropriate to focus on furnace tuning of pulverized coal-fueled boilers.

The reason we chose this topic is that many of our customer friends are having challenges with keeping CO down to reasonable levels. Reasonable is being redefined from say 100's of ppm to something between 20 and 150ppm at the stack. Other factors are furnace outlet CO where SNCR is being utilized. The furnace exit, when SNCR is used, usually needs to have CO below about 500ppm (in the upper furnace). Due to the fact that CO can complete combustion in the convection pass, down to about 1,325°F. Reasonable stack CO levels can be achieved even though the furnace exit may be 5,000ppm or even 50,000ppm. (note: 5,000ppm is only 0.5%). So even if the furnace has extreme CO levels of 5,000ppm or more, it creates no safety issues with regard to furnace explosions or that kind of concern. But from an environmental viewpoint it needs to be tuned out. The best tool we have to do that is the HVT probe. Our field service teams have been busy using water-cooled HVT probes to fine tune the burner belt inputs so that flyash LOI (loss on ignition) and CO levels can be reduced.

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The Water-Cooled HVT Probe

A Handy Tool for Combustion Tuning

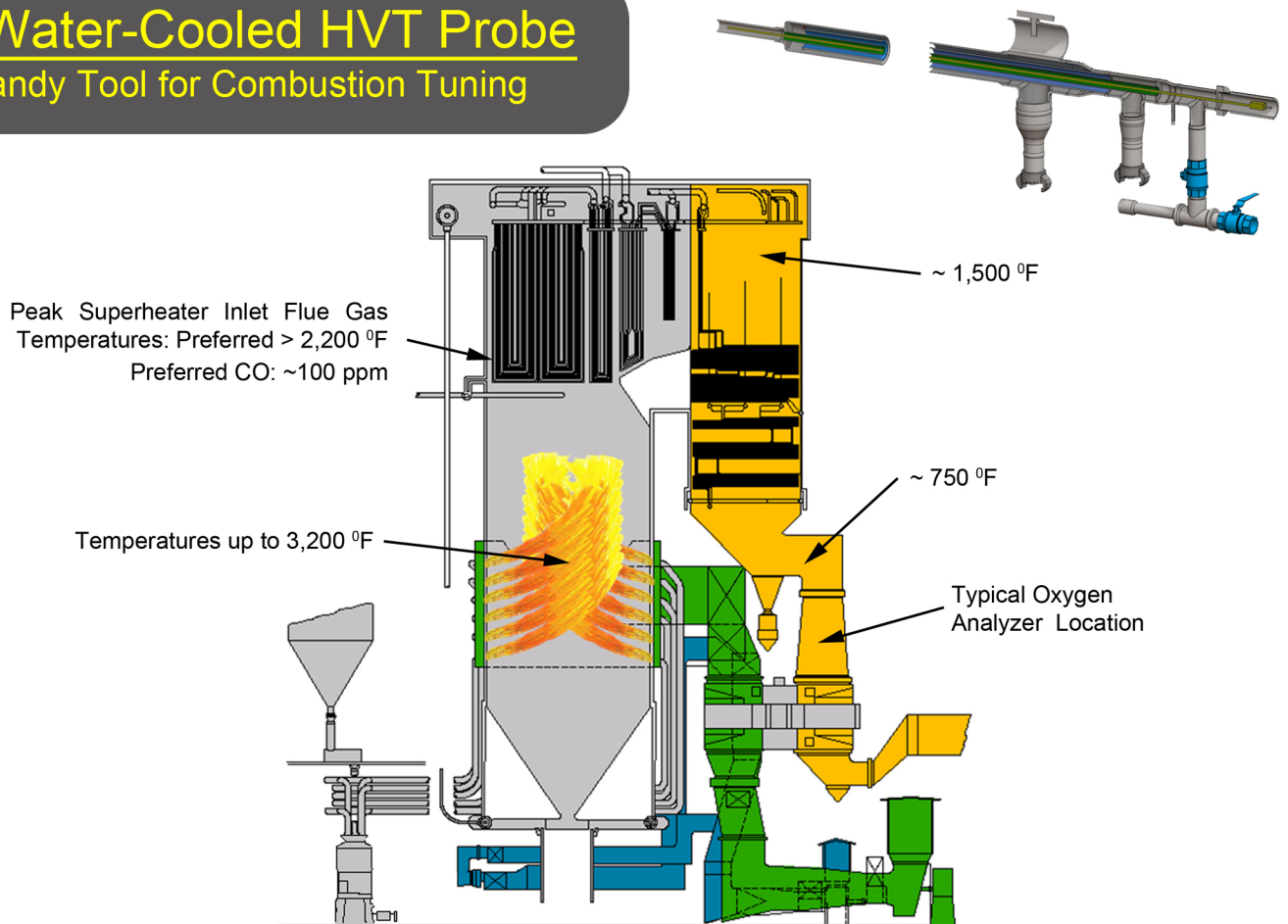


Figure 1

Depicted in Figure 1 is a typical 500 MW pulverized coal utility boiler with ideal temperatures and excess oxygen levels. The furnace exit peak temperature of 2,200°F is noted. The average FEGT (Furnace Exit Gas Temperature) in this illustration is 2,150° F. Unfortunately, this near perfect combustion is rarely found. More than likely, there will be some individual points in the upper furnace that are well above 2,200°F and nearly zero in free oxygen. These are the points that CO may be measured as high as 50,000 ppm. Why? Because the CO will combust down to about 1,350° F. Therefore, the upper furnace may have extreme stratifications of both flue gas chemistry and temperatures, yet the boiler outlet CO levels in the once thought to be reasonable range of say, 50-150 ppm. Today, not only are coal plants under pressure from ever increasing competitive generation costs due to low natural gas prices, but also the ever increasing regulatory pressures of reducing emissions. Not only NO_x and particulates, but also CO. Therefore, we again promote applying the Fundamentals.

The use of a water-cooled HVT probe has been done by our field teams for decades. The acronym HVT means “High Velocity Thermocouple” however, for combustion tuning, the use of the water cooled probe to measure the stratifications of flue gas constituents at the upper furnace is extremely valuable. By probing the upper furnace, the fuel rich and air rich zones of the burner belt can be identified and then appropriate changes made to reduce the stratifications. Storm Technologies, Inc. offers rugged stainless steel HVT probes for this use. For ease in handling a light duty monorail can be installed for easy insertion into the furnace for periodic checks. Figures 2 and 3 show HVT probes with monorail arrangements.

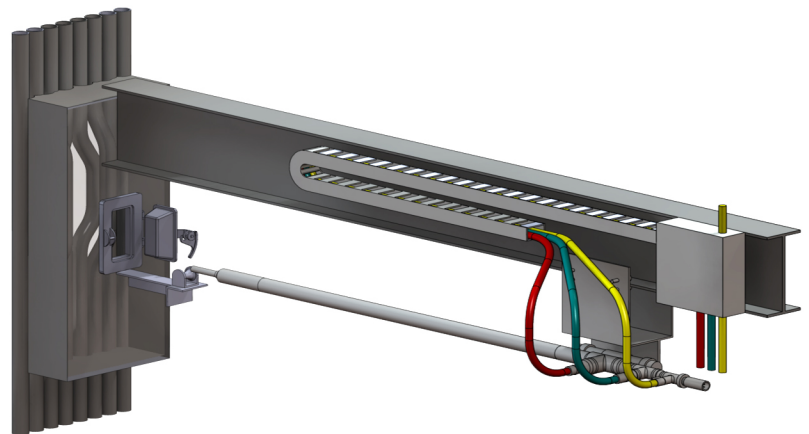


Figure 2

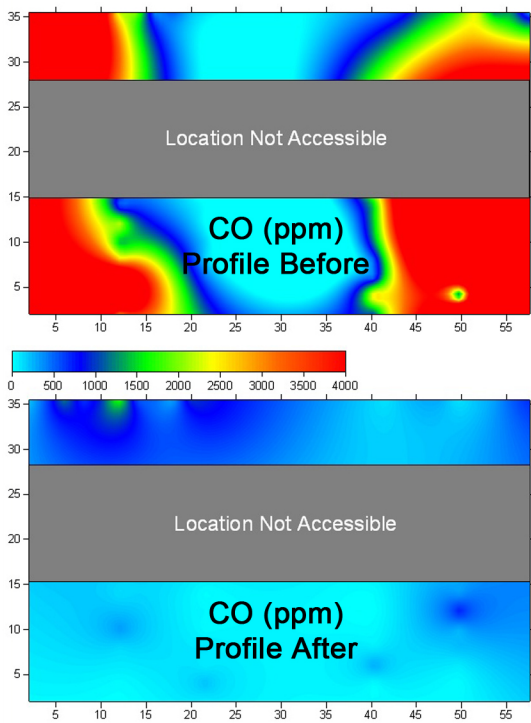


Figure 3

Jon Byers, Storm Field Services Team, demonstrating the HVT Probe with monorail arrangement

The flue gases are extracted through the water-cooled probe and Oxygen, CO, NO_x, and temperatures can be plotted on a 3D graphic, such as is shown to the left. This is from an actual test, before and after tuning. Note: Grey areas indicate no available test ports and Red areas indicated CO at 4,000 plus ppm.

The reduction of upper furnace CO was reduced by pulverizer tuning, air register adjustments and fuel line balancing. This is one way that the measurement and stratifications of the upper furnace flue gas chemistry can be utilized to make corrections.

Want to learn more about how Storm's field teams use the HVT probe and other specialized test gear to tune large utility boilers? Consider participating in our next short course to be held at Hilton Head Island, July 17 and 18.

In closing, let me say that all through my career and with everyone I have worked with my priorities have been: safety, environmental protection, reliability, capacity, efficiency and best possible operability. We all want clean air and clean water. I also want to see America's productive capacity improve. By applying common sense and tried and proven boiler testing and turning procedures, we can make the best of an unfriendly regulatory environment.

Let us know whenever we can assist you, and to all of you who have used our products and services over the years, let me say a very sincere thank you for your business!

Sincerely,

Richard F. (Dick) Storm, P.E.
CEO/Senior Consultant

Disclaimer: These suggestions are offered in the spirit of sharing our favorable experiences over many years. Storm Technologies, Inc. does not accept responsibility for actions of others who may attempt to apply our suggestions without Storm Technologies' involvement.

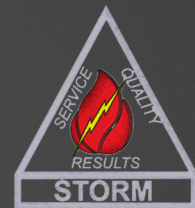
Large Electric Utility Boiler Combustion and Performance Optimization Short Course

An interactive learning event for plant owners and managers who are exploring fuel strategies, operational strategies and environmental compliance options.

When : July 17th & 18th, 2012

Where : Sonesta Resort Hilton Head Island
130 Shipyard Drive
Shipyard Plantation
Hilton Head Island, SC 29928

Phone: (800) 766-3782



Pricing Includes : Registration, learning materials, breakfast and lunch

Standard Rate : \$995 / person

Groups of 5-9 (15% discount) : \$845 / person

Groups of 10+ (25% discount) : \$745 / person

*Limited to 25 Participants

Registration:

Online: www.stormeng.com

Phone: Contact Laura Lorch at (704) 983-2040

Continuing Education Credits: 16 PDH

Large Electric Utility Boiler Combustion and Performance Optimization Short Course

Course Topics:

- Basic Steam Generation
- Evolution of Steam Generators
- Boiler Fundamentals & Design
- Water & Steam Properties
- Basic Thermodynamics
- Boiler Reliability
- The Fundamentals of Combustion
- Typical Plant Performance Challenges
- Comprehensive Diagnostic Testing
- Heat Rate Awareness
- Applying the Essentials
- Coal Quality Fundamentals
- Coal Pulverizers
- Boiler Design
- Fuel / Ash Properties
- The Solid Fuel Injection Systems Approach to Air & Fuel Flow Management
- Low NOx Firing Systems
- Biomass Combustion
- Case Studies
- Circulating Fluidized Bed Boilers (Time Permitting)
- Oil & Gas Firing (Time Permitting)
- Energy, Economics and the Environment (Time Permitting)



Registration:

To Secure a seat for the short course, please fill out the bottom information and either email, fax, or mail or entry. For any further information, please feel free to call the office at (704) 983-2040.

Email Registration to : storm@stormeng.com

Fax Registration to : (704) 982-9657

Mail Registration to : PO Box 429, Albemarle, NC 28002

*Limited to 25 participants and first come availability to Storm customer base

Name(s) _____

Title(s) _____

Company and Plant _____

Address, City, State, Zip _____

Telephone Number(s) _____

Cell Phone Number(s) _____

Fax Number(s) _____

Email(s) _____

Method of Payment (Circle): Company Purchase Order, Check or Credit Card (MasterCard, Visa, American Express)

PO _____

Credit Card Number _____ Type of Card _____

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Note: If claiming Personal Development Hours, please enter PE License Number _____

Specific Questions and/or Interest: _____