

Coal Quality & Combustion



A 2-days intensive course by
Rod Hatt from U.S.

who has over 28 years of experience in working in the coal industry regarding coal quality & combustion, performance engineering and full-scale test burning of alternate fuels.

Trainer's Background~ Mr. Rod Hatt

Member of:

- American Chemical Society (ACS),
- Society of Mining Engineers (SME),
- American Society of Mechanical Engineers (ASME)

Mr. Hatt has over 28 years of experience; 15 years as an independent coal quality specialist, 7 years in technical coal sales and marketing, and 6 years as a utility combustion and results engineer. He has experience in most aspects of how coal quality impacts the operation and performance of industrial and utility coal-fired steam plants.

Mr. Hatt works regularly with fuel purchasing, plant operation and engineering departments at utilities and with coal sales and mining companies. His services include training classes, expert services and computer software sales and development.

Mr. Hatt's marketing and engineering experience, along with a unique blend of creative analytical and communication skills, have allowed him to understand, communicate and solve countless complex coal quality problems.

Course Objectives

The Coal Quality and Combustion is designed specifically to answer the questions about coal quality, plant performance and pollution control issues.

This class will introduce the attendee to laboratory coal analysis and how to utilize the results to predict power plant performance. It will also covers how coal quality affects boiler performance, cost, efficiency, and pollution.



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by choosing the right Coal
& good Combustion processes!



Coal Combustion Inc.
Understanding the business of coal

For more information, please contact

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TOPICS TO BE COVERED

- Boiler Basics
- Major components of PC - fired boiler
- Coal Formation
 - ⇒ What is Coal
 - ⇒ Coal Rank
- Coal Mining
 - ⇒ Surface
 - ⇒ Deep
 - ⇒ Out of seam dilution
 - ⇒ Coal Washing
 - ⇒ Drying coal
 - ⇒ Transportation Impacts
 - Time and Climate
 - Barge Coal tends to gain moisture
- Sampling coal and coal analyses
 - ⇒ Sampling methods
 - The Good, The Bad and the Ugly
 - Good sampling is hard work
 - ⇒ ISO, ASTM Sampling
 - ⇒ Terms
 - ⇒ Proximate – Moisture, ash, volatile, fixed carbon (by difference)
 - ⇒ Short Prox – Moisture, ash, sulfur, Btu/lb
 - ⇒ Ultimate – Moisture, ash, sulfur, + carbon, hydrogen, nitrogen, oxygen (by difference)
- Coal Cost
 - ⇒ Sold by the ton - \$/ton
 - ⇒ Boilers want Calorific Value not tons
 - ⇒ Evaluated by the Kcal or millions of Kcal (MMcal.)
- Coal Handling
 - ⇒ Moisture plays a dominant role
 - ⇒ Fines
 - ⇒ Clays and mineral matter
 - ⇒ Chemical additives
- Spontaneous Combustion
- Combustion
- The three T's in practice
- Size the coal and add air
- Coal Reactivity
- The Story of NOX
 - ⇒ To minimize the formation of NOx
 - ⇒ Post Combustion Control
- Pulverizers
- Coal properties
- Coal fineness
- Measurement Surface moisture HGI Coal size Heating value
- Combustion Process
 - ⇒ Coal Rank
 - ⇒ Air to fuel ratios
 - ⇒ Balancing furnaces
 - ⇒ Balancing burners
 - ⇒ NOx formation
 - ⇒ CO analysis
- Boiler Efficiency
 - ⇒ Boiler efficiency vs. excess oxygen
 - ⇒ Moisture and hydrogen impacts
 - ⇒ Higher vs. Lower heating value
- Ash Deposits - Introduction
- Types of Ash Deposits
 - ⇒ Wall Slag
 - ⇒ Superheater Slag
 - ⇒ Convection Pass Fouling
 - ⇒ Low Temperature Deposits
- Causes of Ash Deposits
 - ⇒ Fuel Related
 - ⇒ Equipment Related
 - ⇒ Design Related
- Analytical Procedures
- The ASTM Fusion Temperature Test.
 - ⇒ Ash levels
- Slagging and fouling indices.
 - ⇒ Elemental loading
 - Pounds of iron per million Bt
 - Pounds calcium, sodium & other elements
- Slagging with Bituminous Type Ash - High Iron
 - ⇒ Ash fusion temperatures
 - ⇒ Advanced ash fusion techniques.
 - ⇒ Ash Chemistry
 - Base to acid ratio
 - Slagging index
 - Dry sulfur x B/A
 - Iron squared term
 - ⇒ Computer Controlled Scanning Electron Microscopy provide some of the best mineralogical information but has not come into common use.
- Fouling Deposits
 - ⇒ Chemical Fractionation
 - Active alkali
 - Water soluble
 - Ammonium Acetate soluble
 - Weak acid soluble
 - Micro crystals
- Cyclone and Wet Bottom Furnaces
- Deposit Analyses
- Electrostatic Precipitator
- ESP Operation
- Equipment
- Airheaters pluggage and leakage
- Resistivity
- Opacity
- Trace Elements
- Coal Specifications
- Computerized Evaluations
- Test Burns
- Online Coal Analyzers
- Conclusion