

Coal specifications

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*“Man!, would you look at those krypton levels, how do you expect me to burn **that** coal”
Things you might hear, even if Superman was running your coal plant.*

One day in my life concerning coal quality has struck me more than most. We asked a group of utility and power plant people what properties of coal they liked and what caused them concern. As each person provided their response you could see that each had their own view. Some wanted dust-less coal, others coal that has good flow through chutes. Many wanted large, lumpy coals, the engineers wanted coal that was dry and easy to grind. The maintenance folk preferred coal that had low abrasion properties. The environmental people liked low sulfur and low ash levels. Then, the ash sales department wanted high ash to dilute the carbon and increase the sales volume. The fuel purchasing group liked low cost coals. Near the end of the discussion I asked if the group was describing coal or natural gas. I have worked with power companies that burn all sorts of coals from lignite and sub-bituminous, dozens of bituminous coals and high rank coals such as low volatile bituminous and anthracite. In twenty years I have not come across a coal that would meet everyone’s preferences.

Introduction

Coal Specifications mean different things to different people.

Ask yourself:

What am I trying to accomplish with coal specifications?

1. Raise the market price I pay for coal.
2. Ensure I am receiving market based pricing.
3. Make life a joy at the plant, (feet up coal).
4. Avoid all problems at plant.
5. Control major problems at plant
6. Control quality from the mine
7. Control product consistency

These and other important business considerations are all influenced by the use of coal specification. This short paper will attempt to cover the main objectives in setting coal specifications. These include

which specifications are important. Why there is a difference between bid and contract specs. How to ensure you are enforcing your specifications, and several other important aspects of setting quality parameters.

Coal Quality

There are many influences that determine coal quality. Depositional environment, geological forces, ground water, mining methodology and care, coal preparation (washing), and storage all influence the coal a power plant ultimately uses. Good sampling and laboratory practices can quantify many quality parameters. An understanding of coal quality and quality impacts on power plant performance can help utilities determine what parameters are most important and cause the most concern. These quality parameters are quantified and set forth in the specification section of coal contracts and purchase orders

The electric power industry is rapidly changing due to deregulation. The author was present one hot day in June of this year, when a southeastern utility company was selling electricity for \$5,000.00 per megawatt with \$85.00 cost. Typical power cost range from the mid teens at night to about \$30.00 on a normal day. The free market place will challenge the power industry in many ways. Fuel is the major cost in electric power. In a regulated industry the cost of fuel was passed on to the customers. Fuels were chosen to minimize problems such as handling, combustion, ash deposits and other operational and maintenance concerns.

Tight specifications were used to eliminate or minimize coals that caused problems. These tight specifications raised the price of fuel by minimizing competition. Deregulation is on its way. As the power stations become individual profit centers, plant management must take a more proactive role in fuel selection. When the plant starts to take a more active role in the selection process, it develops improved communication with fuel purchasing as well as a more accurate overall understanding of coal quality. Fuel cost is always a major production cost. Understanding how coal quality impacts plant performance and cost, allows better fuel selection and specification decisions. The plants need to become more aware of the nature of coal and implement creative solutions for problems arising from

differing coal quality. The potential of lowering fuel cost is so significant that most utilities will at least explore their options. How well plants take advantage of their knowledge, may determine, whether they will be able to compete in a free market place

Coal Specifications

There are many types of specifications used to describe coal, these include:

Geological -	location, basin, seam, and rank
Physical -	heating value, size, moisture, ash, HGI, ash fusion temp
Chemical	sulfur, ash chemistry, ultimate and trace elements

The key to the use of these specifications is to understand the relationships these parameters have on the performance and cost of making electricity. This should include the impacts on efficiency, maintenance, load limiters, and forced outage rates. Unfortunately, even the best computer models are limited in their ability to accurately predict the costs associated with different quality coals. The best source of information for this assessment is the plants experience. The knowledge and sophistication level of the plant employees will greatly influence the range of acceptable specifications, and can play a key role in the risk assessment of using of alternative fuels.

Specifications are meaningful only if there is a strong correlation with plant performance, cost, load, and or forced outage. If not, why are you using them?

The following is a short list of the major components at a power plant that are impacted by coal quality along with several tests used to measure quality parameters:

Coal Handling – coal size, surface moisture

Pulverization – heating value, HGI, moisture, size

Combustion, NOx –	volatile matter, HGI, moisture
Efficiency –	moisture, hydrogen
Ash deposits –	ash, heating value, sulfur, ash fusion temps., ash chemistry, iron, calcium, sodium
Opacity -	ash, heating value, sulfur, sodium, ash chemistry

It should be noted that the US does not have a standard to measure the abrasiveness of coal and therefore it is near impossible to predict or correlate grinding equipment wear and tear and erosiveness of coals in the laboratory.

Specifications are meaningful only if they are enforced. Are you using verifiable quality control systems that protect your interests? Are you confident that the information is accurate and meaningful? Do you take action if quality parameters fall outside the spec? Do you differentiate between penalty and rejection specs? Are you consistent with your enforcement? All of these questions should be considered, why have specifications if you don't use them.

Quality specifications can define your coal marketplace, in some cases they influence the fuel cost as much as transportation. This leads us to the next section.

Bid verse Contract Specifications

In the best of circumstances, you tell the world you can burn anything, and then you decide which fuel is the best for you.

You can open up your coal market place by being willing to consider any fuel specification. The key is to have, in place, the expertise to evaluate the impacts that each fuel will have on your operation and costs. This will generally improve the representativeness of the quality specifications offered, as it allows the mining company to describe their coal rather than try to fit into your specifications.

Contract specifications are those used to control the quality of a coal once the price has been established. Many contracts now adjust the price of coal to the actual specification that the coal was shipped to. These include adjustments for ash and sulfur in addition to the heating value adjustments. Several contracts have even attempted to provide price adjustments. Contract specifications should represent a given purchase situation and may not correlate to original bid specifications.

You gain the expertise of quantifying the costs of different coal quality by keeping accurate records and by conducting test burns. Your test burn procedures should be designed to capture the type and quantity of information.

Conclusion

In conclusion, this short paper has attempted to get you to question where your specifications came from and how they are set. Developing a dialogue between the power plant and fuel purchasing using coal quality information and actual power plant experience is crucial. Understanding coal quality and the quality control process for the mining industry is valuable. You can make meaningful specifications for your particular situation, but remember that specifications are used in many ways, make them work for you, not against you. There are differences in the use of bid and contract specifications, and you should consider how coal quality specifications impact the cost of doing your business. Thank you for this opportunity to address this subject.