ANALYSIS OF ENERGETIC CHARACTERISTICS OF COAL FROM BASIN OLTENIA

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Abstract: *Knowledge of the energetic characteristics of coal used in power plants Oltenia Basin is of great importance. These characteristics also vary influence the combustion process, emissions of nitrogen oxides. Ideally, these characteristics remain constant.*

Key words: coal,*burning, emissions, volatile,calorific.*

INTRODUCTION

Thermal Power Rovinari used for burning coal in three quarries located near the plant: North Rovinari, tomatoes and Pinoasa. Coal reserves are large and will provide the necessary carbon for decades.
Coal composition is different from a quarry to another and even from one layer to another.
Thus, the carbon content ranges from 20.40 to 22.40%, sulfur 0.60 to 0.80%, hydrogen content of 2.35 to 2.50%, ash content of between 19.38 to 23.00 % total moisture between 41.20 to 44.00%.
These characteristics may be different from week to week or even from day to day.

The analysis was carried out on certain days. Sure, it is possible that other days are totally different analysis. Aim of the study was to show that variations exist between the different careers and even within the same career.

STUDY ON VARIATION CHARACTERISTICS OF COAL ENERGY DURING A THREE MONTHS

In this sense, a study of the energy characteristics variation over three months to three careers.
The calorific value during three months the range of 1770-1940 kcal / kg as shown in Figure 1.

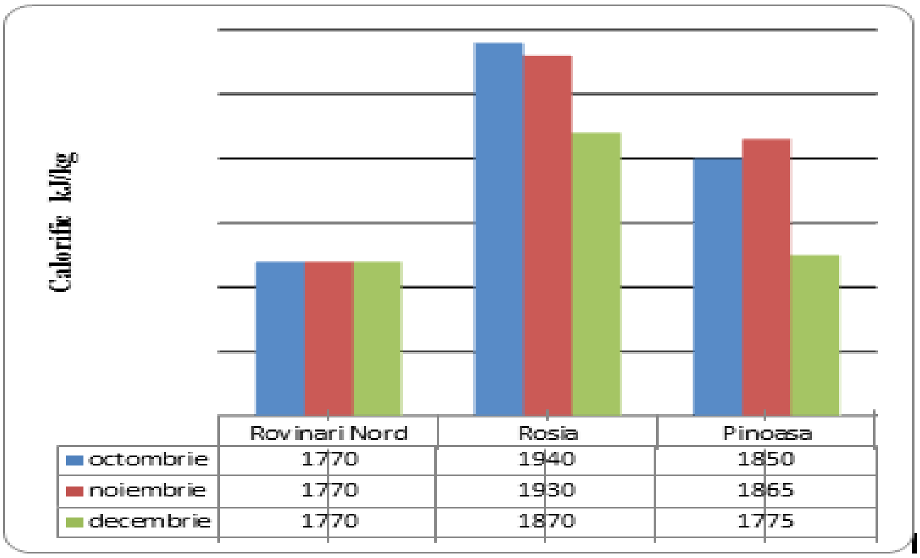

Fig.1. Graphical representation of the variation of calorific the three months to three career

All these features influence the composition and quantity of flue gas which contributes greatly to pollution.

The sulfur content of the coal varies Rovinari from 0.6 to 1.1%. If measurements ranged from 0.60 to 0.80%. Sulfur burns and develops heat but also produce SO2. A part of the SO2 resulting from the combustion in the furnace are combined to form sulfates of Ca, Mg, Na, and remains in the ash and the remainder is entrained in the exhaust gas under certain conditions (temperature, oxygen concentration) .

The amount of SO2 formed is directly proportional to the amount of sulfur in the fuel (Figure 2).

$V_{SO2} = 0,7 \cdot S/100$ Nm^3 SO_2/kg comb (1)

It is noted that by increasing the S content of 0.60% to 0.80% increases the amount of SO2 from 0.0042 to 0.0048 Nm3/kg Nm3/kg. Assuming the fuel consumption of 300 t / h to a group of 330 MW, resulting in the increase of the 0.60% to 0.80% results in a further volume of 180 SO2 SO2 M3N. Depending on the amount of SO2 will be controlled and the operation of the desulfurization.

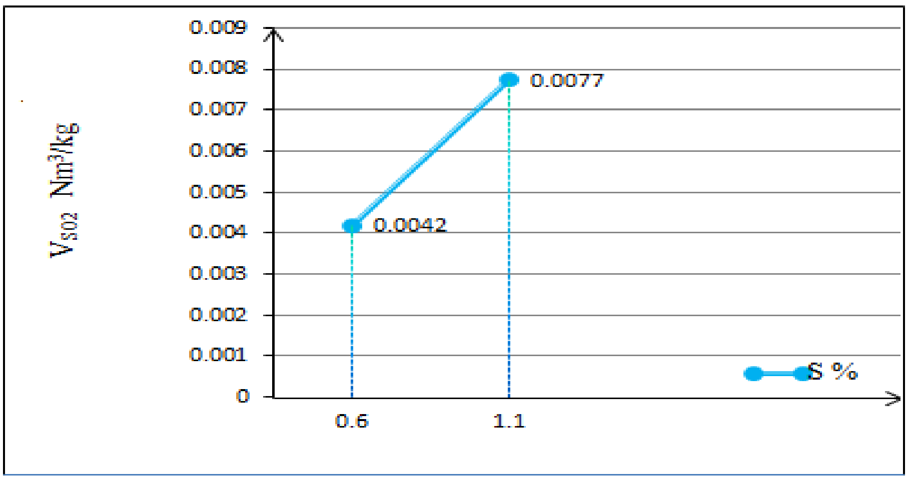

Figure 2.Variaţia based on the SO_2 content S content of the fuel

Calorific value varies within wide limits, and as a result fuel consumption also varies within very wide limits. High fuel consumption leads to high emissions of ash and flue gas.

Variation of calorific value depends not only on operational career but often depends on coal composition and variation in layer. Basically variation in the calorific gas volume combustion, the ash content is permanent making it difficult to lead the combustion process.

The nitrogen content of lignite ranged from 0.70 to 0.75%.

Is the total quantity of volatiles evolved gaseous products by heating the coal particle. The coal is a young man, the volatile matter content is higher and lower carbon content.

In young coal volatiles release starts at a lower temperature than the old ones because the concentration of volatile is higher in young. At the start of heating coal to water vapor yields, CO and CO2. As the temperature rises CmHn predominantly of other volatile substances which together form a carbon particle in the surrounding gas envelope.

Now start to appear first component nitrogen volatiles by breaking ties. This breakage takes place at temperatures between 700 - 10000C. Nitrogen evolution is not constant in intensity. The main gaseous substances containing nitrogen are hydrogen cyanide HCN and ammonia NH3. Materiii coal volatile content of volatile components influence the formation of nitrogen. The lower the volatile matter content of 40% to 10%, the fraction of nitrogen in the carbon released is reduced from 53% to 20%.

The temperature of breaking the molecular bonds of the particles has increased to 750 K for the more volatile coal anthracite 900 K which is less volatile.

Figure 3 shows the dependence represented by the volatilization rate and extent of release of nitrogen based on the carbon content and the temperature. It appears that the coal nitrogen clearance level is very high (over 80%) at temperatures above 1800K.

At a temperature of 600K, about 20% of the volatiles are evolved. For semi (curve 4) release volatiles starts at high temperatures (1200k) and 1800K.

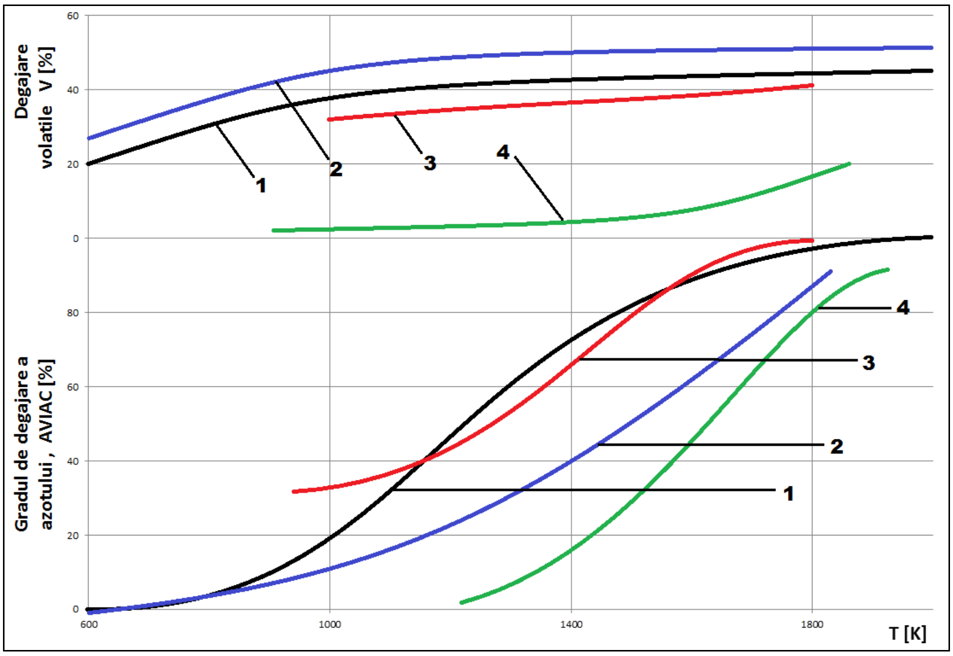

Figure 3. The dependence of the volatilization rate and extent of release of nitrogen from the coal based on the temperature

1 - coal of; 2 - lignite; 3 - coal b; 4 - semi-coke of coal b

AV / AC - ratio of the mass of volatile nitrogen and carbon

Coal Basin coal Rovinari are considered young and high volatile matter between 14.26 to 38.21% as measured which are shown in Figure 3.

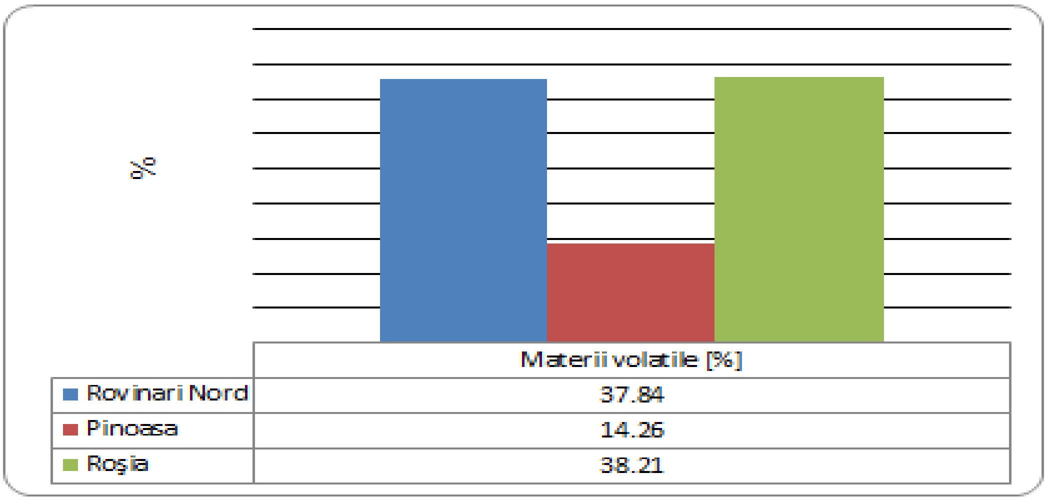

Figure 3.Volatile content of coal burned
CTE Rovinari of three careers

The volatile materials were determined by weighing the sample after the fuel moisture was removed from it by drying in an oven at 1050C, and introduced into an oven at 8500C for 7 minutes.
The high content of volatile materials promotes the ignition of the fuel, the flame stabilizes and helps burn coke.
The volatile materials contribute to reduce the formation of nitrogen oxides by burning it as oxygen-consuming and reduces the likelihood of blending oxygen with the nitrogen. Burning outbreak nitrogen is faster and does not have time to combine being entrained in the flue gas.

CONCLUSIONS

It appears that low calorific value of 1750 kcal / kg in November and 1590 kcal / kg in December. The carbon content is low probably due to autooxidation of carbon layer due to high temperature.
It is noted that the oxygen percentage dropped from 10.60 to 11.57% to 9.86%, which strengthens the belief.
Also in December humidity increased to 46% as a result of ingress of water through the carbon particles. Moisture plays a role of catalyst layer coal autooxidation. This led to lower calorific value.
To reduce water required strong compaction piles of coal and bitumen coating them at least in the rainy season. The loss is far greater if not eliminate the moisture.
The different features influence the combustion process thereof. The amount of air required for combustion is introduced in the quantity of firing components (C, H, S). By varying these components varies the amount of air necessary for combustion. Air adjustment is made by mechanical means of valves. They always have some time to answer and because the air is not very fast set which influences processes outbreak.
By correct adjustment of the excess air in the furnace is obtained as follows: maintaining at constant value the temperature in the combustion chamber, to reduce formation of oxides of nitrogen, to minimize the volume of flue gas.
When varying the composition of coal is difficult to control in a very short amount of air necessary for combustion.
To maintain coal characteristics should mix the three types in a single stack. Coal conveyor can result in the same stack. With constant features can better adjust combustion air.
The volatile content of the coal varies

between the three types of 14,26 -38.21%. Volatile coals to ignite and burn more easily. Release of volatiles is faster than nitrogen volatilization combustibil.Volatilele burn rapidly and consume oxygen and thus can not form nitrogen oxides, combining them harder. Nitrogen stationed far taken by the current outbreak and flue gas. Only a small part of it turns into nitrogen oxides.

After some research [42] seems to most types of coal burned in the amestecuri.Un interacting mixture of coal containing a low percentage of volatile and coal containing a high proportion of volatile improve the ignition, the flame and helps to stabilize the combustion of carbon. Mix tomatoes with volatile coal with 38.21% to 14.26% Pinoasa coal will improve combustion and reduce oxides of nitrogen because the percentage is higher volatile and rapidly consumes oxygen. As a result nitrogen is not to mix oxygen and form nitrogen oxides.

Experiments carried out on the boiler air control led to the conclusion that the amount of NOx decreases linearly with increasing proportion of more volatile coal.

The mixing process is not complicated and can be accomplished without large investments Rovinari TPP.

So by mixing the three types of coal with different characteristics can get a better result by controlling combustion and thus reducing NOx formation.

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