IMPACT OF THE WASTE WATERS FROM THE COAL DRESSING UPON THE ENVIRONMENT IN TNE REGION OF “PERNIK” CENTRAL PREPARATION PLANT, BULGARIA

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## Abstract

The attention of a number of scholars in the field of the coal science is focused towards the problem, originating in coal mining, preparation and burning and the impact of these technological processes on the biosphere. The problem is urgent because humankind exploits coal as an energy source for more 150 years and will continue using them a long time ahead. Progress in the study of this problem is noticed in the USA, Ukraine, Canada, China, Australia, Spain, Czechia and UK. The success, achieved so far, is a result from the working upon the questions of the coal petrology, geochemistry, mineralogy and technology.

The data in the present paper is a part of the individual research project 436/1997-1999 entitled “Establishment of the environmental impact of the waters used in the coal dressing plants”, realized by the financial support of “Open Society Foundation”. Twenty three (23) waste water samples, seven (7) soil and twenty two (22) plant ones from the region of the “Pernik”Central Preparation Plant are a subject of study. A season method of sampling has been used. The water samples have been taken as follows: water, coming in the plant for preparation → water, used during the dressing → water, used to transport the slime and fly ash → water, running out of the slime storage → water, that is draining. They have been tested by: ICP for Hg, Al, Cd, As, Zn, Cu, Pb, Mn, Li, Sr; classical analytical chemistry for K, Na, Ca, Mg, I, Br, F, $HBO_2$, $NO_2$, $NO_3$, $NH_4$, $N_2SiO_3$, $PO_4$, Cl, $CO_3$, $HCO_3$, $SO_4$ and radiology for U, $Ra^{226}$ and ß-radioactive. The soil and plant (including cultivated and wild ones) samples as well as the dry rests from water samples have been analyzed by semiquantitative emission spectral, atomic absorption, X-ray fluorescence, poweder X-ray diffraction and SEM analyses.

It has been established that waters, used for technological needs in “Pernik” Central Preparation Plant get rich in $NO_2$, $NH_4$, $SO_4$, Li, Ba, Mo, Na, P, F, V, Ti, Mn, As, Cu and other components, their contents reaching high concentrations and making them unfit even for industrial needs. These waters are extremely dangerous for fish-farming, irrigation and drinking pools for animals. The soils in the region of the study comprise high concentrations of Cu, Zn, Pb, Mn, Li, S and other elements. For the increased contents of some of the elements (Li, S, La, Br) there has been confirmed the impact of the waste waters. Particularly sound confirmation regarding the waste water impact in the region of the preparation plant is the increased concentrations of a number of elements in the ashes of cultivated and wild plants – Sr, Pb, Ba, Co, Ni, Mn, Li, V, Ti, Cu, Zn, Sn, Ag etc. This, in its turn, directly or indirectly, influences the health condition of the population in Pernik region. The statistic data for diseases that could be provoked by the high contents of the above mentioned elements show not by a mere chance an increased sick rate among the population of Pernik municipality compared to the average ones for the country. With the information, thus submitted, one must not neglect the fact for the proximity of Pernik” Power Station. They also influence the environment through the smoke emission and the waste products – fly ashes, cinders and technological water.