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About Distribution of Co, Ni, Pb, Cr and V in Coal Layer c4 of Mine «Samarskaya» of Pavlograd-Petropavlovsk Geological and Industrial District

The research aims to establish regularities in the distribution of toxic and potentially toxic elements in the coal layer c4, one of the main minable layers of the Samarskaya mine.

To achieve this goal, the following tasks were accomplished:

-establishment of descriptive statistics for the content of toxic and potentially toxic elements in the coal layer c4;

-construction of maps of concentration distribution for toxic and potentially toxic elements and their analysis;

-identification of relationships and calculation of regression equations between the contents of toxic and potentially toxic elements and the main technological parameters of coal.

The object of research is coal layer c4 of the field of Samarskaya mine located in the Pavlograd-Petropavlovsk geological and industrial region of the Western Donbass. The subject of research is regularities of changes in the content of toxic and potentially toxic elements in coal and their relationship with its main technological indicators. Research methods used in the research are traditional methods of studying geological information, as well as a set of methods of mathematical statistics, including correlation and regression analyzes. For the purpose of revealing the spatial regularities in the distribution of toxic and potentially toxic elements and the main technological indicators of coal, 27 maps were constructed and analyzed.

The average concentration of toxic and potentially toxic elements in coal layer c4, does not exceed critical value. Only the average content of lead and vanadium is greater than in whole in the district and only the average content of lead exceeds the average content in the whole of Donbas.

Anomalously high content of ash, sulfur, Co, Ni, Pb, Cr and V are spatially associated with the areas of tectonic disturbances and are genetically related to the mineralization of fracture zones. A rank of closeness of toxic and potentially toxic elements to the organic substance of coals is as follows: Ni – Co – V – Cr – Pb.

The scientific importance of the obtained results is to establish a rank of closeness of toxic and potentially toxic elements with organic matter of coals and calculate descriptive statistics of their contents.

The practical importance of the results obtained is to establish the spatial position of zones of anomalously high toxic and potentially toxic elements contents and the calculation of the regression equations that allow predicting the contents of these elements in the coal layer.