ANNOTATION

dissertations for the degree of doctor of philosophy PhD in
the specialty 6D070700 - «Mining»

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« Improving the efficiency of coal seam gas recovery when drilling directional wells »

All the mines of the Karaganda coal basin are particularly dangerous for gas and with the deepening of mining operations leads to a decrease in the efficiency of pre-degassing of coal mines and, thus, a decrease in labor safety.

Despite enough experience in increasing the gas recovery of coal seams at the Sherubainurinsky site, there is no possibility of an effective method, which is important for the safety of mining operations and a sharp increase in the TEP of work on extracting methane from coal seams.

With the existing depths of mining operations in the Karaganda basin, coal seams have almost zero gas permeability, which is the main deterrent to the development of methane extraction from coal seams. Under these conditions, the development of effective methods and technologies for influencing the coal seam, their processing and ensuring industrial gas flow rates is an urgent task for the coal industry, the solution of which is of great scientific and practical interest.

Purpose of work. Establishing the regularities of methane release in directional wells for the development of technology to effectively increase the gas recovery of coal seams.

The idea of work. Increase in well productivity based on preliminary exposure to hydrochloric acid solution.

Object of research. The process of methane release from low-permeable coal seams of the Sherubainurinsky site when exposed to a solution of hydrochloric acid.

The main objectives of the study:

- analyze the volume of methane recovery from coal seams, their reserves and extraction technologies in countries engaged in the extraction of methane from coal deposits;
- study of mining and geological parameters of coal deposits and characteristics of coalbed methane reservoirs for extraction;
- assessment of the methane release rate from a coal seam in various concentrations by hydrochloric acid exposure.
- development of method for intensification of coalbed methane with the use of directional drilling. Comparative analysis of design solutions for directional and vertical wells.

Research methods. To achieve the goal of the work and solve the research problems experimental methods were used in the laboratory with subsequent mathematical processing.

The basic scientific provisions submitted for protection:

- the dependence between the methane extraction start time and the concentration of hydrochloric acid has the form of a cubic regression;

- the working concentration of the hydrochloric acid, which affects the rate of dissolution of the clay crust and the corrosion activity is established.

The scientific novelty of the work is establishing the dependence type of the clay crust destruction time on the hydrochloric acid concentration and obtaining the empirical indicators increasing the gas output by an average of 17-19 % due to permeability enhancement.

The practical significance of the work is the development of a method for intensifying the release of gas from coal seams.

Structure and scope of the dissertation. The dissertation consists of an introduction, 4 sections and a conclusion, 123 pages of printed text, including 81 figures, 23 tables, a list of references and appendices.

Personal contribution of the author. Doctoral candidate actively participated in the experimental-industrial works Cherubainura plot for extraction of methane from coal seams and on the basis of the experience gained suggested a method of improving the efficiency of recovery of coal bed methane and has been endorsed by leading experts in the field of extracting methane from coal deposits.