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SCIENTIFIC SUBSTANTIATION OF ENERGY-EFFICIENT AND LOW-WASTE TECHNOLOGY OF CARBOHYDRATE RESOURCES DEVELOPMENT

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Purpose. Scientific substantiation and development of energy-efficient low-waste technology for hydrocarbon raw materials extraction by changing its aggregate state by physico-chemical interference, taking into account the peculiarities of changing the geomechanical state of the environment to improve the completeness of the useful components extraction.

Methodology. The complex methodical approach, which contains the analysis of world and domestic experience in the field of thermochemical formation of hydrocarbon raw materials and hydrate formation, methods of mathematical statistics, conducting of analytical researches, computer simulation of the stress deformed state of rock massif, laboratory research were used.

Findings. The character of combustible and ballast gases concentration distribution depending on the type of blast supplied to the underground gasifier during underground coal gasification is established. The optimal parameters of the heat and mass balance of the gasification process are determined. A new dependence of gas hydrate accumulation from methane hydrate hydration and the change of thermobaric formation of gas hydrates from the methane-air mixture of degassing wells, depending on methane concentration, pressure and temperature parameters, was established.

The regularities of the change of the destructive stresses influenced on wells stability depending on curved radius and changes in the geological and technical conditions of thin coal seams extraction by underground gasification technology are established.

Practical implication. The parameters of the work of energy-efficient three-component technological system on the base of the underground gas generator, heat recuperator and the cogeneration unit with the focus on the consumer's specific product with minimization of waste accumulation are considered. The innovative technological scheme of gas hydrates creation in the conditions of coal mines is developed.

Key words: underground coal gasification, gas generator, gas hydrates, coal

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ABOUT THE REASONS FOR THE AMPLITUDE INCREASE OF THE SEISMOACOUSTIC OSCILLATIONS WITH FREQUENCIES OF THE HAZARD RANGE AT COAL SEAMS MINING

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Purpose. Determine the reasons for the amplitude increase (growth) of the seismoacoustic oscillations with frequencies of 700-1400 Hz in mine workings, which is one of the main criteria in the gas-dynamic phenomena predict.

Methodology. The studies were carried out by the spectral analysis of signals that were previously obtained as the result of the seismoacoustic studies in the different mines.

Findings. It is shown that the amplitude increase in the 700-1400 Hz frequency range of the oscillations can lead to the sudden jump in the critical crack lengths. That can initiate the gas-dynamic phenomenona. The possible mechanism of these changes in the oscillation field near the mining workings is considered, when various rock-fracturing working mechanisms act as a source of oscillations. The analysis of seismoacoustic signals is carried out. These signals were obtained in various mines. Possible reasons for the amplitude increase of the oscillations in this frequency range are considered within the framework of the resonating elastic oscillatory system model and the elastic waveguide model. It is shown that an increase of the oscillations intensity in the frequency range under consideration can