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FIELD TRIALS OF A PLANT FOR THE ELECTROPHYSICAL CONVERSION OF LOW-GRADE FOSSIL SOLID FUELS *

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Electrophysical conversion [1] is a promising way to develop low-grade fossil solid fuels that are unprofitable for traditional mining methods. Wells are drilled directly at the deposit, electrodes are immersed in them. A high voltage is applied to the electrodes, which causes a conductive channel to form in the formation. A low voltage current is passed through this channel, which leads to local heating of the rock. As a result, the thermal conversion of the organic component of the fuel into gaseous and liquid products occurs. Tests of the described method in the field at the Bogatyr mine (Kazakhstan, Ekibastuz) showed its potential profitability and scalability.

The installation necessary for the implementation of such a conversion method should provide a high voltage at the initial stage during the formation of the channel. High voltage of lesser value, but more current for the intermediate stage of increasing the conductivity of the channel. And relatively high low voltage current directly at the conversion stage. The maximum voltage provided by the pilot plant was 100 kV, the maximum current was 400 A.

Two types of tests were carried out. The goal of the first was to carry out a long-term conversion with a stable debit. The interelectrode distance was 1 m. To form the channel, a voltage of up to 3 kV was required. The gas debit amounted to 3 n.cub.m./hour. In addition to this, about 10 liters of resin, similar to viscous oil, collected in the chipper. The purpose of the second type of test was to determine the potentially required voltage for a larger interelectrode distance. The distance between the wells was 6 m, and the voltage required to initiate the channel formation did not exceed 1.5 kV.

Among other things, according to the test results, it was concluded that optimization is necessary to transfer the installation to a pilot industrial scale. Firstly, the reduction of the maximum voltage and, accordingly, the cost and weight and size parameters. Secondly, changing the structure of the intermediate and high-current links to increase the resource of the equipment, reduce the time from channel formation to direct conversion, and increase the converted volume per cycle.

REFERENCES

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