



Fig. 2. Crystal packing in compound 1

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References

1. Tretyakov Y.D. // *Successes in Chemistry*, 2004.– Vol.73.– №9.– P.899–918.
2. Pomogaylo A.D., Rezenberg A.S., Dzhardimasheva G.I. // *Russian Journal of Chemistry*, 2009.– Vol.53.– №1.– P.140–148.
3. <http://www.xumuk.ru/encyklopedia/2/3063.html>.
4. Virovets A.V., Cherkasova E.V., Peresyphkina E.V., Cherkasova T.G. // *Z. Kristallogr*, 2015.– Vol.230.– №8.– P.551–558.
5. Cherkasova T.G., Cherkasova E.V. // *Key Eng. Mat.*, 2015.– Vol.670.– P.9–14.

DEVELOPMENT AND EXPLOITATION FEATURES OF METHANE-COAL WELLS USING DOWNHOLE PUMPING EQUIPMENT

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Nowadays natural resources use tends to be effective. As a result there is a necessity of natural methane gas use for industrial and domestic needs. Methane which is extracted from coal beds via drilled wells is environmentally friendly hydrocarbon feedstock

The aim of this work is to analyze the efficiency of wells mechanized with gas-oil equipment on Naryksko-Ostashkinskaya field, as well as a competent selection of advanced technologies for ensure safe performance of definite wells and reduce the extraction cost of formation fluid.

The development of methane-coal wells is fulfilled in two stages. The first stage is characterized by intense carrying out of fluid after fracturing with a high content of mechanical impurities: proppant, clay mud, coal slime.

The results obtained in a specialized laboratory have shown that the average content of solids in pumping fluid at the wells of Taldinskaya area is 12 mg/l. At the wells of Naryksko-Ostashkinskaya area the same value is 406 mg/l. Consequently at the initial stage of the well development there is a considerable cuttings lifting and while an operating

process the content of suspended matters is multiply reducing. Therefore, the objectives of the first stage of the development are:

- mechanical impurities removal;
- minimization of the failures of downhole equipment which will be used during the trial operation;
- indirect identification of potential flowrates of water and gas.

At the second stage of the development different types of downhole equipment units are used: piston sucker-rod pumping units, sucker-rod screw pumping units and electrical centrifugal pumping units.

In 2002–2003 in Kuzbass the use of piston sucker-rod pumping units to pump formation fluid was first experienced [4]. The application of piston sucker-rod pumping units has not received extensive use due to some reasons: clogging of valves with mechanical impurities, inability to backwash and absorption of flush fluid by productive formations.

Besides, at the second stage of the development there are electrical centrifugal pump units, which are used, if water influx permits and it is a steady-state operation. The main reasons of failure of this type of equipment: isolation reduction in cable link; work tool wear; pump jamming. About 84% of the reasons for failure are connected with clogging with mechanical impurities. The mean time between failures of electrical centrifugal pumps is 162 days in the fund (for the period from 2009 till 2012) [1].

References

1. *Gas-dynamic research at the well №16320 at the Taldinskaya area in Ermakovskij region of Kuzbass (by contract report №4 dated 02.10.2002).*
2. Drozdov A.N. (2009) *The use of downhole fluid-jet pumping units for operation in abnormal wells. Oil and gas vertical.* #12.– P.70–73.
3. Karasevich A.M. (2003) *Methodology and man-*

Sucker-rod screw pumping units receive widespread application because they are the most versatile for methane-coal field conditions [3]. The main reasons of failure of this type of equipment: leakage and drop of tubing, drop and breakage of rods, pump jamming. The mean time between failures of sucker-rod screw pumps is 99 days in the fund (for the period from 2009 till 2012) [1].

Thus, for the operation at methane-coal wells the most optimal types of downhole equipment are sucker-rod screw pumping units.

When using this type of pumping units it is recommended to meet the following conditions:

1. Exclusion of a gas-sand anchor from the packaging arrangement to minimize the risk of further failure;
2. Optimal centralizers application and allocation to reduce mechanical wear;
3. Application of the dynamic torque anchor A-168 as part of the sucker-rod screw pumping units to avoid threaded connections drops;
4. Use of a downhole telemetry system with a minimum grade value of 0.01 Bar.
5. If possible, elimination of gas-oil equipment operation in periodic mode [2].

The use of methane-coal beds is economically advantageous, due to the comparatively inconsiderable transportation leg from the field to the consumer. In addition, the methane content in the coal gas reaches 98–99%, which means no additional costs for purifying and processing gas before shipment [4].

agement of the regional gas-supply systems development. The Abstract. Doctor thesis in Engineering Science: Irkutsk.

4. Spitsin G.S. *The gas from the coal beds. Electronic resource, URL: <http://twidler.ru/referat/geografiya/gaz-iz-ugolnyh-plastov-39611> (Access date 02.07.2016).*