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CREATION OF FAVOURABLE WATER – PHYSICAL PROPERTIES OF DRILL CUTTINGS WITH THE USE OF COAGULANTS

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Abstract

The negative physical properties of drilling cuttings are caused generally by the presence of large amounts of exchangeable sodium. Its sources are boring solutions with the use of caustic and soda ash and also the saline rocks extracted in the process of drilling. Drilling cuttings have lack of structure and swelling in the wet state, adhesiveness, low water mobility, reduced air exchange, a high hydrophylicity, lack of filtration capacity. In addition to these physical properties drilling cuttings are characterized by a number of the negative chemical properties, in particular, a high alkalinity and the presence of easily soluble toxic salts of sodium, the lack of exchangeable calcium and magnesium. The following properties make absolutely impossible the use of drilling cuttings in road construction, and also taking into account their restoration. Application of a number of natural coagulants such as (gypsum, diatomite, quicklime, etc.) And the waste of the industrial activity (a phosphogypsum, carnallite, sludge formed during the purification of the surface and underground water) radically improves physical properties of drilling sludge and provides multiple increase in filtration capacity.

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Keywords: drill cuttings or drilling sludge, coagulants, exchangeable sodium, caustic and soda ash.

Abstract

Annual economic damage from the pollution of the environment with production and consumption waste is evaluated at the level of 10% gross domestic product. The most rational direction of utilization of the industrial waste is to use them as technology-related raw material while generating different types of production and, mainly,

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for building purpose [2].

During the process of borehole drilling and deepening large amount of cuttings appears on the bottomhole. During the hydraulic transportation via flush water, the cutting turns into drill cutting under the influence of technology-related factors [3]. Bore mud can be conditionally divided into sump liquid and drill cuttings. Storing of drilled out wastes at the multiple well platforms is carried out in the mud pits [4].

Bore mud is the most important large-tonnage waste of oil industry. It is a sort of industrial wastes with a series of distinctions. This distinction is rocks which are ground during the drilling and carried away to the daylight using drilling agent. Depending on the toxicity of the components of the drilled solids and applied reagents toxicity of bore mud changes [3].

Bore mud has negative hydrophysical and chemical properties, in particular, low filterability, lack of structure, moisture susceptibility, adhesiveness, swelling ability, alkalinity, salt content and solonetzicity.

Research objective: to create favorable physical properties of bore mud using them as coagulants of industrial production waste and natural materials.

Research tasks: to study filterability of bore mud under the influence of phosphogypsum of different dosage, solid sediment of purification of surface and underground waters, natural mineral diatomite.

Filterability of the bore mud with the use of different samples of coagulants was determined in laboratory conditions in three-fold replication by the method of pipes [1].

Diatomite used in the test is from Kamyshlovkoe deposit of Sverdlovkaya region. It is product of ancient geological deposits presented by the diatoms. It contains prevalent amount of compounds of silica and calcium.

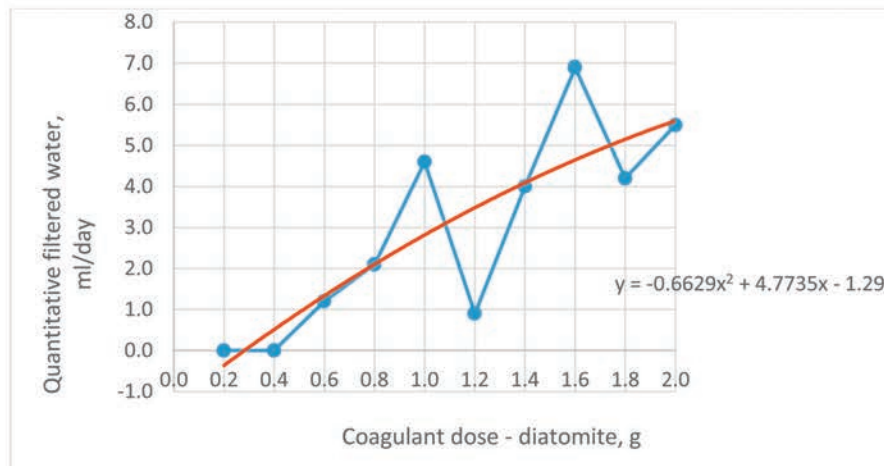


Fig. 1. Influence of diatomite on filterability of bore mud.

Correlation ratio between the samples of diatomite and filtration was 0.83 that testifies to the strong bond. Determination parameter shows that diatomite addition provides 69% improvement of filterability of the bore mud (figure 1). It's necessary to add that appearance of filtration activity took place during the last two weeks, this indicates insufficient content of acting substance used as a coagulant. Very high reserves of diatomite in the North of Tumen region don't exclude possibility of their use as a ameliorant-coagulant.

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