

## DEVELOPMENT OF NEW CHEMICAL REAGENT BASED ON LOCAL AND RAW MATERIALS FOR OIL AND GAS INDUSTRY

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**Abstract.** The article presents the ways of improvement and development new weighted mud receipt based on composite lubricant from local raw materials and industrial wastes for drilling oil and gas wells. In the process of building oil and gas wells to maintain the stability of the walls, to prevent the flow of salts, and to prevent the penetration of formation fluids into the well, it becomes necessary to increase the density of the drilling fluid, which can be accomplished by introducing components with increased density.

As the demand for energy increases, harsh and extreme environments are explored for hydrocarbon; and deeper wells have been drilled to reach targets in formations with very high temperatures and pressures. The successful completion of an oil well depends to a considerable extent on the properties of the drilling fluid. Drilling fluids serve several fundamental functions: (i) to remove the cuttings generated by the drill bit from the borehole, (ii) to control the downhole formation pressures, (iii) to overcome the fluid pressure of the formation, (iv) to avoid damage to the producing formation and (v) to cool and lubricate the drill bit, etc [1,2].

Present time for obtaining and development of drilling fluids for drilling oil and gas wells use more than 4000 kind of chemicals in the world. Such as Carboxymethylcellulose, polyacrylamide, hydrolyzed polyacrylonitrile, ferrochrome-lignosulphonate, grafite, chrompick, NaOH, Na<sub>2</sub>CO<sub>3</sub> and others. In the Republic of Uzbekistan for drilling oil and gas wells use about 3,5-4 thousand ton chemical reagents every year. Domestic chemicals are not fully meet the requirements of geological and technical conditions of wells. The quality of the construction of oil and gas wells, and the quality of the opening of the productive formation, largely depends on the used drilling mud because the drilling fluid is a technological fluid that interacts with the newly opened rock. In all cotton producing countries and factories proceeding cotton seeds gossypol resin is formed as a final product, which has a viscous-fluid consistency, and now find its effective implementation. The transformation of the viscous fluid gossypol resin into a powdered material by modification of the various ingredients of the organic and inorganic origin can bring to the commercial introduction of the products and to expand the field of efficient use in large-tonnage quantities [3].

The structure, composition and physicochemical properties of the domestic composite chemical reagent for drilling fluids, the waste of “Ferganazot” JSC— carbonate-polymer sludge, soda ash and caustic soda, and Na-carboxymethylcellulose “Carbonam” with 500 polymerization degree were studied. Next, the physicochemical properties of mineral weighting agents were investigated - red clay, marble flour, dolomite, scale, hematite and barite (table 1).

Table 1 shows comparative data on the results of studies of the physicochemical properties of the studied organomineral raw materials as weighting agents for drilling fluids.

New compositions of Lubricants and technology of obtaining for production of composite polymer lubricants by using of low molecular weight sodium carboxymethylcellulose, alkali, water-soluble modified powdered gossypol resins and organic-mineral additives of various ratios to improve the physical and chemical properties of drilling fluids have been developed. Water-soluble modified powdery resin contains hydrophobic additives based on sodium salt of fatty acids and ionic surfactants. The use of these reagents for drilling fluids used in drilling oil and gas wells ensures the preservation of the regulated rheological and filtration properties of polymer systems at 80-190 ° C for 30-40 hours. Method of obtaining new composite lubricants based on physical and chemical modification of initial materials on various ratios, environment and regime.

All the physical, chemical and technological parameters of drilling fluids based on composite chemical reagents have been tested in accordance with API standards.

In the development of new composite chemical reagents for stabilization drilling fluids for drilling oil and gas wells we used mainly waste of oil and fat production-gossypol resin, as well as low mass carboxymethylcellulose. Gossypol resin consists of 52 to 64 of free fatty acids and their derivatives, and the rest-a product of condensation and polymerization of gossypol and its transformation, resulting from extraction of cottonseed oil, mainly in the process of distillation of fatty acids from soapstock. In the gossypol resin found 12% of the nitrogen containing compounds, 36% of the transformation products of gossypol fatty and oxide fatty acids. It is a homogenous fluid mass from dark brown to black color. This reagent plays main lubricant for drilling fluids. Polymers are used heavily in the oil industry for controlling the drilling fluid properties or for enhanced oil recovery applications to extract the heavy oil.

Have been developed new chemical reagents for drilling in salt and chemical corrosive environments, as they are stable to cations of polyvalent salts ( $Mg^{++}$ ,  $Ca^{++}$ ,  $Na^+$ ,  $K^+$ ). Composite chemical reagent (CCR) is mainly about 60-65% gossypol resin and has a high lubricity due to the content in its composition of about 35-40% of polymerized fatty acids, pigment, glycerin and other components. These reagents as a surfactants serve to emulsify oil with water, increase drilling speed because of low coefficient of friction, play role as lubricant and corrosion inhibitor.

Results of analyses were given in the table 1

Table 1

**Physico-chemical properties of weighting materials**

Name of weightings	Physical chemical properties				
	Density, g/sm <sup>3</sup>	Mohs hardness	Sieve residue, 0071, %	Humidity, %	pH
Clay (Navbahor bentonite)	2,55-2,65	2-2,5	5	2	7,5
Marble flour	2,6-2,70	2,5-3,0	6	1,5	7-8
CPS	2,7-2,75	2,5-3,0	6	1,8	11-12
Dolomite	2,8-2,9	2,5-3,0	6,5	1,2	7-8
Barite (Uz)	3,85-4,1	3,0-3,5	10	1,9	7-7,5
Barite (Kz)	4,1-4,2	3,0-3,5	8	1,3	7
Barite (Ru)	4,15-4,25	3,0-3,5	7	1,1	7-8
Okalina	4,3-4,5	5-6	8	0,9	7-7,5
Hematite	4,4-4,6	5-7	9	0,8	7-7,5

Developed new composite lubricant based on local raw materials give to drilling fluids high lubricity. It can be seen that developed composite chemical reagents have a multifunction. As a result of research and study of the physical and chemical properties of the developed composite chemical reagents base on local and raw materials, wastes as well as weighting agents have been proposed new compositions of drilling fluids. New receipt of drilling fluids based on developed composite lubricant and weighting agent were recommended for use in drilling oil and gas wells with abnormally high reservoir pressure (AHRP).

#### References

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