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IMPROVEMENT OF DRILLING FLUID FOR CONSTRUCTION OF WELLS IN ARCTIC SHELF WATER.

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Keywords: *clay sandstones, inhibitor, clay montmorillonite, hydration, deformation, dispersion, Arctic shelf waters.*

Abstract: *On the basis of literature and field data, the specific geological and technical conditions for well construction in the Arctic shelf, the effectiveness of the use of inhibitory drilling fluids in unstable silty deposits are considered.*

Most researchers associate the occurrence of landslides and collapses in a well with the process of physical and chemical interaction of the drilling fluid with clay-containing rocks.

The practice of using various types of inhibiting drilling fluids has shown that the effectiveness of their use in some congeological conditions cannot guarantee successful well drilling in other conditions.

Regression equations for describing the technological parameters of polysaccharide drilling fluids are obtained in the form of second- order polynomials , which is associated with the physical meaning of the dependence of fluid properties on its components and technological factors. The inverse problem is to determine the composition of the solution according to technological parameters. Its solution is reduced to minimizing the selected technological criterion (in the case under consideration , *the product of the nonlinearity coefficients n(p) in the pipe* and n(a) in the ring) is taken as a criterion , while satisfying the constraint. For other parameters:

$$^{B}Y \wedge < Y_{t} < Y\wedge,$$

$$F *= Yji \blacksquare Yj\ 2 \text{ --+ } min\ ,$$

where *Yi """ nY* $_{l}^{max}$ - lower and upper calculated limits for the i-th property;

oh well and *j 2* - indices of non-linear coefficients;

D - optimization criterion.

The inverse problem is solved once for the calculated intervals of properties to optimize the composition of the solution and twice (for the real and calculated sets of properties of the solution) for the operational control of technological parameters. In this case, we are talking about determining the equivalent composition of the main components that significantly affect the structural-rheological and filtration properties of the drilling fluid. After that, the percentage composition of the components of the solution is recalculated for the volume of circulation, the technological method of purification and the quantitative composition are determined.

Thus, based on the results of field work and laboratory studies, an algorithm was developed to control the properties of drilling fluids during well construction. On its basis, a program was created to control the properties of an inhibitory drilling fluid with a high transport capacity (IBRUVT) by optimizing the technological method of processing.

results of the use of polymer glycol inhibitor drilling fluid (1N IBR) in the construction of exploratory wells in the fields of **the Ob and Taz bays (North-Kamennomysskoye,**

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Kamennomysskoye-Dengiz, Chugoryakhinskoye, Semakovskoye- Dengiz, Obskoye). , also developed an inhibitory polysaccharide drilling fluid.

The presence of polyglycol in the composition of PGIBR and low values of the filtration index made it possible to qualitatively open the formation and significantly reduce the intensity of its contamination with the mud phase, but in general, the effectiveness of the inhibitory effect of this solution was absent . . high enough.

The developed inhibiting drilling fluid IBRVTs was tested during the construction of an experimental well at the Permyakovskoye mine in Western Siberia. Information about the natural moisture content of clay rocks in the section was obtained from the results of a set of studies carried out during the drilling of a parametric well in this field. Taking into account these data, as well as the results of experiments on the moisture absorption of rock samples (from core material), the activity of the IBRVC dispersion medium was chosen (Table 8).

When using IBRVTs, it was possible to reduce the average values of the well cavernousness factor (drilling range along the technological line) in the range from 1.32-1.39 to 1.16 (similar to those drilled using a polyglycol mud inhibitor - PIBR compared to similar wells).

Table 8

activity of the IBRVTS liquid phase on the adsorption pressure at the rock interface.

Drilling interval	Natural humidity, %	Activity		ao/ar	Adsorption pressure P_{ms}, MPa
		CLAY ROCK JSC	liquid-phase IBRVTs,		
800-	9-12	0.74-0.80	0.88	0.84-	13.1-24.1
1200-	8-10	0.72-0.76	0.81	0.89-	8.6-16.1
17:00-	6-9	0.65-0.72	0.80	0.81-	16.1-29.2

Field trials conducted by IBRVTs show the promise of using inhibitory polysaccharide drilling fluids in landslide-prone drilling intervals represented by clayey rocks. For technological processing of drilling fluid, it is recommended to use the developed algorithm for regulating its parameters.

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