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STUDY OF THE RATE OF MOISTURIZATION OF CLAY ROCKS

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Annotation:
The technique is designed to test the stability of clay rocks of various degrees of lithification to the hydrating action of solutions that differ in qualitative and quantitative composition. The essence of the method for estimating the rate of wetting of clay samples is to exert point uniaxial pressure on a rock sample in the medium of the drilling fluid being tested. The technique is not applicable to clayey rocks containing large-clastic inclusions with a diameter of more than 3 mm that are not subject to hydration destruction, rocks with a high degree of moisture, as well as rocks in a frozen state.

Keywords: differential pressure, stability of clay rocks, viscosity, lubricity, polymer-potassium drilling fluid, colloidal phase concentration.

Introduction

Tests are carried out with specially prepared rock samples until partial wetting, leading to immersion of the loaded identer. Based on the measurements, the wetting rate coefficient Kc is derived, which serves as a criterion for the intensity of wetting of the rock sample. A core material that has not previously been exposed to any technical fluid can also be used as a test sample.

The above technique can be used to test the stability of clay samples, both in the environment of dispersed systems of drilling fluids, and in the environment of true solutions, including water of various degrees of mineralization.

Methods: The time interval is chosen on the basis of a control experiment with distilled water. As numerous studies have shown, the optimal, from the point of view of minimizing errors, is the depth of penetration of the solution into the clay sample of at least six millimeters. At a shallower depth and, accordingly, with a shorter test

time, the rates of wetting samples in different media differ slightly. The control measurement determines the duration of the test. The recommended time is 60^120 minutes.

The table presents the results of studies conducted with the use of water-based drilling fluids.

Table - Moisture rate coefficients in drilling fluids.

Compositions of solutions (density 1100 kg/m3)	Coefficienty
Bentonite slurry	0,85
Bentonite slurry + 2% sodium chloride	1,00
Bentonite slurry + 2% sodium chlorideнатрия + 0,05 % ПАА	0,77
Bentonite slurry + 2% sodium chloride	0,77
Bentonite slurry + 2% sodium chloride	0,77
Bentonite slurry + 2% sodium chlorideКМЦ + 0,5 % КОН	0,46
Bentonite slurry + 3% potassium chloride + 3% CSS + 0.5% CMC + 0.5% KOH	0,38

Evaluation of the lubricity of drilling fluids (KTK-2 device). One of the most common types of complications, and in some cases accidents, is the sticking of a drilling tool. It should be noted that a drill pipe is considered stuck if it cannot be raised, lowered or rotated.

Sticking of the drilling tool can be caused by several different reasons due to geological, technological and organizational reasons. Geological and partially technological reasons include:

- action of differential pressure;
- landslides and collapses of rock;
- narrowing of the wellbore;
- sticking of the tool as a result of groove formation;
- formation of oil seals on the bit.

Most cases of sticking are caused by differential pressure. Excessive differential pressure that occurs in the area of the permeable zone with low pressure can "press" the drill string into the borehole wall and cause it to stick (stick). In addition to the pressure drop, the sticking force is affected by the permeability of the bottomhole zone, the thickness and structure of the filter cake, its adhesive properties in relation to the material of the drilling tool, the contact time between the well wall and the drilling tool.

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Results

One of the main methods to prevent sticking of the drilling tool is to reduce the degree of adhesive interaction and the friction coefficient. The adhesive interaction largely depends on the fineness of the interacting surfaces (rock - drilling tool or filter cake - drilling tool), mineralogical composition of rocks and their plastic properties, drill pipe material and others. A significant role in the manifestation of negative processes is played by the composition of the drilling fluid.

Figures 1, 2 show the dependences of the adhesion properties, friction coefficient and stickiness of the filter cake on the change in plastic viscosity due to an increase in the content of the colloidal component, obtained as a result of laboratory and field studies.

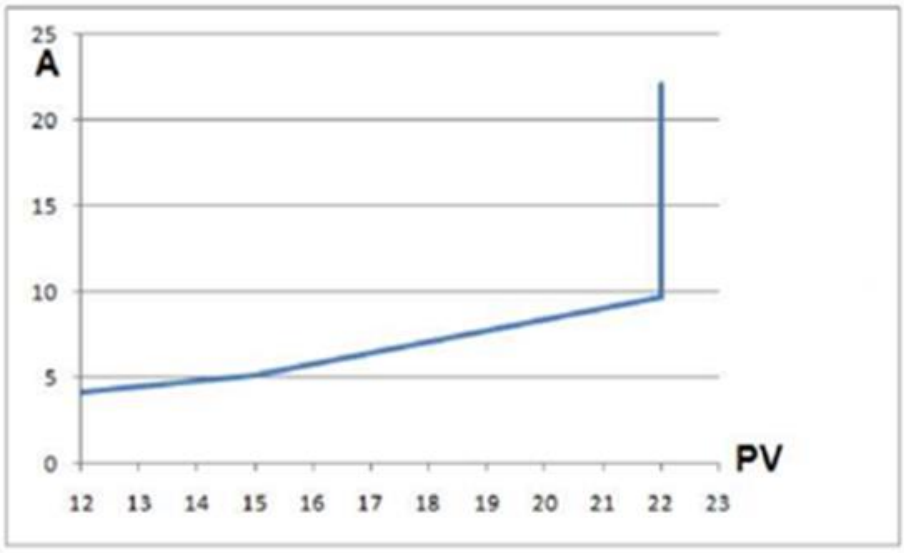

Figure 1 - Dependence of the adhesion index on the plastic viscosity of a clay-free polymer-potassium drilling fluid.

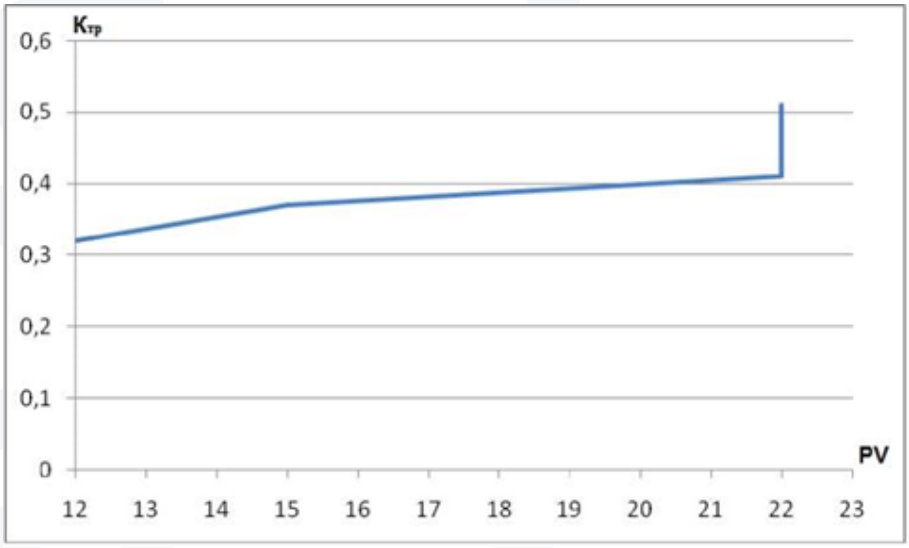

Figure 2- Dependence of the coefficient of friction without clay.

To study the lubricating and adhesive properties of the drilling fluid, various types of devices are used. For example, a device with coaxial cylinders.

For operation, it is necessary to install the device on a flat solid surface and align it with the built-in level. Further, when working with an electronic protractor, you must turn on the device, and in case of its readings other than zero, reset them to zero (Zero' button). After zeroing, it is recommended to turn off the device before the measurement, so as not to waste battery power.

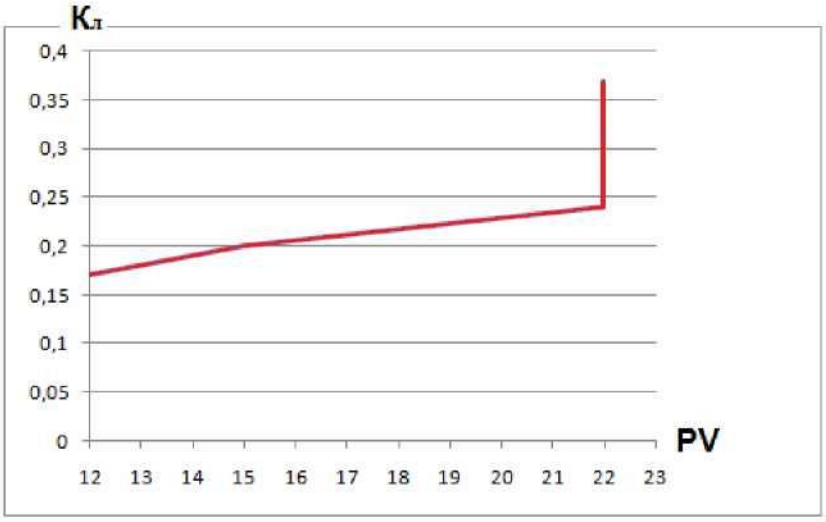

Figure 3 - Dependence of the stickiness coefficient of the filter cake on the change in the plastic viscosity of the drilling fluid.

Prepare a drilling fluid (on the instructions of the teacher or in accordance with the plan of research work) without the addition of a special lubricating composition. Using a filter press, determine the filtration index (water loss).

To determine the lubricity, it is necessary to take the filter with the filter cake remaining after measuring the fluid loss of the solution, and put it on the base of the device with the crust up. In this case, the inclined bar is in the lowest position.

The cylinder is placed on top. Measurements are taken, depending on the task, 1 second, 1 minute or 20 minutes after the installation of the cylinder.

Conclusion:

In the process of measuring, by rotating the lifting screw, the bar is raised until the moment when the cylinder begins to move under the action of gravity. The angle of inclination is fixed (according to an electronic goniometer or according to the position of the risk), after which the coefficient of friction is calculated. The calculation is made either according to a special table, or mathematically.

The coefficient of friction is equal to the tangent of the angle of inclination of the bar. A friction coefficient not exceeding 0.2 is considered acceptable. Consistently treat the original drilling fluid with lubricating additives.

Literature

1. Басаргин, Ю. М. Осложнения и аварии при бурении нефтяных и газовых скважин / Ю. М. Басаргин, А. И. Булатов, Ю. М. Проселков. - М. : Недра, 2000. - 289 с.
2. Salixova o.a., Rajabov sh.e. Method for purification of oil and gas condensate from hydrogen sulfide and mercaptans/ american journal of social and humanitarian research (ajshr)volume 3 | issue 4. April - 2022. Page no-129-134.doi: https://doi.org/10.31150 america.
3. Каменских, С. В. Осложнения и аварии при строительстве нефтяных и газовых скважин : учеб. пособие / С. В. Каменских [и др.]. - Ухта : УГТУ, 2014. - 231 с.
4. О.А.Салихова, Promising catalytic systems for the synthesis of cyclic ketones/ international conference on developments in education, sciences and Humanities. May -2022. Page No 351-354. https: econferencezone.org. Hamburg, Germany.
5. Лукманов, Р. Р. Повышение устойчивос Басаргин, Ю. М. Осложнения и аварии при бурении нефтяных и газовых скважин / Ю. М. Басаргин, А. И. Булатов, Ю. М. Проселков. - М. : Недра, 2000. - 289 с.
6. Салихова. О. А. Разработка получения циклических кетонов. Интернаука, 2021. 47-48 с.
7. Хандамов, Д. А., Муминов, С. З., Мирзакулов, Х. Ч., Салихова, О. А. Адсорбция метанола на модифицированных адсорбентах. Universum: химия и биология. 2019. , 12-15с.