EXAMINATION OF DRILLING MUDS LUBRICITY ON CONTACT WITH BOREHOLE WALL UNDER HPHT CONDITIONS

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The article presents an analysis of modern lubricity additives effectiveness in inhibited drilling fluids, based on the coefficient of friction value changes. Four lubricity additives were tested throughout the studies. They were added at concentrations of 0.5%, 1.0% and 1.5% for the two types of drilling fluids: polymer-potassium and glycol-potassium muds. The studies were conducted based on the measurement of the coefficient of friction using a Grace M2200 HPHT drilling simulator. The coefficient of friction was determined on steel-steel contact and steel-sandstone contact. In addition, the impact on examined agents on the rheological parameters and inhibitive properties of drilling muds has been determined.

The tests have shown that the coefficient of friction on steel-steel contact in the surrounding of polymer-potassium drilling mud at temperature of 20°C is 0.29 and 0.28 at a temperature of 80°C. The steel-sandstone contact friction coefficient values are respectively 0.45 and 0.34. Tests provided in the glycol-potassium mud environment have shown that it has better lubricating properties. The coefficient of friction on steel-steel contact is 0.28 at 20°C and 0.23 at 80°C. On steel-sandstone contact it is 0.29 and 0.31. Tested lubricants are much more effective in reducing the value of friction coefficient on steel-sandstone contact than for steel-steel contact. Concentration of 0.5% is sufficient to reduce the coefficient of friction on steel-sandstone contact by more than 60%, both at 20°C and 80°C.

In most cases, the addition of lubricants causes a slight reduction of the rheological parameters, increased filtration and minimal pH reduction.

THE SEDIMENTATION STABILITY OF CEMENT SLURRY

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Appropriate selection of cement slurries properties largely determines the effectiveness of the insulate of inter-tubular and annular space. It is important to bear in mind that the requirements of cement slurries parameters vary depending on many factors, which also include the construction and purpose of the borehole. Uniform texture, both fresh cement slurry and cement sheath after setting is important for tightness of the well.

An very important parameter during preparation a cement slurry recipe is sedimentation stability. Cement slurry with has a high sedimentation stability value it's characterized very good structural parameters of the resulting cement sheath. Obtained cement sheath from a low sediment slurry it has an isotropic structure along the entire length of the borehole.

The article presents the laboratory test results that were conducted obtain the required sedimentation stability of cement slurries for sealing off casing for directional and horizontal drilling. During the laboratory tests applied previously used and novel additives to prevent segregation of cement slurries grains. Accomplished research for determined opportunities to improve the sedimentation stability of cement slurries resulted selection of the additives used to cement slurries, which tend to segregation of fine fractions. Developed recipes were characterized by homogeneous structure of fresh cement slurries, which do not tend to segregation of grains by the gravitational forces. Obtained cement sheath was characterized by isotropic microstructure of the same mechanical and physicalmechanical parameters on the whole sealing intervals.