



Justifying the Use of Lightening Drilling Mixtures Used in Drilling Low Pressure Formations

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ABSTRACT

In the process of drilling oil and gas wells, great requirements are placed on the properties and parameters of the drilling fluids. It is based on the fact that the wrong choice of properties and parameters of the solution in opening the formations with anomalously low formation pressure causes great complications.

Keywords:

Aerated, globules, foam former, gas flow, explosions.

Introduction.

Aerated washing solutions are obtained by driving the required amount of air into the stream of water or aqueous base mixture using a compressor. The degree of aeration in relation to the consumption of air volume is such that the pressure applied to the well wall during drilling should be less than the absorption pressure and not less than the formation pressure.

The pressure applied to the well wall from aerated washing solutions depends on the drilling mode, its flow rate and the degree of aeration.

As the flow rate increases, the pressure increases, and as the aeration level decreases, the effect of pressure decreases. As the degree of aeration increases, the density decreases, the viscosity of the washing solution decreases, and other properties also change [1].

Due to the small density of air bubbles in the incoming stream, they move slowly relative to the solution medium. As the flow of the solution approaches the top of the well, their movement speed increases, the pressure column of the aerated solution decreases and the bubbles expand. In water, the jumping of

bubbles is not so great, in clay mixtures it is generally small.

Foaming surfactants (SFM) are added to the aerated solution to slow down the jumping of air bubbles in the solutions, which form small globules in the aerated solution and eventually foam. By absorbing the "air-solution medium" on the surface of the partition, the SFM prevents the release of globules into the air in the form of large bubbles and increases the stability of the foam.

The effectiveness of foam-forming SFM depends on the level of mineralization of water and the composition of broken rock particles [2,3]. The mixture of sulfanate and ethyl oxide polyphenol OP-10 has the most effective effect on fresh and salt water. It can be used for drilling clay and non-clay rocks.

Stable foams have thixotropic properties. When foams are used, removal of crushed rocks is improved, contamination of productive layers is reduced, and the required power of the compressor is significantly reduced.

When wells are drilled or flushed with mineralized water aerated solution or foams, it accelerates the corrosion of equipment when used.

To prevent corrosion, inhibitors are added to the solution or calcium hydroxide is added, and its index is ensured to be not less than 10 in the solution medium.

Cleaning the bottom of the well using air or gas. In world practice, methods of cleaning the bottom of the well with air or gas are widely used, instead of the drilling fluid, a circulating agent in the form of a gas is pumped. Many opinions have been expressed about the technology of cleaning the bottom of the well from crushed particles with the help of a flow of solution, opinions have been expressed in previous topics about the fact that it has a number of achievements [4].

We will think about how the bottom of the well is cleaned with the help of gas, whether it has advantages or disadvantages. Gas cannot exert a great resistance pressure on the well wall. When it is applied, it is difficult to stop the flow fluid in the formations, to prevent buckling or flow of unstable rock.

When the gas is at rest, the broken rock does not have the properties of holding the rocks in suspension, it cannot exert a lubricating effect on the rubbing surface [5]. Also, it is advisable to use gas agents mainly in drilling rocks with perennial ice and well-stable rocks, as well as rocks with small anomaly coefficients and few clay particles.

When removing crushed rock particles in the well, the flow of incoming gas has a high velocity. In the process of gas rising, expansion occurs and the speed of the flow to the top of the well reaches 10÷20 m/s. Therefore, high-speed compressors are used for air cleaning, and the top of the well is sealed as required.

If a small amount of water enters with the driven stream during the drilling process, the clay particles contained in the fractured rocks are wetted, stick together and shrink the well column [6].

The flow of gas is not strong enough to destroy such obstacles. Aqueous solutions containing the foaming agent SFM are pumped with the gas stream to prevent shrinkage. When the wells are cleaned by air pumping, it is observed that there is a possibility of explosion when 6.5 ... 12.8% carbonate concentrates from formation rocks accumulate

around the pumped stream. To prevent explosions, an aqueous solution of foaming SFM is pumped together with air flow. If a fire occurs while natural gas is being pumped, gas pumping is stopped and an aqueous base solution is pumped into the well to eliminate it.

Conclusion. The erosion of drilling wells is accelerated due to the abrasive effect of the broken rocks contained in the gas, and as a result of the dry friction of the pipes against the well wall, bending occurs quickly on the outside. Due to the presence of a large amount of water in the fuel gas, the consumption power of the compressor increases.

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