

Study on the technology of offshore drilling fluid

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ABSTRACT

By reading a lot of literature, the article summarizes the requirements and technical difficulties of offshore drilling fluid, Which compared with onshore, and clears the research direction of offshore drilling fluid. At the same time, it introduces several drilling fluids that are now widely used, and their advantages and drawbacks. Moreover, it points out what needs to be improved, and provides an important reference for the oil companies to select the drilling fluid.

Keywords : offshore drilling fluid, direction , widely used, select, advantages

1 INTRODUCTION

NOW with the shortage of oil resources, the exploitation of ocean resources have attracted more and more attention, behoove, we will also face some new challenges, in this paper we will focus on the issues that faced by the deep-water drilling and the development of the technology of offshore drilling fluid.

2 OFFSHORE DRILLING REQUIREMENTS FOR DRILLING FLUID

Offshore drilling is different from onshore drilling, they have many differences between them in environment, so the requirement of drilling fluid is different from onshore drilling.

2.1 Shale stabilizer should be added in drilling fluid

In the ocean, because the different in deposition rate, moisture and other factors, the activity of it is very large. Seawater carry the sediment close to the deep region gradually, the cementation of the sediment is very poor, so that the rock which exist in parts of the ocean will be expansion easily and have high dispersion, when use the drilling fluid, there will be an excess of the solid phase or fine particle diffusion into the drilling fluid[1]. If they want to ensure that the content of the solid phase of low density in the drilling fluid, it requires a amount of drilling fluids, greatly increasing the cost of mining, Nowadays, in order to ensure the stability of the shale generally adding a certain amount of shale stabilizer, both to ensure the stability of the shale and saving the cost of mining. The main shale stabilizer is inorganic salt and polymeric alcohol with cloud point , synthetic-based drilling fluids may also be used.

2.2 Demand for drilling fluid

Offshore drilling is different from the land, Waterproof technology is necessary in the sea, the water drilling technology, the volume of marine riser is larger. In addition, the depth of the offshore drilling is larger than the drilling on land, and the platform drilling fluid system in the sea, we can know the drilling required huge amount of drilling fluid[2]. With reducing the cost in drilling fluid, it is necessary to control the com-

position of the drilling fluid. For example, regulate the content of drilling cuttings in the drilling fluid, and provide the solid control equipment, like grit separator, desilter.

2.3 Wellbore cleaning requirements for drilling fluid

In general, the drilling hole cleaning by drilling fluid reflux, but different from land, as the marine riser has a large volume, and the well's diameter is large, so the drilling fluid reflux speed is small, not enough to clean the hole[3]. Therefore require another method, such as using of drilling fluid that has different viscosity, this method is very useful in the ocean drilling, if the drilling fluid has low viscosity, use the large viscosity drilling fluid to clean the hole.

2.4 Added to drilling fluid additives

Offshore drilling's another major challenge is how to suppress the occurrence of gas hydrate. Found out the gas hydrate in the deepwater is very dangerous, because the gas hydrate is a substance that similar to ice, because the ice on its surface is different from the ice, if the pressure is enough, it can be formed above zero degrees Celsius, As we all know, the pressure in the deep-sea is very big, Greatly increase the possibility of forming the gas hydrate, and the gas hydrate can clog the gas pipeline, pipe, marine riser and the subsea BOP, Resulting in the serious accident[4]. This shows how vital it is to control the formation of gas hydrate, Nowadays the universal way is that use the drilling fluid system that the content of salt is high when drilling; This system can make the temperature that form the gas hydrate is lower than when use the fresh water drilling fluid.

Moreover, in order to reduce the possibility of forming the natural gas hydrates, we also can add alcohols to the drilling fluid, this way can lower the temperature of form the gas hydrate again.

3 SEVERAL COMMON MARINE DRILLING FLUID SYSTEM

Recent years, there are many drilling fluid that commonly used by petroleum companies in the world. Some of them's effect is very obvious, but Side effects is very big it will have very serious consequences if cannot deal with this very well, so if we cannot deal with the side effects, we should choose the drilling fluid without side effect[5]. Next it is analyzed that the advantages and disadvantages of drilling fluid.

3.1 Disadvantages the smaller offshore drilling fluid

Now the Offshore drilling fluid that used very often and have Small defects includeorganic salt drilling fluid 、 polyethylene glycol drilling fluid, methyl glycoside drilling fluid of glucose. Therein the Organic salt drilling fluid appear in recent years,it belong to non-solid phase water-base drilling fluid, Its greatest advantage is lower corrosiveness, so it can protect the hydrocarbon reservoir and to recycling and reusing[6]. Organic salt drilling fluid main include formate, for example sodium formate, potassium formate and so on, this formate is nontoxic, degradability is good when thin up, belong to easily degradable material, experiment has proved that the formate 's water degradation rate can reach 70% in a month, the shortcoming of organic salt is its exorbitant price,because it can recycling and reusing, the problem can be ignored. It has been attracting increasing attention for properties of Organic salt drilling fluid, now the Organic salt drilling fluid has been used in America and the euro area and gain great effective.

polyethylene glycol drilling fluid is made up of polyethylene glycol, have the advantages of water-based drilling fluid and improve its shortcoming, it is a environment friendly drilling fluid, has little influence for exploit and environment, easy to control[7]. Polymeric alcohol can dissolve in water at normal temperatures, when act as drilling fluid. If the borehole temperature rise, the polyethylene glycol drilling fluid will be A kind of emulsion Adsorption on the borehole or the Surface of the cuttings, Form an adsorbed film, Can effectively protect the wall and have lubrication action, EPA detection the polyethylene glycol drilling fluid at one time, its degradation rate can reach 100% in 30 days. its ability of degradation Is obvious than Organic salt drilling fluid, we can see its extensive Promising applications, now in our country, Bohai Oilfield has started to use polyethylene glycol drilling fluid, because its Environmental Performance.

Here is our most used by oilfield drilling fluids, methyl glucoside drilling fluid, which is a new type of water-based drilling fluid system, which also has the advantages of the organic salt drilling fluid and polymeric alcohol drilling fluid --protects oil-gas layer, non-toxic, easily biodegradable and less impact on the environment[8]. While methyl glucoside drilling fluid with performances that both of these drilling fluids do not have, to maintain good stability at high temperatures and inhibition of shale-hydrated, maintain the stability of shale. It is the drilling fluid of a well completed task re-

quirements. Methyl glucoside drilling fluid can also be attracted to the bottom surface of shale, remove the shale type water from shale, maintain the stability of shale to ensure borehole stability. Methyl glucoside drilling fluid is favored by oil companies because it can be used by direct synthesis of glucose, making technology simple, materials, production costs are lower.

3.2 Abuse more offshore drilling fluid

The larger common ills of drilling fluid including synthetic-based drilling fluids and silicate based drilling fluid. Synthetic-based drilling fluids is man-made or artificial transformation organic compound, synthetic base fluid as the continuous phase, salt water as the disperse phase, with emulsifiers, organic clay, lime etc., compose water-in-oil emulsion drilling fluid, based on the performance needs adding fluid loss additive, rheological regulator and barite etc. Synthetic-based drilling fluids components can be added according to actual demand, with the first application success of Beihai, synthetic-based drilling fluids into the eyes of the oil companies, the kinds of synthetic-based drilling fluids also began to increase, continuous improvement for existing ills, now the characteristics of the synthetic-based drilling fluids is nontoxic, biological degradation, and less environmental pollution, at the same time, the synthetic-based drilling fluids also has lubricity, adsorbing sidewall to increase the shale stability and effectively stabilizing sidewall, compared with other drilling fluid, the synthetic-based drilling fluids' the biggest advantage is eliminating the step of recycling, waste drilling fluid can be discharged directly into the sea, save the cost of recovering, but now the synthetic-based drilling fluids has also raised widely disputed, whether it is fully biological degradation when it is discharged into the ocean, will large area pollution still need further study, so the use of synthetic-based drilling fluids must be cautious, not in order to improve the level of human life and destroy the living environment of human beings[9].

Silicate drilling fluid has lower cost and environmental. The ability of stable the shaft lining is obvious [10]. So attracts more attention of people, But silicate also has many disadvantages, for example, the silicate has properties of hydrogeling and sedimenting, it can stoppage the hole of hydrocarbon reservoir,and it is hard to clean,it is unlike other drilling fluid which is easy to control, nowadays part area has develop a kind of SCA that can stop hydrogel and precipitation, although the drilling fluid has a good application prospect,but the company which skills deficit doesn't use the drilling fluid best, because if the drilling fluid does in control , it will produce a very serious consequences.

4 CONCLUSION

We all know that through above content,the select of drilling fluid is very important, every drilling fluid has different characteristic, Can't choose it blindly, should based on the condition of company, fully considered the advantages and

disadvantages of drilling fluid. Whether can improve the disadvantages though the technology, this is more important. at the same time, We should improve it incessantly in using summarize and improve though the practice, Only in this way can make the technology of Offshore drilling fluid development and progress, adapt to the demand of human being.

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