



Original Research Article

Chemical investigation of drilling flowers, types of contaminations and ways to treat them

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ABSTRACT

Generally, the drilling mud is divided into three groups of oil (gas oil) and gas based on its base (the main phase), which is often mixed drilling mud from two or more times a mixture of all three fluids that are present at the same time. In this paper, we first investigate the types of drilling flowers, and then we study the pollution of the types of drilling flowers that are said to be any material (solid, liquid or gas) that has a decisive influence on the physical and chemical properties of the fluid. . The components that cause the pollution of a flower type are not necessarily contaminated in other types of flowers and then provide solutions for the treatment of mud flowers.

Keywords: Drilling mud, Main phase, Contamination, Components, Treatment

Introduction

Water was the first drilling fluid to be used and in most drilling fluids it was the cheapest and most accessible component. There are two types of classification systems to distinguish drilling fluids: 1. Classification based on specific gravity including: light fluids (specific gravity smaller than or equal to 83 lb / ft ³) and heavy liquids (specific gravity larger than 83 lb / ft ³) and 2) classification based on base fluid (main phase) which includes: base water fluids, oily base fluids, gas base fluids The main classification system is the following: A-Blue base consisting of: 1- water (fresh water) 2- solution (salts: sodium chloride, calcium chloride-soap, flocculators-organic colloids: B-oily base consisting of: 1-Oils (Diesel oil), B-oil, Bentonite, 2. Oily flowers (emulsifier agents - Alkaline control chemicals - Wetting agents - Control agents for filtration properties - Weight gain ingredients) C-Gas base including: 1. Dry gas (dry air, gas Natural gas - exhaust gas, gas cooler); 2) wet air (humid air-droplets of water or airflow); 3- floor (air bubbles surrounded by a thin layer of water and a type of soap); 4) stable stains The foam contains a film of solidifying materials such as organic polymers and bentonite.

water base muds

Generally, drilling is carried out in Iran using blue-flowered flowers, and under certain conditions they use other types of flowers. Because different flowers are used in different formations. Forming of southwestern formations of Iran in terms of drilling mud can be classified into three main groups. 1- Low pressure areas including Aghajari, Mishan and upper parts of the Gachsaran Formation, which are drilled with water or salt water. 2. High pressure formations form the six lower parts of the Gachsaran Formation, where heavy saturated mud from salt and medium ph is used. 3. The ten oil fields include Asmari, Eocene, Bangestan and other lower formations, which are drilled with low and medium weight flowers, while occasionally from oily base flowers or flowers that are oil emulsified Is used.

Oil base drilling fluid

Oily flowers have been used since about 40 years ago, and it has been recognized that before applying to the oil utilization classes and before completing these layers, the use of oily flowers yielded a better and brighter appearance, and this theory accepted by the engineers Exploitation and geology, which, in order to complete the completion of the oil well, have better results than the base blue flowers. The basis of this theory is that, because of the composition of the oil, it is

close to the components of the application layer, and if, as an extraction of filtration, it enters the oil-bearing layer of the pay zone, it does not affect the clay and soluble solids rather than damage the layers. Make For this purpose, crude oil was first used. The use of crude as a drilling fluid has long been commonplace before modern oily flowers have been developed. Crude oil has been useful for this purpose, and has been damaged in four ways: 1. Crude oil is not durable and can not be used in large quantities, and its specific weight is limited to oil Raw is limited. 2. Crude oil viscosity is limited. 3. The amount of crude oil is high. High filtration 4. Crude oil has a volatile compound that lowers the ignition point, causing severe fires and also due to the presence of gasoline (organic compounds) on the equipment Rubber used in pumps and other drilling tools has a negative effect. Since crude oil is not suitable for drilling fluid, it has been tried and diligent to develop a serious oil well to obtain a suitable oil drilling rig with favorable characteristics. The definition of oily flower is that the main and continuous phase is oil. The following is common oilseed: 1- Oil base mud, which is a mixture of oxidized asphalt, organic acids, alkali, stabilizing materials and diesel with high flash point. Such flowers contain from 3 to 5 percent water in the emulsion oil. 2. Inverted emulsion oil muds containing up to 50% water in different emulsions, emulsifying water and keeping both water and oil systems in operation. Is taken away. When the economy is in the drill, oil is used like other flowers. The cost of initial preparation, the cost of daily repairs, the encountered bugs, the information obtained from the well depth and the operation of the well should be considered. Some of the uses of oily flowers, which are considered to be its benefits include: 1- Drilling in deep wells with high heat 2- Drilling in hard-working shale layers 3- Drilling to make cores of oil layers 4- Drilling salt layers , Limestone, etc. 5 - as diverted drilling fluid direction al drilling 6 - as a drilling fluid for thin hole drilling 7 - Drilling in layers containing hydrogen sulfide and carbon oxide 8- As filler fluids and when the hole The perforation of the cavity pipe is desired. 9. As a release valve when stuck pipe 10 is stuck. As a drilling fluid, the packer fluid 11- Corrosion agent.

Dry gas drilling

Of these types of flowers, drilling of oil-rich regions of Iran is rarely used. But digging with air and flooring has a small history. In the 1970s and 1970s, in the mountainous areas of Kaki, 26 inches of open wells were used and 17-1.2 inches of foam and aerated mud were used to drill a well. At present, the wells of the Nar and Kangan are drilled with air, foam or aerated mud. The

main reason for using this low-pressure drilling fluid is that it can not be used even from diesel oil, which weighs about 52 pounds per cubic foot. Because complete loss will occur, so digging with gradient gradient is very low and so-called low pressure drilling. Because the history of this type of drilling is low due to the life of drilling in Iran.

Inflows of drilling flowers

Common contamination in the base water and oil base and gases is pollution caused by solids of the earth's surface such as clay and clay loam, contamination from liquid materials such as seawater, chemical pollution caused by drilling It is added to the mud, like carbonates and bicarbonates, which are caused by the cementation of the well. All materials that unintentionally enter the flower and changes in its properties cause contaminating materials

The source of contamination is as follows:

1. Contamination from solid materials such as clay and gypsum clay
2. Contamination caused by liquid substances in the ground floor, such as sea water
3. Contamination from chemicals that are added to the mud when drilling, such as carbonates and

Carbonates

4. Contamination due to well cementing

The following table shows the contamination and harmful ions:

Unpleasant ion The name of the agent of contamination

Calcium cement (lime)

Gypsum and waterless plaster

Chlorine + sodium salt and salt water

Magnesium + calcium, hard water, salt water

Magnesium pollution

with irritation, from the sign Flammable pollutants are magnesium. In fact, in hard water, clays do not contain high levels of hydration Therefore, it has not been very compact, which makes it

easy to control the flower Other effects of magnesium on the flower's function can be due to the low solubility of chemicals in water It's hard to say that these materials are not cost effective

Symptoms: 1) Neoplasm of Warwick and unstable disorder 2) Increased hardness after treatment with calcium with its hydrate. Treatment: The following treatment for low-level contamination is applicable, such as sea water. Massive magnesium contamination should not be used with cassettes. 1- Increasing the pH of the mud to 11 by soda ash or potassium cassette to remove magnesium 2- Maintaining PH at this level to prevent magnesium re-dissolving.

Contamination of gases with salt water flows

Twin waters can contain a wide variety of salts. The origin of these salts goes back to sediment itself. For this reason, lake sediments deposited in seawater usually contain salts found in water. The concentration of salt is considerably high in drainage water from the sediment compaction process. The glory of most salts depends on the temperature. By increasing the temperature of a saturated solution of salts at a surface temperature, salt temperatures can be kept below salt temperatures at deep temperatures. Other chemical reactions, such as the washing of sedimentary minerals by underground water, can enrich water from twins from various anions and cations. The water enriched with calcium and magnesium plays a decisive role in drilling fluids.

Symptoms: 1- Increase the level of flowers in the tank 2. Increase the return speed of the flower from the well

Treatment: 1- Turn off the flower pump 2. Kelly bushing lifting and closing the bottom for cleaning 3. Closing the well with BOP 4. Measuring the pressure of the drilling pipe and calculating the density required for the ball to kick off 5. If the gas kick is removed Gas from the system by surface equipment and gas-removers. 6. If saline water is to damp the salt water at a level if possible, then improve the condition of the flower by adding the stools and soda ash; dilute the concentration of nacl ion or fresh water as needed; control Pf and PH by adding lime and soda ash if needed.

Salt Pollution

Salts are soluble and react quickly with clays. When salt water flows. To control the flow before changing the flow conditions should increase the density of the mud. The salt contamination mechanism is based on the reactions of cation exchange with clay, mass cation activity and sometimes PH. Only systems that have soluble salts have little or no effect on them. These include pure water, saline water, oily base flows and sometimes polymeric systems. The primary effects of this type of contamination include increased viscosity, increased gelatinous strength, increased irritation and increased chloride content with a slight increase in the density of flow filters.

Symptoms: 1. Increased viscosity 2. Increased swabs 3. Increased chloride and soluble calcium 4. Reduced Pf and PH

Treatments: 1- Dilution with water (if salt form is immediately after drilling); Loss of viscosity with lignosulfonate; Soda and lime quartz from 1 to 2 control of pH and Pf; Bentonite to control irritation; 2- If salt formation The system should be saturated with sodium chloride; for controlling the viscosity of lignosulfonate, soda ash, and lactic acid; to control any loss of starch content and pre-hydrated bentonite (in The use of starch to control any freeze, to prevent fermentation, salt content should be in the 190000 mg / lb preserved).

Carbonate contamination

Chemical contamination from soluble carbonates is one of the most complex concepts in drilling fluid fluids. Contamination of carbonates or bicarbonates is usually accompanied by a high viscosity of the flow line, a high turquoise point and high gelatinic strength, which can cause the flow to solidify. The increase in viscosity results from the ingestion of carbonates and bicarbonates in the flow.

Symptoms: 1. High gelatinous strength 2. Increased Pf with constant pH 3. Increased difference between Pf and Mf 4. Increased carbonate and bicarbonate

Treatment: 1- Increasing PH from 10.3 to 11.3. Adding lime or gypsum; Utilizing calcium sources to remove carbonates as CaCO_3 .

Cement pollution

The probability of contamination is in all wells. The severity of the contamination depends on factors such as previous control measures and the amount of drilled cement. Barite is associated with severe contamination during transportation. The initial effects of cement contamination increase the viscosity and strength of gelatin and reduce the loss of control, resulting in an increase in pH and absorption of calcium ions by clay particles and cause barking.

Symptoms: 1. Increased viscosity and jelly strength 2. Increased pH, Pm and Pf 3. Increased fluid fluid loss 4. Lower excessive calcium (total hardness)

Treatment: 1- Depending on the type of system used, SAPP or sodium bicarbonate may lower dissolved calcium at low pH. Clay particles are discharged by reaction with a thinner or an aqueous solution. 2- Use of water and SPERSENE to control the flow characteristics and then add Bentonite to control the flower grass.

Anidrite and gypsum pollution

Gypsum and Nydrite are classified in the group of calcium sulfate, and their difference is in their chemical composition. Gypsum is water and more soluble than anhydrite. The severity of the pollution depends on the amount of drilling. We can control low levels of contamination with calcium ion sedimentation. But in high levels of contamination, we need to change the type of flower system to the calcium base system. Gypsum-based calcareous base systems, without changing the characteristics of the flower, can control the anidrite and gypsum contamination. The initial effect of calcium contamination on the system of flower bomentonites High viscosity and gelatinous strength, and a smoother drop. This property depends on the concentration of contamination, the concentration of active solids, and the concentration of anesthetizers in the fluid.

Symptoms: 1. Increased viscosity and gelatin strength 2. Increased flower throat 3. Increased calcium dissolution (yellow hardness) 4. Potential reduction of Pf and PH

Treatment: 1- Sedimentation and separation of phosphate-soluble calcium or sodium hydroxide, reduction of viscosity or lignosulfonate and soda ash, reduction of percentility with bentonite; 2- Removal of gypsum and anhydrite in the system until the solution level of calcium is reached to 600 mg / Viscosity with lignosulfonate, pH control with soda astichment, Bentonite freeze control

Pollution of hydrogen sulfide

Hydrogen sulfide gas (H₂S) is the most serious type of pollution and causes severe corrosion. This gas destroys the pipes and is toxic to humans. In this case, detection of this type of gas, the necessary measures should be taken immediately.

The main sources of this gas in drilling operations are: 1) thermal remnants 2) gas predominating 3) biodegradation 4) separation of sulfur materials.

The hydrogen sulfide gas can be detected as follows (markers):

1- Reduced PH of the flower (Reduced alkalinity) 2- Sensory smell of rotten eggs in the flow lines (at low concentrations of H₂S) 3- Change of color of the flowers (in dark color) due to the formation of Fes of barite 4. Increased viscosity and fluid loss due to reduced PH 5. Formation of Fes black on the drill pipe

Treatment: 1- Increase PH from 11 to 11/5 with Soda Castile 2. Add Lime 3. Add Zinc Oxide Like SULF-X, other compounds may be used on zinc or zinc carbonate.

Note: 1- Fw is the percentage of water generated from the ritter (distillation). 2. The added lime (lb / bbl) is $\frac{40}{26}(Pm - (Pf * Fw))$

Soluble carbonates

During drilling in Khuzestan oil-rich regions, the pollutants of flowers caused by liquid materials of the earth's classes And the chemicals are very low. Flowers by which we dig them due to

consumption Some salt will find some calcium and magnesium in them, which will increase the relative amount of these two Cationic will not leave any damages to the properties of the mud. The chemicals used in drilling mud are purchased from very good mines And will be thoroughly investigated in the drilling laboratory. Unless their profile is with The specifications of the international standard are in accordance with the requirements of the international standard.

Clay stones

The rocks are formed from the accumulation of marine sediments. These deposits are deep The earth is suffering from extreme heat loss, but clay stones have different types Their only common attribute is having a clay in their depths. Sometimes claystones (or stone mud) are also said to be in the table below. The amount of compounds present in clay and clay soils is shown.

Conclusion

Contaminants cause damage due to the effects on drilling fluid physical and chemical properties. So, in order to be able to deal with these changes and treat them, we must first have information about them for which to do this. We need to know the fluids and their types first and then the spontaneity and ways of coping with it. Therefore, this issue in the drilling industry, especially in various genesis and operations, is very important. Hence, in this article, we examined the issues that we can cost and trouble with Drilling down and speed up our operations and the potential damage that some of the contaminants is necessary to prevent such h2s.

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