

# Design of drilling fluid

Profession



**ASSIGN  
BUSTER**

## Design of Drilling Fluid

### 1. Introduction:

Boring fluid is the fluid used while boring oil and natural gas. Boring unstable design is a really of import portion of boring procedure. Boring fluid is the media between drill spot and the formation. The design of boring fluid is based on the chief maps of boring fluid and the demand of each particular good. Generally, boring fluid has three major maps. They are:

1. Cools and lubricates the drill spot.
2. Circulates the boring film editings back to the surface.
3. Balances or overcomes formation force per unit areas in the well bore to minimise the hazard of well-control issues. [ 1 ]

### 2. Boring unstable environmental considerations:

The design of boring fluid should do boring fluid meets the specific demand of each well and besides should be the most cost-effective manner. The public presentation of boring fluid can impact the efficiency of boring. There are a few cardinal concerns of planing a boring fluid.

Healthand environmental concerns are one of the issues the interior decorator of boring fluid should see. The type of boring fluid may pollute the groundwater and the chemical composing can impact the wellness of the operators. Safety is ever the first consideration and if the operation affects the ecosystem, it will go harder to obtain authorities permission. So it is of import to do certain the fluid is safe and lasting plenty during the boring operation.

As one of the major map of boring fluid, it is of import to calculate out the proper weight of the fluid. A proper weight of fluid has to be sufficient to forestall runaway and will non fracture the well. If the fluid is excessively heavy, it will fracture the well because the force per unit area of the fluid is relative to the denseness of fluid. On the other manus, light fluid can non equilibrate the force per unit area of formation.

In the instance of high-temperature well, the boring fluid should be able to bear 275-300 Fahrenheit of high temperature. When the formation being drilled is wage zone, the boring fluid should non impact the permeableness of the formation. It should be a non-damaging fluid.

Cost is ever a large concern for an applied scientist. Mud may represents 5 % to 15 % of boring cost but may do 100 % of boring jobs. [ 2 ] So a proper design of boring fluid is like a via media. It provides the maps every bit less as it can and the interior decorator should detect the possible hazard.

### 3. Boring fluids types:

The basic types of boring fluid will assist us understand the design of boring fluid better.

- Water-based fluid.
- Drill-in fluid.
- Oil-based fluid.
- Synthetic-based boring fluid.

Water-based fluid is less expensive than oil-based fluid and synthetic-based boring fluid. It is widely used to bore 80 % of all Wellss. [ 3 ] Basically, most

<https://assignbuster.com/design-of-drilling-fluid/>

portion of a well is suited for water-based fluid. This system dissolve natural clays. The base fluid can be fresh H<sub>2</sub>O, saltwater, seawater and saturated seawater which do less injury to the environment. Some habit-forming can be added into the base fluid in order to assist fluid-loss control or complete certain undertakings. After the surface shell is cemented, the operator can still utilize water-based fluid unless another certain demand is needed. For all of these advantages, water-based fluid is a dominant system used in on-shore rigs. The two wide classes of water-based fluid are non-dispersed systems and spread systems. Non-dispersed systems can be weighted to 17.0 to 18.0 ppg and run at 350 Fahrenheit and higher. Dispersed systems are treated with chemical dispersants that are designed to deflocculate clay atoms to let improved rheology control in higher-density clay. [ 4 ]

Drill-in fluid is the boring fluid after boring into a wage zone. The design of a drill-in fluid requires adequate cognition about the reservoir. It should make less or no harm to the reservoir stone and easy to clean up. Drill-in fluids are used widely in horizontal Wellss, where the wage zone is exposed to the boring fluid a long distance. Drill-in fluids can be water-based, brine-based, oil-based or synthetic-based. The pick of drill-in fluid is of import to the production of a well because one time the harm has been made to the formation, it is rarely possible to retrieve the status of wage zone to the initial status.

Oil-based fluids were designed and developed to assist turn to several boring jobs: formation clays that react, swell, or slough after exposure to WBFs ; increasing downhole temperatures ; contaminations ; and lodge pipe and torsion and retarding force. [ 5 ] Oil-based fluid can stand higher

<https://assignbuster.com/design-of-drilling-fluid/>

temperature without interrupting down. Oil-based fluids besides has greater cleaning abilities with less viscousness. It is used to avoid the jobs which water-based fluid could has. The disadvantages of oil-based fluid are:

1. It is more expensive and more toxic than water-based boring fluids.
2. Film editings can non be separated from the fluid while boring.
3. Sing the environmental facet, oil-based fluid incorporating Diesel fuel may incorporate aromatic hydrocarbons which can do taint.

Synthetic-based fluid is a fluid which the base fluid is man-made oil. It is designed to avoid environmental impacts. It is frequently used on seaward rigs or environmentally sensitive countries, because it has the belongings of an oil-based clay, but the toxicity of the fluid exhausts are much less than an oil-based fluid. This is of import when work forces work with the fluid in an enclosed infinite such as an offshore boring rig. [ 6 ] Major types of synthetic-based boring fluids are:

- Esters
- Poly-alpha alkenes
- Linear ciao alkenes
- Internal alkenes
- LAO/PAO ( additive alpha olefin/poly-alpha alkenes ) [ 7 ]

#### 4. Additives

Barite is a common used addictive to all systems. It is used to increase denseness of the system.

Keeping a high pH by adding NaOH helps command H<sub>2</sub>S and CO<sub>2</sub>.

Bacterias can be controlled by utilizing a microbiocide additive.

## 5. Decision

Mud control is an of import portion of boring. A good boring fluid design can avoid a batch of work and supply a good status of the wage zone which can better the public presentation of the well. With the development of the engineering for horizontal Wellss, the design of boring fluid truly became a more of import procedure.

Mentions:

[ 1 ] Lake, Larry W. *Petroleum Engineering Handbook* . Richardson, TX: Society of Petroleum Engineers, 2006. Print.

[ 2 ] Bloys, Ben, Neal Davis, Brad Smolen, Louise Bailey, Otto Houwen, Paul Reid, John Sherwood, Lindsay Fraser, and Mike Hodder. `` Designing and Managing Drilling Fluid. " ( *Oilfield Review* ) , *Schlumberger* . 1 Mar. 1994. Web. 12 Mar. 2015. & It ; hypertext transfer protocol: //www. slb. com/resources/publications/industry\_articles/oilfield\_review/1994/or19940403\_drilling\_fluid. aspx & gt ; .

[ 3 ] Oilfield Market Report 2004. Spears & A ; Assoc. Inc. , Tulsa, Oklahoma, www. spearsresearch. com.

[ 4 ] `` Drilling Fluid Types. " - . Web. 8 Mar. 2015. & It ; hypertext transfer protocol: //petrowiki. org/Drilling\_fluid\_types & gt ; .

<https://assignbuster.com/design-of-drilling-fluid/>

[ 5 ] Lake, Larry W. *Petroleum Engineering Handbook* . Richardson, TX: Society of Petroleum Engineers, 2006. Print.

[ 6 ] `` Drilling Fluids. " *AES DRILLING FLUIDS, LLC* . Web. 8 Mar. 2015. & It ;  
hypertext transfer protocol: //www. aesfluids. com/drilling\_fluids. html & gt ; .

[ 7 ] Meinhold, Anne. *Model for a Comparative Environmental Assessment of Drilling Fluids* . Washington, DC: United States. Office of the Assistant Secretary for Fossil Energy ; , 1998. Print.