Managing Drilling Fluids

Managing drilling fluids is not a small task and is a very important part of the drilling project. The job of mixing drilling fluids is often given to the newest member of the drilling crew, and that works if that person realizes how important the job is. But the driller/owner needs to take an active interest in the drilling fluids program, which can be a profit driver if done correctly or a profit drainer if done incorrectly. This article will deal primarily with mud drilling, but drilling fluids management also applies to air/foam drilling and drilling with polymers, along with other types of drilling fluids. If you are trying to drill with straight water, may the Lord help you because anything can happen and you will eventually need His help!

Some of the issues involved in management of drilling fluids are:

• Knowledge of the formation to be drilled. It is critical to know the soil conditions you will be encountering. This very important information can be found in well logs, geologic maps, and other information and drilling history of the area. It will determine which products to include in the drilling project and the quantities needed.

• The water source and quality for mixing with the drilling products. This is also supremely important for a good drilling fluids program because, after all, water is the largest portion of the drilling fluid and bad water can spell problems for drilling fluid products. Adjusting pH and water hardness with soda ash is critical to good use of drilling fluid products. pH levels should be in the range of 8.5 to 9.5 and contaminants such as calcium in the water need to be removed. Soda ash will adjust both and doesn’t take that much of it, one-quarter to one-half pound per 100 gallons should normally be enough, and it is not that expensive. It has been estimated that the improved effectiveness of the drilling products as a result of using soda ash will cost more than pay the cost of the soda ash.

• Good mixing and pumping equipment is also essential to a good fluids program. A Venturi mixing hopper is recommended for good mixing. The design of the mud pit is also critical as it should be designed to slow the drilling fluid while in the pit, usually accomplished by changing the direction of the drill fluid while in the pit. The point is to get the cuttings to drop out and not send them back down the borehole.

• Solids control is very important in drilling fluids management. High solids mud can damage and increase wear on equipment and can place unnecessary pressure on the formation downhole. A good solids control program will make all the difference in getting the hole drilled quickly and efficiently. The right drilling products in the right dosages are also critical to a well-managed drilling fluid program. Knowing the solid conditions, the products that work well in those conditions and the quantities needed for those conditions are critical to success. Following the manufacturer’s specifications is essential as well.

It “ain’t like it used to be” when it comes to drilling products. There are many more products available to the driller to choose from than in the early days of drilling and these can save the driller a lot of time, expense and worry in getting the job completed. Bentonite manufacturers provide considerable education on these products in all regions and I hope that you will take advantage of those classes and listen closely for which products will help you and your drilling situation. I want to stress again that these issues discussed above do apply to just mud drilling but to all types of drilling fluids and the used fluids for them.

Let’s look at what we want the drill fluid to do in the drilling operation:

1. We want it to stabilize the borehole and keep it open to completion.
2. We want to be able to clean the borehole, and suspend and remove the cuttings.
3. We don’t want to lose the fluid to the formation; we want it remain in the hole.
4. We want the fluid to protect the drilling equipment and the borehole. It is especially important for keeping the bit and drill string cool and to provide lubricity for them and the hole.
5. We want the drilling fluid to control sands, gravel, cobbles and clays or shales, and whatever else may be there. We want the fluid to keep us from getting stuck and possibly losing the drilling tools in the hole.
6. We want the fluid to control downhole pressures.

The right drilling fluids program characteristic is very important for protecting the drilling equipment and the formation by keeping solids content low. This can be tested by using a mud balance or sand content kit. A mud weight of 8.6-9.0 is ideal.

The testing equipment mentioned above is readily available from distributors or manufacturers of drilling products. The testing equipment can be purchased separately or as a kit to protect the equipment and as a safe means of transporting it. In the scope of the cost of equipment it is really not that expensive and can give valuable insight about the quality of the drilling fluid.

Below I am listing the basic drilling products that are available to make drilling more efficient.

• Bentonite drilling fluids in various barrel yields and characteristics.
• Foam for air drilling.
• Polymers and additives for drilling clays and shales. Some of these coat the clays, while others break them down and liquefy them so that they can be pumped out of the hole.
• Polymeric and additives that help in controlling sand, gravel and cobble. These are very effective in stabilizing the borehole and in preventing fluid loss. These are called “PAC” polymers and are an effective tool every driller should learn.
• Additives for thinning mud or for well development.
• Products for disposal of drilling fluid spills after drilling is complete. These include products that are bentonite-based, polymer-based, or combinations of bentonite and polymer. This gives the driller a choice of how much he wants to pay versus how quickly he needs to dispose of the spoils.

Drillers can learn about these products from educational classes, from distributors and manufacturers of drilling products, from literature, from Internet websites, and from fellow drillers. Please take advantage of these opportunities to learn about what is available to you for your drilling application. May you have only the greatest success in your drilling projects!”

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