



The Importance of High Quality HDD Drilling Fluids

To ensure the most successful run of the Hole Opener, high quality drilling fluids must be used. Drilling fluid is composed of a carrier fluid (water) and drilling fluid additives (bentonite and/or polymers). The most widely used drilling fluids for HDD applications are based on bentonite. Bentonite is a naturally occurring clay mineral (montmorillonite) that forms a mud when mixed with water. The best performing drilling fluids are manufactured from natural sodium bentonite from a region in western United States.

The key functions of HDD drilling fluids include:

- ◆ Cools downhole tools and equipment
- ◆ Lubricates to reduce friction between the drill pipe/product & the bore wall
- ◆ Cleans off build-up on drill bits & reamer cutters
- ◆ Stabilizes and seals the sides of the borehole
- ◆ Carries the cuttings out of the hole

The following factors must be considered:

- ◆ **Viscosity**
Viscosity is the resistance of a fluid to flow. Maintaining the proper flow is imperative to successful HDD drilling.
- ◆ **Gel Strength**
Gel Strength is the ability of the drilling fluid to support, suspend and carry cuttings. If proper suspension is not maintained, the cuttings will quickly collect around the drill pipe or product line being pulled. This could cause a loss of circulation and a build up of pressure, resulting in a 'frac out' and possible loss of the tool.
- ◆ **Low Fluid Loss**
Fluid Loss is the measurement of filtrate (free water) passing from the drilling fluid into a porous permeable formation. Low Fluid Loss is a characteristic of good drilling fluids and the key to borehole integrity. The goal of a good drilling fluid is to create a thin filter cake on the sides of the borehole. This prevents the excessive loss of fluids into the formation.
- ◆ **pH**
The pH is an expression of acidity or alkalinity of a solution measured between 0 and 14 with 7 being neutral. It is critical to maintain the proper pH of drilling fluids to ensure optimal performance. In HDD projects pH should be maintained between 8 and 9. Soda ash is the simplest means of raising pH.