

Ron Peterson: Columnist

Long time Baroid IDP representative Ron Peterson has earned a reputation for knowing the ins and outs of the water well drilling business. He has received many awards and spent a year as a visiting lecturer for the National Ground Water Association.

Now he's writing a regular column for the group's magazine *the Water Well Journal* in addition to his day job for Baroid IDP.

The column is an outgrowth of the year he spent as the McElhiney Distinguished Lecturer for the National Ground Water Association and the National Ground Water Research and Education Foundation.

He had that role for the year 2015 speaking in North America, Europe, and Australia. Then the Association asked him to develop a regular column using topics from his lectures and from questions submitted to the journal.

Peterson says it is a way to learn – for him.

"I've always learned more in the process of putting anything like this together than I knew going into it, and learned more from the people I worked with than I ever taught anybody," he says. "And by doing that it will extend my own knowledge but also allow us to get more information out. Because in that hour and a half talk that I originally put together there a dozen or more topics that could go an hour each."

Ron's column started in March and is called "Water Wells and Common Cent\$." The August column focused on drilling fluid basics and the next one will look at mixing and handling drilling fluids and additives.

For more information about *the Water Well Journal*, visit their web site at: <http://waterwelljournal.org>

WATER WELLS AND COMMON CENTS



DRILLING FLUID BASICS

You may have heard them before, but they're critical to a job.

Planning

The first step in choosing to use any additive (PAC, MFC, etc.) is proper planning. Included in the planning phase is choosing an appropriate drilling fluid program – one properly matched, hydrologically, or engineers often require a drilling fluid program.

Your chosen drilling fluid vendor can either provide a drilling fluid program for your drilling system, or prepared for you. Make sure you provide them with as much data as you can on the program to optimize for your project.

Water

We need to locate and verify a quality water source. The quality of the water is critical and will determine the effectiveness of any drilling fluid additives you use.

The water should be low in salt (less than 500 ppm chloride), low in hardness (less than 500 ppm, average hardness is around 500 ppm), and low in chlorine (around 100 ppm). The pH and the iron content can be adjusted using acids with caution (2.0 to 2.5 ppm per 100 gallons).

Excessive chlorine, in tandem with salt and iron, can require a different water source or adjusting the drilling fluid additives to address the altered drilling fluid properties. Water quality parameters for drilling fluid applications are measured using pH strips, calcium strips, or various titration methods to obtain more specific properties like alkalinity or the ratio between calcium and magnesium hardness as well as more specific chlorine content.

Viscosity

Viscosity depends on the drilling decision. There are two ways to alter a fluid's viscosity and viscosity. Viscosity is speed or rate of flow. Viscosity is the resistance of the fluid to flow in resistance to flow.

When drilling with air, the fluid part is more fluid due to adding a bearing agent. A water-based fluid is much thicker by using additives or a polymer. When adjusting viscosity, always use the manufacturer's product literature and designed for use in a drilling fluid.

Filter Cake and Water Loss

These two properties are closely interrelated. Any additive (adding the filter cake thickeners and lignite will usually reduce the water loss. We want to keep the filter cake thin, light, and slurry penetrable – usually about 2.0 in. or less. This will keep the liquid phase of the drilling fluid (usually water) from going into the formation and causing any water-sensitive formations to become wet and swell, potentially causing formation stability problems. The desirable water loss is typically 15 cubic centimeters or less, depending on the nature of the formation.

Filter cake and water loss are controlled by the use of a high quality bentonite in combination with proper amounts of specific polymers. Always use the most cost-effective product available. Filter cake and water loss are determined using an American Petroleum Institute (API) designed filter press.

Weight or Density

This is a measure of how heavy the drilling fluid is. Water typically has a weight of 8.33 pounds per gallon (ppg) while drilling fluid usually weighs less than 8.5 ppg, when all the desired additives are mixed in.

The only reason the total drilling fluid will be higher than 8.5 ppg is because extended (usually two to six) hours maintenance is added to make it heavier or denser to control a subsurface pressure, or control flow, in an unstable formation.

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