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'Downhole drilling friction virtually eliminated by innovative lubricant'

‘Downhole drilling friction virtually eliminated by innovative lubricant’

Don Barnes, Executive Vice President, ProOne, USA

Typically not a newsmaker, drilling mud suddenly finds itself a key to large scale time /cost savings during the global cutbacks in drilling activity and capital budgets. Field-proven in more than 700 wells throughout North America, the drilling mud additive XPL+ (Xtreme Pressure Lubricant) virtually eliminates friction in all components of a downhole drilling system.

In the laboratories of ProOne llc, jointly headquartered in Houston, TX and Orange County, CA (USA), R&D scientists developed a product attribute that sets XPL+ completely apart from any other lubricant on the market. Positively-charged instead of negatively-charged, this additive provides an extraordinary film strength fifty times that of conventional lubricants and without exception bonds to any metal downhole under the most extreme heat and pressure.

Quite simply, this development is changing how companies drill wells worldwide as ProOne expands its distribution domestically into international markets through the 300+ distribution locations of the Distribution NOW spin-off of oilfield service company giant, U.S.-

headquartered National Oil well Varco.

Wide-ranging solutions

Many operators have expressed their surprise after using XPL+ for the first time because their thinking had been the same as many other operators that “A lube is a lube is a lube.” After trying XPL+, however, their drilling crews discovered that not all lubes are the same because now they could solve more than a dozen major drilling challenges and beyond. They could also save as much as \$1 million per well in overcoming all the drilling obstacles typically caused by the No. 1 downhole enemy: friction.

As ProOne’s international distribution ramps up, the product is already being used at drilling locations as wide-ranging as the

South American country of Colombia to China. At the major Chinese company, two particularly significant accomplishments that drilling crews observed were the big reduction in torque and that the lubricant helped them reach Total Depth (TD) better than ever. As a result, in this sprawling oilfield region, operators are anxiously awaiting new opportunities to deploy this additive on multiple upcoming projects. In fact, it would not be unrealistic for them to mandate a complete changeover in lubricants at drill sites throughout China based on their field experiences. Drillers in the Middle East and Africa are also XPL+ customers.

In a recent (mid-January 2015) torque example, an operator was cutting a curve at 14,000 ft lbs to

head into a horizontal when the crew introduced one set of this lubricant into the hole and dropped the torque to 7500 ft lbs. That approximately cut the torque in half, allowing the crew to drill both faster (typically 20-percent faster) and cleaner in a water-based hole. Since crews often get a bonus when finishing a hole quicker, this lubricant directly helps them reach that bonus.

Aside from torque solutions, exactly what

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are these operators, and others worldwide, seeing in their downhole drilling operations by changing out to ProOne's additive? Above all, crews are experiencing friction reduction that has never been possible through any other methods, equipment, treatments or processes. Problem solving includes fewer expensive trips, straighter verticals with less corkscrewing, achieving higher Rate of Penetration (ROP), ability to drill curve in 50-percent less time, greatly reducing hook load and sliding liner faster.

As expected by customers, there is also considerably less corrosion and wear on all metal surfaces throughout the entire downhole drilling system and this greater lubricity increases the lifecycle of three very important components: mud pumps, mud motors and drill bits. Yet, the lubricant's benefits do not stop there, but also extend to better results with deviated wells, long horizontals, spiraled and chopped holes, along with doglegs and micro doglegs.

Remarkable financial benefits

Of course, any way that operators can substantially reduce drill time is a major benefit which makes drilling efficiencies a primary objective at drill sites. And cost savings which come from these new efficiencies are the ultimate bottom line where XPL+ has built its reputation fairly quickly, too.

Money saving examples are quite striking, in terms of how much operators can save without changing their operations—methods, procedures or equipment—in any way other than switching from their current drilling fluid lubricant to ProOne's additive. And that includes what would ordinarily be called a negative in that this lubricant actually costs more than

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competitors'. However, this new additive actually comes out ahead because its heavy concentration means that operators use much less than with others. With XPL+, only 1-3 percent to volume is necessary compared to the typical 3-10 percent to volume.

From ensuring much less wear and tear on downhole drilling components to solving major drilling challenges, the numbers play out along these lines. If operators only save money on having to use fewer mud motors and drill bits, each well will cost up to \$100,000 less to drill. Yet much larger savings are readily available including up to ½-million dollars through such benefits as higher ROP and fewer trips. And to exceed practically any operator's estimate on cost savings when drilling, more companies are finding opportunities for extra windfalls of up to \$1 million by keeping twist-off risk to a minimum, avoiding hole collapse and freeing stuck pipe.

Unique attributes & new developments

Rapidly becoming known worldwide for its most newsworthy attributes of migrating toward intense heat and pressure, plus

bonding to any metal downhole, this additive has other unique characteristics.

One is that it works equally well in oil-based mud (OBM), water-based mud (WBM) and brine, as compared to other lubricants which may work in one but not the other because they are negatively charged, unlike the ProOne lubricant's positive charge. Also, in what could be considered an unexpected benefit, this lubricant can be transferred to another well; it does not have to be discarded after only one usage.

An attribute as unique as the money-saving capabilities is that this product is completely environmentally safe. Whether a drilling region conducts operations in strict accordance with protecting the environment, this earth-friendly technology is increasingly important as people and places become more at-risk. ProOne's scientists recognized environmental concerns and engineered this lubricant to be 100-percent biodegradable; on the 16th day it already degrades by 60-percent and by the 31st day it is more than 80-percent biodegraded.

Originally, being 100-percent

This earth-friendly technology is 100% biodegradable



ProOne's new technology solves, two examples illustrate the using/dosing:

For stuck drill string:

- Set up four slug pits for a ratio of 6% by pit volume (80 barrels = 3360 gal. x 0.06 = 201 gal./55 gal.drums = 4 drums)
- Determine when pill will reach bit and slow mud pumps down to 50-percent for soak time.

After third plug surfaces, pull to max.capacity. If no

biodegradable got the industry's attention primarily from an onshore drilling perspective. Recently, being non-toxic to marine life is generating interest among offshore oil and gas drillers. Toward the end of 2014, ProOne was approved by the U.S. Environmental Protection Agency (EPA), which is widely known for strict standards and regulations, for drilling offshore California. As that was occurring, companies were inquiring about taking the product offshore in the U.S. Gulf of Mexico.

Meanwhile, with the relatively new coiled pipe drilling technique increasing in popularity, ProOne developed an XPL+ companion technology: CoilPro. Paralleling the original technology, this newest commercialized R&D also is positively charged, bonds to any metal, has fifty times other lubricants' film strength and is actually attracted to extreme heat and pressure. Among its benefits are better borehole stability, inhibiting hydration of clay fraction in shale and overall greatly reducing friction.

Yet, all those attributes may be

secondary to this newest fluid's unprecedented ability to pull out flat plugs, a challenge on which coiled tubing service companies have both hit and missed. Given that plugs are typically inserted at approximately thousand-foot intervals, and by conservative estimates are not able to be pulled out 50-percent of the time, a friction reducer makes a major difference. The result of not leaving multiple plugs in the hole, which forces substantial crude to not be produced, often quickly adds up to millions of dollars per well.

As of early 2015, in every usage of CoilPro, all plugs in every well have been removed. Essentially this is a market that came to ProOne after word got around in the North America oilfield about the XPL+ product family. Consequently, after starting in the Bakken, product usage has spread to Eagle Ford and the Permian Basin, all of which become major U.S. drilling activity locations.

Using the problem-solving technology

Of all the drilling challenges that

results, send fourth pill down and repeat. Typical recovery: between third and fourth pill with ten barrels of water.

For high torque:

- Begin with one drum every two hours until reaching TD or increase to adjust required torque reduction. Anticipate 3,000-4,000 ft/lbs torque reduction
- Introduce above suction pipe at 5% of pump volume until reaching surface to surface
- Reduce rate to one drum/hr to maintain desired working torque (increase if necessary).

Anticipate as much as 50-percent torque reduction immediately, then feather out dosage to working torque range for most cost-effective result.

Field-proven in more than 700 wells, after being tested and certified by widely-respected laboratories and used by major oil industry companies, this game-changing lubricant technology is now making a difference for operators internationally after its U.S. success in reducing downhole drilling friction as never before. dewjournal.com