THE AMERICAN OIL & GAS REPORTER®
OCTOBER 2011
The "Better Business" Publication Serving the Exploration / Drilling / Production Industry

Shale Plays Driving Drilling Fluid R&D

By Al Pickett
Special Correspondent

The mud system is "the lifeblood of the entire drilling operation," which means the success of any drilling project begins with selecting the right engineered fluid system for the job at hand.

So says Kerry Redmann, the Gulf Coast division drilling superintendent for BOPCO Inc. in Metairie, La., and director emeritus of the American Association of Drilling Engineers. One of the first issues independent operators must consider in drilling mud selection is lubricity, especially in horizontal and directional drilling applications where friction is a major concern. "The newest generations of drilling fluids provide significant improvements in lubricity, reducing friction by as much as a 30 percent in some cases," he states.

"Another challenge is finding a water-based mud (WBM) that is competitive with oil-based mud (OBM) in terms of drilling performance, especially in shales, which tend to absorb water," Redmann explains. "Drilling fluid companies have spent a lot of time finding the right combination of fibers for hole cleaning and lost circulation control. And, of course, finding drilling fluids that can work in high temperatures continues to be a challenge. By the very nature of mud circulating, it can drop the temperature of the rocks in deep wells by 200 degrees. That causes stress fractures, which causes mud loss and well bore instability."

Redmann says good working relationships with drilling fluid companies are crucial for midsized and small independents such as BOPCO. "An independent relies on the fluids company to design the best mud program for a given drilling operation," he says. "We need an experienced mud engineer with good mud knowledge, who can come in and study what is going on and make a proposal within a day or two to help put a proper mud program together. Good mud engineers are invaluable to us."

New WBM System

For operators, the term "high performance" is synonymous with reducing the number of days required to reach total depth and shave costs off the bottom line. Harry Dearing, vice president of technology marketing at Houston-based Newpark Drilling Fluids, says that ability to reduce operators' drilling costs is a key factor in new water-based drilling fluid systems for horizontal shale drilling. "Torque and drag is a challenge in horizontal wells, and penetration rates with WBM are always a concern," he says. "The newest WBM technology addresses that."

Newpark unveiled its Evolution™ water-based system engineered for the Haynesville Shale last year in response to operator demand for a clean and environmentally friendly, yet robust alternative to the diesel-based fluids that historically had been required in the area's hard drilling environment, according to Dearing.

"The main drivers are the benefits associated with eliminating oil-based fluids while also providing a reduction in rig days to drill a well," he claims. "Whether an OBM or a WBM, we consider an application a success if the well is drilled as designed and reduces the number of rig days to reach TD. We put the system together for the Haynesville, where there are deeper horizontal depths and higher temperatures."

Since its introduction last summer, Dearing reports that Evolution has been used by 64 operators to drill more than 300 wells in several geographic areas. He says the system has economically provided improved penetration rates, well bore protection and lubricity while standing up to the demanding requirements of high temperatures, contaminants and drilled solids. "It has proven a win/win solution in the Haynesville Shale, giving operators the ability to use a WBM with performance equal to or better than OBM," he remarks.

The system features a clay-free combination of two central components: a polymeric viscosifier and a proprietary high-pressure/high-temperature lubricant that delivers lubricity coefficients similar to OBM, according to Dearing.

"It is a polymer with thermally stable components that has performed well in applications with temperatures to 350 degrees Fahrenheit and high carbon dioxide content. Those are the kinds of downhole conditions we see in the Haynesville," he points out. "We try to do everything possible up front to ensure that the fluid system will meet the requirement on a given well. We do the design work using samples and research the characteristics of the reservoir as well as past failures to understand all possible problems, and then propose a system to the operator."

With the successful Haynesville ap-

plications as the spring board, Dearing says Evolution is being used in other shale and tight sands plays, including the Cotton Valley in East Texas, the Barnett Shale in North Texas, the Niobrara in Colorado, and the Avalon/Bone Spring in West Texas and southeastern New Mexico, as well as in Canadian shale plays.

"Operators are seeing improvements in penetration rates and reductions in torque and drag in all of these plays," Dearing concludes. "Our main focus on engineering the system is making sure we have the people and equipment in place to do the job right." ❐