

Startups Offer Innovative Technology

By Colter Cookson

For many startups, the path to success depends on anticipating future demand, maneuvering to meet it and hiring people with the skill and attitude to offer exceptional service. But for a few, success depends not on understanding business trends but on turning sound concepts into field-proven technologies.

The oil and gas industry is a case in point. Recently-formed startups have introduced a drilling fluid technology designed to drastically mitigate the negative

effects of friction and extend rigs' technical limits, enabling them to drill faster and further; a transmission that allows pump and compressor motors to run at their most efficient speeds while expanding opportunities for casing gas engines; and downhole sand and gas separators that boost rod pumps' efficiency and extend useful lifetimes.

These innovative technologies come not from sudden bursts of inspiration, but from seasoned professionals with a knack for identifying needs, gathering data and thinking outside the box. Consider

Eco Global Solutions Inc.'s Armando Navarro, the 30-year drilling engineer who launched the research and development effort responsible for bringing the aforementioned drilling fluid additive to producers and operators.

"The initial thrust to develop the product came from a personal need," he recalls. "I was lead drilling engineering adviser for 38,000-foot wells, which were then the longest wells in the world. We had the world's largest rigs, but even after trying every technology then available, we knew drilling the wells would be difficult at best."

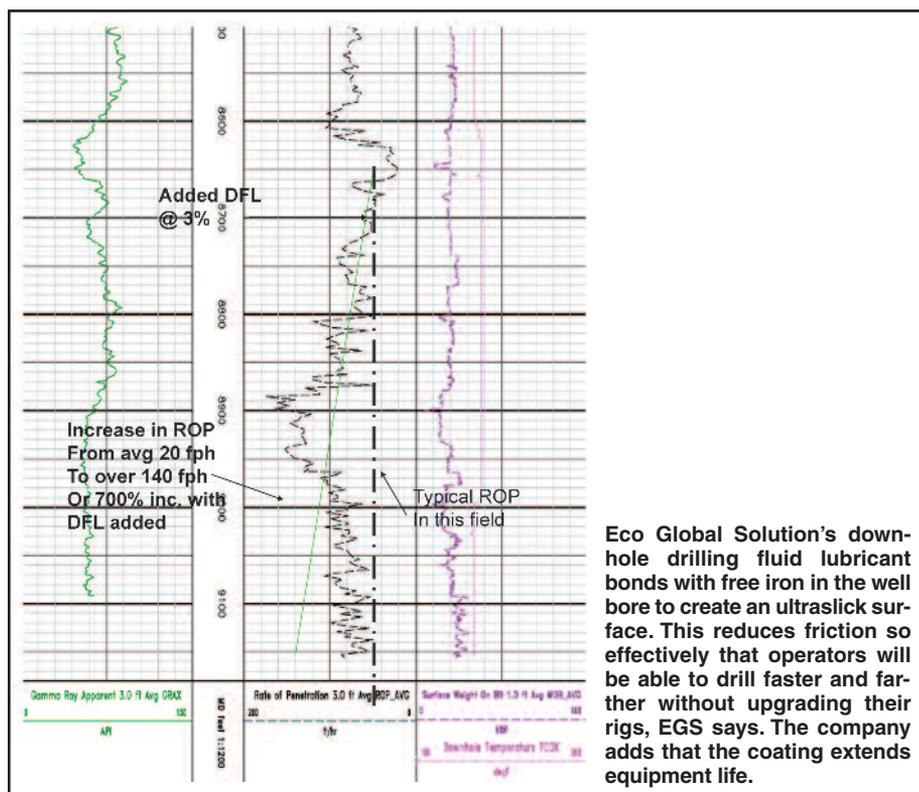
Navarro says he knew friction was the culprit, so he started looking for ways to reduce it. "EGS began developing its core drilling fluid technology based on an oil additive I had been using in my car," he says. "As soon as I used it, I noticed my gas mileage going up and my engine running cooler. Eventually, I started to wonder if I could use it on a drilling rig, made a few calls, and ran some tests."

Those tests yielded astounding results, Navarro says. "The additive reduced friction four to five times more effectively than traditional drilling fluid additives," he reports.

After two years of intense research, development and field testing, EGS rolled out its flagship drilling fluid technology, DFL. Navarro, who now serves the company as director of global drilling operations, says DFL has enabled rigs to drill longer laterals while boosting penetration rates and extending equipment life.

New Approach

Navarro explains that DFL mitigates friction using a creative approach that





differs from the one taken by standard friction reducers. “Instead of thinning the drilling fluid, DFL bonds with the free iron in the bore hole to create a slick surface,” he says.

According to Navarro, the bonding approach has several advantages. “In addition to reducing friction more than flowing lubricants, it leaves the mud intact, which means operators can use it without buying chemicals to restore the mud’s carrying capacity,” he says. “Furthermore, the bonding creates a layer with a molecular strength exceeding 40,000 psi. This layer protects equipment and extends its life.”

DFL would be compelling even if it was only a friction reducer, Navarro maintains. He points out that reducing friction offers several benefits:

- It increases penetration rates.
- It reduces the pressure from equivalent circulating density (ECD), enabling faster pumping.
- It reduces standpipe pressures, enabling users to optimize other drilling parameters.
- It lessens downhole vibrations, extending the durability of downhole motors, measurement-while-drilling and logging-

while-drilling equipment, and even bits.

“Since we are reducing the friction down hole, the operator can run the rig at 60-70 percent capacity instead of running it at 90 percent capacity,” Navarro adds. “That greatly reduces the number of breakdowns and thus decreases nonproductive time.”

As of mid-October, EGS had used the product in 40 commercial applications, he indicates. “We have seen drilling rates increase anywhere from 50 percent to 500 percent, pressures drop 50-65 percent, and torque fall 50-70 percent,” Navarro reports. “We also have seen bit life extensions, with operators in one field going from using two or three PDC bits on each well to using one.”

Unexpected Benefits

According to Navarro, Eco Global Solutions’ field tests also have revealed several unexpected benefits. “DFL has been shown to promote well bore stability,” he says. “In one field, a company used to ream every well for three or four days before it could run casing. After using DFL, which has become the company’s standard operating practice, it no longer needs to ream at all.”

Navarro points to pump pressure as an explanation. “When drillers turn the pump on and off, they create pressure fluctuations down hole that create instability,” he notes. “By reducing the amount of pressure from ECD, DFL moderates those fluctuations, which reduces their impact on well bore stability.”

DFL’s friction reduction also has made it easier to run casing, Navarro says. “On a few wells, the well bore has been so slick from DFL that operators can run casing to bottom without picking it up and rotating,” he reports.

Navarro acknowledges that DFL costs slightly more than traditional drilling lubricants, but says its benefits justify the cost 10 times over. “This is especially true if an operator recycles drilling fluid,” he says, explaining that DFL can be used in three or four wells before losing effectiveness.

The technology is compatible with water- or oil-based mud, meets worldwide environmental standards, and is not toxic, Navarro reports. He predicts it will have a profound, worldwide impact. “Because it is so effective at reducing friction, DFL will enable operators to drill longer laterals with today’s most powerful rigs and get more from standard rigs,” he says. □