

Innovations Extend Pump Run Times

By Colter Cookson

Whether they are experts in electric submersible pumps, rod pumps, plunger lift systems, tubulars and sucker rods, or downhole separators and other equipment, the companies that provide artificial lift solutions share a goal: Helping operators not only produce high initial volumes, but also maintain production as economically as possible over a well's full life.

That often means extending a given pump's minimum and maximum flow rates and enhancing its durability to reduce how frequently an operator needs to pull and replace equipment. Toward that end, pump providers and other artificial lift experts say they are employing slicker materials, optimizing component geometries and refining techniques for reducing flowing bottom-hole pressure. Simultaneously, they are coming up with ways to improve safety, including blowout preventers to protect wellheads against completion-induced pressure spikes and a portable device that makes it easier for well technicians to respace rod pumps.

Magnificent Material

Through partnerships with operators and service companies, Materion Performance Alloys reports it is expanding the artificial lift applications for a durable, non-galling copper-nickel-tin alloy it originally tested with Hess Corp. to extend the life of sucker rod couplings.

Its latest development is a valve rod guide bushing (VRGB) coupling intended for the bushing that connects the rod string to the pump drive rod, says Diane Nielsen, Materion's global oil and gas

manager. "In deep wells that use hollow rods, buckling at the bottom of the string causes frequent contact between the bushing and the production tubing," she says. "This contact wears out the tubing."

"Based on the success Hess had with sucker rod couplings made from the low-friction alloy, we decided to replace the steel material in the bushing with the alloy," Nielsen continues. "We also wanted to reduce movement at the bottom of the rod string, so we made the bushing body thicker to enable it to act as a stabilizer."

The VRGB coupling has performed well in the field, Nielsen reports. "We have 12 operators in various plays, including the Bakken, the Permian and the West Coast Basin, that are adopting it. They tell us it is significantly reducing tubing leaks and wear while providing more stabilization."

Other companies are looking to use the alloy in subs containing downhole sensors for measuring compression, pres-

sure, temperature, torque and tension, Nielsen reports. "By installing these sensor-containing subs throughout the rod string, operators will be able to understand what is going on down hole, including when the rod string is coming into contact with the production tubing, which is a major cause of wear," she says. "This will help operators modify their string designs to optimize pump efficiency and minimize wear."

Nielsen adds that ESP providers are considering using the low-friction alloy in motor bearings. "We have several companies that are doing lab testing and qualification on the alloy and a manufacturer that has qualified the alloy for production," she details. "They believe the same attributes that have made the alloy so successful in sucker rod applications—the combination of low friction and high fatigue strength—can improve bearing performance and ultimately the ESP's efficiency and production." □

To protect production tubing from buckling-induced wear in deep wells with hollow rods, Materion Performance Alloys has introduced a coupling for the bushing that connects the rod string to the pump drive rod. The company says the coupling uses a wide design to reduce buckling and, therefore, contact with the production tubing. It is made from a low-friction alloy that minimizes damage when contact occurs.

