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What's new in artificial lift?

Part 2: In this second of two monthly reports, the authors highlight innovations in ESPs, PCPs, plunger lift and gas lift systems, plus new developments in power, automation, control and monitoring systems.

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Continuing last month's "What's new in artificial lift?" discussion, we report on several items that we hope you find useful.

PLUNGER LIFT DEVELOPMENTS

Plunger lift is used commonly to remove liquids from gas wells or produce relatively low volumes in high-GOR oil wells. Because the plunger provides a "seal" between the liquid and the gas, a well's energy can be used to lift liquids out of the wellbore efficiently.

Pad sleeve bypass plunger. A pad sleeve bypass plunger (Fig. 9), by PCS Ferguson (part of the Dover Artificial Lift group) reduces shut-in times and maximizes production. This plunger is the first of its type on the market, making more trips with faster fall times. It often helps wells achieve a significant increase in daily production. This padded version has more controlled travel times than the traditional sleeve and allows for a tighter seal in wells with tubing irregularities.

The ball and sleeve are held in the lubricator by the separator rod and latch. When the latch opens, the combination of the differential pressure and the rod hold the sleeve, while the ball falls toward the bottom of the well. When the differential pressure decreases, the sleeve begins to follow.

When the sleeve reaches the bottomhole bumper spring, it joins the ball and forms a seal. Pressure builds, causing the ball and sleeve to travel together while lifting fluid to the surface. When the plunger reaches the lubricator, the separator rod extends through the sleeve, knocking the ball down the tubing and the cycle repeats.

A well in Bridgeport, Texas, was producing 5 bopd and 500 Mcfgd, using a traditional 9-in. sleeve and a stainless steel ball. The well is 6,760 ft deep and has slight tubing irregularities.

The traditional sleeve plunger was replaced with a pad sleeve bypass plunger. After three months, the new plunger traveled 4,735 round trips, running at 11.5 min/trip. The plunger increased oil production 40% and gas production 10%.

POWER, AUTOMATION, CONTROL AND MONITORING

McKinsey statistics show that engineers spend around 28% of their working days dealing with email, while *Industry Week* says 25% to 50% of their time is spent in meetings. That's why it's important that well analysis is automatic, providing engineers with ranked opportunities and problems.

Monitoring is critical. Although most wells have downhole sensors and real-time surface data, all too often the information is not actually used to optimize production. What's even more problematic, is the use of different vendor-provided monitoring systems for ESP and gas lift wells can cause data to be scattered over multiple systems. This makes comprehensive analysis difficult, and wells are run sub-optimally. These issues, combined with WTI hovering around $45 to $55/bbl, require that wells on lift be fully optimized, 24/7.

Cloud-hosted monitoring and optimization system. Dover Artificial Lift has introduced its LOOKOUT monitoring and optimization system powered by Theta Oilfield Solutions' XSPOC software, Fig. 13. This new system delivers users a powerful tool for real-time monitoring, decision making, collaboration and well performance optimization. It's controlled with a cloud-hosted system for ease of support and maintenance.

The system is tailored to the producer's specific needs and economics, from simple on/off notifications to active monitoring scenarios targeting key performance indicators. Fostering collaboration and streamlined workflows, the system allows for easy access across a variety of platforms from mobile to desktop; and presents useful information, allowing for gains in production and lengthening lift system run time.

By leveraging the Theta's XSPOC artificial lift monitoring system, LOOKOUT can be utilized on every form of artificial lift, including ESPs, rod lift, gas lift and others. Operators can pump by exception, where wells that are operating properly can be passed over in lieu of wells that are not operating properly. The system moves beyond alarming and set points, which force users into a reactive monitoring role.

However, by looking at a well model (comparing the ideal performance of both well and equipment, with the actual per-

Fig. 9. High-cycling pad sleeve, bypass plunger increases hydrocarbon production.

formance) the system can identify wells that could be operating more efficiently. Further enhancements include daily and monthly reports, all automatically generated, to make the user's time more effective. The system enhances the way operators can view run life information by categorizing shutdowns into general causes and tracking the root cause of failures.

A key feature is the automatic diagnostics, utilizing the well equipment parameters and its real-time data. By comparing the actual flow from automatically imported well tests against the theoretical flow; diagnostics, such as pump wear or potential tubing leaks, can be proactively determined. Another feature that spans lift-type boundaries is the sizing score, providing the user with an accurate look at well conditions (based on IPR data) and equipment application, indicating if a re-size should occur at the next workover.

By automatically performing these calculations—whether it is exception reports, pump operating points, optimization based on system software diagnostics or well test uploads—the automated nature of the system helps accurately monitor, diagnose, optimize and ultimately increase recovery.

Dover suggests that the power of the system is not only in its automatic operation, but in the collaboration between their artificial lift experts and operators. Company experts will work with users to establish KPI's, a generate a holistic approach to meeting those KPI's. Finally, they will conduct weekly meetings, where performance is evaluated and adjusted to meet the operator's objectives.

Fig. 13. Dover Artificial Lift's new cloud-based monitoring and optimization system.

OTHER DEVELOPMENTS

Borets, an ESP engineering, manufacturing and service provider, has purchased an operations facility in Midland, Texas. The 11.2 acre site has 58,000 sq ft for manufacturing and service capabilities, and 10,000 sq ft of office space. The facility will accommodate assembly and dismantling operations, a full-service cable shop, sales and service teams equipped to serve customers throughout the Permian basin. WO

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