

## What's new in artificial lift?

Part 1: In this first of two monthly reports, new innovations that improve operations and/or reduced expenses are described in the categories of Beam/Rod Pumping, Gas Well Dewatering and Gas Lift

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It has been another banner year for artificial lift innovations. The offerings have been prolific enough, that we have split this year's report into two halves. This first-half report will cover eight developments in Beam/Rod Pumping, Gas Lift and Gas Well Dewatering.

In beam/rod pumping, a "three-in-one" solution is discussed, whereby coiled tubing is not only used as a pumping string, but as a means for the operator to preventively treat the well. Another item is a downhole sucker rod pump that sets new efficiency standards. Finally, there is a diverter downhole separator, for use in wells where one cannot locate the pump intake below the producing interval.

Among gas well dewatering developments, there is a casing plunger application that improves gas production. A second item is a plunger that provides a complete diagnostic picture of downhole conditions. Yet another device is a low-volume positive displacement pump that is well-suited for dewatering gas and CBM wells, and can be used in a various applications, including severely deviated wells.

As regards gas lift innovations, a single-point gas lift system enhances the effectiveness of wellhead compression. There is also a dual-pocket, side pocket mandrel that is suited for offshore, high-pressure,

deepwater and subsea installations. It is designed to lower costs and downtime by improving the pressure integrity of the upper-completion wellbore environment.

### GAS LIFT

Recent innovations include a mandrel ideally suited for offshore situations, and a single-point gas lift system that enhances wellhead compression.

**Barrier Series dual-pocket, side pocket mandrel.** Suited for offshore, high-pressure, deepwater and subsea installations, the Barrier Series systems from Schlumberger's Camco unit are designed to lower costs and downtime by improving the pressure integrity of the upper-completion wellbore environment. The dual-pocket, side pocket mandrel (Fig. 8) is based on an existing Camco dual-pocket, side pocket configuration with a dual-inline, redundant, leak-tight seal. This configuration allows for the use of two separate, distinctly retrievable flow control check valve devices that work independently to simultaneously meet flow control and pressure barrier system requirements.

The Barrier Series mandrel is a round-body, fully machined mandrel, with a one-piece, twin 1½-in. bore pocket design, plus a dual-tool discriminator containing a tubing-to-casing barrier valve (TCBV). The valve prevents communication between the tubing and casing, when the normal operating gas lift valve is removed from the primary pocket. A 1½-in. TCBV barrier valve, along with a standard Barrier Series valve, enables well unloading. Multiple models of the Barrier Series gas lift valve and traditional Barrier Series orifice valves facilitate continuous-flow lift operations.

Both the integral tubing and casing barrier valve and active gas lift valves are slickline retrievable. This new technology incorporates dual, flush-mount, full-length OD grooves to facilitate cable and control-line bypass, reducing overall running OD and offering maximum line protection.

**Fig. 8.** The Barrier Series dual-pocket, side pocket mandrel prevents communication between the tubing and casing.

