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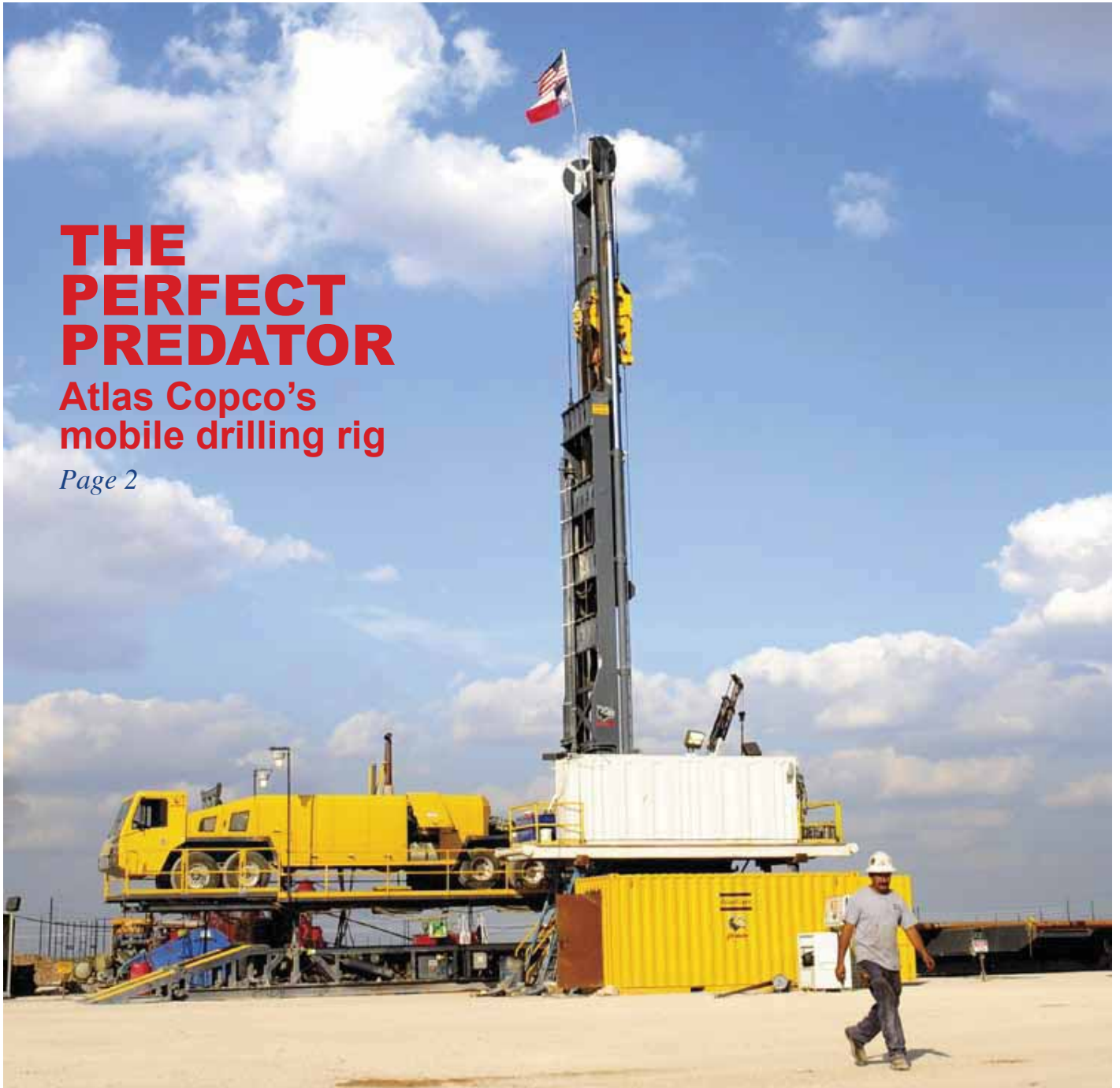
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Cementing your position



Pressure pumping expert, Trican, outlines the advantages of its low-density AccuLite™ cementing system

TODAY, oil and gas operators are drilling deeper and deeper, frequently encountering problems with lost circulation during cement jobs – mainly owing to weak and/or depleted formations. High hydrostatic pressures from the cement can cause weak formations to fracture, or the re-opening of natural fractures already present, resulting in lost circulation (loss of cement into the formation). The consequences of losing circulation during the production cement job vary, but the most immediate and perilous of these is the loss of well control, the potential for blowout and thus costly remediation.

Multistage cement jobs are generally an effective solution when dealing with losses, but in order to optimise both fracture geometry and the resultant production of a well, many fracturing operations require especially high fracturing rates and pressures during well completion. These high rates and pressures rely upon pump-down-casing techniques to stimulate the zones effectively. However, in many cases conventional cementing systems require a stage collar to ensure that cement is brought back to the surface. As well as inflating the overall costs of the operation, stage collars have been known to fail during cementing operations and also create a weak link during high-pressure fracturing operations.

A need has evolved requiring cement pumping companies to deliver not only lower-density cement systems to reduce hydrostatic pressure on formations, but cement systems that meet regulatory requirements for compressive strength development at shallow depths. These cement slurries must also have excellent properties regarding their thickening time control, quick gel strength development, and ease of mixing for field operations. Furthermore, they must measure up to the effectiveness expected of conventional non-lightweight cements, such as a short transition time from liquid to solid, minimal to no free water, slurry stability, excellent ductility, low porosity and excellent rheological properties.

These greater demands on safety and effectiveness resulted in the development of Trican's AccuLite™ systems.

Trican solution

The AccuLite product line was developed with all of the desired properties listed above. Conventional low-density cement systems are successful for use down to 1,320 kg per cubic metre (11 pounds per gallon), but if low hydrostatic pressures are required, special low-density systems such as AccuLite are needed. Trican's goal in creating these lightweight cements was to ensure performance overall, but more importantly, to provide the same physical characteristics, performance properties and the ease of mixing in the field as any other conventional cement design.

AccuLite 1200™ (1,200 kg/m³, 10 ppg) and AccuLite 1100™ (1,100 kg/m³, 9.2 ppg) are low-density cement slurries designed to minimise formation breakdown by reducing hydrostatic pressures. Weak formations are easily broken down, often resulting in cement seeping into fractures or the natural cracks of the formation. This affects the cement's ability to isolate the formation, support the casing and ultimately achieve the required cement top.

AccuLite stands for Accurate and Lite density. This means that the surface mix density of the design will remain the same as the cement reaches the maximum equivalent circulating densities (ECDs) in the wellbore, regardless of the depth of well (unlike foamed cement). This enables users to stay within prescribed density tolerances and more accurately calculate the hydrostatic pressure. Because of its low weight, AccuLite provides excellent zonal isolation while maintaining accurate density at bottomhole hydrostatic pressures up to 70 Megapascals (10,000 psi).

Trican's AccuLite system also provides consistent density from start to finish. Many competing systems require the addition of nitrogen to reduce slurry density. However, as the produced density is designed



Since the introduction of AccuLite cement, Trican has pumped 27 production jobs with only 2 not achieving cement returns to surface, resulting in a 93% success rate. Furthermore, since the release of the AccuLite 1100™ cement, 9 out of 9 jobs had cement returns to surface.

►► for a specific wellbore depth, higher ECDs are encountered at the shoe because of compression. Nitrogen also imparts higher slurry viscosities, further increasing ECDs by way of higher friction.

Rheologies are critical as well. Increased hydrostatics and rheologies are detrimental, as operators are at risk of inadequately covering the annulus with cement. The low rheological properties of AccuLite allow for low friction pressures, improving the opportunity to obtain returns to surface.

AccuLite cements are blended, hauled and pumped by the same means as conventional cement blends and therefore do not require the additional equipment and personnel necessary when using foamed slurries – all providing a significant cost and time benefit.

Case study

One particular E&P company completed 628 conventional production cements jobs between 2009 and 2011. Of these, 125 were unsuccessful in achieving cement returns to surface. This resulted in a 20% failure rate. Losses in associated non-productive time (NPT) totalled hundreds of thousands of dollars in remedial cementing costs.

Since the introduction of AccuLite cement, Trican pumped 27 production jobs for this customer, with only 2 not achieving cement returns to surface, resulting in a 93% success rate. Furthermore, during this time period, when AccuLite 1100™ cement was released, 9 out of 9 jobs had cement returns to surface.

Trican is further developing AccuLite technology to provide more options for the more demanding wells. Cement designs with higher strengths and lower densities (below 1,100 kg/m³) are in the process of being field-tested. ■

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