URFC helps deliver the longest lateral wells in Vaca Muerta Basin

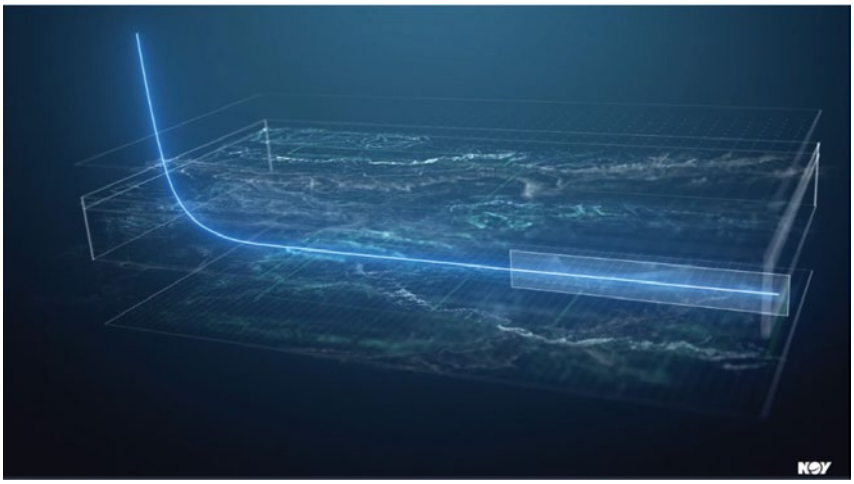
Successful deployment of the longest extended slim wells and maximized efficiency utilizing NOV's Ultra-Reach Flotation Collar

Background

An Operator in Argentina wanted to optimize well performance in the deployment and installation of their slim-hole well pads in the Vaca Muerta's Basin with longer than 4,250 m (13,943 ft) lateral sections. The operator has experienced different challenges trying to increase lateral length due to frictional forces and lack of available hook load to push the liner to bottom.

Solution

After analysis of different methods to deploy the casing in the horizontal section, buoyancy technology was selected to optimize the deployment and maximize efficiency. NOV's Ultra-Reach Flotation Collar was deployed and set between 6,562-9,843 ft (2000-3000 m) between the 3 different wells on well pad. This device traps air between the flotation sub and the shoe, reducing the frictional forces acting on the casing through buoyancy effects. The Flotation Collar has a calibrated glass barrier which is ruptured with surface applied pressure once the casing reaches measured depth, allowing well circulation suitable for the cementing operation. The flotation collar placement is optimized for maximizing the hookload available while crossing the curve and build sections, which have the highest dogleg severity. This method improves the probability of reaching measured depth in challenging wells, while maintaining the original completion and casing design.



Case study facts

Location: Vaca Muerta Basin, Argentina

Customer: YPF

Product Specifications

- Ultra Reach Floatation Collar (URFC)

General Well Information

- Open Hole Size: 6.375-in. (161.93-mm)
- Parent Casing Size: 7.625-in. (193.68-mm)
- Parent Casing Weight: 24.00-lb/ft (35.72-kg/m)
- Production Casing Size: 5.000-in. (127-mm)
- Production Casing Weight: 21.40-lb/ft (31.85-kg/m)
- Well TVD: 10,023-ft (3,055 m)
- Well TD: 23,929-ft (7,294 m)
- Temperature: 250°F (121.1°C)

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Results

Using the URFC in conjunction with the original completions and casing design, Argentinian customers were able to successfully reach measured depth in Vaca Muerta's wells with the longest horizontal drilled section for slim-hole applications as of December 2022. Over 25% reduction to mean run-in hole time was achieved was achieved while avoiding string rotation in the curve and building sections.

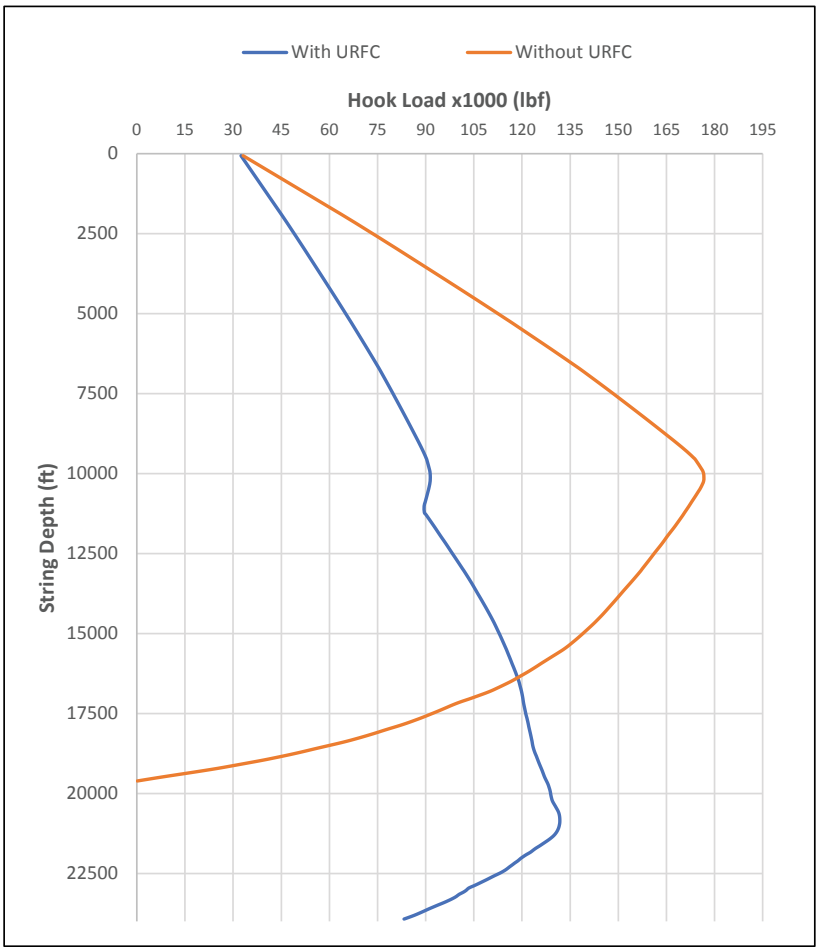
Different placement depths were compared between hookload availability in the build section and when the string reaches measured depth. The method has shown to be sensitive to filling strategy—this effect was detected on the first two wells leading to improvements in the operational procedure in the subsequent wells.

As shown below, on one of the wells the complete hookload was lost at 19,600-ft (5,974-m) MD when deciding to not run with the URFC. Utilizing the flotation collar, the customer was able to continuously increase their hookload while running casing and reach a value of 83,000-lbf (36,920-daN) at measured depth, thus allowing the customer to successfully reach the intended measured depth.

This method has been proven for casing wells with up to 13,949-ft (4,250-m) of horizontal section with open hole frictional factors up to 0.46.

Utilizing NOV's URFC customers are able to:

- Increases the probability of reaching measured depth in highly challenging horizontal sections.
- Reduces lateral friction forces experienced while running in hole.
- Reduces buckling effects on string.
- Over 25% reduction of well delivery time considering deployment and cementing operations.
- Avoid need to rotate casing string and save money using premium connections.



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