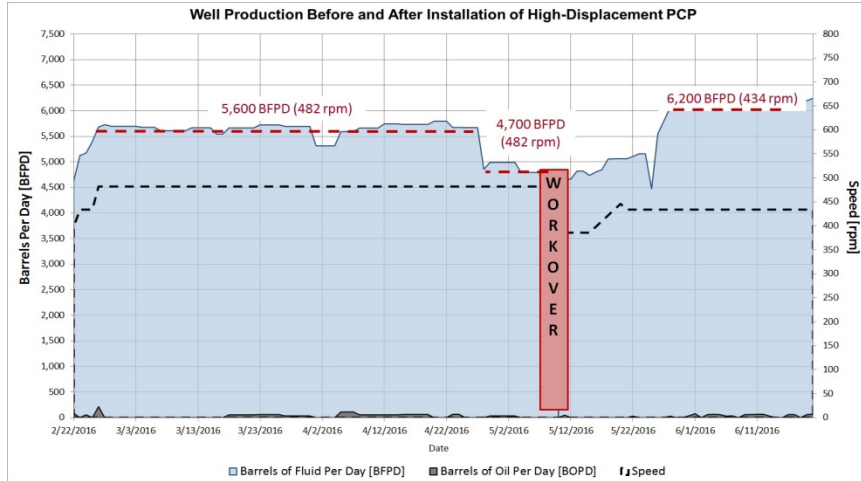


# High-Displacement Progressing Cavity Pump Decreases Pump Speed By 10% While Increasing Flow Rate By 21% In An Offshore Well



In an offshore well with a high water cut, Weatherford installed a high-displacement PCP and successfully increased both the rate of fluid displacement and the overall flow rate in the well while decreasing the pump speed.

## Objectives

- Increase the rate of fluid displacement in an offshore well with a water cut of 90%. A conventional progressing cavity pump (PCP) had been installed previously, but it did not provide sufficient displacement to reduce the dynamic fluid level in the well. The average displacement in the well was only 11.6 barrels of fluid per day per revolution (bfp/d/rpm) (1.84 m<sup>3</sup>/d/rpm) of the PCP.
- Decrease the operational speed of the PCP from the previous average speed of 482 rpm.
- Increase the overall flow rate—including both water and oil production—from the well. The average overall flow rate was 5,150 BFPD (819 m<sup>3</sup>/d).

## Our Approach

- For this operation, Weatherford custom-designed and deployed the high-displacement PCP Model 302-800 to provide adequate displacement of fluid in the well. The PCP increased the rate of fluid displacement to 19 bfp/d/rpm (3.02 m<sup>3</sup>/d /rpm). As a result, the overall flow rate in the well increased to 6,200 BFPD (986 m<sup>3</sup>/d).
- Weatherford also recommended adding the Hi-Per™ nitrile 313 elastomer to the PCP for its excellent fluid resistance in high-water-cut conditions.
- The high-displacement PCP reduced the average operational speed of the pump to 434 rpm.

### LOCATION

Congo

### WELL TYPE

Offshore, vertical, oil

### HOLE SIZE

9-5/8 in.

### CASING SIZE AND TYPE

9-5/8 in., 47 lb/ft (69.9 kg/m)

### TUBING SIZE AND TYPE

4-1/2 in., 12.75 lb/ft (19 kg/m)

### SUCKER-ROD SIZE AND TYPE

1-1/4 in., API Grade K

### WATER CUT

90%

### PUMPING DEPTH

868 ft (264 m)

### POST-INSTALLATION FLUID-DISPLACEMENT RATE

19 bfp/d/rpm (3.02 m<sup>3</sup>/d/rpm)

### POST-INSTALLATION FLOW RATE (OIL AND WATER PRODUCTION)

6,200 BFPD (986 m<sup>3</sup>/d)

### OIL TYPE

24° API oil

### PRODUCTS/SERVICES

- PCP Model 302-800
- Hi-Per nitrile 313 elastomer



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### Value to Client

- The Weatherford high-displacement PCP decreased the operational speed of the pump from 482 to 434 rpm, a reduction of 10%. This extended run life and reduced the frequency of interventions associated with wear on the tubing rod.
- By replacing the conventional PCP with the high-displacement PCP, the client increased the overall flow rate in the well from 5,150 BFPD (819 m<sup>3</sup>/d) to 6,200 BFPD (986 m<sup>3</sup>/d), an increase of 21%, within 15 days of installation.
- As a result of the success experienced using the high-displacement PCP in this well, the client plans to install additional high-displacement PCPs in more wells in the field with similar conditions. Some of these other wells have electric submersible pumps (ESPs) installed. By replacing the ESPs with high-displacement PCPs, the client will be able to decrease equipment costs and enhance field economics.

