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117 STAGES: NEW SINGLE-POINT ENTRY FRACTURING RECORD

EAGLE FORD BASIN, TEXAS, USA

PRESENTED BY: STAGE COMPLETIONS TEAM

STAGE COMPLETIONS INC. SET A NEW SINGLE-ENTRY POINT FRACTURING RECORD IN THE EAGLE FORD BASIN, SOUTH TEXAS

USING THE STAGE COMPLETIONS BOWHEAD II, 117 STAGES WERE FRACTURED IN RECORD TIME.

An operator in the Eagle Ford Basin completed an extended-reach well with 116 Bowhead II collet activated cementable sliding sleeves. During the deployment and installation of the 15,000 psi (103 MPa) Stage Completions system, the operator was able to gain efficiencies by pre-bucking the Bowhead II valves to the casing joints allowing for a safer handling of equipment on the rig floor, a significantly reduced installation time and much tighter fracture stage spacing thanks to the shorter overall length of the Stage Completions' hardware.

The fracturing operation launched on April 24, 2017 stimulating 117 intervals with the Bowhead Technology in a record time of 160 hours and accurately placing 11.6 million lbs (5800 ton) of sand and 361,000 bbl (57,394 m³) of fluid at a maximum sand concentration of 4.7 ppg (563 kg/m³) and 42 bbl/min (5 m³/min) average rate breaking the previous record number of stages in a single well.



Figure 1. Pre-bucked Bowhead II valves to casing joints.

The success of the operation is a result of the simplicity of the technology, running a dissolvable ball on a collet that activates the sliding sleeves and eliminates the need of employing coiled tubing or wireline.

The Bowhead series has a constant ID throughout the wellbore that allows for higher pump rates and higher sand concentration. Elimination of coiled tubing and ball seats led to reduced friction during the fracturing treatment, therefore decreasing the required horsepower for the operation by up to 60% of the total pumping units available on location, successfully optimizing every stage while maximizing the stimulated reservoir volume.



Figure 2. The Bowhead Technology features a constant ID throughout the wellbore reducing the required horsepower for the operation.

The collet launcher (figure 3) employed during the stimulation is designed to enable continuous pumping operation and it is remotely operated, keeping all field personnel out of the red zone.



Figure 3. The collet launcher is remotely operated and allows for continuous operation.

An advanced acoustic and pressure monitoring system was installed on the wellhead. The high sensitivity and accuracy of this technology confirmed the successful launch and consistent sleeve engagement of the collet in every single stage (see figure 4), adding validation to the shifting signature observed on the surface treating pressure (see figure 6), also corroborated by the actual displacement volumes in each case.



Figure 4. Acoustic and pressure responses during engagement and shifting as captured by the monitoring system.

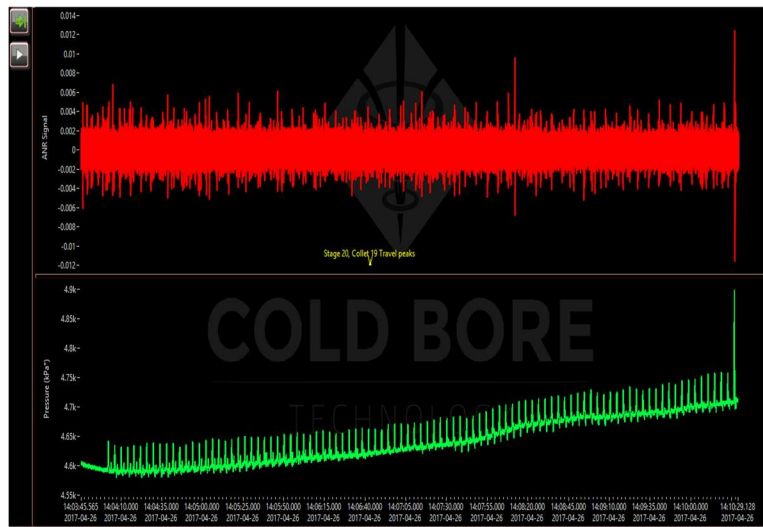


Figure 5. Travel peaks observed as the collet is pumped down to the target depth.

The green curve in Figure 5 represents the pressure increases as the collet is traveling through each installed sleeve until landing at the target depth. This unique feature provided the operator with the ability to monitor and locate the collet in the wellbore throughout the launching and shifting process.

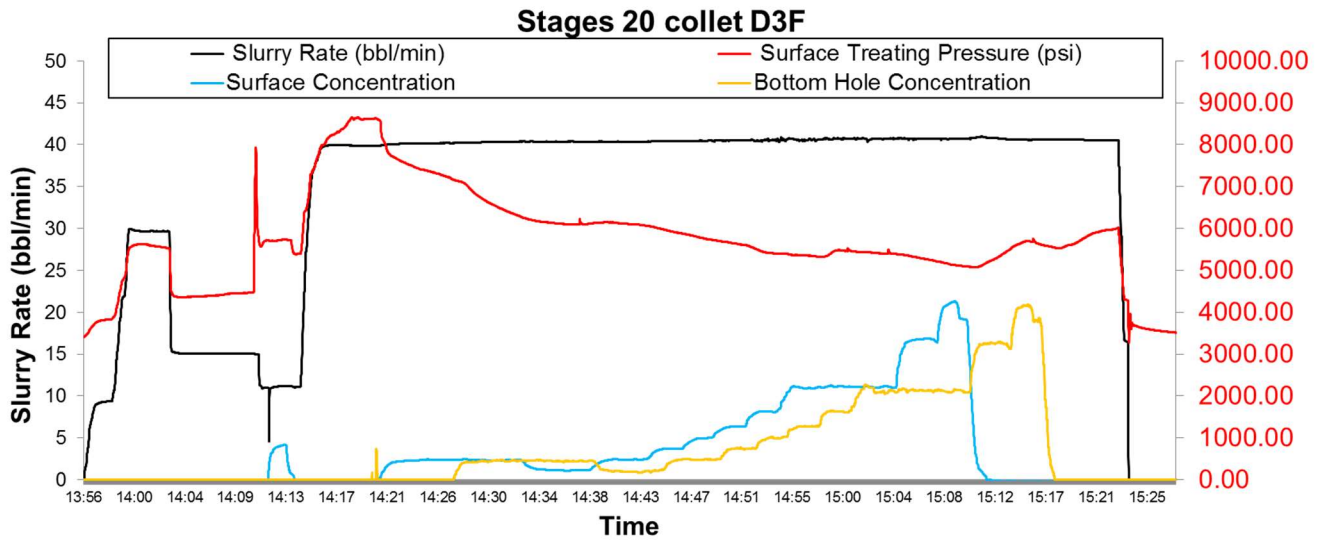


Figure 6. Fracture treatment plot for stage 20 of 117

Figure 6 shows the treatment plot for stage 20. The shifting signature is observed on the surface treating pressure curve at 14:10 after decreasing the pump rate to achieve the recommended landing velocity, followed by the immediate fracture treatment as designed for the stage.

The bowhead technology provides single-point entry fracturing capability to operators allowing increased EUR, improved water management and continuous operations with deployment under pressure capability.

The operation on this well marked a record-setting completion with the highest stage count thus far and embodies the focus of Stage on multistage completions as a highly innovative technology company.

For further information on Stage Completions, please visit www.stagecompletions.com