Eagle Ford Pressure Pumping Company Improves Pump Reliability and Lowers Operating Costs

XLH®/SuperGold® Packing and Core-X™ tungsten carbide plungers help improve operational efficiency while reducing downtime

**CHALLENGE**

Improve pump reliability and operational efficiency while reducing maintenance downtime in the Eagle Ford Shale.

**SOLUTION**

Use XLH®/SuperGold® packing and Core-X™ tungsten carbide plungers with proper installation procedures to increase pump reliability in aggressive completion applications.

**RESULTS**

Improved pump reliability after completing a 13 stage frac job with zero maintenance, downtime; reduced operating costs while maximizing production efficiencies.

**PRESSURE PUMPING COMPANY WANTED TO INCREASE PUMP RELIABILITY AND REDUCE DOWN TIME THROUGH IMPROVED MAINTENANCE EFFORTS**

The Eagle Ford Shale is a hydrocarbon producing formation capable of producing both gas and more oil than traditional shale plays. It contains a much higher carbonate shale percentage, upwards to 70% in South Texas. This high percentage of carbonate makes the play more brittle and "fracable," but with wellhead pressures reaching up to 15,000 psi, these shale wells present unique logistical, operational, and completion challenges. Pumping slickwater or hybrid fracturing treatments at these high rates requires a significant amount of horsepower on location. High treating pressures also demand more proppant and fluid than other unconventional plays.

**OVERVIEW**

Completing an Eagle Ford Shale well in DeWitt County, Texas, an operator employed a pressure pumping company (PPC) to frac a 13 stage well. Prior to this well commencing, the PPC requested Utex consultation regarding pump expendables advising maintenance costs had drastically increased, along with down time, completing these types of wells. PPC advised pumps were only achieving 2 to 3 hours of pumping time before failures caused each pump to be taken out of service for expendable maintenance issues. This well was completed in December of 2016.

**SOLUTION**

Utex designed a targeted approach improving the PPC's pump reliability issues. The root basis of this solution was the utilization of Utex's XLH®/SuperGold® packing coupled with Core-X™ tungsten carbide plungers offering a premium performing expendable combination proven successful in aggressive, high pressure and volume, pumping applications.

Secondly, Utex technical personnel conducted on-site expendable installation training alongside the PPC's equipment operators. This offered a valuable education towards the proper and recommended installation and maintenance techniques to achieve the maximum performance out of their frac pumps.

After the field analysis, educational training, and re-packing of 1 pump were complete, the pump was utilized in the 13 stage “Merideth #3H” well performing flawlessly for the duration of the job. This pump completed all 13 stages, averaging 10,500 psi, 95 bpm, with a total of 9.5 million pounds of 100 mesh sand pumped down hole without requiring any additional maintenance, offering zero downtime. Upon completion of the well, the pump was broken down to review internal components. After 40.80 total pumping hours, the packing and plungers showed no degradation to the running surface, capable of continued service.
UTEX APPLIED PREMIUM EXPENDABLE COMBINATION FOR MAXIMUM PUMP RELIABILITY

Packing sets consisting of style 2108, UTEX's patented XLH® (X-tended Life Header) ring with two SSF double stacked SuperGold® pressure rings were coupled with Core-X™ high performance flame fused tungsten carbide plungers. UTEX's recommended installation and lubrication specifications achieved maximum pump reliability by offering zero downtime for maintenance completing this 13 stage well.

Table 1 illustrates the results of the pump's overall performance analyzed per stage.

<table>
<thead>
<tr>
<th>STAGE NO</th>
<th>POUNDS OF SAND PER STAGE</th>
<th>STROKE COUNT PER STAGE</th>
<th>PUMPING TIME FOR EACH STAGE</th>
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<tr>
<td>1</td>
<td>313,050</td>
<td>7,552</td>
<td>2.20 hrs (132 mins)</td>
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<tr>
<td>2</td>
<td>816,230</td>
<td>23,022</td>
<td>3.80 hrs (228 mins)</td>
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<td>3</td>
<td>191,850</td>
<td>25,331</td>
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<td>28,158</td>
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<td>5</td>
<td>815,510</td>
<td>23,344</td>
<td>3.20 hrs (192 mins)</td>
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<td>6</td>
<td>814,490</td>
<td>22,674</td>
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<td>30,152</td>
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<tr>
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<td>12</td>
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<td>867,040</td>
<td>25,113</td>
<td>2.60 hrs (156 mins)</td>
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</tbody>
</table>

13 9,519,820.00 329,312 40.8 hrs (2448 mins)

APPLICATION DETAILS
- 13 Total stages completed
- 10,500 psi average pumping pressure
- 95 bpm (barrels per minute) flow rate
- 100 mesh sand proppant utilized
- 9.5 million pounds of 100 mesh sand pumped down hole
- 40.8 Total pumping hours
- 329,312 total stroke duty cycle

INSPECTION AND ANALYSIS OF PACKING AND PLUNGERS REFLECTED MINIMAL WEAR

Upon completion of the 13 stage well, the packing and plunger expendables were removed from the fluid end for further analysis. Results of the visual analysis proved the packing and plungers completed the 13 stage well showing minimal wear.

Figure 1 Shows pictures of packing and plungers after completion of 13 stage frac job.

CONCLUSION

A pressure pumping completions company, employed by an operator in South Texas, requested UTEX recommendations to improve pump reliability and operational efficiency while reducing downtime fracking a 13 stage Eagle Ford Shale well. UTEX technical personnel spent a total of 108 man hours on site with PPC equipment operators educating, training, and installing UTEX premium XLH®/SuperGold® packing and Core-X™ tungsten carbide plungers. The results reflected a pump completing 13 stages, 40.8 pumping hours, with zero downtime for maintenance compared to the PPC's past performance of overhaul expendable maintenance completed after 2 to 3 hours of pumping time. After completion of the frac job, the UTEX expendable components showed minimal wear, with much longer expendables life potential. This resulted in a significant improvement in pump reliability lowering the cost of ownership.

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