

Wizard ZERO Large-Bore Dissolvable Collet

Case Study: Eliminating Coiled Tubing Intervention in Low Temperature Tight Gas Wells

BACKGROUND

Many operators has switched to dissolvable frac plugs from composites to shorten postintervention time and improve operation efficiency. Recent years, in the southwest region of China, tight gas development is also shifting from composites towards full lateral dissolvable.

However, in these shallower formations, plugs not dissolving fully has became a common issues among operators, experiencing extended post intervention, even surpassing the drill out time of composites. Some operators told us it can take nearly a hour to drill out a dissolvable plug. Instead of improving their efficiency, it made it more time consuming and costly.



FINDINGS

Looking into the problem in detail, we quickly identified some key factors which can lead to slow dissolution.

Firstly, the formation temperature is relatively lower than the shale plays in this region. In most tight gas wells, the downhole temperature is between 140-158°F.

Secondly, there were plenty of water supply nearby, the frac fluid is mostly fresh water, salinity is below 1000 ppm.

Thirdly, some operators deployed dissolvable plugs were designed for the shales, which had much higher temperature rating (250°F and above) resulted slower dissolution time in this case.

Finally, most dissolvable plugs used here were based on traditional plug designs, which have many parts and a lot of materials.

Although many were made of low temperature rated materials, they still could not dissolve quick enough. During clean out run, they were pushed towards the toe and form a pack off between every 5-6 stages.

SOLUTIONS

So doing what we do best.. That is finding out the problem and provide a solution, we designed Wizard ZERO Large-Bore Dissolvable Collet to address dissolving and intervention issues. The theory behind the design is "Simple". We managed to compact all the core functions of a frac plug in to one component, and it works.



VERTECHS

In Oct 2022, another operator switched to Wizard ZERO Large-Bore Dissolvable collet after conducting below comparison trial with another competitor's dissolvable plugs.

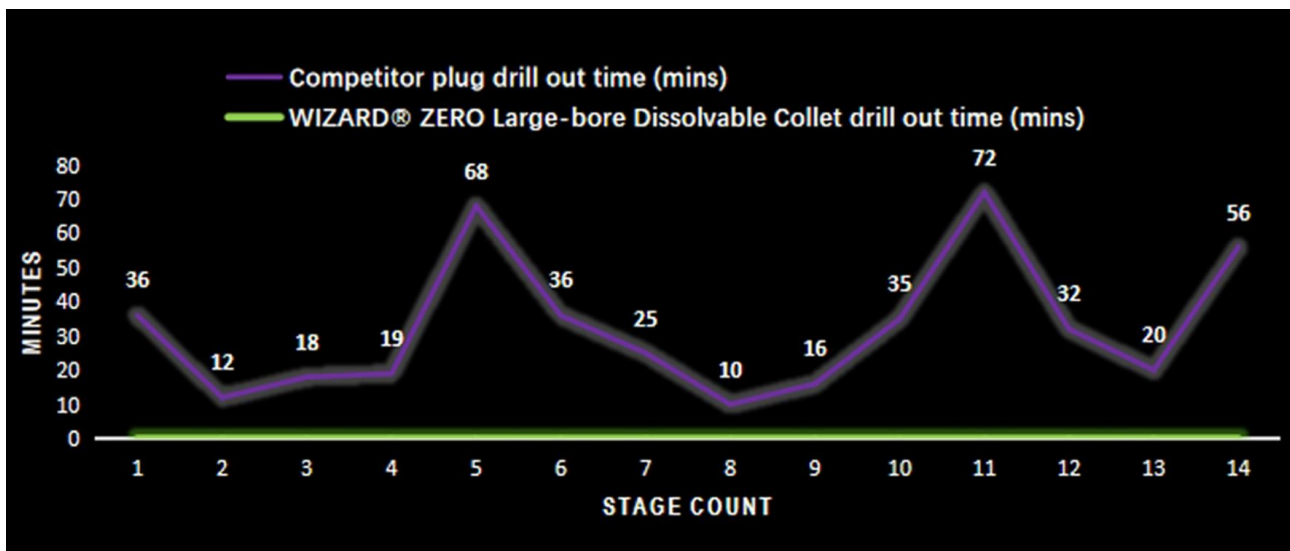


PARAMETERS:

- Downhole Temperature: 150°F
- Frac Fluid Salinity: 379 ppm
- Flowed Back Fluid Salinity: 735 ppm
- Casing Size: 5.5"23 ppf P110
- Lateral Length: 5016.4 ft
- Stage Count: 15

POST INTERVENTION (40 HOURS AFTER FRAC):

- 1st heel plug NO TAG
- Last toe plug NO TAG
- Mill out time ZERO



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