Background

In August of 2022 a Texas operator ran a head-to-head trial with the Lonestar ONEplug and two competitors. The ONEplug was ran in one of two wells on a pad in Howard County, Texas. Howard County wells are historically low-pressure wells that have nearly zero flow back capability. This makes it imperative that the frac plug and wireline companies have flawless frac plug deployment and perforating gun actuation. Because of the risk of a ball-in-place type application in these low-pressure environments, the operator chose to run the ONEplug in the ball drop configuration.

The 5.500" 20.0# wellbore had a TVD of 6578' and a TMD of 19,700'. Injection breakdown pressures averaged 9000 psi, while the average injection pressure would stabilize around 7,500 psi. The operator pumped a small volume of treated slickwater to initiate the frac schedule. This pad was followed by 8 incremental stages to achieve a final density of 2.5 ppg sand density, followed by a flush, diverter, and finally a repeat of the initial frac schedule. This frac schedule coupled with the low-pressure environment subjected the ONEplug to an estimated 7500+ psi for around 90 minutes.

The operator decided to run five One plugs' in the heel of the well, while the previous stages were run by a direct competitor. Running five plugs simultaneously gives the operator a good idea of the overall pump down ability, pressure holding capability and drill-ability of the plugs. All five plugs were run in the ball drop configuration.

Pump Down

Part of the head-to-head trial was to determine which plug deployed best. The wireline operator was asked to treat the ONEplug as if he were running their standard plug and to evaluate its performance. Over the vertical section the plug was lowered in at 400 feet/minute and the wireline operator noted that the ONEplug fell in the vertical section much better than the competition. During the pump down speeds of 650 feet/minute were achieved at 17 barrels/minute with 700 lbs. of line tension. The wireline operator thought that the ONEplug pumped exceptionally well, was smooth and stayed suspended in fluid stream. He also commented that he would have liked to have more lateral to open up and pump and that he thought the ONEplug could handle higher rates.

Setting

The plugs were deployed and set with a Baker 20 type setting tool that utilized a slow burn charge provided by diamondback industries. The wireline engineer commented that one of the other competitors was getting no weight-loss indication in the wireline truck after firing the setting tool and the ONEplug proved to show as much as 200 lbs. of weight-loss indication. All setting equipment was redressed after every run and all bleeder ports were removed from the tools to aid in leak prevention and eliminate subsequent plug pre-sets.

Fracking

During the fracking operations it was noted that all five plugs performed as intended. The completions engineer and field superintendent kept a close eye on the pump charts and were confident that the plugs were creating adequate zonal isolation.

Drill-out

The trial plugs were all drilled out utilizing a 4.625" Varel Slip X-Treme tri-cone bit. The BHA provided by TTS was deployed on stick pipe and provided the operator with a total of 440 RPM's and an estimated 3000 lbs. of weight on bit. The pipe was rotated @ 80 RPM and plug sweeps were pumped every 2 plugs. It was noted that every ONEplug was tagged on depth and with an average drill time of 5-8 minutes. Overall, the operator was pleased with the drill-up performance of the ONEplug. Results of cutting size from the drill-up can be seen in figures 1-3 below.

Figure 1:
First ONEplug and remainder of debris from kill plug (seen in red)

Figure 2:
Debris from #2 and #3 ONEplug

Figure 3:
Debris from #4 and #5 ONEplug