

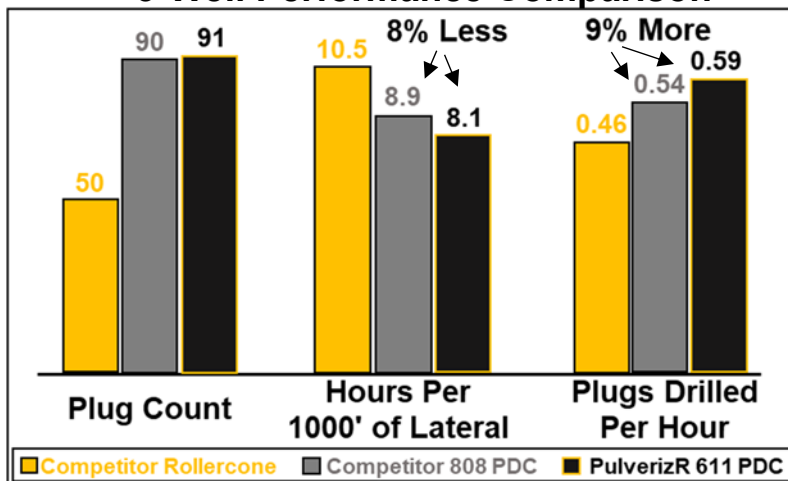
WOS PulverizR PDC Drills 91 plugs with 30% Faster Mill Time

July 2022

A natural gas operator in the Utica Shale enlisted Workover Solutions to provide thru-tubing BHA components and tool specialists for their stickpipe-conveyed frac plug drillout operations. In this application, the high plug count in the long lateral section posed a significant challenge to bit and tool life. In addition, a casing patch in the vertical section posed a pass-thru restriction. For this three well pad, a different drill bit provider was utilized on each well.

The result of the operation was that all plugs were drilled out to TD in one run. The **PulverizR PDC bit** performed the best on the pad with the highest plug count (91) with 30% faster mill time avg (9.4 min/plug) and 6% reduced 'KP to TD' hours (122.8 hrs) compared to competitor PDC bit run. It also achieved the lowest hours per 1000ft lateral length (8.1), and highest plugs/hour average (0.59).

3-Well Performance Comparison



Application Challenges

- Long lateral sections (>28,000 ft TD)
- High plug count (up to 91)
- Pass thru restriction from casing patches
- Drill bit life

WOS Results

- All 3 wells drilled to TD with no HSE incidents
- PulverizeR PDC bit** performs best on the pad:
 - Most plugs with deepest TD (91, 28,128')
 - 30% faster** mill time avg
 - 6% reduced** "KP to TD" hours
 - 8% less** hours per 1000ft of lateral
 - 9% more** plugs drilled per hour

Pad Overview

Application:	Utica Shale
Location:	Belmont County, OH
Operation:	frac plug drillout
Date:	July 2022
Well Count:	3
Tool Conveyance:	2-3/8" tubing
Production Casing:	5-1/2" OD, 20 lb/ft
Casing Patch:	4.68" OD (4.08"ID)
Drill Bit Size:	4" OD
Plug Type:	Scorpion Composite and Stinger Dissolvable
Final Depths:	19,800 – 28,300 ft
Lateral Lengths:	10,400 – 19,100 ft
TVD Avg:	8,820 – 8,910 ft