

StackFRAC HD Improves Efficiency of Horizontal Multi-Stage Acid Stimulation in Northern Iraq Field

[International, Iraq](#)
[StackFRAC HD System](#)

In an effort to increase oil production, the Kurdistan region of Iraq began soliciting investment from foreign companies in 2007. Operators have since been rapidly developing the unconventional resources in this region, learning from their own and others' experiences to varying success.

An international operator was working in a naturally fractured limestone-dolomite formation in the area, interbedded with shale and anhydrite. A number of completion techniques had been trialed, including slotted and cemented liners, bullhead acid treatments, plug-and-perf, and coiled tubing activated sliding sleeve systems.



Northern Iraq Region

Challenge

The operator's objective was to stimulate a long horizontal well with an acid treatment in 70 m sections. The completion presented a number of challenges due to near wellbore damage and the geology of the formation. Some of the complications that disqualified standard techniques included:

- Using a slotted liner, fluid was likely to flow primarily into the heel of the well, leaving most of the lateral untreated
- Bullheading acid at a high rate was known to be ineffective after about 70 m of lateral
- Cementing long laterals in this area had been unsuccessful and would not provide effective isolation for plug-and-perf
- Drilling out bridge plugs was considered risky and time consuming
- An inflatable packer system run on coiled tubing would limit the flow rate to 2-3 barrels per minute (bpm), which would be too low to overcome leakoff
- A manual sliding sleeve system required two coiled tubing runs (opening and closing) for each stage, adding 3.5 days for 7 stages—an unacceptable delay between acid treatment and cleanup operations that could severely compromise subsequent production

The operator wanted a solution to overcome these risks with the maximum possible operational efficiency.

Solution

A Packers Plus 7-stage, 4.5-in. StackFRAC® HD system was successfully installed in an open hole horizontal to a planned depth of 3,440 m. The system was designed to account for:

- Proper isolation of each 70 m section
- Rapid execution and continuous pumping such that cleanup could begin within 12 hours of the start of the stimulation
- A minimum 20 bpm stimulation rate to overcome leakoff

Results

All 7 stages were successfully stimulated with acid as designed in approximately 10 hours, with clear pressure indications of packers setting, balls landing on seat, and FracPORT™ sleeves opening. A total of 4,970 bbl of fluid was pumped, with a maximum pump rate and treating pressure of 20 bpm and 3,800 psi, respectively.

Using an uncemented system provided additional benefits. Not using plug-and-perf was a major advantage because the transportation of explosives in this region required 15 days advanced notice, and was fraught with unplanned delays. Also, the elimination of coiled tubing significantly lowered potential problems, as each trip in and out of the wellbore carries operational risks.