



## Completion Solutions

# Permian Basin Operator Saves Time and Money with Enhanced Plug and Perforate Method

Location: Permian Basin

**Overview:** In the Permian Basin’s Wolfcamp unconventional shale play, the use of cemented completion liners in horizontal wellbores is common practice, as is stimulating more than 30 stages in a single wellbore at high fracturing rates. An independent oil and gas operator in the area was using the plug and perforate method to complete their well, but wanted to find a way to improve on the efficiency of the operation. By immediately pressure testing each frac plug prior to perforating the target fracturing stages, the operator could eliminate the risk of the fracturing plug not holding pressure and causing a loss of isolation during stimulation. With the current plug and perforate process, pressure testing cannot be achieved since perforations are created prior to pulling the wireline bottomhole assembly (BHA) out of the hole and dropping the ball to isolate the ID of the frac plug. Additionally, if the pressure was equalized across the plug prior to milling, it could reduce risk during the millout operation and improve the efficiency of the process, thus saving time while removing the frac plugs from the wellbore.



RapidBall™ DP Self-Removing ball

HAL38656

CHALLENGES	SOLUTIONS	RESULTS
Pressure testing composite frac plug prior to perforating	RapidBall™ DP frac balls to isolate frac plug ID	Enabled pressure testing of each plug, helping to eliminate the risk of plugs not holding pressure during stimulation
Equalization of pressure across composite frac plugs prior to milling	RapidBall DP frac balls to isolate frac plug ID	RapidBall DP frac balls slowly degrade, helping ensure equalized pressure when an operator is ready to RIH with coiled tubing for millout operations
Decrease amount of debris created during millout operations	Fas Drill® 250 series composite frac plugs	Streamlined, compact design eliminates 31% of the material versus standard design

Halliburton collaborated with the operator to find a solution, ultimately proposing Halliburton Fas Drill® 250 series frac plugs combined with RapidBall™ DP self-removing frac balls to isolate each fracturing stage. Fas Drill 250 series frac plugs have been specifically enhanced with design features, such as a single piece element packages, bull nose bottom subs, and shorter body lengths that improve pump down operations in horizontal wellbores. The shorter body length also translates into faster millout times and less debris in the wellbore, helping to reduce the cost of post-stimulation operations and helping to ensure a cleaner wellbore.

RapidBall DP self-removing frac balls were chosen because they can be run in place on top of the frac plug during the wireline trip. Once each Fas Drill 250 frac plug was set, a pressure test of each frac plug could then be conducted prior to perforating. In the case of a perforating gun misfire, the RapidBall DP ball would degrade so that flow could be re-established and another set of perforating guns could be successfully pumped to depth.

This enhanced plug and perf method helps save time and completion fluids, stimulation fluids, some description by dropping the frac plug isolation ball after perforating the target stage, as required in the traditional plug and perforate process. It also enables an effective way to help eliminate the risk of a frac plug not holding pressure or moving downhole as each plug is pressure tested prior to fracturing. The degradation of the RapidBall DP balls also help eliminate pressure that can affect millout operation efficiency.

The collaboration between Halliburton and the operator yielded positive results and together they found a successful solution to achieve their goal of an enhanced plug and perforate completion. 35 individual Fas Drill 250 composite frac plugs were run to target depths, set, and pressure tested without issue. This gave the operator confidence that they would not lose zonal isolation during the stimulation of each frac stage and that they would be effectively stimulating the entire lateral section of the wellbore. Fortunately, no misfires were experienced on the job. By not having to drop a frac plug isolation ball for each stage after perforating, the operator was able to save an estimated 7,000 bbls of fluid and 12 hours of completion time. This translated into significant cost savings for the operator.

