

LightningPLUS Composite Plug overcomes casing deformation issues to simplify installation and deliver successful stimulation

[Canada, Montney](#)

[Lightning Composite Plug](#)

An operator working in the Upper Montney formation of British Columbia was having trouble reaching planned depths when running composite frac plugs in the wellbore due to casing deformation. This led to unplanned intervention, which increased operational risk and costs and, in extreme cases, stages were compromised or lost altogether. Packers Plus worked with the operator to solve this issue by running the LightningPLUS™ Composite Plug with a reduced outside diameter (OD) that could be pumped passed trouble areas in the casing and still withstand the differential pressure required during stimulation operations.



Challenge

In plug-and-perf operations, it is imperative that the frac plug reaches the desired depth, firmly sets and holds pressure without moving downhole during or after stimulation. This will ensure an efficient and safe operation by reducing intervention and eliminating the need to pull live perforation guns out of the well. Using a frac plug with a standard OD, the operator could not pass sections of the wellbore with deformed or partially collapsed casing, unnecessarily increasing rig time and risk to personnel.

Solution

The operator required a robust frac plug with a reduced OD to optimize operations, lower costs and improve safety. A comparison between reduced OD frac plugs from two different vendors was planned, including the Packers Plus LightningPLUS Composite Plug. This plug is designed with a short length to facilitate fast pump-down and quick millout times, and includes specially engineered anti-preset and anti-prestroke features to provide further assurance the plug will reach planned depth. The reduced OD version of the LightningPLUS plug has a circumference of 3.44-in. and the plug from another provider being run in the comparison has a circumference of 3.40-in.

Results

The operator deployed two frac plugs from each vendor in the problem section of two wells for a direct performance comparison. The uniquely shaped pump down fin of the LightningPLUS plug enabled faster run-in-hole speeds and resulted in less fluid pumped compared to the competitor plug. The LightningPLUS plug also enabled the operator to spot acid at a sufficiently low pumping pressure and optimal line tension before setting the plug.

All four LightningPLUS Composite Plugs were pumped to the planned depth, set successfully and held pressure throughout the stimulation program, which included wellbore pressure up to 56 MPa (8,122 psi) and 100 tonnes (220,000 lb) of proppant at 13.0 m³/min (82 bbl/min) without any slippage of the frac plugs. After stimulating the wells, the operator milled out each LightningPLUS plug within 6 to 10 minutes. The two-well comparison of the reduced OD frac plugs led to the operator ordering additional LightningPLUS Composite Plugs to continue their stimulation program in the Upper Montney.



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