UNCONVENTIONALS

CASE STUDY

Record-Setting Lateral Completion Achieved with Obsidian® Plugs

HALLIBURTON AND ECLIPSE RESOURCES SET 124 FRAC PLUGS AVERAGING 5.3 FRAC STAGES PER DAY

ECLIPSE PURPLE HAYES 1H WELL, UTICA SHALE

CHALLENGES

- Pumping a frac plug down 18,544 ft in a lateral
- Drilling out 124 frac plugs
- Optimizing well costs
- Finding a reliable solution with a history of field-proven success

SOLUTIONS

- Obsidian® frac plugs
  - Composite plug that has no metal parts
  - Reputation for drilling out in a short time
  - Designed to provide a perfect size cutting when drilled with the right parameters
  - Economical solution with proven reliability
  - Halliburton wireline adaptor kits engineered with an OD that provided the best chance of avoiding preset while pulling out of the well

RESULTS

- Successfully ran 124 Obsidian® frac plugs in a 18,544 ft lateral with no presets at an average of 5.3 frac stages per day
- Drillout process averaged seven to 10 minutes per plug with two bits, one short trip
- Achieved a North America land record of 26,641 ft in plug setting depth

OVERVIEW

In the Utica Shale, Eclipse Resources chose to optimize well development cost through the use of longer laterals or "superlaterals." In the Purple Hayes project, the lateral was a record 18,544 ft in length and 27,034 ft in total measured depth. One-hundred, twenty-four Obsidian plugs were set in a 5 1/2-in., 23-lb/ft P-110 casing with an average of 5.3 frac stages per day. In the first 10 runs a maximum pump-down rate of 18 bpm and a maximum line speed of 417 ft/min were achieved. All plugs were tagged on depth during the drillout process, taking an average of seven to 10 minutes per plug.

CHALLENGE

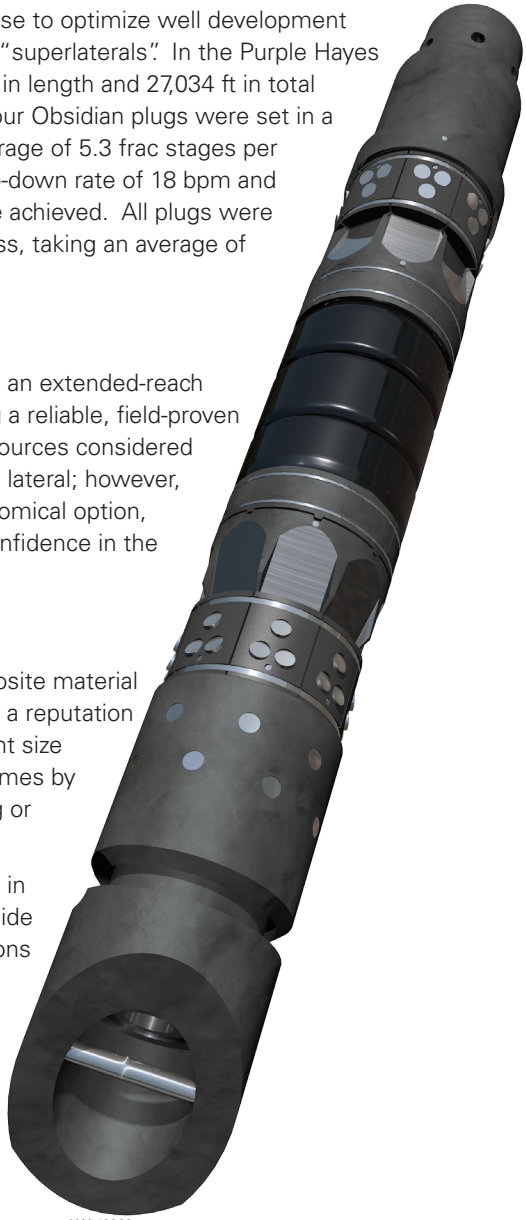
Setting and drilling out 100 + frac plugs in an extended-reach 18,544 ft lateral is no easy feat, so finding a reliable, field-proven completion solution was key. Eclipse Resources considered running a sleeve system for the extended lateral; however, Obsidian plugs proved to be a more economical option, and past experience gave the operator confidence in the success of this technology.

SOLUTION

Obsidian frac plugs are made from composite material without using any metal parts. They have a reputation for drilling out in a short time with the right size cuttings; which provides quicker drillout times by not bridging off the backside of the tubing or clogging the flowback screens.

The Halliburton wireline adaptor kits used in setting plugs are engineered with an outside diameter that provides optimum dimensions to avoid presets.

All of the plugs were tagged on depth during the drillout process, which used only two roller-cone bits with a 3 1/8-in. mud motor on a standalone unit.



HAL43969

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The first roller-cone bit drilled out 70 Obsidian frac plugs without a short trip, and the second roller-cone bit had only one short trip after 30 Obsidian plugs were drilled out. The 3 1/8-in. mud motor operated at 200 revolutions per minute with a pump rate through the tubing of 3-4.5 bpm, which resulted in 250-275 revolutions per minute at the bit.

RESULT

The well was completed in 23.5 days, placing a plug-and-perf hydraulic fracturing stage every 150 feet along the 3.5 mile-long lateral. Halliburton and Eclipse Resources set 124 frac plugs averaging 5.3 frac stages per day, and achieved a North America land record of 26,641 feet in plug setting depth.

This achievement offers more evidence to support the reliable reputation of the Halliburton Obsidian frac plugs, even when tested in lateral lengths not reached before.

HAL-43973

Roller cone Bit #1 - Drilled out 70 Obsidian® frac plugs with no short-trip

HAL-43970

Roller cone Bit #2 - Drilled out 54 Obsidian® frac plugs with one short-trip after 30 Obsidian plugs

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