



ACTIVATESM Refracturing Service

Halliburton helps Eagle Ford operator increase EUR by 62%

Location: Eagle Ford Shale Formation, Texas

Overview


In the Eagle Ford shale play, completion designs are continuously improving to increase stimulated reservoir volume and well productivity. Many of these improvements have been focused around tighter cluster spacing and more proppant per well to create a higher density of fractures along the wellbore. For many operators, this continual improvement has left a large inventory of understimulated wells with vintage completion designs that have a high potential for refracturing. An operator utilized Halliburton's ACTIVATESM refracturing service to begin a pilot program to evaluate the economic viability of refracturing in the Eagle Ford shale play.

Solutions

Through collaboration with Halliburton, the operator was able to assemble a four-well pilot program located in various parts of its acreage. In the candidate selection phase, each well was screened based on reservoir and completion quality. Findings determined that the original completion design on the candidate wells did not effectively stimulate every perforation cluster, so the goal of the refracturing treatment was to create new fractures in understimulated clusters.

In the design phase, the refracturing treatment was tailored for each candidate well to ensure fracture coverage along the lateral. Halliburton's proprietary Pressure Sink Mitigation process was incorporated into the design to first restore conductivity to old fractures, and then quickly seal them off and build pressure so that new fractures could be generated. In the execution phase, AccessFrac[®] stimulation service was deployed to isolate each proppant cycle and place new fractures along the wellbore, resulting in an effective coverage of the lateral. Figure 1 shows one of the treatment plots where this service was used to successfully place 6.5 MM lb of proppant in 21 cycles.

62%
AVERAGE
EUR UPLIFT



HAL41125

DID YOU KNOW

The ACTIVATESM service involves four steps:

01
SCREEN

SCREEN the best candidate wells based on reservoir and completion quality

02
DESIGN

DESIGN the optimal refrac treatment to connect existing fractures and place new fractures with the Fraclnsight[®] service and proprietary Pressure Sink Mitigation process

03
EXECUTE

EXECUTE the refrac treatment for full lateral coverage with AccessFrac[®] stimulation service

04
DIAGNOSE

DIAGNOSE refrac efficacy and optimize refrac design for future pads with the Integrated Sensor Diagnostics service and FiberCoil[™] tubing

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Predictable refrac wells can enable operators to build a balanced portfolio of new wells, infills, and refracs, and to reduce the cost per BOE breakeven point of their specific acreage. Refracs also allow operators to book incremental reserves.

In basins where we have delivered the ACTIVATE service, operators have seen up to:

- **25% increase in oil recovery factor** with balanced portfolio
- **66% reduced cost per BOE** compared to new drills

| CHALLENGES | SOLUTIONS | RESULTS |
|--|---|---|
| <ul style="list-style-type: none"> Economically create new fractures in an understimulated wellbore | <ul style="list-style-type: none"> ACTIVATESM service, which includes the AccessFrac[®] service, to isolate each proppant cycle and place new fractures along the wellbore | <ul style="list-style-type: none"> Average estimated ultimate recovery (EUR) increased 62% on the four pilot wells, proving that new reservoir rock was stimulated and adding uplift of 1 MM BOE |
| <ul style="list-style-type: none"> Reestablish conductivity to damaged fractures | <ul style="list-style-type: none"> Proprietary Pressure Sink Mitigation process to restore conductivity to damaged fractures and to seal off depleted zones so that new fractures can be generated | <ul style="list-style-type: none"> All wells achieved at least 50% of the wells' original initial production (IP), with the best coming in at 82% of the original IP |

Refracturing Treatment Plot

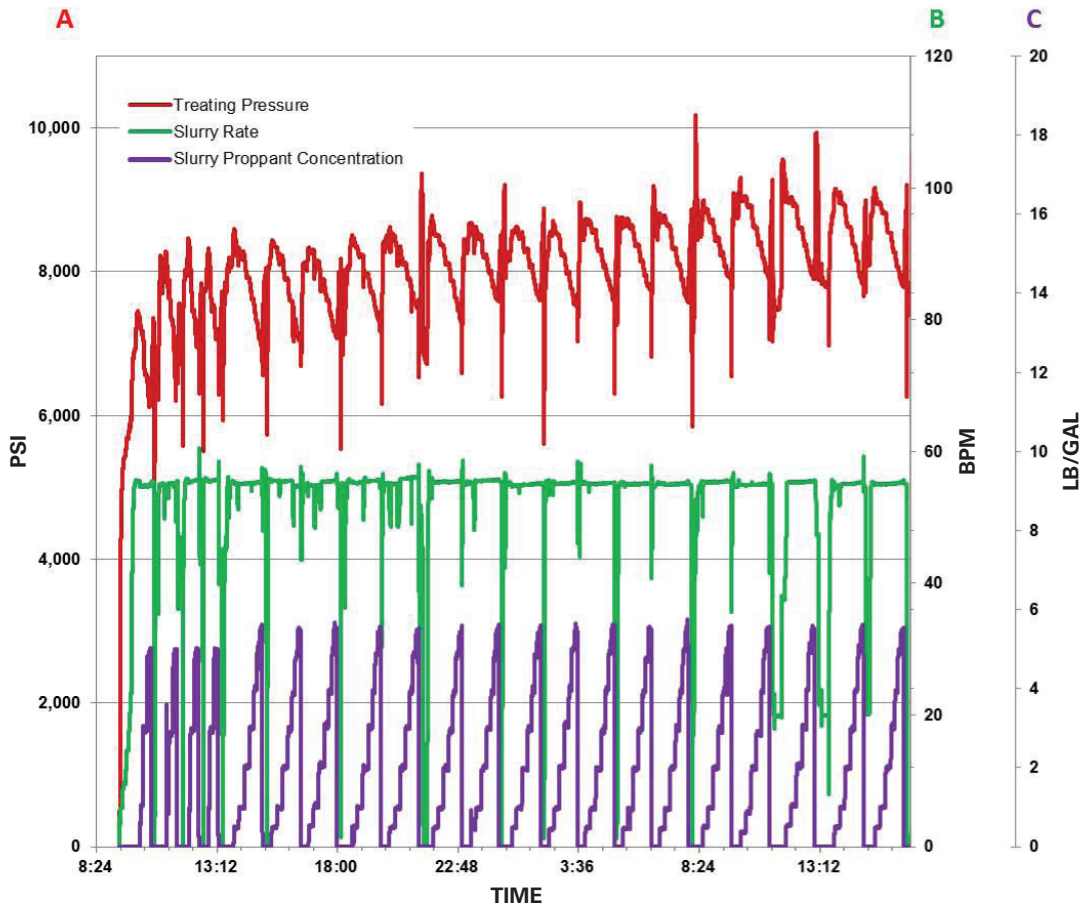


Figure 1 shows treatment plot for one of the pilot wells in the four-well refrac program. This design included 6.5 MM lb of proppant pumped in 21 cycles. It also included Halliburton's Pressure Sink Mitigation process to improve lateral coverage.

Results

Results from the pilot program exceeded the operator's expectations. ACTIVATE service helped the operator achieve an average estimated ultimate recovery (EUR) uplift of 62% from the four pilot wells. All the wells achieved at least 50% of their original initial production (IP), with the best well achieving 82% of its original IP (Figure 2). ACTIVATE service demonstrated huge potential for refracturing in the Eagle Ford shale play, and that it can be done, predictively and repeatedly, for larger field developments.

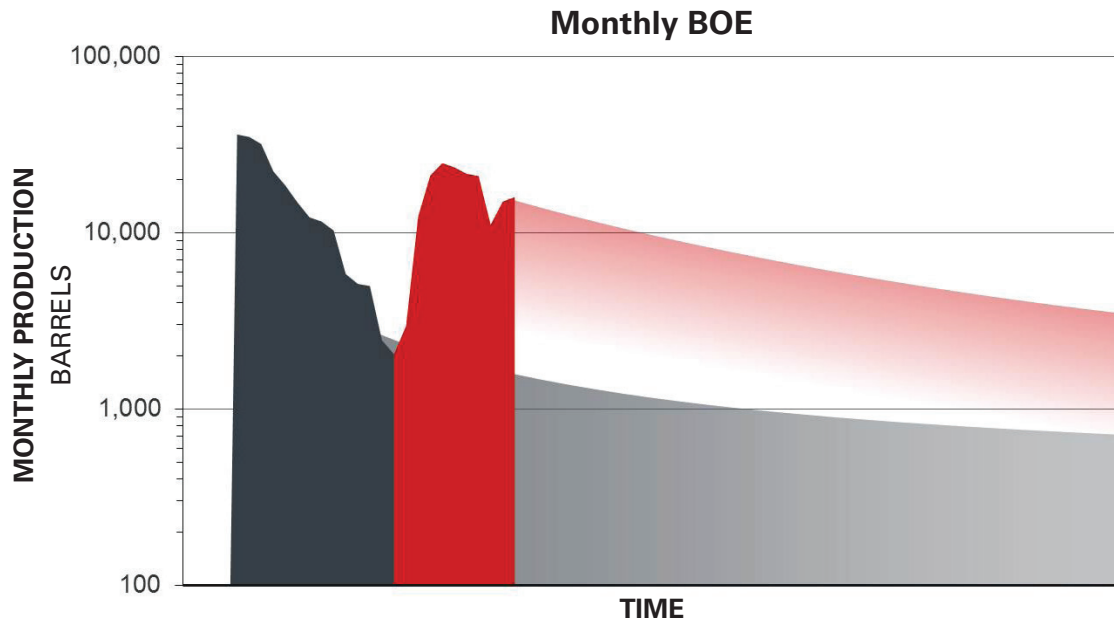


Figure 2 shows monthly production for one of the pilot wells in the four-well refrac program. Production rates of over 600 bopd were achieved, and the post-refrac initial production (IP) was 82% of the original IP.

Contact Halliburton to see how the ACTIVATE service can help you build a balanced portfolio and recover bypassed reserves predictively and repeatedly.