Restoring Annular Barrier in a Horizontal Well

Grant Stephen – Chevron Drilling Engineer
13 3/8” Shoe 4917ft
4,110ft TVD
70° inc.

Partial Pack off

Port Collar
11,000ft
5,100ft TVD
76° inc.

10ft Perforated Interval
15,319 – 15,329ft
5,743ft TVD
84° inc

Complete Pack off

Float Collar
19,150ft
6,415ft TVD

Float Shoe
19,503ft
6,453ft TVD
88° inc.
Identification of 10ft perforating interval
- Liquid filled annulus
- Adequate standoff
- High confidence of circulation path from shoe to perforations
PERF-WASH-CEMENT CHALLENGES

• Identification of 10ft perforating interval
  △ Constrained to perforate at the existing perforated interval

• Liquid filled annulus over logged interval
  △ No annular base to provide cement support once spotted

• Adequate standoff
  △ 84° inclination, high risk of cement slumping and exposing perforations/formation

• High confidence of circulation path from shoe to perforations
  △ Challenging environment to achieve 100% zonal isolation and reinstate casing integrity with PWC
Perforated 126ft of 9 5/8” casing with 7” 18spf guns.

Washed perforated interval with 11.8ppg OBM at 0.5ft/min, 345gpm, 6rpm (loss free rate). Passed over interval down then up.

RIH below bottom perf and wash with 11.8ppg spacer at 250gpm, 6rpm.

Opened cement valve with a ball drop, conducted cementing operations with 105gpm, 80rpm whilst pulling out of hole at 6ft/min. (350% of perforated interval, 800ft)

Volume control is critical throughout operation.
HYDRAHEMERA™ OPERATIONS

- Tagged TOC 100ft above perfs
  - 65% of cement volume was contaminated.

- Drilled out internal cement, observed dynamic losses when the top perforation was exposed

- Performed cement squeeze to achieve zonal isolation – 1.9bbl squeezed away

- Drilled out internal cement with no losses and successfully pressure tested

- Logged cemented interval
# RESULTS ACHIEVED

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All operations conducted at +/- 15,400 ft (+/- 20hr round trip)

- Install FasDrill bridge plug
- Perforate casing
- Wash and cement
- Drill out cement
- Perform remedial squeeze
- Drill out cement and pressure test
- Perform cement evaluation log

Total operational time: **14 days** (5 days tripping)