



human energy®

HYDRAWELL
INTERVENTION

Schlumberger



Restoring Annular Barrier in a Horizontal Well

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PRESENTATION AGENDA

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OVERVIEW OF WELL

2

CHALLENGES FACING
SUCCESS OF PWC

3

PWC OPERATIONS

4

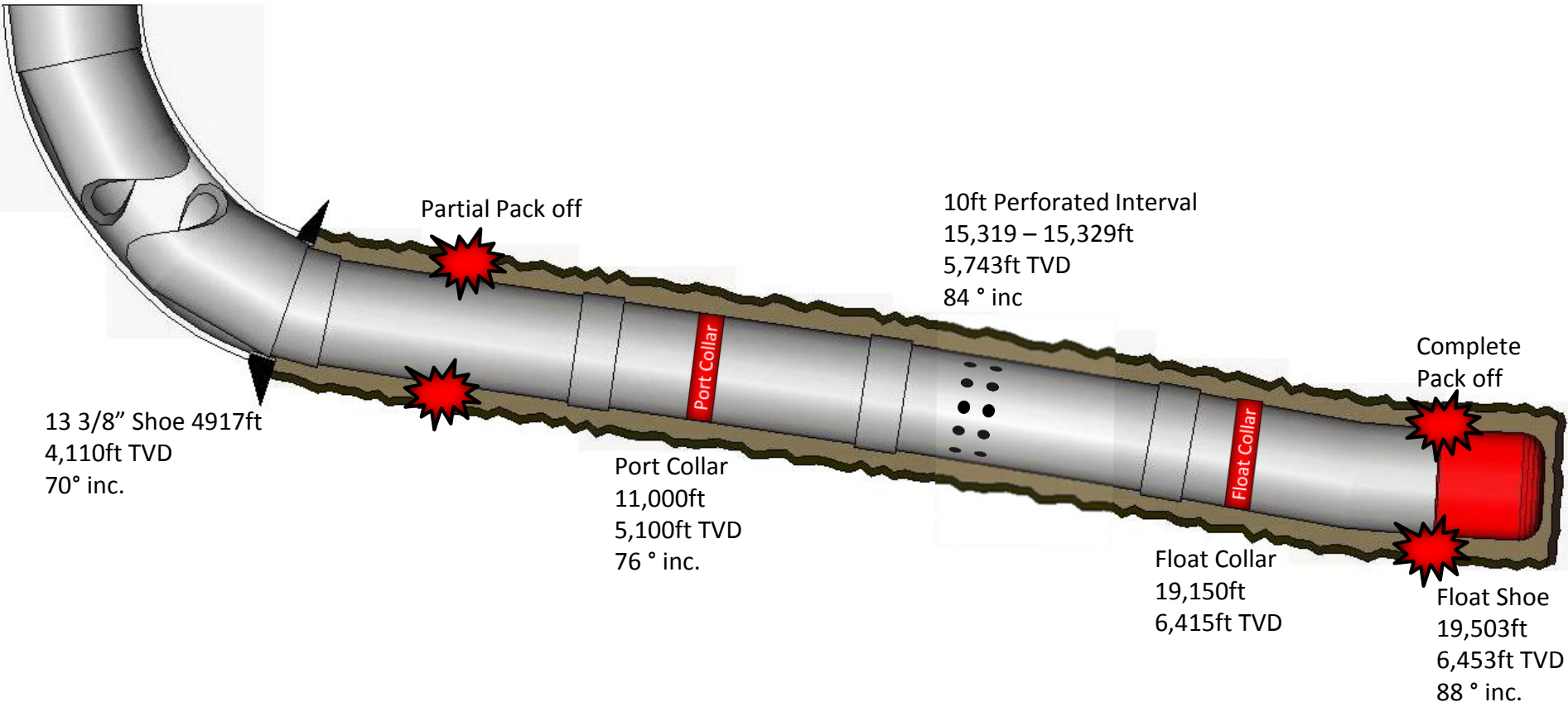
RESULTS ACHIEVED

5

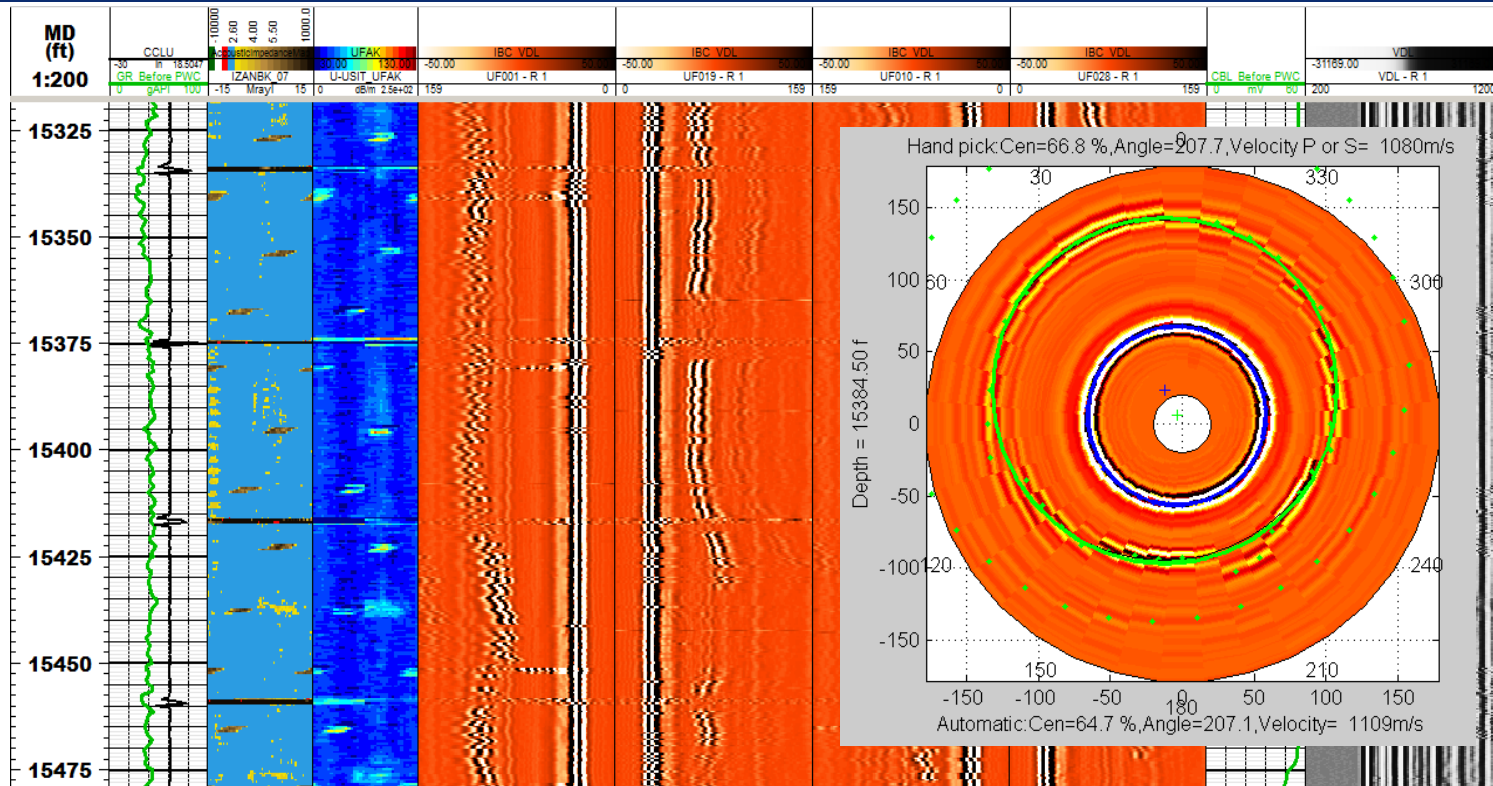
QUESTIONS



WELL STATUS



WELL STATUS



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



HYDRAHEMERA™ OPERATIONS

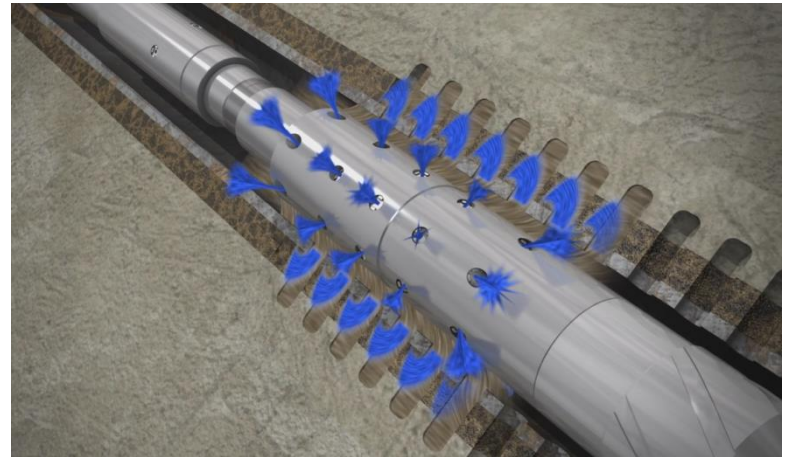
Perforated 126ft of 9 5/8" casing with 7" 18spf guns.

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.

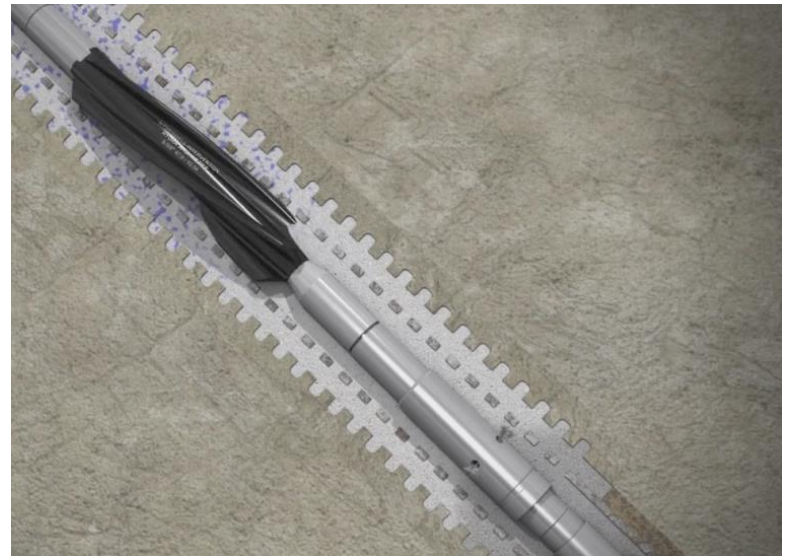
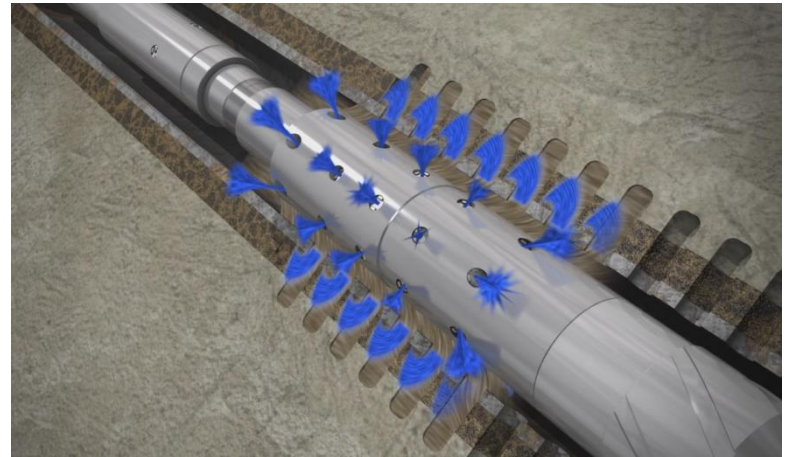
Opened cement valve with a ball drop, conducted cementing operations with 105gpm, 80rpm whilst pulling out of hole at 6ft/min. (350% of perforated interval, 800ft)

Volume control is critical throughout operation.



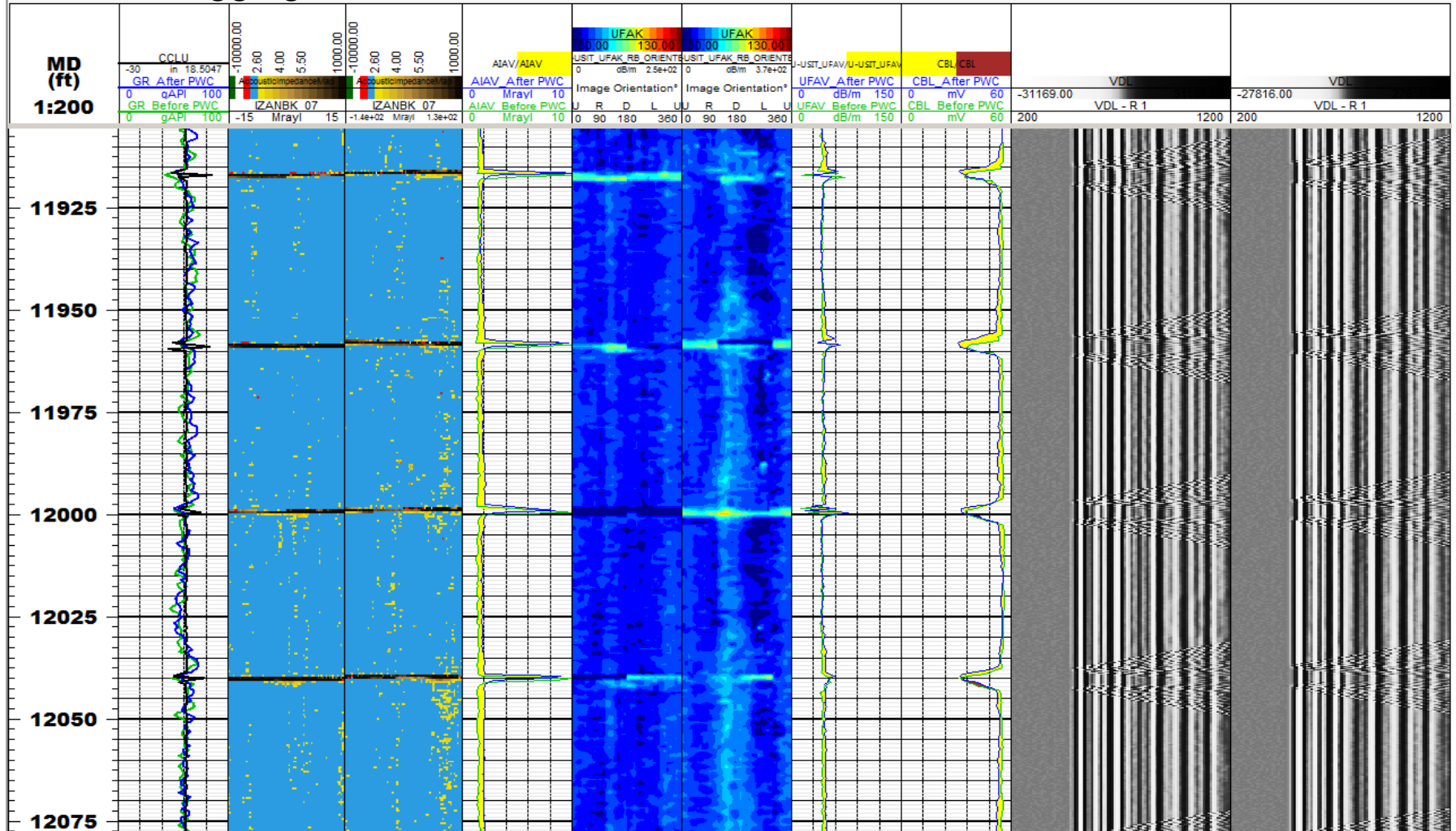
HYDRAHEMERA™ OPERATIONS

- 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

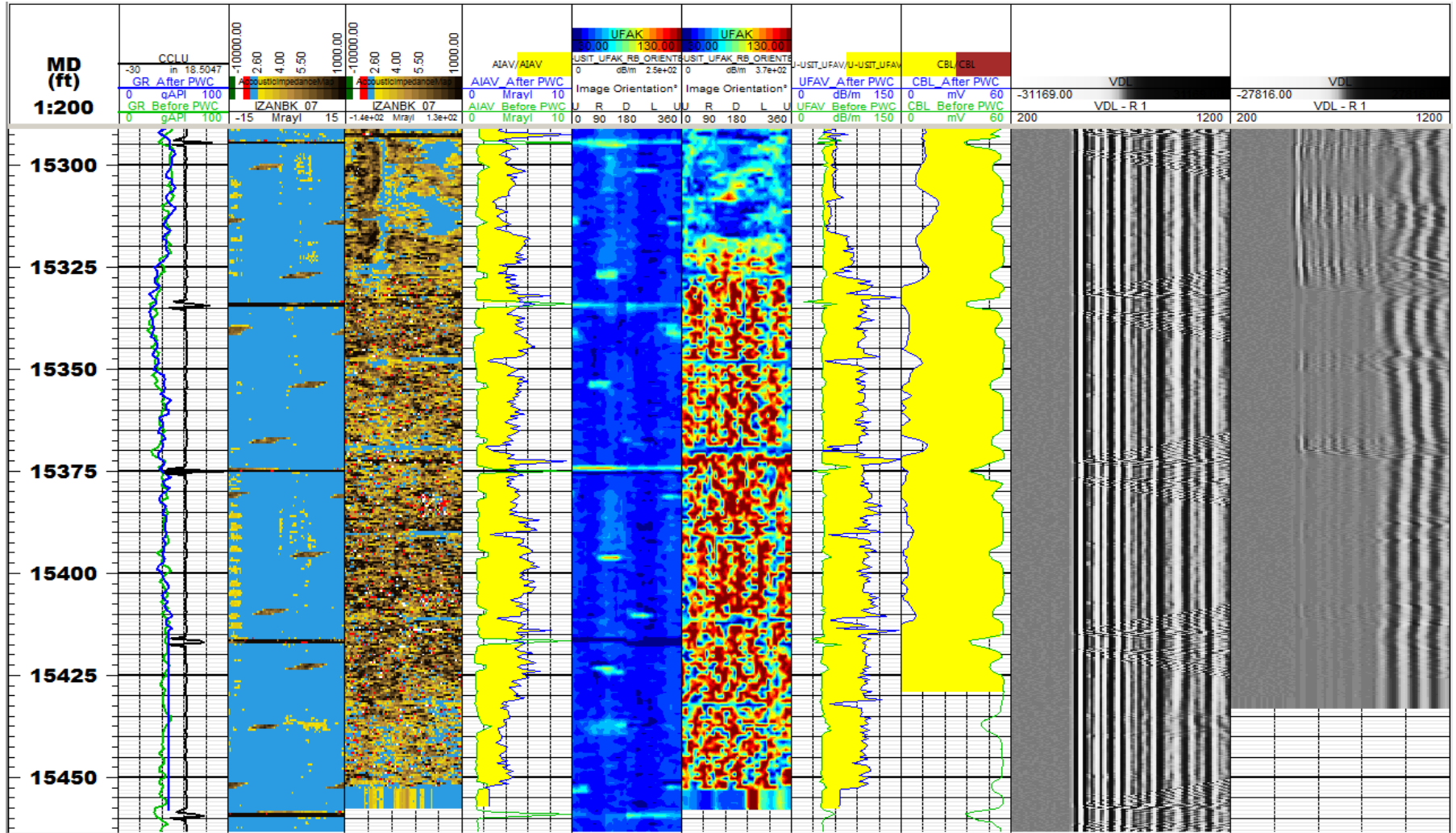


RESULTS ACHIEVED

Calibrate Logging Results



RESULTS ACHIEVED



RESULTS ACHIEVED

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)



