

Expro Excellence

Detecting sub minute duration B-annulus micro-leak in PCP producer well using DFOS Fibre Optic Surveillance

Well Intervention and Integrity



Objectives and background

- Sustained B-annulus pressure (< 80 psi) was observed in a producer well
- A bleed-off test sustained less than 10 seconds of intermittent liquid droplets, indicating an extremely low-rate leak
- Well Integrity evaluation would be challenging due to the minimal acoustic and thermal responses generated
- Conventional through-tubing surveillance options were restricted by the presence of the Progressive Cavity Pump rod string
- Expro was commissioned to identify the source of the leak and evaluate the integrity of the annulus

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- Expro deployed a Distributed Fiber Optic Sensing hybrid line for real-time downhole monitoring
- The surveillance program was specifically designed to detect subtle fluid movement, using a series of shut-in and bleed-off tests to distinguish genuine leak signatures from background noise
- To maximize leak detectability, the B-annulus pressure was rapidly manipulated to create the largest possible pressure perturbation
- A rapid bleed-off reduced the B-annulus pressure from 65 psi to 0 psi in just 3 seconds. During a four-hour period, less than 2 gallons of water were produced, equivalent to approximately 0.28 bbl/d

Value to the client

- DFOS identified a subtle leak signature between 290ft and 620ft in the well
- Subsequent fluid sample analysis revealed a salinity profile inconsistent with the previously suspected aquifer at 900 ft, confirming that the leak originated from a shallow leak source
- The results suggest a potential integrity issue affecting in the 9% casing and C-annulus
- Despite the identified integrity concern, the leak's low rate, shallow location, and fluid characteristics indicate that its impact on production is likely to be negligible. However, ongoing surveillance was recommended to monitor changes and to support future mitigation planning
- These findings provided a robust basis for continued well integrity monitoring, informed risk management, and the evaluation of potential remediation options

Enhanced production



Well integrity

