Expro Excellence

Validating DFOS eXDTS injection allocation with PLT in a multi-zone water injector

Well Intervention & Integrity

Objectives and background

- A multi-zone water injector was deployed to maintain reservoir pressure and support field-wide production optimization. The well was completed with multiple Sliding Side Doors (SSDs), all open during injection, allowing commingled flow across several zones. While injection allocation was estimated through static open-hole (OH) data and permeability-based modeling, the actual injection distribution among zones remained uncertain
- The primary objective of this operation was to determine the true injection allocation profile along the wellbore and validate the reliability of DFOS eXDTS slope-based injection profiling by comparing it directly with Production Logging Tool (PLT) measurements. This was particularly critical to build confidence in DFOS as a standalone or complementary solution for injection surveillance in multi-zone completions

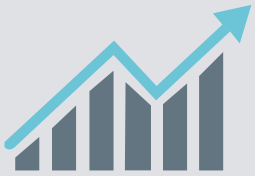
Expro Excellence

- Expro deployed an integrated DFOS surveillance solution providing simultaneous DTS and DAS acquisition, with DAS data further processed to extract Low-Frequency DAS (eXDTS). This enabled high-resolution, slope-based fluid velocity analysis with the sensitivity required to detect subtle temperature changes associated with injected water entry across multiple zones
- Accurate depth correlation was achieved through GR-CCL and temperature matching, aligning open-hole GR data to DTS and subsequently to DAS/eXDTS measurements. The acquisition program captured a baseline, two injection rates separated by a shut-in period, allowing dynamic evaluation of injection behavior. DFOS data was acquired continuously throughout the entire sequence
- A PLT run was performed during the final injection rate using a tool string comprising GR-CCL, pressure, temperature, and spinner sensors, providing an independent and direct measurement of injection allocation for validation of the DFOS interpretation

Value to the client

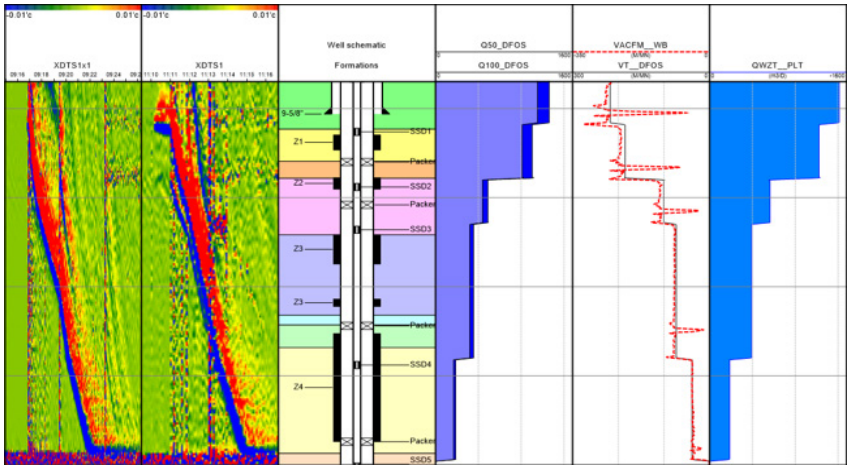
- Delivered direct confirmation of actual injection entry points and allocation across the multi-zone SSD completion, moving beyond model-based assumptions
- Demonstrated strong agreement between DFOS eXDTS–derived injection profiles and PLT measurements, increasing confidence in allocation accuracy
- Validated DFOS eXDTS as a reliable surveillance solution for commingled, multi-zone injection monitoring across varying injection rates
- Reduced uncertainty in multi-zone injection performance, supporting improved reservoir pressure management and operational decision-making
- Enabled ongoing field optimization through a low-risk, repeatable, and cost-effective injection surveillance approach suitable for future monitoring programmes

Enhanced production



Well integrity

A compact, integrated DFOS + PLT approach delivered validated, flow-based injection allocation insight, providing the clarity required to manage multi-zone water injectors and optimize reservoir pressure support with confidence



DFOS & PLT Injection profile comparison

The LF-DAS image shows two injection rates with the PLT tool stationed between Zones 4 and 5. DFOS captures a consistent injection profile across both rates, with an increase in magnitude of approximately 10% during the second injection. The PLT run conducted at the second rate shows a similar zonal profile, with minor magnitude differences likely due to timing differences or spinner calibration. Overall, the comparison confirms DFOS as a reliable tool for evaluating water injection performance.