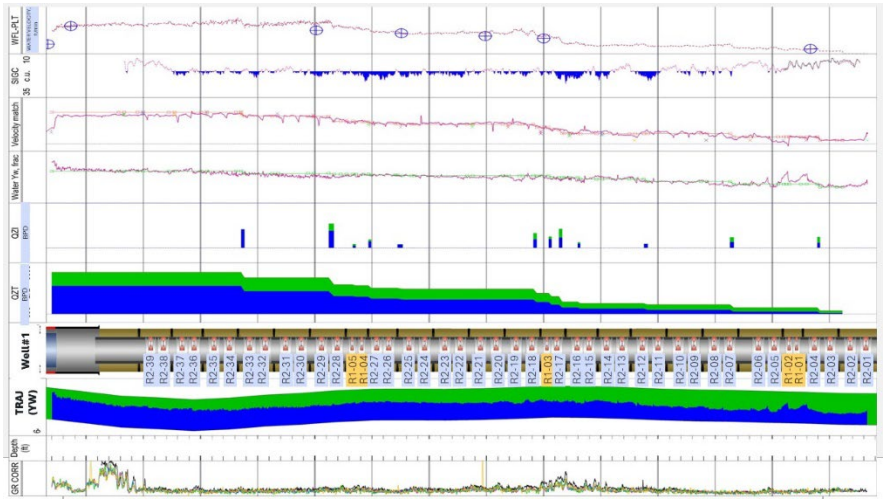
Rigless E-Line Coiled-Tubing Flow Profiling

Clarifies Water Source in 44-Port ICD Well, Identifies High-Value Intervention Targets



Schematic showing the flow contribution profile across ICD ports along the horizontal section.

Objectives

- Confirm the flow profile across the different ports of a horizontal inflow control device (ICD) completion.
- Understand oil production potential across the completion and identify where value remains in the well.
- Evaluate performance across a 44-port ICD completion with 22 swell packers in a 2,200-ft (670-m) long-radius horizontal section and determine the source and distribution of excessive water production in a well where water cut had increased to more than 90%.

Our Approach

- Executed a rigless intervention using E-line coiled tubing in a horizontal development producer to enable flow profiling in an ICD completion.
- Deployed an innovative real-time combination of compact array production logging tools (PLT), pulsed neutron logging (PNL) for SIGMA, and water-flow log (WFL) measurements, optimizing WFL station positioning during the operation.
- Applied cross-plot analysis between PLT water-velocity profiles and WFL water-flow vectors to improve inflow interpretation, assess swell packer integrity, and identify abnormal water entry from specific ICD ports.
- Overcame the challenges of a long ICD section, heavy oil, potential fluid emulsion, and ESP lift with Y-tool configuration to establish a robust multiphase flow profile and near-wellbore water saturation understanding for intervention planning.

LOCATION
Middle East

WELL TYPE
Development, producer

FORMATION
Sandstone

HOLE ANGLE
Horizontal

PRODUCTS/SERVICES
- Raptor® 2.0 cased-hole evaluation system
- Array fluid velocity resistance capacitance tool
- Weatherford production logging tools

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Value to Customer

- Delivered a continuous, validated multiphase flow profile by integrating PLT, SIGMA, and WFL measurements, reducing uncertainty around water saturation, port contribution, and swell packer integrity.
- Identified two ICD clusters for shifting and the bottom section for cleaning, pinpointing water-producing ports and bottom ports with high oil hold-up to reduce water cut and improve oil production.
- Gave the customer a clear understanding of well performance, confirmed well value through rigless intervention, and defined the path forward for the next intervention and rig workover phases.
- Demonstrated a first-time E-line coiled-tubing deployment of compact array PLT, PNL SIGMA, and WFL in an ICD completion, establishing an optimum approach for flow profiling in horizontal ICD wells.



The Weatherford array fluid velocity, resistance and capacitance tool is a compact 6-arm multi- sensor array production logging tool. Each arm provides three measurements via a fluid velocity sensor, and a co-located fluid resistance and fluid capacitance sensor.

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