/ AB SMART SERVICES · PROBE™ MULTILAYER DOWNHOLE MONITORING SYSTEM

Real-time zonal inflow monitoring with PROBE™ in dual-zone ESP wells

01 · TASK

Arystanovskoye, in Western Kazakhstan, is a mature field producing from stacked Jurassic horizons; its dual-zone oil wells commingle two formations and lift them with ESPs. Zonal surveillance relied on PLT surveys run past the pump through a Y-tool — each one a well shut-in, a logging crew and a high cost per run, and each only a snapshot. Between surveys the operator could not see how production was split between the formations, nor the water cut and pressure of each: allocation rested on an expected split of about 70/30 in favour of the upper horizon.

The operator needed continuous, real-time zonal inflow data — without well shut-ins and without recurring logging runs.

02 · SOLUTION

AB Smart Services integrated the PROBE Multilayer system into the ESP completions of four dual-zone wells: two instruments per well, one directly above each producing formation, eight in all. The system goes in during an ESP workover with the standard program unchanged — no Y-tool, no bypass tubing, no additional cable to surface.

On well A-228, documented in SPE-236181-MS, the two instruments hang on a single armoured cable from the bottom of the standard ESP downhole gauge. The upper one, 14 m below the gauge and above horizon J-X, measures the flow of both horizons; the lower one, 32 m further down between the horizons, measures horizon J-XI alone, and the difference gives J-X. Each measures flow rate with a turbine, water cut over 0–100%, pressure and temperature. The gauge relays their data through the ESP power cable to the control panel, where they appear next to the ESP parameters every 10 seconds.

- Vendor-neutral: connects at the standard downhole-gauge interface of all major ESP suppliers
- Four-hour sensor-string hookup within the normal run-in-hole, function-tested every 500 m on the way down
- No added cable, control line, wellhead penetration or surface infrastructure

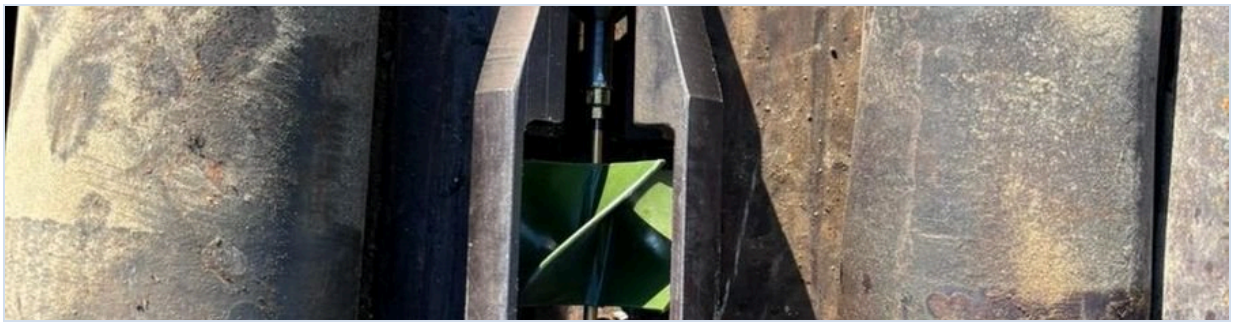


FIG. 01 · PROBE™ INSTRUMENT — TURBINE FLOWMETER IN ITS PROTECTIVE CAGE · ARYSTANOVSKOYE

03 · RESULT

55 / 45	~70 / 30	12.7 m³/d	10 s
Measured upper / lower split, ±4 pp	Split assumed before installation	Downhole total; separator 11.9, tank 12.1	Zonal data update, in real time

Both instruments on A-228 streamed zonal data from start-up, with no shut-in and no logging run. In the first weeks, while the total rate settled from about 9.4 to a stable 11–11.7 m³/d, the split between the horizons visibly shifted as each layer cleaned up — a change that commingled surface data and snapshot logging would have missed.

- Measured split over the stable period, 23 July – 3 August 2024: 55% upper (J-X), 45% lower (J-XI), ±4 percentage points — not the ~70/30 expected before installation
- The operator adopted the measured split for official production accounting and regulatory reporting
- The downhole total of 12.7 m³/d agreed with a separator test (11.9 m³/d) and tank measurement (12.1 m³/d) within instrument accuracy
- Water cut showed the lower zone first producing kill fluid while the upper zone produced oil from start-up
- ESP operating modes optimised against each zone's response; any change in the well is traced to its interval as it happens
- Y-tool PLT campaigns eliminated — more than 12 surveys over the pump run, with their shut-ins, crews and personnel exposure
- The two-instrument assembly costs about as much as one conventional PLT survey, so the first avoided survey pays it back

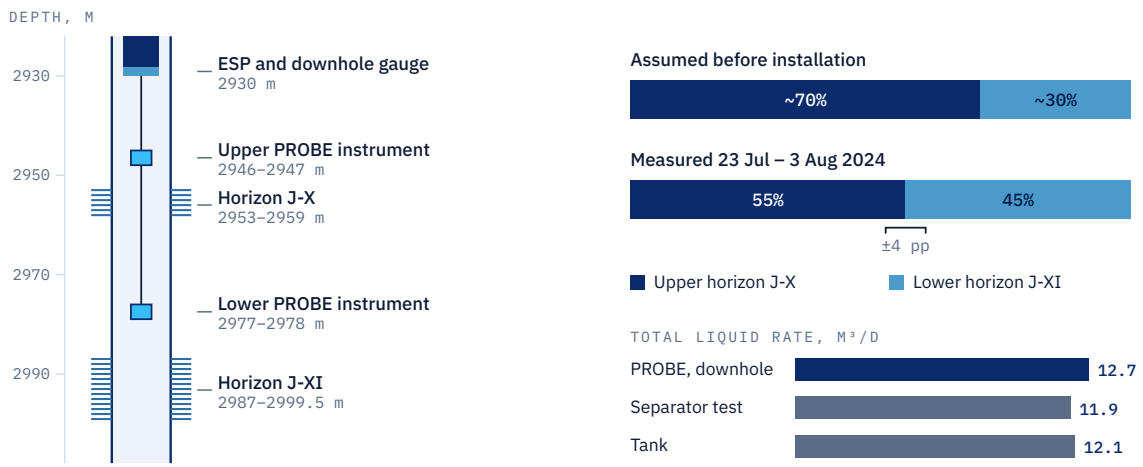
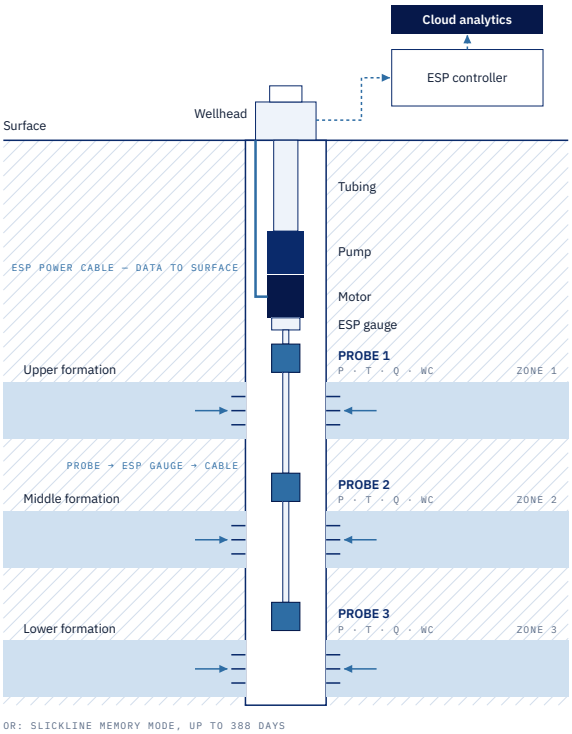


FIG. 02 · WELL A-228: AN INSTRUMENT ABOVE EACH HORIZON (LEFT); THE ZONAL SPLIT AND THE RATE CHECK (RIGHT)



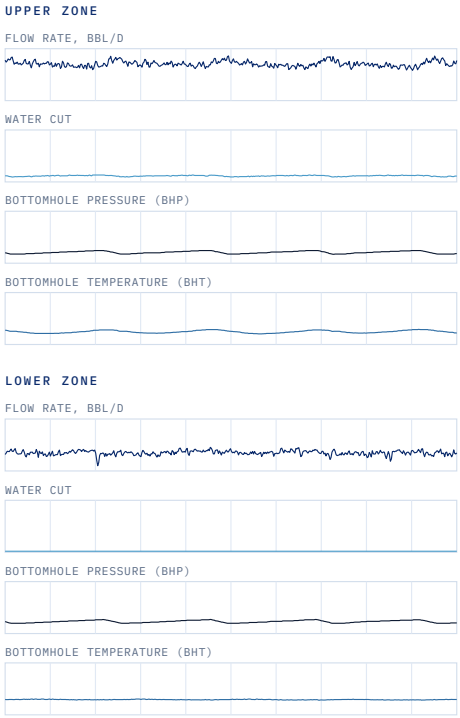


FIG. 04 · REAL-TIME DATA FROM THE TWO PROBE INSTRUMENTS, UPPER AND LOWER ZONE · TRENDS; THE SOURCE GIVES NO SCALES

PUBLICATION

SPE-236181-MS — ADIPEC 2026, Abu Dhabi, 2–5 November 2026 (to be presented)