

Reservoir Evaluation System Acquires Samples Without Sticking in Two Wells, Drives Decisions to Save \$400,000



Using a slim and advanced design, the Weatherford reservoir evaluation system (RES) reduces the chance of sticking without sacrificing the quality of data.

Objectives

- Perform pressure tests and obtain a high volume of sampling data despite challenging geological conditions to enable making prompt decisions on well completions. Wireline formation testing and sampling has an inherent risk of sticking because of pressing the tool string against the openhole wellbore wall with high force for several hours. Another service company had experienced several sticking incidents and left expensive equipment downhole when performing wireline testing in the 6-in. liners of the customer's wells.

Our Approach

- Although the customer had prohibited a dual-packer configuration based on incidents with other tools, the Weatherford wireline team proposed using this arrangement with the RES solution because of the technical advantages:
 - RES assembly offers a smaller 4.5-in. (114-mm) size compared to other companies' 4.8-in. (120.7-mm) equipment size.
 - Weatherford compression packers have much less contact area with the wellbore wall, and they require much less time for switching between the transport and working positions and vice versa than inflatable packers from other service companies.
 - Weatherford compression packers are as much as half the distance apart compared to competitors' products. This reduced distance, of up to 19.7 in. (0.5 m), results in significantly less volume to displace before logging can commence. The outcome is a more efficient logging operation.

LOCATION

Russia

WELL TYPE

Onshore, exploratory

FORMATION

Porous, fractured

HOLE SIZE FOR LINER

6 in. (152.4 mm)

DEPTH

- Well A: 10,902 ft (3,323 m)
- Well B: 16,404 ft (5,000 m)

PRESSURE AT DEPTH

- Well A: 3,600 psi (24,821 kPa)
- Well B: 6,092 psi (42,000 kPa)

TEMPERATURE AT DEPTH

- Well A: 223°F (106°C)
- Well B: 199°F (93°C)

NUMBER OF TESTS

- Well A: 53 PVT tests, 3 samples
- Well B: 110 PVT tests, 6 samples

PRODUCTS/SERVICES

- Openhole logging services
- Reservoir evaluation system (RES)



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Our Approach (continued)

- After reviewing the proposal, the customer approved the work in Well A as an exception.
- The wireline team planned the operation in advance with the participation of the customer's leading specialists, the drilling contractor, and the logging company. Planning helped to minimize and control the inherent risks associated with this wireline method.
- In Well A, the team deployed the RES to a depth of 10,902 ft (3,323 m). It performed 53 pressure tests and obtained three pressure-volume-temperature (PVT) samples without sticking incidents. This initial operation proved the viability of the solution.
- Four months after the RES success in Well A, the operator enlisted the wireline team for even more complex work in a similarly designed well drilled with oil-based mud.
- In Well B, the team deployed the RES to a depth of nearly 16,404 ft (5,000 m), which had a pressure of 6,092 psi (42,000 kPa) and a temperature of 199°F (93°C). The RES performed 110 pressure tests and obtained six PVT samples.
- At one depth of study and after the selection of two PVT samples, the RES recorded a mini-drillstem test in just 2 hours. A pressure probe took two representative samples, and a module of double compression packers took the rest on pipe-conveyed logging (PCL) in one run over 155 hours.
- Because of the success in both wells, the customer made the RES in the dual-packer configuration the preferred option rather than the exception for challenging conditions in its 6-in. wells.

Value to Customer

- The Weatherford RES solution performed pressure tests and obtained high-volume samples in two wells after tools from other companies had failed in similar scenarios. As a result, the customer made efficient, data-based decisions about the completions, which reduced unnecessary costs for casing running, cementing, perforating, and drillstem testing for a savings of approximately US \$400,000.

