High-Performance Downhole Reservoir Testing System Introduced

Engineering a complete testing string into a fully integrated system allows operators to get everything they need in a single trip.

Contributed by Schlumberger

The Quartet* high-performance downhole reservoir testing system is one-fourth as long as the system it replaces. The system’s four technologies work in concert to help develop an accurate characterization of the reservoir in less time and with greater reliability than conventional systems.

The difference

The tool string is four times shorter than a similarly capable tool string available. Shorter means simpler, as evidenced by the elimination of drill collars and slip joints, that translates to greater reliability, safety, and deployment efficiency. Tools are joined using premium connections so hydraulic integrity is assured. With fewer downhole connections, fewer seals, single-trip capability, and ruggedized modules, the Quartet system can be used to simultaneously deploy high-performance perforating gun strings so users can shoot and test in one sequence.

The name derives from the four individual tools that isolate, control, measure, and sample for a better reservoir test. Starting at the bottom, the CERTIS* high-integrity reservoir isolation system is the first of its kind: a retrievable test system that delivers production-level isolation. Combining the features of a retrievable drillstem test packer with a hydraulic-set permanent packer, the system eliminates the need for drill collars and slip joints. Annulus pressure activates the packer so no rotation or mechanical setdown weight is required. This is useful in deviated or horizontal wells where applying precise mechanical forces can be problematic. Once set and locked, the stinger is released from the packer body and the internal seals are free to move in the sealbore, protected from damage or debris. When reservoir testing is complete, a pull releases the slips, retracts the packer seal element, and opens an internal bypass valve so the string can be retrieved from the well without swabbing.

With the CQG* crystal quartz gauge, measurement accuracy and high-resolution are assured by a single quartz crystal that measures both pressure and temperature at the same point. Real-time dynamic compensation ensures measurement stability with minimal drift and is enabled by the dual-mode pressure sensor and an accurate clock. As a result, long-term pressure transients can be acquired for reservoir investigation.

Located immediately above the CQG is the SCAR inline independent reservoir fluid sampling tool. Multiple, independent fluid samples can be captured and maintained at reservoir conditions with independent nitrogen gas charges. Capable of acquiring up to six 600 cc samples or up to ten 300 cc samples per trip directly from the flow stream to minimize contamination, the samplers can be activated simultaneously or selectively at any time during the flow sequence using annulus pressure.

System control is maintained by the IRDV intelligent remote dual valve tool which includes a tester valve and a circulating valve. The tester valve controls flow from the reservoir to the surface, and the circulating valve controls flow between the annulus and the test string. This field-proven tool is operated by low-pressure pulses sent down the annulus, which allows it to operate independently of other tools or guns in the string. Valves are hydraulically powered by and referenced to hydrostatic pressure and are immune to temperature and pressure fluctuations. For optimal downhole testing operations, the tester valve and circulating valve can be operated simultaneously, independently, or sequenced to operate automatically.

For more information, visit Schlumberger at www.slb.com/Quartet.com

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