

CT-Conveyed Production Logging Tools

Help Operator to Characterize Fluid Type and Volumes Across Multiple Zones in a Horizontal Well

Objectives

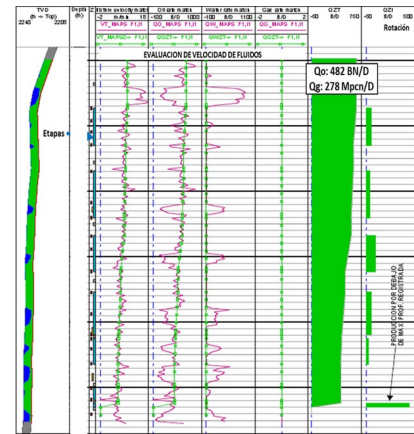
- Riglessly acquire high-quality production log data across six productive intervals in a challenging horizontal well.
- Evaluate fluid types and volumes produced from individual frac stages in an unconventional reservoir.

Our Approach

- An operator called on Weatherford to acquire cased-hole production logs in a horizontal well. The operator needed the log data to book reserves in an unconventional reservoir to secure financing for subsequent development activity.
- The operator informed Weatherford logging specialists that their job would be complicated by a long, tortuous horizontal interval that contained milled frac-plug debris. In addition, there would be no drilling rig on location. The logging specialists teamed with their pressure pumping colleagues to devise a plan for running logs on coiled tubing (CT) to overcome those challenges.
- Weatherford crews deployed to the wellsite with a suite of production logging tools, CT unit, and crane. The crane suspended the CT gooseneck over the wellhead, and logging crews made up the logging tools to the CT.
- The CT unit operator carefully controlled the descent of the logging toolstring through the dogleg and into the horizontal section. After reaching total depth, the operator pulled the CT out of the hole, and the logging tools recorded an extensive suite of formation-fluid measurements.
- The logging crew ran conventional and multi-array production logging tools under flowing and shut-in well conditions to evaluate the zonal contribution, fluid type, and flow performance across six hydraulically fractured intervals.

Value to Customer

- Weatherford logging and CT crews overcame complex downhole conditions to riglessly acquire high-quality logging data that the operator required to certify production.
- With a full suite of comprehensive fluid measurements, the operator was able to evaluate the efficiency of each frac stage and to assess water, oil, and gas fractions to determine how different parts of the reservoir contribute to the production stream.



Plot of the flowing well PLT analysis shows fluid volumes and flow velocities across productive intervals.

LOCATION

Tamaulipas, Mexico

WELL TYPE

Onshore unconventional exploration well

FORMATION

Upper Jurassic shale

HOLE SIZE AND ANGLE

6-1/4 in., 90.62°

CASING SIZE AND TYPE

4-1/2 in., P-110, 15.1 lb/ft

LOGGING DEPTH

8,202 to 10,039 ft (2,500 to 3,060 m)

PRODUCTS/SERVICES

- Production logging tools
 - Caged fullbore flowmeter (CFBM)
 - Fluid density radioactive (FDR) tool
 - Inline spinner (ILS) flowmeter
 - Platinum resistance thermometer (PRT)
 - Production gamma ray (PGR) tool
- Multi-array production tools
 - Resistance array tool (RAT)
 - Spinner array tool (SAT)
- Pressure pumping services
 - Coiled tubing unit
 - Bowen lubricators
 - Double stripper packer
 - Injector

