

Operator Improves Complex Reservoir Understanding with Advanced Analysis

IN-DEPTH REPRESENTATION OF FLUID DISTRIBUTION LEADS TO MORE PRODUCTIVE DRILLING FOR UP TO 20% INCREASED RESERVOIR RECOVERY

THE MIDDLE EAST

CHALLENGES

- » Enable the operator to better understand the reservoir's complex fluid distribution
- » Thoroughly correlate and analyze PVT data to more accurately predict actual GORs and CGRs
- » Enhance existing equation-of-state to improve field development planning

SOLUTIONS

- » Reevaluate existing modular dynamic test and well test data
- » Correlate pressure and seismic data to identify structural isolations
- » Derive representative PVT data that would accurately predict correct GORs and CGRs
- » Devise new methodology to tune the existing equation-of-state
- » Deliver enhanced guidelines for collecting and testing future PVT samples

RESULTS

- » Created a new fluid distribution model, enabling new reserve booking and providing higher confidence for identifying infill drilling locations
- » Achieved enhanced PVT characterization, leading to better representative GORs and CGRs
- » Provided new guidelines for collecting and testing future PVT data
- » Improved characterization of PVT and fluid distribution to increase reservoir recovery

A key to the project's success was the Halliburton team's ability to analyze data from multiple sources and correlate the data to develop an improved characterization of PVT and fluid distribution for **more accurate field development planning**.

OVERVIEW

A customer in the Middle East sought to further understand a mature field's complex fluid distribution to redefine its reserve booking and enhance its field development planning accuracy. Understanding fluid distribution enables better targeting of hydrocarbon traps and can improve reservoir recovery by up to 20%. Halliburton Consulting partnered with the operator to complete an integrated subsurface analysis with the intention to aerially explain the existing condensate and oil segregation in the field and understand compartmentalization in the reservoir. The Halliburton Consulting team developed a new methodology to analyze the available well test and production data and refine the existing equation-of-state coefficients to better represent the field's fluid distribution.

CHALLENGES

The mature field's complex fluid distribution was leading to uncertainty on current hydrocarbon volumes in place, thus impairing reserve booking and future field development planning. Additionally, the numerous collected samples of pressure/volume/temperature (PVT) did not accurately represent and predict the actual condensate/gas ratio (CGR) or producing gas/oil ratio (GOR), with lab results indicating a lower GOR than seen during actual production.

SOLUTIONS

To provide additional insight toward accurate interpretation of the PVT data, the Halliburton team compiled and analyzed a comprehensive set of well test, production, and fluid sample data. Halliburton analyzed the modular dynamic test (MDT) data, utilized the well test data to determine the produced fluid type, and correlated the pressure and seismic data to identify structural isolations. Fault data were also compiled and reinterpreted for compartmentalization. The Halliburton team then devised a new methodology that integrated production and well test data with the equation-of-state so simulation models could more accurately predict the GOR and CGR.

RESULTS

The improved equation-of-state led to more accurate PVT characterization and a better understanding of the complex fluid distribution in the reservoir. The operator was able to better identify future infill well locations to ensure efficient recovery of remaining reserves and help achieve forecasted production targets. A key to the project's success was the Halliburton team's ability to accurately analyze data from multiple sources and correlate this data to develop an improved characterization of PVT and fluid distribution, thus leading to enhanced reservoir recovery.

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