

Case study: Middle East

RCX MAGNA large area multi-probe service achieved all objectives in an extremely challenging borehole

While operating in the Middle East a customer drilled an 8³/₈-in. well with water-based mud. Open-hole logs identified the well had high rugosity and washouts. The estimated maximum overbalance across the reservoir was 5,500 psi with expected mobility as low as 0.1 to 1.0 md/cp, making the deployment and retrieval a major concern. Achieving a seal within a borehole in this condition would also be difficult. Pipe conveyed logs were required to retrieve the sampling and testing tool string after deployment because of differential sticking risks over multiple overbalanced reservoirs.

To evaluate the commercial value, make important decisions about optimum recovery strategies, and maximize the return on investment, the customer required exceptional service performance to collect pressure data, fluid characterization, and representative samples. The customer needed to efficiently secure samples in the ultra-low mobility reservoir with contamination less than 5% and successfully retrieve the tool string out of the well. Other vendors could only perform the job using inflatable packers. The customer wanted to avoid the use of inflatable packers due to the high risk of becoming stuck downhole and additional time for clean out.

Due to the extreme wellbore conditions and high risk of differential sticking, the Baker Hughes Wireline team recommended the **RCX™ MAGNA large area multi-probe sampling service**. The RCX MAGNA service is the industry's largest probe packer

that can test and sample in ultra-low mobility reservoirs as low as 0.1 md/cp with 66 square inches of flow area and differential limits of up to 7,500 psi. The RCX MAGNA service includes an equalization feature that prevents differential sticking and reduces the dependency on inflatable packers.

The RCX MAGNA large area multi-probe sampling service provided the modularity that allowed the customer to design a custom tool string to achieve all objectives in a single decent. A single probe, straddle packer, and the RCX MAGNA service were included in the same testing and sampling string to facilitate decision-making during the job. The straddle packer was included as a contingency and the operation of the inflatable packer was not required during the job.

Baker Hughes achieved impressive results in an extremely challenging borehole. The high differential limits and large flow area of the RCX MAGNA service resulted in high flow rates with less pressure drop for efficient operation. The RCX MAGNA service eliminated the need of inflatable packers and secured the samples at all stations in less time. The job challenged the capabilities of the RCX MAGNA service with the lowest mobility sampled of 0.14 md/cp with an overbalance of 5,500 psi. The equalization feature allowed the customer to increase the time on stations for pumping out borehole fluid while avoiding differential sticking. The total time on the wall during execution was approximately 28 hours.

Challenges

- Secure samples in an ultra-low mobility formation
- Reduce risk of differential sticking
- Overcome overbalance across sampling and testing intervals
- Deploy and retrieve tool string in borehole with high rugosity and washouts

Results

- Achieved sampling objectives as low as 0.14 md/cp
- Sampled in overbalance of 5500 psi
- Retrieved string without sticking or over-pulls
- Eliminated the need for inflatable packers
- Saved 12 hours of rig time

Over multiple settings there was no over pull coming off the wall and no sticking issues during retrieval, demonstrating the safe and risk free deployment.

The RCX MAGNA large area multi-probe sampling service saved the customer 12 hours of rig time and achieved all testing and sampling objectives. The customer was extremely pleased with the safe and efficient execution of the service.



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