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FLAIR Service Identifies Hydrocarbon Zones for Successful Downhole Fluid Sampling in Tight Reservoir

Advanced gas logging module provides quantitative measurements and improves selection of representative sampling targets in reservoir, offshore Abu Dhabi

CHALLENGE

- Reduce uncertainties in reservoir fluid evaluation due to lack of representative offset data.
- Identify movable hydrocarbon zone in a reservoir and guide downhole sampling tool to collect a referential fluid sample.

SOLUTION

Use the FLAIR* real-time fluid logging and analysis service along with the Techlog* wellbore software platform to evaluate hydrocarbon zones before running downhole formation evaluation tools.

RESULTS

Successfully identified two zones within the reservoir for sampling and refined sampling stations and strategy.

Gather high-resolution data to map tight, deep reservoir

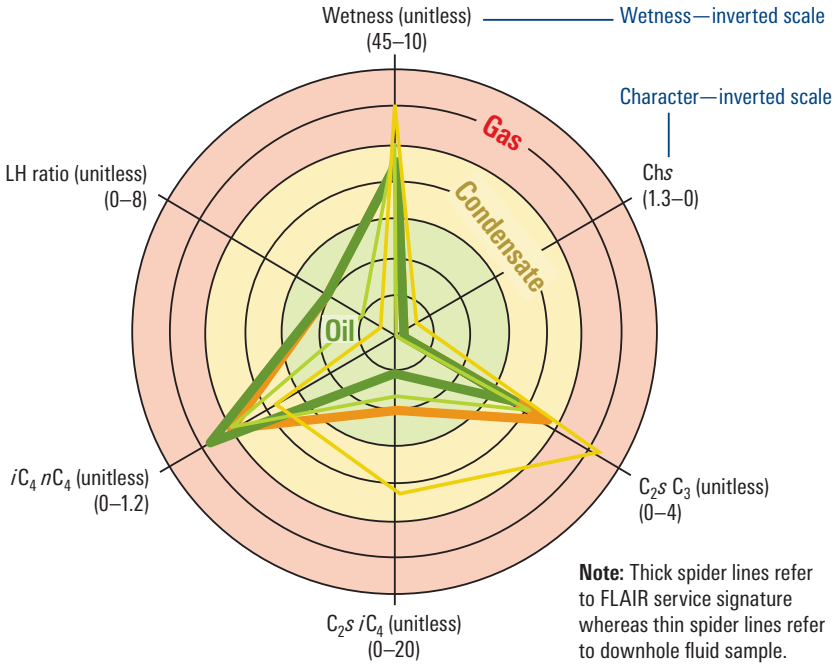
A target reservoir in the Gulf has a 20% porosity, but the presence of movable hydrocarbons have been reported from certain structures. Well B is the first of an appraisal-well drilling campaign in this deep and tight reservoir and was drilled to gather and evaluate reservoir potential. The nearest offset is Well A, drilled 35 years ago with limited logging tools.

Deploy FLAIR service for versatile, advanced surface measurements

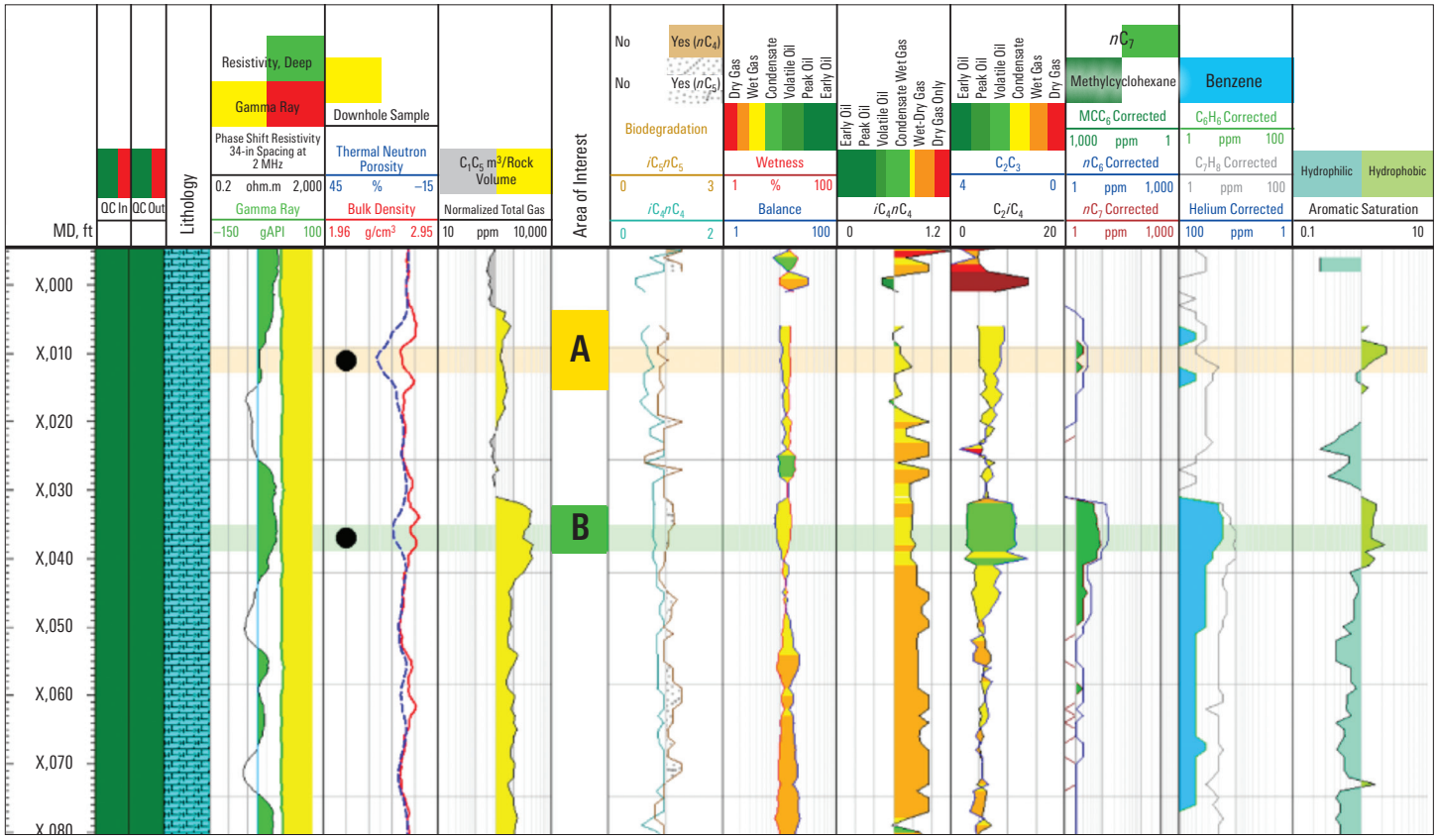
Schlumberger recommended the FLAIR service to enable better appraisal of the target reservoir's fluid characteristics and achieve more accurate downhole fluid sampling. This would deliver high-resolution data and nearly complete formation fluid coverage while drilling. Advance measurements include quantitative C_1 to C_5 hydrocarbons, qualitative C_6 to C_8 hydrocarbons, and C_7H_8, C_6H_6, and MCC_6 aromatics. The FLAIR service also measures CO_2 and helium qualitatively. Data gathered using the service were further analyzed using the Techlog platform.

Identified two sampling zones using integrated service workflow

When drilling Well B, the operator collected downhole fluid samples at two zones identified by the FLAIR service, which were marked as Peaks 46 and 47. Sample A was collected at Peak 46 and produced inconclusive PVT lab results. One month later, Sample B was collected, and laboratory analysis showed a close comparison to the previous FLAIR service quantitative composition, validating reservoir understanding.



Note: Thick spider lines refer to FLAIR service signature whereas thin spider lines refer to downhole fluid sample.



The FLAIR service helped achieve accurate and successful downhole fluid sampling where high-resolution data gathering was a major concern in thin and tight reservoir layers.

The use of the FLAIR service ahead of downhole formation evaluation enabled the operator to

- prove the presence of movable hydrocarbon for better selection of downhole representative sampling zones
- perform accurate fluid typing (oil, gas, or water) and compositional analysis with lighter and heavier components
- optimize coverage of the sampling zone with continuous fluid logging
- combine formation evaluation, dynamic drilling information, and wireline logging to develop an efficient testing strategy.

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