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Integration of Image and Open Hole Logs and Formation Tester to Identify the Hydrocarbon in Thin Laminated Reservoirs

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SUMMARY

Due to deposition environment in Egypt (including the Med) thin bed reservoirs evaluation contains large volume of hydrocarbons and a proper evaluation. By using a proper combination between MDT new services and the Dual OBMI our clients can improve their reservoir evaluation and to optimize the logging operations.

This approach focuses on maximizing reservoir understanding while the well is still being logged.

El Qara N-1 Well has been drilled in January 2010 in Offshore Nile Delta using a synthetic oil base mud system. Petrobel needs to characterize their sandstone reservoir especially to define the possible reservoir geometry (paleocurrent) and its sedimentological environment from the dip pattern and the conventional open hole logs responses. The presence of thin film of a non-conductive mud is basically acts as an opaque curtain preventing conventional micro-resistivity imagers from measuring the formation.

There is a considerable volume of oil and gas located in thin beds around the world. Thin bedded reservoirs can be difficult to evaluate as the thickness of the layers is below the resolution of many logging measurements. Thin bed analysis techniques can add considerable value to the reservoir through more accurate reserves estimation, by improving the understanding of how reservoirs will produce and reducing the uncertainty of formation evaluation.

A systematic methodology is applied during data acquisition to identify all hydrocarbon-bearing layers and assess their productivity. The borehole imager with its higher vertical resolution (1.2") can precisely identify the sand layers, down to the thinly laminated ones.

Under these reservoir conditions traditionally the pretest/sampling efficiency with Wireline formation testers have been very low main due: high chance to get dry or tight tests with long pressure stabilization times, formation pressure affected by supercharging effects, poor pressure gradient estimation, excessive logging time, poor pretest efficiency, cable creep and tool sticking risk. To improve the job efficiency several different approaches have been recently launched to increase the success ratio of wireline formation testers in getting reliable pressures and fluid analysis, including real-time monitoring of each survey by reservoir engineers. This paper includes and explains with details the new Elliptical probe with improved capabilities to address thin laminations and the cable creep computation.

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