

A Combination of Advanced Mud Gas Technology and RockWise to Identify Hydrocarbon Bearing Zone, a Case Study

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ABSTRACT

The formation evaluation of any exploratory and or appraisal well is challenging due to scarcity of information with respect to reservoir, its characterization and expected pressure. It is expected that hydrocarbon bearing reservoirs, especially which has challenges and any type of uncertainty, might possibly be overlooked as these are difficult to interpret from petro physical logs for the presence or absence of hydrocarbons in case of drilling complications that lead to cancel coring and wire line logging program. An advanced surface mud gas acquisition and analysis system, based on membrane technology, was utilized for several wells in Kuwait, Advanced mud gas analysis and interpretation of conventional and unconventional carbonate reservoirs identified interesting hydrocarbon bearing zones which were subsequently confirmed by integration of electric log, X-Ray Fluorescence (XRF) and open hole test data. The analysis is based on the computation of several gas ratios, which utilize gas components (C1-C8), & Aromatics (Benzene & Toluene) within the drill fluid. Gas components are continuously extracted from the drilling mud and monitored at the rig site by mud logging personnel using the advanced gas extraction system To determine well productivity, hydrocarbon bearing zone and sweet spot identification a cases study in recent drilled exploratory wells showing how integrated cuttings analysis and mud gas analysis have been used to identify zones of greatest potential in reservoir, Experience has proven that a combination of liquid hydrocarbon presence (as measured by membrane-based mud gas analysis), and high brittleness (as estimated from mineralogy and elemental data) make for the best target zone. This enhanced data has been used to identify and confirm the open hole test intervals was suggested by electronic logs. Whilst its application at the time was limited to total gas detection, it has proven the principle is both reliable and rugged enough for wellsite deployment. Experimental and field data show the potential of the tool in utilizing gas ratio analysis to improve fluid contact determination, reservoir characterization, and sweet spot identification.