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Selected Core Analysis of the Layered Lower Burgan Sub-Member In Kuwait

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Summary

In this study, we investigated on the core of selected wells in the Layered Lower Burgan Sub-member in Kuwait. The primary aim was to identify and interpret the depositional environments and facies analysis of the Lower Burgan Sub-member. This required core description of 3278.5 feet of core from 13 selected wells, definition and interpretation of lithofacies and facies associations. This analysis is essential to constrain the petrophysical and build the petro-elastic models. The final core log panel are generated by WellCad. High resolution photographs were taken using a Nikon D610 full frame camera with a Nikon 50mm f1.8D lens of cored intervals from 5 wells.

The Lower Burgan Member represents deposition in a 3rd order transgression from a proximal fluvially dominated system into a fluvial-estuarine to marginal marine system. The lithology and facies distribution of the Lower Burgan is governed by an interplay of fluvial and wave energies. The Lower Burgan Member has been separated into two sub-members; the underlying fluvially-dominated Massive Lower Burgan and the overlying tide to wave dominated estuarine system of the Layered Lower Burgan.

The Massive Lower Burgan facies are characterised by sand-dominated, amalgamated and stacked channels in the core, exhibiting a low gamma ray wireline log profile. Within the Layered Lower Burgan sub-member, three sedimentary units are identified. The lowermost unit, dominated by inner estuary fluvio-estuarine channel facies, is overlain by the middle unit representing a middle estuarine embayment. The final stage of the sub-member is represented by a more distal outer estuary to marginal marine embayment.

Due to the nature of the environment, the Layered Lower Burgan is heterolithic with the small preserved sand bodies. Within the middle unit, the argillaceous middle estuarine subsetting exhibits core analysis data points suggesting likely potential reservoir units associated with laterally and vertically confined, amalgamated channel and barform sand bodies. In addition heterolithic facies (i.e. tidal flats, subtidal sand sheets, and bar and channel margins) may also act as a reservoir, with thin, yet potentially, extensive sands with promising porosity. These heterolithic facies are in their highest abundance in the Layered Lower Burgan middle estuarine subsetting.

The final core log panel, together with the high-resolution photographs, provide sandbelt geometries which will be used in the next construction of a 3D static model.

Theory / Method / Workflow

Plug assessment – [27 plugs]

Constant immersion cleaning – [27 plugs]

Humidity oven drying at 60 deg C and 40% relative humidity. – [10 plugs]

Plug trimming - [10 plugs]

High resolution white light photography and brief lithological description – [10 plugs]

Final report

Results, Observations, Conclusions

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