

Sedimentologic Study and Reservoir Characterization of the Aptian carbonate Platform in Fkirine area. Implications for Hydrocarbon Exploration

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The Aptian carbonate platform is the main target in Fkirine Exploration Permit. This carbonate reservoir has been proved since the late sixties in the Douleb, Semmama and Tamesmida fields in Central Tunisia. Due to the lack of well data in the block (log and core data) we carried out a number of sections on most of the outcrops of the Aptian in the localities of J. Fadhloun, J. Faroua, J. Kemkine and J. Garci. The main purpose of this work was to evaluate the reservoir potential of the Aptian Serj formation in the permit and to map the reservoir prone facies and their lateral extent and above all to build a play fairway map for the Aptian in Fkirine permit.

On the stratigraphic side, we have been able to subdivide the Aptian section into 5 lithostratigraphic units (Figure.1). Which units correlate to Serj formation type section subdivision. The correlation of the logged cross sections and the EH-1, SNJ-1 and EF-1 wells showed an import variation in the overall thickness of the Aptian platform (Serj formation equivalent).

The bed by bed logging and thin section analysis led to the identification of 7 facies associations. These facies associations correspond to the standard microfacies SMF1, SMF3, SMF5, SMF7, SMF8, SMF10 and SMF18 in Wilson, 1975 and Flugel, 2004. The identified facies range from shallow lagoon with moderate energy to deep shelf setting. A map showing the facies distribution and the related depositional environment over the block have been generated.

The petrophysical analysis in the lab of some samples picked from all lithological units showed low to moderate porosity and permeability values. It has been also confirmed by a "direct" permeability values measured in the outcrop in J. Fadhloun, along the whole section by the mean of a portable permeameter (Tiny Perm). The moderate values of the porosity and permeability of the reservoir are still in the range of values of the producing fields, where the fracture network is believed to enhance reservoir characteristics.

This work will be integrated to the structural analysis of Fkirine Block and a Basin modeling study as part of a regional play analysis will allow the generation of the play fairway map of the Aptian. It will help to better decide on the drillable prospect and reduce the risk of the exploration in the permit.