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Mid-Cretaceous Platform Carbonate Play in Tunisia, North Africa: Attributes and Evidences from Producing Fields

The Mid-Cretaceous Bireno carbonates correspond to an attractive exploration play in Tunisia with good attributes including porous carbonate reservoir, mature source rocks and early formed traps. These carbonates are oil and/or gas bearing in several onshore and offshore fields in central Tunisia. The Mid-Cretaceous Bireno carbonates may be subdivided into two Upper and Lower lithologic units separated by a regional unconformity. They generally consist of up to 120m of peritidal to shelf margin bioclastic and oolitic facies having been deposited on a progradational and aggradational carbonate platform. The boundaries of this platform have been partly controlled by E-W and NW- SE Cretaceous faults. Reservoir quality of the Bireno carbonates has been controlled by depositional environment and diagenesis related to the intra Bireno unconformity. The porosity is largely secondary in origin, formed by dolomitization and selective dissolution. Best quality reservoir is found in pervasively dolomitized facies. The mean porosity and permeability values range between 7 to 27% and 50 to 350mD. The Bireno reservoir is sealed by thick Upper Cretaceous Aleg shales. Stable carbon isotope and biomarker data indicate that the Upper Cenomanian-Lower Turonian Bahloul Formation is the predominant source rock for oil stored in the reservoir. Burial and thermal history modeling shows that oil expulsion began in the Eocene time thus postdating the trap development. Traps are generally faulted anticlines and fault blocks limited by synsedimentary faults that die out within the Upper Cretaceous sealing shales. In addition, these faults are primary and efficient conduits for short distance migration.

More intensive exploration of this target supported by high quality 3D seismic data and better attributes definition may result in further significant discoveries.