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HYDROCARBON POTENTIAL OF OLIGOCENE MIOCENE RESERVOIRS IN THE GULF OF HAMMAMET BASINS, TUNISIA

REKYA SELWA JEDDI and HATEM BEN KILANI
ETAP, 27bis Avenue Kheireddine Pacha, 1002 Tunis, Tunisia

The siliciclastic and carbonates deposits of Oligocene-Miocene have proven petroleum reservoirs in Tunisia. Main fields discovered in the NE of Tunisia (fig.1) are associated with (fig.2) :

- The Birsa Formation (Lower Serravallian), in the Gulf of Hammamet, is a good reservoir (10 to 33% of porosity) which is producing Oil in some fields and recently in the Baraka discovery well. Three members are defined in Birsa Formation: sandstones facies with thin interbedded shales, limestones, thick bars of sandstones with interbedded shales and silts. These shallow marine facies are developed in the Gulf of Hammamet. Three depocenters are shown, oriented N-S, NE – SW and E – W. In the Northeast of the Gulf of Tunis (Kerkouane well) the limestones attributed to the Nilde Formation (lower Serravallian) sealed by shales of Terravechia Formation, can constitute a potential target ; it is a proven good reservoir in Sicily.

The shales of the Lower Oum Douil Formation (Serravallian – Tortonian) constitute an efficient seal for the Birsa reservoir.

- The Ain Grab Formation (Langhian), in the Gulf of Hammamet, exhibits good petrophysical characteristics (15 to 30% of porosity and 150 md of Permeability) . In Yasmin1 well, this reservoir flowed 2390 BOPD. The thickness of Ain Grab is variable (0 to 100m). Three main depocenters oriented generally NE- SW are identified. This reservoir is bioclastic limestone facies, rich in shells, pectens, benthic fauna. Its facies varies laterally. Different environments are identified (upper to middle foreshore, shallow marine to offshore facies). This reservoir is sealed by Mahmoud shales.

- The Ketatna Formation (Oligocene–Aquitania), largely developed in the East of the Gulf of Hammamet, is marine carbonates platform deposits. Its good potential is proven in the center of this area, where the thickness of the Ketatna formation varies from 10 to 225m. The equivalent facies of Ketatna in the western part of the Gulf of Hammamet is the Fortuna sandstones which are deltaic deposits. In the North West of Tunisia, the lateral equivalent of this Oligocene–Aquitania facies is the Numidian Flysch. It is recognized as turbiditic deposits.

Generally the Ketatna reservoir is sealed by Lower Miocene shales.

The main source rocks in the Hammamet Basin are : the Albian Fahdene black shales, the upper Cenomanian Bahloul limestones, the Lower Eocene Bou Dabbous limestones and possibly some middle Miocene organic rich shales.

The Zouza Formation which is being investigated may constitute a source rock for the Numidian reservoir.

Structural setting for these Oligocene-Miocene reservoirs is complex . It's characterized by :

- the presence of Grabens associated with wrench faulting NW-SE oriented,
- Pliocene Extension features, trending NE –SW.

These tectonic phases have generated both structural and/or stratigraphic traps.

The seismic interpretation in the South East or Northeast of the Gulf of Hammamet revealed the presence of some prospects and leads of Birsa, Ketatna, Ain Grab and Nilde reservoirs, many of which are located in open acreage.

FIG.1 Geological map and study area location

PERIOD	SERIES	STAGES	FORMATIONS	RE SR SEAL	HYDROCARBON OCCURRENCES
PALEOGENE	QUATERNARY	PLEISTOCENE	SSW NNE		
		VILLAFRANCHIAN			
	PLIOCENE	PIACENZIAN	PORTO FARINA		
		ZANCLIAN	RAF RAF		
		MESSINIAN	QUD BEL KHEDIM MELGART		
		TORTONIAN	SOMAA SAOUAF		
	MIOCENE	SERRAVALLIAN	SAOUAF ZELFA - U BIRSA - U		
		LANGHIAN	MAHMOUD TORB. shail		
		BURDIGALIAN	AIN GRAB D. Hammam Behara		
		AQUITANIAN	El Haouaria		
	OLIGOCENE	CHATTIAN	Eq. Fortuna		
		RUPELIAN	KORBOS		
	EOCENE	PRIABONIAN	WOUAR		
		BARTONIAN	KEIATNA HAKY ELMEUSE		
		LUTETIAN	EL		
		YPRESIAN	HARIA		
CRETACEOUS	SENIOR LATE	MAASTRICHTIAN	ABIOD		
		CAMPANIAN	ABIOD		
		SANTONIAN	ALG		
		CONIACIAN			
	EARLY	TURONIAN	FANDENE		
		CENOMANIAN			
		ALBIAN	ALBAM SERDJ		
		APTIAN			
	NEOCOMIAN	BARREMIAN	M'CHERGA		
		HAUTERIVIAN			
		VALANGINIAN			
		BERRIASIAN	SIDI KHALIF		
JURASSIC	MALM	TITHONIAN			
		KIMMERIDGIAN			
		OXFORDIAN			
		CALLOVIAN	NARA		
	DOGGER	BATHONIAN			
		BAJOCIAN			
		ALENIAN			
	LIAS	TOARCIAN			
		PLIENSCHACHIAN			
		SINEMURIAN			

* OIL ◊ CONDENSATE ◊ GAS

Fig.2 STRATIGRAPHIC CHART SIMPLIFIED IN THE NORTH EAST TUNISIA

BY R. S. JEDDI