Poster 5

Preliminary stratigraphic study on Attahaddy Field, Sirte Basin, Libya

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A preliminary stratigraphic study of the Attahaddy gas field was mainly based on well log data provided by the Sirte Oil Company (SOC) Libya. The Attahaddy gas field is located northwest of concession 6, in the central part of the Sirte Basin, Libya. A total of eight well log sections were used to examine the subsurface geology of the area and to establish their stratigraphic correlation. Northsouth and eastwest stratigraphic correlation were constructed to illustrate lithology and facies relationship among the wells. A total of about 12,500 feet (3,810 m) thick of sedimentary formations were logged. The sediments consist primarily of shale and carbonates with some evaporates. The depositional sequences comprise of the Tertiary, Cretaceous, and Cambro-Ordovician strata. In general, the lithostratigraphy of the Attahaddy Field is represented by eleven formations and groups. The oldest one is Cambro-Ordovician Gargaf Group, and the youngest one is the Miocene Zaggut Group.

The rock successions vary in thickness. The thickness variations of the Upper Cretaceous sections are prominent, because of either non-deposition or erosion of the Bahi or Sirte Formations. The thickness of the Bahi Formation, varies from 38 feet (12 m) in well FF15-6 to 326 feet (100 m) in well FF12-6. The Bahi-Gargaf interval is a principal reservoir representing the most important commercial gas bearing interval in the field. The fundamental portion of the Bahi-Gargaf reservoir interval of the Attahaddy field is represented by the highly fractured and fracture induced (diagenetic) effective porosity bearing quartzites of the Gargaf Group. The thickness of the gas column is more than 2,500 feet (762 m) in some wells. The thick shale of

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the Sirte, and limestone of the Kalash Formations were deposited during the Maastrichtian time, when the sea covered the area and formed the first flooding surface. The Sirte shale represents the hydrocarbon source rocks of the Cretaceous reservoirs. By the end of the Cretaceous, the first transgressive Paleocene sea covered the Attahaddy area where a thick sequence of marine sediments (shale, marls and carbonates) was deposited.

A sequence of shale was deposited during Danian time, followed by deposition of shallowing-upward regressive carbonate and evaporates sequences (Kheir, Gir and Gialo Formations) in the Upper Paleocene and Eocene time. The other transgressive cycle covering the area is represented by deposition of the Augila shale during Upper Eocene time. This cycle was followed by the deposition of shallow marine sands of the Oligocene Arida Formation. These sands are interbedded with shale beds particularly in the upper part of the formation. They are very shallow and often with the undifferentiated rocks represented by the Zaggut Group during the Miocene time. This Group is composed of interbedded calcareous shale, sandstone, limestone and beds of anhydrite.