

Hydrocarbon Potentiality of the Upper Campanian G1-71 Reservoir in Beda Platform, Concession 71, South-Central Sirt Basin, Libya

Mohamed A. Haman¹ and Hatem K. Hamed¹

¹Waha Oil Company, Tripoli, Libyan Arab Jamahiriya

Abstract

The lower Campanian G sand reservoir deposited in shallow marine, near shore environment, formed a huge NE-SW elongated sandbar and spit. The NE termination of the sandbar is apparently attached to the sand beach deposit of Wahah-Daffah Peninsula. The name of G sand refers to the G1-71 well which was first well encountered this reservoir. G sand mainly consists of three lithofacies, the calcareous sandstone of the sandbar, composed mainly from fine to coarse quartz grains, the wackstone/packstone facies which deposited in a lower energy environment behind the bar, and the calcareous shale facies deposited in an offshore environment east of the sandbar in the study area. The hydrocarbon significance of the G sand reservoir is limited to the calcareous sandstone facies which quality influenced by depositional environment and diagenesis processes. The thickest and the best reservoir quality of the G Sand was encountered in G1, and G2-71 oil wells drilled on the eastern flank of south Beda platform 40 km SW Defa field. About 230 ft gross thickness, 55 ft net thickens, the porosity ranges from 8 to 22% and permeability reached 255 md. The calcareous sandstone thins to a few feet to the SW towards M1 and H1-71 wells 20 km from G1-71, and it diminishes to the N towards K1-71 well 21 km from G1-71 well to wackstone facies. The G Sand reservoir is capped by the Upper Cretaceous Sirte Shale forming a regional cap rock, and it is the main source rock in western Sirt Basin. It is developed within the three troughs surrounding the study area. S-Marada Trough to the N-E, Gerad Trough to the NN-W, and Abu Tummym Sub-basin to the S-W of the study area. Sirte shale reaches about 1000ft, of organically rich section. It has good organic contents over large area 2% to 3%. Marginally commercial hydrocarbon accumulations were encountered in G1, and G2-71 wells in the calcareous sandstone facies. Hydrocarbon shows were reported in the K1-71 well in the wackstone facies. this is an indication of vertical and lateral migration of hydrocarbon from the adjacent source kitchen the Marada Trough to the study area. This sandbar is considered a very prolific hydrocarbon target, about 75 million barrels of hydrocarbon in place (P-mean) reserves is expected to be trapped in structural and or stratigraphic traps. Several structural/stratigraphic exploration opportunities to the north and south of G1-71 oil pool are identified to test the hydrocarbon potentiality of G1-71 calcareous sandstone on and near the eastern margin of south Beda Platform.