Recent Exploration Activities in NW Sudan Reveal the Potential of South Kufra Basin in Chad

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Petroleum exploration was first undertaken in Chad Kufra basin in 1999. Agip drilled a couple of dry wells in 1978 (A1-NC43 & B1-NC43) in the northern part of the Libyan side of the Basin. RWE drilled a dry well in 2007 (well A1-NC198) in its concession south of Agip's block. Recently Statoil drilled another dry well (A1-171/4 in 2008) close to the border with Chad. Despite the stratigraphic similarity between Kufra basin, Murzug basin, and Ghadamis basin, there is more than 35 Billion STOIIP discovered in both Murzug and Ghadamis basins whereas nothing is so far discovered in Kufra. The non-discovery of oil in the above wells is puzzling as the similarity between the basins is unique and all the ingredients for oil discovery are present in the Kufra basin; **so what is missing?**

Recent exploration activities by PetroSA in Block 14 of Sudan in the year 2008 confirmed that the basin extends into Sudan (SE corner of Libya) and the depth of the basin at that point is more than 4000 meters. A consortium of companies operating in block 12A in Sudan (south of Block 14) has run extensive seismic and gravity surveys and the data confirmed that the depth of the basin at the northern border between Sudan and Chad is about 6000 meters.

Most of the generated cross-sections for Kufra basin in the literature figure the depth of the basin to be between 3000 and 4000 meters. These estimates were based on seismic surveys run in Kufra basin in Libya. As no seismic was run in the Chadian side at the southern half of Kufra basin, it was convenient to extrapolate that depth range to cover the basin in Chad as well. Here is a possible pit-fall that is revealed by seismic surveys in neighboring Sudan.

The Gravity map of Chad shows two anomalies (deep areas) extending East-West and the eastern anomaly touched the Sudan-Chad border where it is 6000 meters deep. Extrapolating the base of the basin westwards towards the deep anomalies (guided by the gravity map), indicates that the anomalies are very deep - far below the 6000 meters. A geologist impression can give a cross-section with a basin depth between 8000 and 10,000 meters at the two deep anomalies. Comparing this architecture with the observations from the seismic surveys in Libya reveals that the basin is tilted southwards and the depo-center is in Chad some 200 kilometers south of the Libyan border.

Recent regional work indicated that the Silurian shale which represents the source rock in the Kufra basin was deposited in the lowlands when the ice cap covering North Africa melted. Therefore, it is patchy and is thicker in the deepest part of the basin. It is envisaged that the depo-center will be containing the thickest sections of the source rock and represents the kitchen area.

The presence of the kitchen area in Chad may give an explanation of why the wells which were drilled in the shallow north (in Libya) were dry. These wells may have missed the oil which can be patchy (similar to source rock distribution) and limited far away from the kitchen area. **Maybe this is the fact that was missing.**

The above analyses suggest a very high potential for the Chadian side of the Kufra basin which is right on top of the depo-center. Furthermore, oil migration from the depo-center might be to the eastern, western, and southern side of the basin in Chad.

A data exchange agreement was signed between Sudan and Chad government which exposed the above information and prompted the Chadian government to subdivide the area into eight blocks and to arrange for a Licensing Round on October 31st 2011 Managed by PETRO-TEC.