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## Libya: Petroleum potential of under-explored basin centers, a 21st century challenge

**R**ecoverable reserves in approximately 320 fields in Libya's Sirt, Ghadamis, Murzuq, and Tripolitania basins, exceed 52 billion barrels oil and 40 trillion cubic feet gas. The great majority of these reserves are located in the Sirt Basin, where there are about 250 discoveries with reserves of 45 billion barrels oil and 33 trillion cubic feet gas.

Approximately 80 percent of the reserves were discovered prior to 1970. Since then a less active and more conservative exploration effort has persisted. Complex, subtle and, in particular, deep plays were rarely pursued during the 70s and 80s because of a lack of definitive imaging technologies, limited knowledge of the petroleum systems, high costs, and risk adversity.

Consequently, extensive petroleum resources remain to be discovered in Libya. These resources will be accessible with the prudent integration of geological and geophysical knowledge, innovation, state-of-the art technology and computer power. For example, 3D seismic acquisition, sequence stratigraphic concepts, and other effective methods will be required.

Most of the undiscovered resources will probably be found in the vast, under-explored deep areas of the producing basins. These areas have rich, well-established petroleum systems. Six specific basin or trough centers, which are the subject of the paper, are exceptional in this regard. Three of the under-explored sectors are in the Sirt Basin, a Cretaceous to Paleogene rift basin. The Sirt Basin areas are: the south part of Ajdabiya Trough, the Maradah Graben the and south part of the Zallah Trough, including the Tumayan Trough. The other three subject areas are in western Libya: the Paleozoic age central Ghadamis Basin and central Murzuq Basin; and the extreme

eastern part of the offshore Tripolitania Basin, a Mesozoic-Tertiary domain. These highly prospective basin sectors encompass a total area of nearly 150,000 sq. km.

Libyan petroleum potential is certainly not limited to the above under-explored areas. In all four of the producing basins, opportunities are far from exhausted. Considerable potential remains near to, and on trend with, the prolific producing fields in moderate to small, subtle structural and stratigraphic traps. Several sectors of the Cyrenaica Platform, in eastern Libya, are virtually unexplored. Also, the unexplored deepwater areas of the offshore Sirt Basin and Sirt Rise, and, further east, the offshore Derna and Benghazi basins cannot be excluded.

### Biographical sketch

**Donald C. Rusk**, consulting geologist for international exploration, received a BA in geology from the University of Colorado in 1952. After 3 years of geological work in western Venezuela for Creole, he joined Pan American International Oil Company (Amoco). His 31 years of service with Amoco, which included 17 years at overseas locations, were exclusively in the international arena. For the past 10 years Mr. Rusk has worked as a consultant for numerous major and independent oil companies on a wide range of petroleum projects. During this same period he co-authored major geological and geophysical studies on Libya, Ecuador, Algeria and Syria.

In the capacity both as geologist and supervisor over his career, he has been active in basin and prospect evaluation, regional studies, operations and new venture matters in more than 150 basins in 55 countries. □

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