

Largest Oil and Gas Discoveries in Mexico in 2002-2008, Gulf of Mexico Basin

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Hydrocarbon exploration from 2002-2008 in east and southeast Mexico coastal Tertiary basins, their offshore extensions and adjacent shelf, and in deep-water south Gulf of Mexico, found 22 relatively large oil and/or gas accumulations. Each of these discoveries contains proven and probable (2P) reserves >40 MMbbls oil and/or >150 Bscf gas. Collectively, the discoveries hold 2P reserves of ~1,300 MMbbls of oil and ~3 Tscf of gas. Twelve main discoveries are oil pools, of which 10 occur offshore. The other 10 accumulations, five of them located offshore, contain gas. The two largest oil discoveries, found at wells Pit DL1 and Ayatsil DL1, hold heavy oil and lie in Campeche Bay in ~100 m water depths. The two main gas pools, discovered by wells Lakach 1 (non-associated gas) and Tsimin 1 (associated gas), occur offshore Veracruz in the southeastern Mexican Ridges and in the Tabasco shelf, in water depths of ~1,000 m and ~15 m, respectively.

The discoveries occur in a wide range of tectonic settings. Extensional, growth-faulted structures predominate in northeast Mexico, whereas transpressional-transtensional structural styles are common in east and southeast Mexico and show extensive halokinesis and/or shale flowage imprint in southeast Mexico. All the main oil discoveries occur in Sureste Basin in structural traps involving naturally fractured, Mesozoic carbonate reservoirs. The main gas accumulations occupy structural and combined stratigraphic-structural traps. In the northeast and east Mexico coastal Tertiary basins, adjacent shelf, and deep-water Gulf of Mexico, the main gas accumulations reside in Tertiary sandstone reservoirs. In Sureste Basin, the gas reservoirs are naturally fractured, Mesozoic carbonates except at the Chukúa 1 discovery, where gas occurs in Pleistocene sandstones.

The 2002-2008 discoveries partly mitigate reserves and production declines of Mexico mature fields typified by offshore giant Cantarell complex. They also provide important clues for future exploration opportunities. Understanding of the geology and exploration implications of the discoveries, particularly at play level, and continued deployment of modern technologies, are essential for exploration campaigns aiming at increased reserves and production. This talk highlights key discoveries and their geologic settings, and provides some insight on their significance for future exploration and re-exploration programs.