

Lower Cretaceous Bahi Sandstone Reservoir as Sourced of Co2 Accumulation Within the En-Naga Sub Basin, Sirte Basin, Libya

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Abstract : En -Naga sub - basin considered to be the most southern of the concessions in the Sirte Basin operated by HOO. En Naga Sub - basin have likely been point-sourced of CO₂ accumulations during the last 7 million years from local satellite intrusives associated with the Haruj Al Aswad igneous complex. CO₂ occurs in the En Naga Sub-basin as a result of the igneous activity of the Al Harouge Al Aswad complex. Igneous extrusive have been pierced in the subsurface are exposed at the surface. The lower cretaceous Bahi Sandstone facies are recognized in the En Naga Sub-basin. They result from the influence of paleotopography on the processes associated with continental deposition over the Sirt Unconformity and the Cenomanian marine transgression In the Lower Cretaceous Bahi Sandstones, the presence of trapped carbon dioxide is proven within the En Naga Sub-basin. This makes it unique in providing an abundance of CO₂ gas reservoirs with almost pure magmatic CO₂, which can be easily sampled. Huge amounts of CO₂ exist in the Lower Cretaceous Bahi Sandstones in the En-Naga sub-basin, where the economic value of CO₂ is related to its use for enhanced oil recovery (EOR) Based on the production tests for the drilled wells that makes Lower Cretaceous Bahi sandstones the principle reservoir rocks for CO₂ where large volumes of CO₂ gas have been discovered in the Bahi Formation on and near EPSA 120/136(En -Naga sub basin). The Bahi sandstones are generally described as a good reservoir rock. Intergranular porosities and permeabilities are highly variable and can exceed 25% and 100 MD.In the (En Naga sub - basin), The very high pressures assumed associated with local igneous intrusives may account for the abnormally high Bahi (and Lidam Formation) reservoir pressures. The best gas tests from this facies are at F1-72 on the (Barrut I structure) from part of a 458 feet+ section having an estimated high value of CO₂ as 98% overpressured. Bahi CO₂ prospectivity is thought to be excellent in the central to western areas where At U1-72 (En Naga O structure) a significant CO₂ gas kick occurred at 11,971 feet and quickly led to blowout conditions due to uncontrollable leaks in the surface equipment. Which reflects a better reservoir quality sandstones associated with Paleostructural highs. Condensate and gas prospectivity increases to the east as the CO₂ prospectivity decreases with distance away from the Al Haruj Al Aswad igneous complex. To date, it has not been possible to accurately determine the volume of these strategically valuable reserves although there are positive indications that they are very large.

Keywords : 1)en naga sub basin, 2)alharouge al aswad igneous complex, 3)co₂ generation and migration, 4)lower cretaceous bahi sandstone

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