

Light Oil from Offshore Simple Four-way Closures: Wenchang 13-1 and 13-2 Fields in the Pearl River Mouth Basin, China

M.E. Enachescu, J. Hodder, P. Pilch, L. Zanussi, and D. Nguyen
Husky Energy Inc.

The Pearl River Mouth Basin, offshore China contains several interconnected half-graben sub-basins separated by intervening ridges. The Wenchang 13-1 and 13-2 oil fields discovered in 1997 by CNOOC are situated 7 km apart, on the Qionghai basement ridge, 100 km west of Hainan Island, in 100 m of water. Husky is a 40% working interest partner in the development and production of the Wenchang oil fields and holds 100% working interest in the surrounding 39-05 Exploration Block, that is larger in size than the entire Jeanne d'Arc Basin.

Two exploration wells, two delineation wells and 21 highly deviated development wells have been drilled in the two oil fields. The main hydrocarbon bearing sandstone is the Miocene aged Zhujang Formation. The Zhujang Formation consists of two members, named the ZJ1 and the ZJ2. The ZJ1 member sandstones were deposited in a shallow marine environment while the underlying ZJ2 sandstones were deposited in a tidal flat environment with numerous tidal channels cross cutting the fields. The source rock is the underlying Eocene aged Wenchang and Enping Formations. Drill stem tests from the Zhujang Formation have produced up to 5000 BOPD of between 48 and 26° API oil. Porosity values range from 15-30%, with permeability values ranging from 250 to over 1500 mD.

The basement is severely faulted and shows considerable relief that is generally healed after the deposition of the syn-rift sediments. As a result, at the level of the reservoir, the fields are simple drape anticlines with relatively low vertical closure and only minor bordering faults that are discontinuous. A detailed 3D stochastic geological model of the two oil fields was built to monitor the development drilling and production that will start during the summer of 2002 with peak oil production at 50,000 bopd, from an estimated 250 million barrels of oil in place.