

Understanding Thin Bedded Reservoirs in Pliocene Slope Channel Levee Complexes offshore West Nile Delta

Vince L. Felt¹, Mohamed Reda¹, Donald Easley², Sherif Montasser¹, Tom R. Williams³, and Mohamed Fathy¹. (1) Exploration, bp Egypt, 14, Road 252, Digla, Maadi, Cairo, Egypt, phone: 202 706 2420, fax: 202 706 2460, feltvl@bp.com, (2) Exploration NGOS, Gupco/bp, Cairo, 11511, Egypt, (3) BP-Egypt, Cairo, Egypt

The Pliocene petroleum system of the West Nile Delta is characterized by turbidite slope channel levee complexes. Thin-bedded reservoir sands constitute a significant portion of the bulk rock volume in these complex reservoir systems, and may not be properly accounted for in recoverable gas reserve estimates. Recent well data supports increasing recoverable gas reserves by 30% from thin-bedded reservoirs.

Pliocene slope channel levee systems are deposited in confined canyons to broad coalescing valleys. The main turbidite architectural elements vertically stack to include basal debris flows, HARP's, amalgamated channel sands, and muddy debris flows. Large abandonment channel levees composed of laminated/thin bedded reservoir sands cap the sequence. The dimensions of a single slope channel levee complex are 4 – 8 kms wide and 200 – 300 meters thick.

Thin- bedded levee facies are 25 –125 meters thick with 10 – 60% net to gross. Porosities range from 25 – 35%, while permeabilities of 100-1000mD are common. Although formation pressures and test data show thin- bedded reservoirs contain a significant amount of gas, they are difficult to quantify using conventional petrophysical tools. Oil based dipmeter images improve the quantification of thin-bedded pay. Other tools such as NMR and dipole sonic improve the hydrocarbon storage estimate. Recent understanding of thin-bedded reservoirs justifies a revision of the Pliocene recoverable reserves in the Nile Delta.
