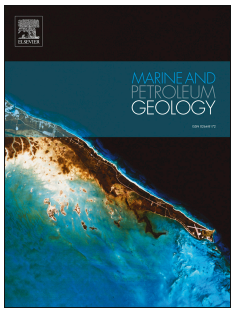
Accepted Manuscript



Reservoir description of Upper Cretaceous concretion-rich sandstone, Mississippi, USA: Example from Tinsley Field

Essam Sharaf, Hussain Sheikha, Stephen C. Boger

PII: S0264-8172(17)30498-1

DOI: 10.1016/j.marpetgeo.2017.12.017

Reference: JMPG 3172

To appear in: *Marine and Petroleum Geology*

Received Date: 13 April 2017

Revised Date: 4 October 2017

Accepted Date: 10 December 2017

Please cite this article as: Sharaf, E., Sheikha, H., Boger, S.C., Reservoir description of Upper Cretaceous concretion-rich sandstone, Mississippi, USA: Example from Tinsley Field, *Marine and Petroleum Geology* (2018), doi: 10.1016/j.marpetgeo.2017.12.017.

Reservoir Description of Upper Cretaceous Concretion-rich Sandstone, Mississippi, USA: Example from Tinsley Field

Essam Sharaf[1,2]*, Hussain Sheikha[1] and Stephen C. Boger[1]

[1]Denbury Resources Inc, Plano, TX, USA
[2]Geology Department, Faculty of Science, Mansoura University, Mansoura, Egypt

*Email: essam.sharaf@denbury.com

Abstract:

The Upper Cretaceous Woodruff sand in Tinsley Field provides a good case study of addressing the challenges influencing the flooding process of a complex reservoir. It primarily consists of sandstone intervals that were deposited in a shallow marine, wave-dominated shoal environment and appears deceivingly simple on wireline logs. Deeper investigation finds that the clastic reservoir is actually rich in carbonate concretions with varying geometries and percentages. These carbonate concretions change from scattered ovoid to discontinuous thin beds alternating with bioturbated intervals throughout the structurally-separated fault blocks of the field. Evidence supports the concretions acting as baffles rather than barriers to flow within the reservoir.

The main Woodruff rock types were categorized based on petrographic description of cores taken from different locations and fault blocks within Tinsley Field, and this approach helped to highlight the impact of diagenesis on the reservoir quality throughout the field. The probe permeameter data of the cored wells provided a discrete, high-resolution method to determine net reservoir sand. Calibration of probe permeability measurements from the cores with wireline log-based permeability provided a good control on the petrophysical properties throughout the field.

The uncertainty related to distribution of reservoir properties was addressed by building a sector model representing one of the Tinsley fault blocks. Population of the properties was controlled by semi-variogram ranges. Although thickness and percentage of pay versus non-pay remained uncertain, validation of the sector model was achieved by matching the static properties and calculated pore volumes