THE 4TH GEOLOGICAL CONFERENCE
OF
THE GEOLOGICAL SOCIETY OF TRINIDAD AND TOBAGO
June 17-22, 2007, Hilton Trinidad & Conference Centre
Port-of-Spain, Trinidad and Tobago

"Caribbean Exploration – Planning for the Future"

ABSTRACT

GEOLOGICAL MODEL OF THE CRUSE FORMATION, SOUTHERN TRINIDAD AND COMPARISON WITH HYDROCARBON RESERVOIRS OF THE OFFSHORE COLUMBUS BASIN

Rene Winter
bpTT, Queens Park Plaza, 5-5A Queens Park West, Port of Spain, Trinidad & Tobago

Outcrop study, integrated with core, well, and seismic data has allowed a study of the Cruse Formation of Southern Trinidad in a depositional systems and sequence stratigraphic framework. The Formation represents a 3rd order, Regressive – Transgressive depositional sequence, shallowing from a deep-water, slope dominated setting to a storm-wave influenced outer shelf with deltas, that is overlain by a transgressive shelf that supported retreating shorelines that were fluvially and tidally influenced.

The Formation is capped by a major regional flooding interval, the Lower Forest Clay. Reservoir intervals within the Cruse represent a number of sub-environments that are differentiated by systems tract, ranging from prograding shelf-edge distributary mouth bars, thin-bedded turbidites and basin-floor fans of the Falling Stage and Lowstand Systems Tract (FSST and LST) to storm-influenced delta front and distributary channel fill, bayhead deltas, tidal flats and crevasse splays of the Transgressive and Highstand Systems Tract (TST and HST). Regressive – transgressive units like this repeat and stack 6-7 times in the overall Cruse development.

From a depositional systems perspective, reservoirs in the Cruse are superficially similar to reservoirs in the more prolific offshore settings. However, the Cruse Formation records a more fluvially influenced, strongly progradational evolution across an open, unstructured shelf platform whereas offshore Columbus Basin reservoirs exhibit a much more wave influenced, aggradational architecture, in a growth-fault dominated shelf setting. This results in significant differences in reservoir properties.

Cruse reservoirs are much thinner and laterally more extensive than stacked, thicker but laterally confined (to growth compartments) offshore equivalents, resulting in a much higher hydrocarbon yield per unit area in the latter. The growth structures of the latter also provide more abundant traps.

The work has allowed for a better understanding of reservoirs in the Cruse Formation, which serves as an important tool for present, as well as future exploratory and production activity planned for onshore Trinidad.