Monday, March 19, 2007

HGS International Explorationists Dinner Meeting

Register Now! Registration deadline is Fri 16-Mar-07 5:30 PM
Westchase Hilton • 9999 Westheimer
Social Hour 5:30-6:30 p.m.
Dinner 6:30 p.m.

Cost: $28 Preregistered members; $35 non-members & walk-ups

The HGS prefers that you make your reservations on-line through the HGS website at www.hgs.org. If you have no Internet access, you can e-mail reservations@hgs.org, or call the office at 713-463-9476 (include your name, e-mail address, meeting you are attending, phone number and membership ID#).

by ***W. Keith Campbell***

Impact of Seismic Loop-Scale Depositional Models on Reservoir Architecture in a Heavy Oil Accumulation, Santos Basin, Brazil

University and College Students Please Note: the first 14 students can attend for free, compliments of Swift and ConocoPhillips. Additional students will be charged the emeritus rate, half the regular member rate. Students are encouraged to call the HGS office in advance of the meeting they wish to attend and to make a reservation; but walk-ins are also accepted at events. Students will need to identify themselves and provide school name and ID.

Several deepwater turbidite discoveries of Eocene age have been made in the northern Santos mobile salt basin, offshore Brazil. The Shell-operated BS-4 NE discovery (2001) shows significantly better reservoir development than in equivalent sections penetrated nearby. Both the discovery and appraisal wells encountered in excess of 100 m of predominantly clean sand.

A 3D seismically-based study covering some 4000 km^2 was undertaken to better understand the sub-regional context, paleo-slope position and depositional architecture of the proximal, high net-to-gross reservoirs penetrated in the BS-4 NE. The main focus was on detailed loop-scale seismic interpretation of internal heterogeneities and understanding aquifer potential, both of which have direct impact on field development planning.

Study results demonstrate that considerable uncertainty remains with respect to the distribution of discrete heterogeneities within these highly amalgamated reservoirs, specifically the nature and configuration of predominantly silty material that drapes over incision surfaces. Reservoir facies were deposited within a dominantly channelized environment as part of a fan apron developed across an inherited stepped slope profile, with a depositional trend from NW to SE. An Eocene intra-slope break is evident about 15 km up-dip of the present-day closure, at the downward limit of several confined feeder canyons, outboard of which low- to moderate-aggradation channel complexes were deposited across a lower gradient slope. The BS-4 NE reservoir complex is situated in the outer part of this low gradient "step flat" with a higher gradient "exit ramp" immediately down-dip. Seismic mapping of complex erosional surfaces with evidence for multi-phase knick point migration and significant bypass, also supported by core and image log data, provide a framework within which to better understand the distribution of key heterogeneities. A key observation is that the canyon systems and channel complexes become progressively younger to the NE. There is a strong interplay between this migrating sedimentary system and tectonics that can be related to the amount of incision and bypass. The conceptual models derived from this front-end work provide key constraints to static reservoir model building in order to derive realistic infill architecture for testing the dynamic impact of reservoir heterogeneities. Results from the 2006 appraisal drilling on BS4-NE are consistent with the conceptual geological model. ■

Seismic mapping of complex erosional surfaces…supported by core and image log data, provide a framework within which to better understand the distribution of key heterogeneities.

Biographical Sketch

W. Keith Campbell is production geologist for Shell Brazil's BS4 Appraisal/Development Team based in Houston. Keith's 16-year career with Shell International E&P has covered a variety of technical roles. Based initially **International Dinner** *continued on page 21*

HGS International Dinner Meeting continued from page 19

in the Netherlands, he worked on exploration projects in the Southern North Sea, both as seismic interpreter and as regional/structural geologist. In 1997, Keith transferred to Syria, where he was involved in country-wide and near-field evaluations, in both carbonate and clastic environments. In 2000, Keith was seconded to Al Furat Petroleum Company, a joint venture with the Syrian government. He spent the next 5 years working as production geoscientist on mature waterflood projects in the clastic-dominated Euphrates Graben. He took on sub-surface coordination roles in both operations and study teams before transferring to Texas in early 2005. His talk today is based on a presentation made at the AAPG Annual Convention in April 2006.

Keith received BSc Honours in geology from University College London and was awarded an MSc in basin evolution and dynamics from Royal Holloway College. In between his University of London studies, he worked for 2 years in Indonesia as exploration geologist for Petromer Trend Corp., where his work included conducting a 6-month field geological survey in southeast Borneo.