**Monday, May 15, 2006**

# International Explorationists Dinner Meeting

Westchase Hilton • 9999 Westheimer
Social 5:30 p.m., Dinner 6:30 p.m.

Cost: $25 Preregistered members; $30 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* ***David R. Steele***
*Shell Exploration and Production*
*Houston, Texas*

# Deepwater Nigeria Play Characterization

Deepwater Nigeria is divisible into eight major structural plays: eastern and western minibasins, eastern and western fold belts, eastern and western thrust belts, and the relatively unstructured transform margin. Each play is characterized by a unique set of play criteria, including predominate trap type, lead density, field size distribution, gas fraction and success rate. Discovered probable recoverable volumes from all plays total 10.8 billion barrels of oil equivalent (BBOE) with 65% of the volume being oil.

*Thrust plays cover 35,000 sq km, half the structured play area in deepwater Nigeria.*

Minibasin plays in the eastern and western portions of deepwater Nigeria cover areas of 6,000 and 15,500 sq km, respectively. Water depths range from 200 to 1,500 m. The minibasins are complex extensional basins that have a high density of relatively small traps along shale diapir flanks and faults. Twenty-one structures have been drilled in these plays, resulting in 3.5 BBOE of probable recoverable volumes. Although a few of the wells are dry, the commercial success rate is the lowest of the proven plays with hub volumes discovered in only two of the basins, the Bonga-Aparo Basin in the west and the Usan Basin in the east. Hub volumes have been discovered in channel-over-nose structural-stratigraphic traps on larger, simpler structures. Wells finding technical success volumes are predominantly along steeply-dipping diapir flank structures. Although past discoveries have predominately seen oil, the gas fraction most likely comprises at least 50% of the future play volumes.

The fold plays in the eastern and western portions of deepwater Nigeria cover 9,200 and 10,000 sq km, respectively. Water depths range from 1,500 to 2,000 m. The fold plays are characterized by a small number of very large simple traps. An estimated total of 7.1 BBOE has been discovered by 18 wells with a 50% commercial success rate. The wells have proved one of the largest global deepwater field size distributions with a mean discovery volume of 475 MMBOE. The eastern fold play is characterized by relatively simple anticlines with Middle to Lower Miocene basin floor reservoirs. The western fold play targets predominantly channel-over-nose structural-stratigraphic traps in Middle to Lower Miocene reservoirs. The low density of large traps resulted in rapid creaming of the plays.

Thrust plays cover 35,000 sq km, half the structured play area in deepwater Nigeria. Thrust plays are subdivisible into three segments: inner and outer thrust belts in the western and an eastern outer thrust belt. The outer thrust belts are toe-of-slope compressional trends coincident with the main phase of extension along the coast to the outer shelf. The western inner thrust belt is probably an older fold/thrust system reactivated by shale diapirism from the Upper Miocene to the present. Due to extreme structural complexity and low trap retention, the western inner thrust belt has been tested by only one well, a dry hole. The outer thrust belt plays include nearly 200 en-echelon seaward- and landward-dipping thrust structures in water depths of 2,000 to 3,000 m. A majority of the structures have present-day seafloor bathymetric expression. Trap retention coupled with charge and migration risks as well as ultra-deepwater depths make this a technically challenging play. ■

**Biographical Sketch**

David Steele joined Shell in 1983. He has held various research and exploration positions and is currently a Shell consultant for Regional Geology and Play Analysis and is also assigned to Nigeria exploration.