

Monday, October 11, 2004

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

Cost: \$25 Preregistered members; \$30 Nonmembers & Walk-ups

The HGS prefers that you make your reservations on-line through the HGS website at [www.hgs.org](http://www.hgs.org). If you have no Internet access, you can e-mail [reservations@hgs.org](mailto: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#).

## HGS General Dinner Meeting

by *Abdulkader M. Afifi*  
Saudi Aramco  
Dhahran, Saudi Arabia

### AAPG Distinguished Lecture

# Paleozoic Hydrocarbon Habitat in the Arabian Plate

The Paleozoic section became prospective during the seventies following discovery of oil in Oman and delineation of the enormous gas reserves in the Khuff Formation. Exploration has since targeted the Paleozoic section throughout the Middle East and has resulted in major oil and gas discoveries in Oman, Qatar and Saudi Arabia. Our improved knowledge of the Paleozoic geology is a direct outcome of these activities.

*The Paleozoic hydrocarbon system...is estimated by USGS to have generated mean recoverable, conventional resources of 37 billion barrels of oil and 808 trillion cubic feet of gas.*

The Paleozoic section in Arabia was deposited along the continental margin of Gondwana in predominantly clastic environments that ranged from continental near the Arabian Shield to outer shelf in Iran and Syria. Carbonate deposition became dominant during the Permian opening of the Neotethys. Six megasequences are recognized, separated by regional

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## NeoGeos 5th Anniversary Birthday Bash



Tuesday October 19<sup>th</sup>, 2004

5:30PM – 8:30PM

SAINT ARNOLD

BREWING COMPANY

2522 Fairway Park Drive  
Houston, TX 77092



**The NeoGeos cordially invite all members of the HGS to attend!**

**This is a GREAT opportunity to socialize and network with others in the HGS!**

**Food and drink will be provided!**

**\$10 at the door for NeoGeos**

**\$12.50 at the door for HGS members**

**Tours of the brewery and free beer tasting all night.**

unconformities. The paleo-environments ranged from arid to glacial, reflecting the drift and rotation of the region during the Paleozoic from equatorial to high southern latitudes and back.

Rifting during the Late Precambrian initially formed salt basins in Oman and the Arabian Gulf region. Subsequently, the Cambro-Ordovician clastic sequences were deposited over a leveled continental platform. However, during the Late Ordovician this margin probably separated into two terranes along the Zagros suture zone. The Hercynian orogeny during the Carboniferous caused widespread intraplate deformation including broad upwarps in Egypt, Central Arabia, northern Syria and Oman, which underwent extensive erosion. Other manifestation of the Hercynian deformation are transpressional basement horsts in Eastern Arabia that host the major oil and gas fields. The Hercynian deformation occurred in at least two pulses and probably resulted from collision along the northern margin of Gondwana. The Hercynian deformation was followed during the Permian by rifting and opening of the Neo-Tethys along the Zagros fault zone and the deposition of Khuff carbonates and evaporates along the new passive margin.

Two petroleum systems are recognized, sourced by rocks of Precambrian and Silurian age. The Silurian petroleum system is sourced by the Qusaiba hot shales, which extend over large areas in the Arabian plate. The hydrocarbons are trapped in Ordovician, Silurian, Devonian and Permo-Carboniferous sandstone reservoirs except in high-relief structures, where the upward propagation of basement faults has breached seals allowing charge into the Permian carbonate reservoirs. The Paleozoic hydrocarbon system is oil-prone along the basin margin in Central Arabia, but is predominantly gas prone elsewhere owing to the deep burial of the source rocks. It is estimated by USGS to have generated mean recoverable, conventional resources of 37 billion barrels of oil and 808 trillion cubic feet of gas. In Arabia, the Paleozoic hydrocarbons are ultimately sealed by the thick Triassic shales, which prevented any mixing with Mesozoic hydrocarbons.

The Precambrian source rocks have been proved to be effective in the interior salt basins of Oman, where they have charged Precambrian, Paleozoic and Mesozoic reservoirs along faults and salt diapirs. The Hercynian uplift of Oman largely removed the Silurian source rocks and effectively saved the Precambrian source rocks from excess burial.

The main challenges to exploration and development are (1) the difficulties in seismic imaging of the Paleozoic section because of

multiples, seismic transparency and near-surface problems; (2) the prediction of porosity in the tight, deeply buried reservoirs; and (3) the hostile subsurface environments. ■

#### Biographical Sketch

**DR. ABDULKADER AFIFI** received his MS from the Colorado School of Mines and PhD from the University of Michigan. From 1980 to 86 he worked with the U.S. Geological Survey in Saudi Arabia doing geological mapping and geochemical and stable isotope studies of the Mahd Adh Dhahab Gold District. After earning his PhD in 1990, he joined Saudi Aramco, where he has held a variety of positions including Chief Explorationist and Chief Geologist. Dr. Afifi is currently a Senior Geological Consultant with Aramco's Upstream Ventures department. He shares his expert knowledge of the Saudi Arabian region as an AAPG Distinguished Lecturer.



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## TAKING DRILL-READY PROSPECTS

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