

Monday, December 9, 2013

Westchase Hilton • 9999 Westheimer  
Social Hour 5:30–6:30 p.m.  
Dinner 6:30–7:30 p.m.

Cost: \$30 Preregistered members; \$35 non-members/walk-ups

To guarantee a seat, pre-register on the HGS website & pre-pay by credit card.

Pre-registration without payment will not be accepted.

Walk-ups may pay at the door if extra seats are available.

## HGS General Dinner Meeting

*Joseph Carl Fiduk, PhD*  
Chief Geologist, WesternGeco  
Houston, Texas

HGS General Dinner Meeting

# Influence of Salt Structures and Salt Deformation on Petroleum Exploration in the Deepwater Northern Gulf of Mexico

Hydrocarbon exploration beneath the shallow allochthonous salt canopy of the ultra-deepwater central Gulf of Mexico has encountered three thick, sand-rich, submarine fan successions that punctuate an otherwise relatively condensed and fine-grained basin-center stratigraphy. These sand-rich fans are Late Paleocene, Early Miocene, and Middle Miocene in age, which coincide with periods of very high sediment influx and basin margin instability. They are the primary exploration targets in most ultra-deepwater fields, recent discoveries, and failed exploration tests.

The underlying basement configuration contains the horsts and grabens of a rift basin setting. The deep parts of the rift became salt basins filled with the Jurassic Louann salt. During the Cretaceous, kilometers-thick salt nappes extruded from these basins onto the basin margins. The nappes may have coalesced to form a regional allochthonous salt nappe around the margin of the salt basins, similar to the modern Sigsbee Escarpment. Later clastic sedimentation caused deflation of the nappe, leaving remnant salt structures behind. The remnant salt bodies form the core structures over which younger sand-rich fans are folded and draped.

Regional three-dimensional Pre-Stack Depth Migration data show that remnant salt bodies from the now deflated Cretaceous nappe form the core structure in fields at Chinook and Cascade, and in recent discoveries at Stones, Das Bump, St. Malo, and Jack. Both seismic and well data show that the sand-rich outer fan of all three fan systems overlies the zone of salt nappe remnants. It would be a remarkable coincidence for the sandy outer fans of three different age depositional systems and the termination of two more widely separated (both temporally and spatially) allochthonous salt systems to stack vertically. The fact that they do suggests that both deep-water fan deposition and allochthonous salt emplacement were responding to a deeper structural control. ■

### Biographic Sketch

JOSEPH CARL FIDUK has a bachelor of science degree and a master of science degree in geology from the University of Florida

plus a master's degree in business administration from the University of Texas of the Permian Basin. He later received his doctorate degree in geology and geophysics from the University of Texas at Austin. He has worked for the United States Geological Survey, Gulf Oil, Discovery Logging, the Texas Bureau of Economic Geology, British Petroleum, Texas A&M University, the University of Texas, and the University of Colorado. He later worked as a private consultant and Chief Geologist for CGG and CGGVeritas. He is currently Chief Geologist for WesternGeco in Houston, TX.



Dr. Fiduk's research interests cover coastal and shelfal clastic deposition, salt structural deformation and evolution, basin analysis, shelf margin to deep marine depositional processes, marine sedimentology, petroleum systems analysis, and the use of three-dimensional seismic data in petroleum exploration. He is currently involved in salt-sediment interaction research in the Flinders Ranges, South Australia, fluvial deltaic deposition in the Cretaceous Seaway of northwest Colorado, and deep marine stratigraphic analysis in the Gulf of Mexico. Dr. Fiduk teaches internal training classes on seismic interpretation and salt tectonics for WesternGeco and external industry courses for Nautilus U.S.A. and local geological societies.

Dr. Fiduk is a member of the American Association of Petroleum Geologists and a Certified Petroleum Geologist. He is also a member of the Houston Geological Society, the Society of Exploration Geophysicists, the Geophysical Society of Houston, the Society for Sedimentary Geology (SEPM) and a member of the Gulf Coast Section of the SEPM where he is the current president-elect. In his 30 plus years as a working geologist, he has published over 70 peer-reviewed abstracts and papers.