

by *Harold Illich, John Zumberge, and Stephen Brown*
GeoMark Research
Houston, Texas

Effective March 30th, the price of the HGS General Luncheon increased to \$30 and \$35 (\$15 for Emeritus and Honorary).

Oil Mixing in Deep Shelf and Deep Water Areas of the Gulf of Mexico

The article has been abridged. See the *Bulletin* Web version for the full abstract and images: [/www.hgs.org/2005/April](http://www.hgs.org/2005/April)

Oil-oil mixing in deeper water areas of the Gulf of Mexico Basin is demonstrated using geochemical data obtained from more than 1300 oils. Oils that are compositionally intermediate between well characterized end-member families, and oils that have experienced bacterial alteration but contain “fresh” gasoline-range chemistries, are interpreted to have originated through oil-oil mixing. Some oils possess both compositional patterns.

Occurrence of mixed oils indicates overlap of petroleum systems, a phenomenon directly impacting exploration risk. Additionally, total oil volumes might be anticipated to be greater in basinal areas where the Cretaceous and Jurassic systems overlap.

Oils possessing compositions similar to those occurring naturally have been produced in the laboratory by mixing Cretaceous oils from shale-rich sources occurring in the basin with Jurassic oils from carbonate-rich sources. The map distribution of compositionally intermediate oils additionally supports a mixing interpretation.

“Fresh” oils derived from Gulf of Mexico Cretaceous sources tend to contain minor amounts of sulfur and moderate to high API gravities. Oils from Jurassic sources tend to have larger sulfur contents and lower average gravities. Mixing of these end members can be viewed as degrading the quality of the Cretaceous oils, or as improving the quality of the Jurassic oils.

Occurrence of mixed oils indicates overlap of petroleum systems,

a phenomenon directly impacting exploration risk. Additionally, total oil volumes might be anticipated to be greater in basinal areas where the Cretaceous and Jurassic systems overlap.

Mixing resulting from multiple migration-accumulation episodes may mainly characterize basins where the principal vector of fluid movement is vertical rather than lateral. ■

Biographical Sketch

HAROLD ILLICH has thirty-six years of experience in petroleum exploration, basin analysis, and exploration geochemistry. At GeoMark Research, he has lead or been a member of teams responsible for the evaluation of oil and rock geochemical data for numerous basins on a world-wide basis. Before joining GeoMark, he worked for Oryx Energy Company or its predecessors.



Harold holds a BS from the University of Texas at Austin and a MS from the University of Montana.

ENDEAVOR NATURAL GAS, LLC

Seeking Drill-Ready Prospects

Texas and Louisiana Gulf Coast
East Texas • North Louisiana

Contact: Bruce Houff

(O) 713 658-8555 • (F) 713 658-0715

(Email) [bhuff@endeavorgas.com](mailto:bhouff@endeavorgas.com)

1201 Louisiana, Suite 3350 • Houston, Texas 77002