Wednesday, October 25, 2006

Petroleum Club • 800 Bell (downtown)
Social 11:15 a.m., Lunch 11:45 a.m.

Cost: $30 with advance reservations, $35 for walk-ins, space available ($15 for Emeritus and Honorary).

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#).

HGS General
Luncheon Meeting

by *Alexei V. Milkov*
and *Evvy Goebel*
BP America
Houston, Texas

Compartmentalization and Time-Lapse Geochemical Reservoir Surveillance of the Horn Mountain Oil Field, Deep-Water Gulf of Mexico

Oil is produced at the Horn Mountain field (Gulf of Mexico, Mississippi Canyon blocks 126 and 127) from two middle Miocene reservoirs (M and J Sands). Reservoir facies are characterized as sand-filled channels and associated overbank deposits and are positioned in combination structural-stratigraphic traps. Prior to initial production, several barriers and baffles were identified in both reservoirs by integrating geological, geophysical, petrophysical, pressure, PVT and geochemical data and petroleum-filling history. A Compartmentalization Risk Matrix was developed to facilitate and visualize the integrated evaluation of compartmentalization.

During production, reservoir surveillance is a vital task aimed at understanding how petroleum is produced from a reservoir. In addition to traditional surveillance technologies, we applied time-lapse geochemistry (TLG) to visualize the petroleum sweep by monitoring changes in fluid composition and fingerprints across reservoirs. For this technology, appraisal and preproduction fluid samples are first analyzed to map fluid types across a static reservoir. Then, a surveillance program in which fluid samples are taken from producing wells at regular time intervals is designed and executed. The production samples are geochemically "fingerprinted" and compared with preproduction fluids from the same well and surrounding wells. At Horn Mountain, interpretation of geochemical data allowed us to infer oil movement across the M Sand and helped to reevaluate reservoir models and reduce risks in managing reservoir performance. In the J Sand, an untapped compartment was identified, and an additional producer was justified for future drilling. TLG results are consistent with and complementary to other surveillance data available to date. Our study demonstrates that TLG is a safe and cost-effective technology that reduces uncertainties associated with other reservoir surveillance methods and appears to be a valuable technique for reservoir management. ■

Biographical Sketch

ALEXEI V. MILKOV works for BP America Inc. as a Petroleum Systems Analyst in the Exploration and Production Technology

Group. He holds a BSc (1996) and an MSc (1998) in petroleum geology from Saint Petersburg State University (Russia), and a PhD (2001) in geology from Texas A&M University. In his previous life as a marine geologist with Texas A&M and Woods Hole Oceanographic Institution, Dr. Milkov worked on gas hydrates and mud volcanoes and published 35 peer-reviewed papers on these subjects. Since joining BP in 2003, Dr. Milkov has used his basin modeling and organic geochemistry skills to assist in exploration, appraisal, development, production and environmental projects in the Gulf of Mexico, Alaska, Canada, Colombia, offshore Angola and offshore Trinidad. Dr. Milkov is an Adjunct Professor at Cornell University, where he teaches "Introduction to Petroleum Systems Analysis."

EVVY GOEBEL works for BP's Gulf of Mexico Deepwater Production business unit, where she is assigned to the Horn Mountain field as a development and production geologist. She earned a BSc in geology from Marietta College and an MSc in geology from the University of Cincinnati. Goebel has over 20 years of industry experience in exploration, development and production. She has worked in numerous clastic and carbonate fields in Ohio, West Virginia, Alaska, Alberta, New Mexico and the Gulf of Mexico. She enjoys the challenge of integrating static and dynamic reservoir data in order to better understand and model each reservoir's architecture and potential. Goebel is a licensed professional geologist in Texas.