Monday, December 10, 2007

HGS Joint General and North American Dinner Meeting

Westchase Hilton • 9999 Westheimer
Social 5:30 p.m., Dinner 6:30 p.m.
Cost: $30 Preregistered members; $35 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 **M.L. Sweet** and **L.T. Sumpter***
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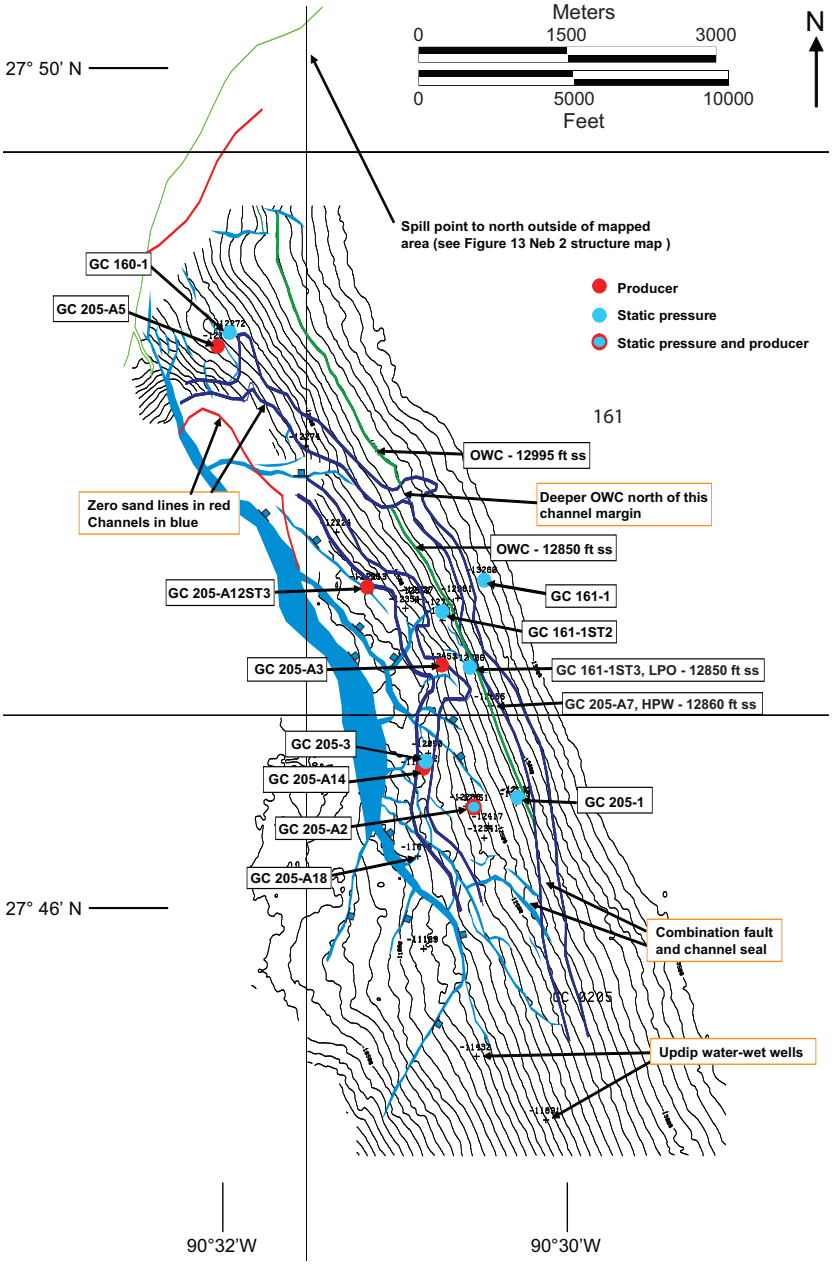
Recognizing Reservoir Compartments on Geologic and Production Timescales in Deep-Water Reservoirs: An Example from Genesis Field, Gulf of Mexico



Top Neb 1 depth structure map showing key wells and Neb 1 oil-water contacts, fault traces and an outline of Neb 1 channel.

A key objective of reservoir description is the early identification of reservoir compartments. Early recognition of compartments requires the integration of structural and stratigraphic data with observations of pressure and fluid contacts. At the exploration and appraisal stage of field life, static compartments may be recognized. In this talk we define static compartments as reservoir compartments defined by boundaries that, over geologic time, represent barriers to fluid flow. Within a static compartment, the contact between two fluids will settle at a single elevation. Analysis of fluid contact and pressure data was done within a rigorous framework, developed at ExxonMobil, called Reservoir Connectivity Analysis (RCA). As the field is depleted, other barriers and baffles may become apparent through observation of pressure depletion and aquifer movement. These dynamic compartments are defined by boundaries that are not effective barriers to fluid flow over geologic time, but impede flow to the extent that they have a significant impact on contact movement or pressure depletion during production.

The Genesis Oil Field is located in Green Canyon Blocks 205, 160 and 161, Gulf of Mexico. We explored the stratigraphic and structural controls on compartmentalization in two Pleistocene-age deepwater reservoirs in Genesis Field (Neb 1 and Neb 3). We interpreted the older of these reservoirs, Neb 3, as an erosionally confined channel complex. Over a geologic timescale, Neb 3 was a single compartment, with a common oil-water contact throughout the field. As the reservoir was produced, Neb 3 development wells showed a common pressure decline trend and moderate aquifer support indicating communication in the oil column and between the oil column and the aquifer. In contrast, Neb 1 showed at least two

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different oil-water contacts before production started. Multiple barriers and baffles to flow became apparent with production. Aquifer support ranged from moderate to none. We interpreted Neb 1 as a channel levee complex. The connection between channels and levees appears to be poor and this is an important heterogeneity that was not previously recognized. In the case of the Neb 1 and Neb 3, reservoir architecture was the primary control on the degree of compartmentalization over both geologic and production timescales. ■

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Biographical Sketches

Michael Sweet is a stratigrapher at the ExxonMobil Upstream Research Company in Houston, Texas. A native of Anchorage, Alaska, he received a Bachelor's degree in geology from the University of Wisconsin Madison and a Master's degree in geology from the University of Illinois. He began his career in the oil industry with Getty Oil, but left to pursue a PhD in geology from the University of Texas at Austin, where his dissertation was on airflow over eolian sand dunes. After receiving his PhD, he worked as a sedimentologist for BP in Houston and Aberdeen, studying clastic reservoirs in Alaska, Colombia, the deepwater Gulf of Mexico and the North Sea. After leaving BP, he was a consultant for Knowledge Reservoir. Mr. Sweet joined ExxonMobil Upstream Research Company in 2001. His research interests are the stratigraphy of deepwater clastic rocks and the interplay between sedimentary architecture and fluid movement in the subsurface.

Larry T. Sumpter earned a BS degree in geology from California State University, Sacramento in 1984 and an MS degree in geology from the University of Arizona in 1986. He has been with ExxonMobil for the past 21 years, working as an exploitation geologist out of offices in New Orleans, Houston and Aberdeen for most of that time. Since December 2003 he has held a research position in ExxonMobil's Upstream Research Company.