Tuesday, April 21, 2009

Crowne Plaza Hotel - Greenspoint (former Sofitel)
425 North Sam Houston Pkwy E

Social 11:15 AM, Luncheon 11:30 AM

Cost: $31 pre-registered members; $35 for non-members & walk-ups; Emeritus/Life/Honorary: $14; Students: FREE

To guarantee a seat, you must pre-register on the HGS website and pre-pay with a credit card.
Pre-registration without payment will not be accepted.
You may still walk up and pay at the door, if extra seats are available.

F. Jerry Lucia
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Locating Remaining Oil in Carbonate Reservoirs: The Reservoir Characterization Problem

Only a small percentage of original oil in place (OOIP) is produced during primary production from most carbonate reservoirs. Secondary recovery programs, such as waterflooding, commonly double the amount of oil recovered, but much of the OOIP remains in the reservoir. To effectively improve recovery, development programs must target the location of remaining oil. The reservoir characterization challenge requires building a model that images remaining oil saturation and can be used to predict the outcome of various development (i.e., secondary recovery) programs.

Building a carbonate reservoir model begins with an understanding of the relationship between pore space and petrophysical properties. This relationship must be linked to depositional and diagenetic models so that the petrophysical properties can be imaged in 3D space. One rock fabric method for making this link has been developed at the Bureau of Economic Geology by an integrated team of geologists, petrophysicists, and reservoir engineers. Pore-size distribution is the key link between petrophysical measurements and rock fabric descriptions, and rock fabric is the key link to sequence stratigraphic models.

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Rock fabrics are composed of matrix fabrics—which contain interparticle and separate-vug porosity—and nonmatrix fabrics—which contain interconnected vugs. How a reservoir performs during production will be related to the volume and distribution of these basic fabrics. To properly anaylze a reservoir with matrix fabrics, understanding its sequence stratigraphic framework is crucial. The primary stratigraphic element is the high-frequency cycle within which basic rock fabrics are systematically distributed. However, the primary petrophysical element is the rock-fabric flow unit, which is defined by facies stacking within a high-frequency cycle. The result is a static 3D model of porosity, permeability, and initial oil saturation suitable for input into a numerical flow simulator. Production history of the field is simulated, and the end result is an image of the location of remaining oil saturation. ■

Biographical Sketch

F. Jerry Lucia is a Senior Research Scientist at the Bureau of Economic Geology, The University of Texas at Austin. He is an expert in carbonate reservoir geology, reservoir characterization, and carbonate petrophysics. His technical expertise includes carbonate sedimentation, origin and distribution of dolomite, and developing relationships between carbonate rock fabrics and petrophysical properties.

Before joining the Bureau in 1985, he was a Consulting Geological Engineer for Shell Oil Company assigned to the head office staff. Mr. Lucia retired from Shell in 1985 after 31 years of experience as a geological engineer in research and operations. He is currently co-principal investigator of the Reservoir Characterization Research Laboratory, developing new techniques and methods for characterizing carbonate reservoirs to improve recovery from existing oil fields through the integration of geological, petrophysical, engineering, and production data. Project areas include the Permian Basin and the Middle East. Mr. Lucia is an active member of the American Association of Petroleum Geologists, the Society of Petroleum Engineers and the Society for Sedimentary Geology (SEPM), and is a Fellow of the Geological Society of America.