geoLOGIC NEWS

A publication of Subsurface Consultants & Associates, LLC

Quarterly Newsletter - Q3, 2011

CHAIRMAN'S CORNER

WHO CONTROLS THE WORLD'S OIL SUPPLY???

It seems like every time there is an increase in the price of crude oil, politicians like the U.S. Senators and Representatives, and even the President of the United States are quick to blame those bad, dirty American oil and gas companies (corporate greed). Hearings are held on Capitol Hill. This type of thinking indicates that many politicians do not understand the current global oil and gas industry and are still stuck in the 1950's/60's mentality that the Exxon's, Shell's and BP's of the world control the world's supply and the price of crude oil.

A clear picture begins to emerge when we ask ourselves just a few basis questions:

1. Name the biggest oil company in the world?
2. How much of the world's oil reserves are produced by multinational oil companies like Exxon, Shell, BP, etc.?
3. Where is the growth and demand for resources of crude oil?

How many people know the answers to these simple questions? I am afraid not too many people do, including today's elected officials. For example, if the U.S. Senators and Congressmen and the President of the United States knew the answers to just these three simple questions, I am confident that "Energy Policy" decision making on Capitol Hill would be 180 degrees from where it is today.

Let's answer these basic questions:

1. Name the biggest oil company in the world?
   No, it is not Exxon, Shell, BP or any other multinational oil company. In fact the thirteen (13) largest energy companies on earth are owned and operated by governments. These companies are referred to as NOC's - National Oil Companies.

(Please see continuation of The Chairman's Corner on page 8)

About SCA and geoLOGIC

SCA is a worldwide petroleum industry leader in professional consultancy and advanced training services. From major synergistic field studies to sequence stratigraphy, from property evaluations to prospect reviews, our staff of geologists, geophysicists, and engineers have the expertise and experience to provide you with the very best consulting and training services available. Since 1988, we have helped our clients discover billions of barrels of oil and train for the challenges of the new millennium. We are proud to serve you and hope you enjoy reading geoLOGIC. For more information on SCA, please contact us today.

Inside geoLOGIC News

OIL AND GAS RESERVOIRS AND CORAL REEFS
by Dr. Frederick 'Rick' Sarg, Ph.D.

Reservoir Characteristics of Coral Reef Systems -

Carbonate reservoirs are important contributors to world oil and gas production, and contain more than one half of global discovered, recoverable hydrocarbons (Roehl and Choquette, 1985). Reef and reef-related deposits comprise a significant proportion of these reservoirs, most prominently in carbonate systems of Siluro-Devonian, Cretaceous, and Neogene age. The Neogene-aged reservoirs commonly comprise coral reef and their associated deposits. In general, the original textures of the carbonate sediments and their early diagenetic pathways are determinants of the likelihood and extent of carbonate reservoir rocks. Primary sedimentary textures related to depositional environment, provide the initial matrix pore system, and generally determine the extent of the prospective reservoir. The vast majority of the carbonate reservoirs have undergone modification of primary pore space because of syn- to post depositional diagenesis. Both occlusion and enhancement may occur. Preservation of reservoir-quality pore systems is most commonly the result of cessation of occluding processes such as cementation (i.e., early marine, meteoric phreatic, and/or burial), and compaction, rather than the result of pore enhancement from processes like karst solution or dolomitization, although these can be important processes locally and during certain time periods (e.g., icehouse times).

Coral reef and related reservoir-prone deposits are most commonly comprised of thick to massive bedded, reef boundstones in platform margin and platform interior patch reef settings; and skeletal rudstones, floatstones, grainstones, and packstones interbedded with the boundstones and in fore-slope debris. Reef deposits occur over relatively small areas (square km to 10's of square km), and range in thickness from meters to 100's of meters (up to a 1000 m or more), and can have very thick oil columns. The most common depositional pore types in reefs and reef associated beds include interparticle, intraparticle, and growth-framework shelter porosity (see Choquette and Pray, 1970, Lucia, 1999, and Lønøy, 2006 for pore classifications) (Figures 1 and 2).

These pores generally range in size from mesopores (50-100 µm) to macropores (>100 µm), and can have a patchy (e.g., shelter and intraparticle) to uniform (e.g., interparticle) distribution (Lønøy, 2006). Where affected by karst dissolution, pore types include moldic macropores (> 30-30 µm), vugs, and solution-enlarged fractures. Porosity values range from low (<5%) to high (>30%), as does permeability (<100 md to Darcy's). Reef reservoirs are generally very heterogeneous. Porosity ranges from patchy to uniform distribution over moderately large areas, resulting in variable interconnectivity and in many fields, tortuous fluid pathways. Nevertheless, these reservoirs are some of the most prolific in the world (Trice, 2005).

(*Please see continuation of* ***Coral Reef Systems*** *on page 2)*

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***(Coral Reef Systems -** continuation from page 1)*

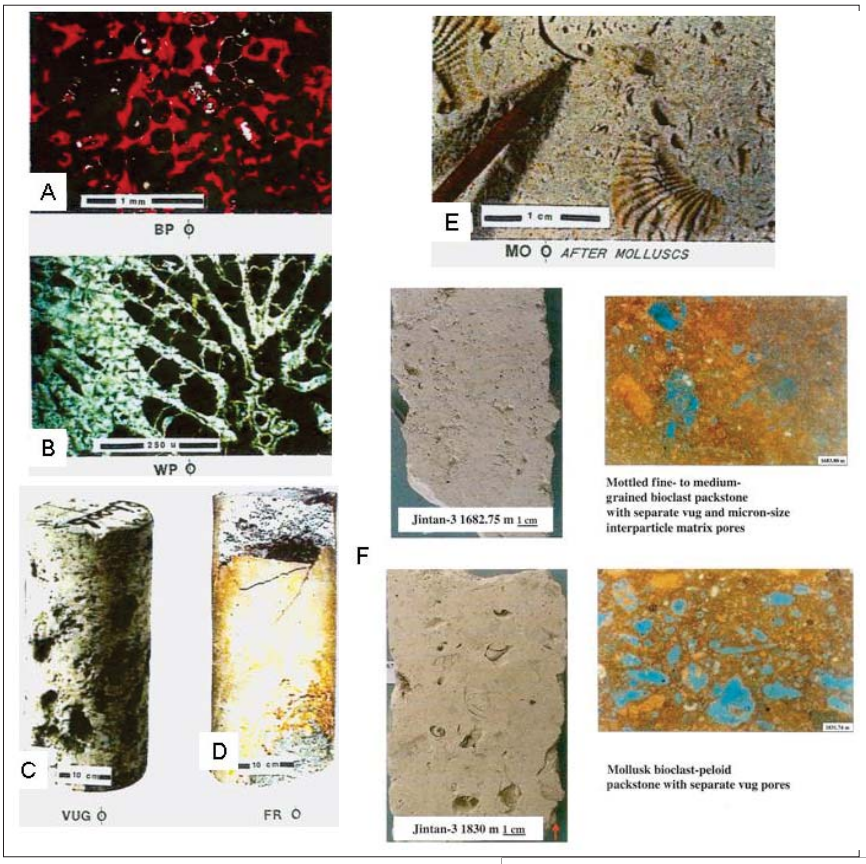


***Figure 1** (left) - Common reef and reef-associated pore types.*

(A) Interparticle porosity (BP) (bright red) in skeletal grainstone.

(B) Intraparticle porosity (WP) in a Pleistocene coral.

(C) Vuggy (Vug) porosity in a core from Arun Field.

(D) Fracture porosity (fr) in a core from Rainbow Field (Devonian).

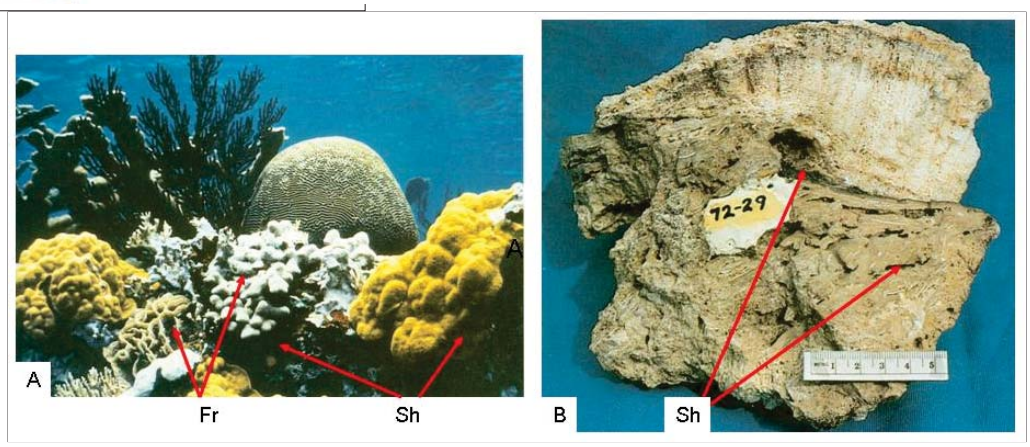
(E) Moldic porosity (Mo) after mollusks.

(F) Skeletal packstone displaying BP and Mo porosity, Jintan Field (Miocene).

Figure 2 (below) - Common reef pore types.

(A) Living corals, Bahamas displaying abundant potential framework (Fr), and shelter (Sh) porosity.

*(B) Reef limestone (circa 9,000 years old), Belize. **Montastraea cavernosa** colony on top, underlain by platey algae (**Halimeda**)-rich lime wackestone / packstone. Numerous cavities are dominantly shelter voids (Sh) (scale in cm) (from James, 1983).*



Reef Reservoirs and Climate -

Climate is a major controlling factor on early diagenesis and pore system history. Greenhouse and icehouse climatic conditions effect carbonates differently (Read, 1995; Trice, 2005). Greenhouse times are characterized widespread flooding of continental shelves, and by small amplitude sea level changes, typically from 10-50 meters (Goldhammer et al., 1990; Koerschner and Read, 1989; Wright, 1992; Read, 1995). Greenhouse reservoirs develop in reed and carbonate sand shoal lithofacies that stack in aggradational or gently prograding ramp geometries. Reservoirs are relatively homogeneous, and form extensive sheets that, in many cases, form prograding ramps. Vertical communication through pore systems is dominated by primary porosity. Small sea level falls prevent significant drops in water tables, and reduce meteoric diagenetic effects. Long-term exposure (100's kyr) at sequence boundaries can be more significant, and can lead to enhanced meteoric diagenesis, soil formation, and/or silcrete/caliche caps that provide reservoir baffles and barriers. Reef reservoirs of Devonian and Cretaceous age exhibit many of these characteristics.

Ice-house times are characterized by high amplitude (60-100+ meters), high frequency sea level fluctuations. Carbonate productivity can vary over short distances, resulting in considerable lateral variability in thickness and internal facies distribution. Deeper muddy subtidal facies, shallow shoal water grainy facies, and facies exhibiting subaerial exposure may be juxtaposed over short lateral distances. High-frequency cycles show juxtaposition of deep water muds, shallow water facies, and subaerial emergence features (Read, 1995), resulting in vertical baffles and barriers to flow. In arid settings, caliche or silcrete will form extensive nonporous caps to depositional cycles. Ice-house reservoirs thus can be more compartmentalized than greenhouse reservoirs.

Icehouse conditions will produce disconformity bounded sequences, 10's to 100's of meters thick. Large amplitude, sea level fluctuations are significant and cause large-scale lateral and vertical migration of diagenetic zones. Facies deep within platforms are subjected to repeated interaction with marine and meteoric fluids in vadose ad phreatic environments. The extend of karst formation is dependent on the climatic conditions at the time of exposure (Perkins, 1977; Beach, 1982).

*(Please see continuation of **Coral Reef Systems** on page 4)*

SCA UPSTREAM TRAINING

SCA FEATURED INSTRUCTOR: J. FREDERICK 'RICK' SARG, Ph.D.

SCA's training department is proud to add Dr. Frederick "Rick" Sarg to our growing list of exceptional instructors. Dr. Sarg is a geoscience consultant who specializes in stratigraphy and seismic interpretation with an emphasis on carbonates, applied to both exploration and production problems. His "Sequence Stratigraphy of Carbonates" course has proved to be quite popular as both an in-house and public course. Dr. Sarg has 33 years of experience in the petroleum industry including research, staff and management positions with Exxon, Mobil and ExxonMobil. Dr. Sarg concluded his career as Stratigraphy Coordinator for the Upstream Companies. He has conducted research in the seismic and sequence stratigraphy of carbonates in North America, offshore West Africa, Indonesia, the North Sea, the Middle East, Kazakhstan, Australia, and Argentina, has conducted numerous stratigraphy short courses and led field trips for both industry and academia.

Dr. Sarg has authored and co-authored 30 publications and edited three volumes on carbonate stratigraphy. SEPM Special Publication 44 (1987), AAPG Memoirs 57 (1993) and 81 (2004). He has served as an associate editor of AAPG and is a GSA Fellow and active member of AAPG and SEPM. He received the SEPM Excellence of Presentation Award at the 1984 mid-year meeting. He has served in a number of positions for both the national SEPM and the Permian Basin Section, and has recently completed a term as SEPM President.

Rick received his B.S. and M.S. degrees from the University of Pittsburgh, and his Ph.D. in geology from the University of Wisconsin, Madison.

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August 8 - 12
(Dallas, Texas - 5 day course) instructor Mr. J. Brewton

GEOSCIENCE "BOOT CAMP"
August 15 - November 4
(Houston, Texas - 12 week program)

Structural Styles in Petroleum Exploration & Production
August 15 - 19
(Houston, Texas - 5 day course) instructor Dr. S.Mitra

Basics of the Petroleum Industry
August 20
(Houston, Texas - 1 day course) instructor Mr. H.Miller

Applied Sequence Stratigraphy of Clastic Rock & Reservoirs: Well Logs, Cores, Outcrops & Seismic
August 22 - 26
(Houston, Texas - 5 day course) instructor Dr. R.Slatt

Applied Subsurface Geological Mapping
August 29 - September 2
(Houston, Texas - 5 day course) instructor Mr. J. Brewton

Practical Interpretation of Open Hole Logs
September 6 - 9
(Houston, Texas - 4 day course) instructor Dr. R.Maute

Cased Hole and Production Log Evaluation
September 12 - 16
(Houston, Texas - 5 day course) instructor Dr. J.Smolen

Practical Seismic Exploration & Development
September 12 - 16
(Houston, Texas - 5 day course) instructor Dr. J.Willis

Applied Subsurface Geological Mapping
September 19 - 23
(Kuala Lumpur, Malaysia - 5 day course) instructor Mr. R.Shoup

Seismic Interpretation Workshop
September 19 - 21
(Houston, Texas - 3 day course) instructor Mr. A.Cherry

Basic Petroleum Engineering for Non-Engineers
September 22 - 23
(Houston, Texas - 2 day course) instructor Mr. D.Lanman

Applied Subsurface Geological Mapping
October 10 - 14
(Houston, Texas - 5 day course) instructor Mr. S. Agah

Applied Subsurface Geological Mapping
October 17 - 21
(Perth, Australia - 5 day course) instructor Mr. R.Shoup

Applied Problems in Interpretation of Clastic Reservoir Systems
October 24 - 28
(Perth, Australia - 5 day course) instructor Mr. R. Shoup

Quality Control of Subsurface Maps (QLT's)
November 7 - 9
(Houston, Texas - 3 day course) instructors Mr. D.Tearpock / Mr. J.Brewton

Exploring, Appraising & Developing Tight Oil & Gas Reservoirs
November 7 - 10
(Houston, Texas - 4 day course) - instructor Mr. C.Jenkins

Descriptive Lithology Analysis of Cutting & Cores
November 7 - 11
(Houston, Texas - 5 day course) - instructor Dr. R.Merrill

For a complete list of the 2011 public course schedule including course descriptions, target audience and dates available, please visit our website at www.scacompanies.com

***(Coral Reef Systems -** continuation from page 2)*

Humid conditions lead to considerable leaching of less stable carbonate minerals (i.e., aragonite and hi-Mg calcite) forming significant secondary porosity (i.e., molds, vugs, caves, caverns, etc.) (Loucks, 1999). Arid settings tend to allow preservation of original primary porosity. The lack of meteoric water allows primary pores to remain open, and allows preservation of permeable networks. The Neogene reef reservoirs of the Australasian region are characterized by humid karst-modified primary pore systems. Because of their similarities to Pleistocene and Modern reef systems (Melim et al., 2001), and their significance as oil and gas reservoirs, they are summarized below.

Neogene Reef Platform Oil and Gas Reservoirs –

The late Oligocene through Miocene was a period of widespread coral/algal carbonate platform development in the Australasian region (Epting, 1980; Fulthorpe and Schlanger, 1989; Ehrlich et al., 1993; Saller et al., 1993; Gucci and Clark, 1993; Sun and Esteban, 1994). These Neogene reef platforms have been targets of hydrocarbon exploration and there have been numerous discoveries (Table 1) [i.e., Malaysia: central Luconia (Ho, 1978; Epting, 1980; Epting, 1989; Sulaiman, 1995); Philippines: Nido (Withjack, 1985 and Malampaya (Grötsch and Mercadier, 1999); Indonesia: Arun (Abdullah and Jordan, 1987; Jordan and Abdullah, 1992), northwest Java Sea (Yaman et al., 1991); Ramba (Longman et al., 1987); South Lho Sukon (Maliki and Soenarawi, 1991), Natuna (May and Eyles, 1985; Rudolph and Lehmann, 1989); China: Liuhua, Pearl River (Moldovanje et al., 1995)].

*(Please see continuation of **Coral Reef Systems** on page 5)*

Field Name	Country	Depositional Component	Porosity Types	Est. Porosity Range (%)	Estimated Ultimate Recovery (MMBOE)
Arun	Indonesia	Coral/Algal/ Foram/Molluscs	Chalky, Vug, Mo, WP, Fr	5-25	3900
Kampung Baru	Indonesia	Coral/Algal/ Foram/Molluscs	Mo, Vug, Chalky, Fr	25-30	90
Krisna	Indonesia	Coral/Algal/ Foram/Molluscs	Vug, Mo, Chalky, Fr	10-35	55
Lho Sukon A	Indonesia	Coral/Algal/ Foram/Molluscs	Vug, Mo, Chalky	5-20	85
Liuhua	China	Coral/Algal/ Foram	Vug, Mo, BP, WP, Chalky	15-35	115
Nido	Indonesia	Coral/Algal/ Foram	Vug, Mo, Fr	1-10	20
NSO A	Indonesia	Coral/Algal/ Foram/Molluscs	Vug, Mo, Chalky, Cav, Fr	15-30	245
Natuna L	Indonesia	Coral/Algal/ Foram/Molluscs	Vug, Mo, BP, WP, Cav	10-30	26250
Luconia F6	Malaysia	Coral/Algal/ Foram/Molluscs	Vug, Mo, BP,	5-35	740
Salawati A	Indonesia	Coral/Algal/ Foram/Bryozoan/ Molluscs	Vug, Mo, Fr, BC	~15	20
Kasim	Indonesia	Coral/Algal/ Foram/Bryozoans/ Molluscs	Vug, Mo, BC, Fr	5-40	60
Walio	Indonesia	Coral/Algal/ Foram/Bryozoans/ Molluscs	Vug, Mo, BC, Fr	5-30	200
Rama	Indonesia	Coral/Foram	Chalky, Vug, Mo, BP, WP	15-40	125
Bima	Indonesia	Foram/ Molluscs/ Coral/Algal	Vug, Mo, Chalky, WP	20-40	90
Ramba	Indonesia	Foram/Coral	Vug, Mo, Chalky, Ch, Fr	5-30	90
Bombay High	India	Coral/Algal/ Foram	Vug, Mo, Chalky, Fr	15-25	5015
Ras Fanar	Egypt		Vug, Mo, Chalky, BC, Fr	10-30	140

***Table 1** - A partial list of significant Miocene-aged, coral reef platform oil and gas fields, compiled from various sources, including references above (MMBOE = million barrels of oil equivalent)*

Pore types:
***Vug**=vuggy, **Mo**=Moldic, **Chalky**=chalky microporosity, **BP**=Interparticle, **WP**=intraparticle, **Fr**=fracture, **BC**=Intercrystalline, **Ch**=channel, **Cav**=cavernous).*

Depositional components, and pore types listed in order of abundance.

*(Please see continuation of **Coral Reef Systems** on page 5)*

***(Coral Reef Systems -** conclusion)*

Two of these fields, Natuna L (Rudolph and Lehmann, 1989) (Figures 3), and Jintan, Luconia Province (Vahrenkamp et al., 2004) illustrate aspects of coral reef reservoir architecture and lithofacies. Both of these field examples are isolated reef platforms of middle to late and middle Miocene age respectively. Reservoir columns are approximately 1000 (Jintan) to 3000 (Natuna) feet in thickness. Reservoir lithofacies range from coral-algal boundstones, rudstones, floatstones, grainstones, and packstones (Figures 1 and 3). Bioclasts also include abundant foraminifera, mollusks, and echinoderms. Porosity ranges from 5 to 40%, and pore types are dominantly Vug, Moldic (Mo), and Interparticle (BP). Each platform has undergone periodic and significant subaerial exposure leading to secondary porosity enhancement (Figures 3, and 4). The best reservoir quality occurs in highstand systems tract deposits that have been subjected to subaerial exposure. These reservoirs tend to stack vertically, and extend across each platform (Figures 3, and 5).

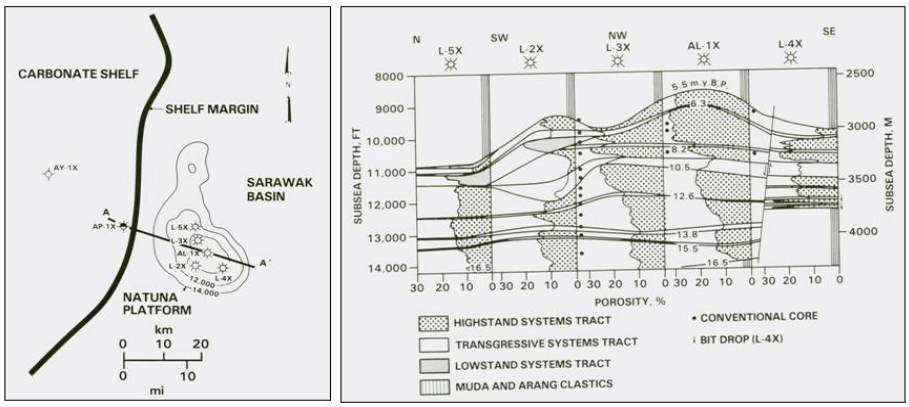

Figure 3 - Reef reservoirs Natuna L structure -

(A) Natuna L subsea depth structure in feet (from Eyles and May, 1982).

(B) Natuna sequence stratigraphy showing well correlations.

Platform consists of alternating thick, shallowing upward highstands (increasing porosity) (i.e., highstand systems tracts), and thin deepening upward transgressive (decreasing porosity) deposits (i.e., transgressive system tracts). Highstand deposits show porosity enhancement beneath subaerially exposed sequence boundaries (i.e., age date surfaces). (modified after Rudolph and Lehmann, 1989).

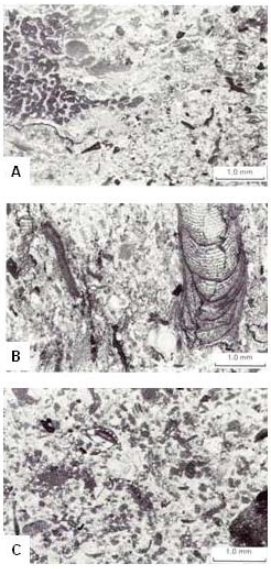

Figure 4 - Reef reservoirs Natuna lithofacies -

Thin section photomicrographs of Natuna reservoir lithofacies, plane-polarized light.

(A) Coral-red algae boundstone in a grainstone matrix. A moldic, mud-filled coral encrusted by red algae to left. Light gray areas are moldic and vuggy porosity.

(B) Coral-red algae-echinoderm packstone/grainstone.

(C) Coral-red algae-echinoderm grainstone.

Moldic porosity shown in light gray areas. (modified after Rudolph and Lehmann, 1989).

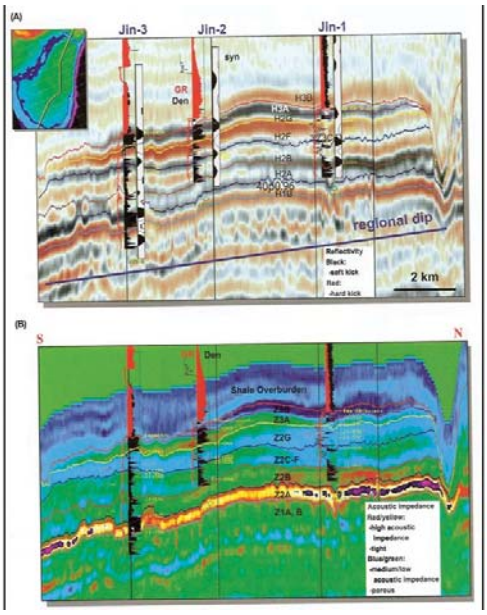

Figure 5 - Reef reservoirs Jintan porosity -

(A) Reflection and

(B) Acoustic impedance section through Jintan field.

Synthetic seismic logs show good match with seismic. Horizons (H1B, H2A, etc.) define reservoir zones shown on acoustic impedance (Z1a, Z2a, etc.). Low impedance areas (blue/green) (i.e., higher porosity) show both vertical and lateral connectivity. (from Vahrenkamp et al., 2004).

Summary

Carbonate reservoirs are important contributors to world oil and gas production (>50% of global reserves), and reef reservoirs are a significant proportion of these reservoirs. They are particularly abundant in the Siluro-Devonian, Cretaceous, and Neogene time periods. The Neogene-aged reservoirs are commonly coral reef and associated grainsupportstone deposits. Reef reservoir pore systems are generally characterized by some combination of primary depositional and diagenetic pore types. Porosity ranges from patchy to uniform, resulting in vertical and horizontal heterogeneity. Climate controls the effects of early diagenesis. Greenhouse reservoirs show less effect of subaerial dissolution, and greater internal continuity. Icehouse reservoirs that have been affected by humid karst conditions show significant pore system modification. The Neogene coral/algal reservoirs are most similar to modern reef systems and exhibit dissolution modification of their pore systems.

Bibliography

The bibliography list can be made available upon request. Please send your request to info@scacompanies.com.

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OIL AND GAS OPPORTUNITIES (DEALS)
by Jeff Lund and Daniel Tearpock

Oil and gas "opportunities or deals" are the heartbeat of the upstream industry. Almost every well that is drilled, almost every acreage block that is leased, almost every oil or gas field that produces, has or has had a history of ownership change and often phases technology application. It's common to hear the terms "brown field" projects and "green field" projects referring to "old projects being renovated or receiving a new round of activity" ("brown") and new or start up ("green") projects.

Deals and Who Does Them

Deals involve individuals, small companies, huge companies, independent and so-called major companies, national companies, foreign governments, **naïve investors and thieves**. They can range from exploratory prospects looking for undiscovered resources, development of discovered but incompletely exploited fields, application of new technologies (water flooding for example) to force out additional oil and simply reselling of producing properties as companies re-balance investment portfolios or have differing opinions of the future of commodity prices.

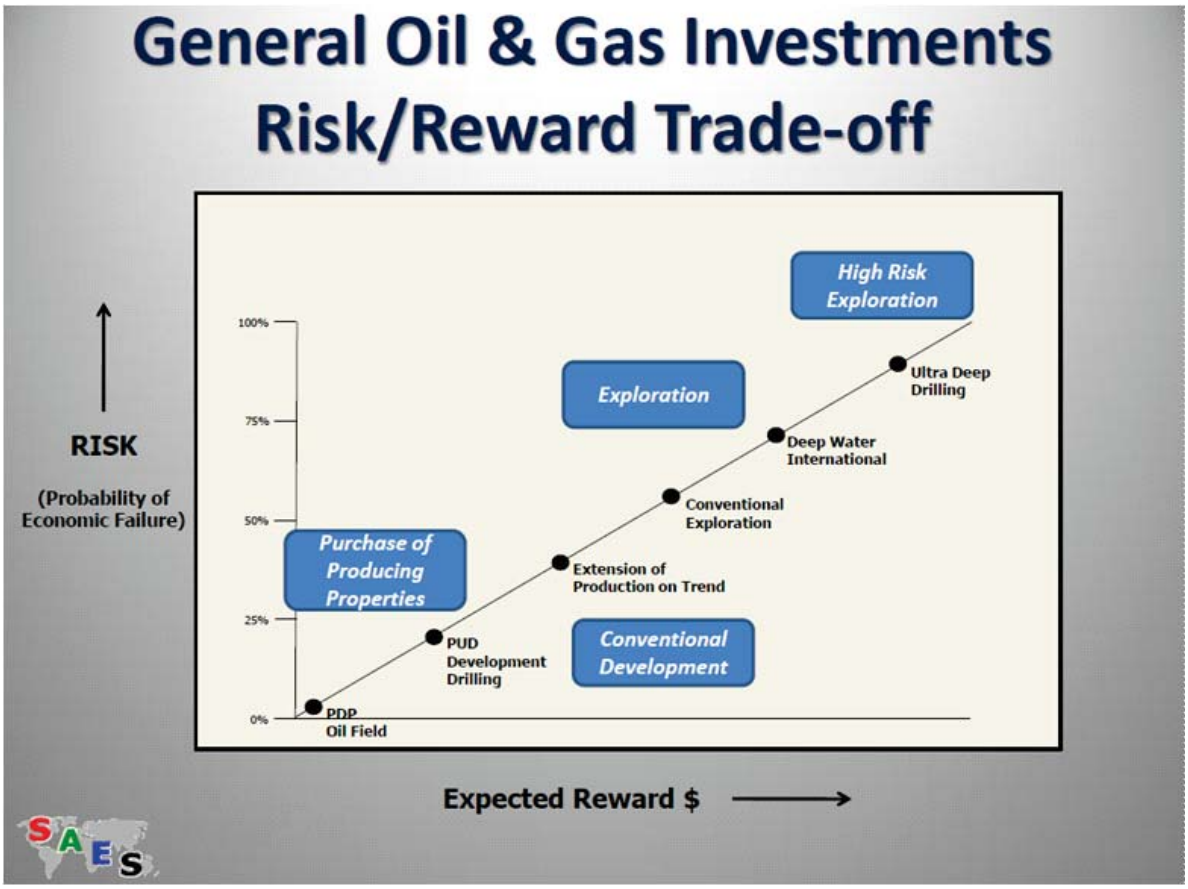
There are many opportunities that are done, not through large "brand name" investment houses, but through individuals and small consulting companies having sound personal contacts from decades of working in the industry. They can identify and evaluate some of the best opportunities. The key ingredients are: 1) personal contacts; 2) extensive industry experience; 3) the technical ability to separate the wheat from the chaff (to be able to define what is of good quality over what is of poor or lower quality) and 4) to find these opportunities often without the potential buyers having to go through competitive bidding processes.

Small entrepreneurial consulting companies often have the edge over the larger investment houses due to their ability to personally identify and evaluate opportunities including the financial, economic and perhaps the most important part of the equation, the technical merits of the opportunity (the geology, geophysics, petroleum engineering, and other technical areas behind the discounted cash flow numbers). Opportunities span a huge range of values. We have seen investments ranging from a few ten's of thousand to several billion dollars.

The Risk Reward Trade-Off

There is also a large range of risk and reward available in the oil and gas deal market place. The graph below shows a relationship of increasing risk of economic failure (such as drilling dry holes) to potential reward. The general rule is that increasing reward almost always involves being exposed to greater risk. The various types of oil and gas deals ranging from buying proven producing properties up to frontier or high risk exploration, systematically expose the investor to greater potential reward but also greater chance of failure. One issue on which many companies and individuals need advice is quantifying this trade off.

Sometimes an enthusiastic seller has become so excited about the deal he is proposing he forgets to explain the risk element to buyers. That's one good example where expert technical advice is critical to buyers.

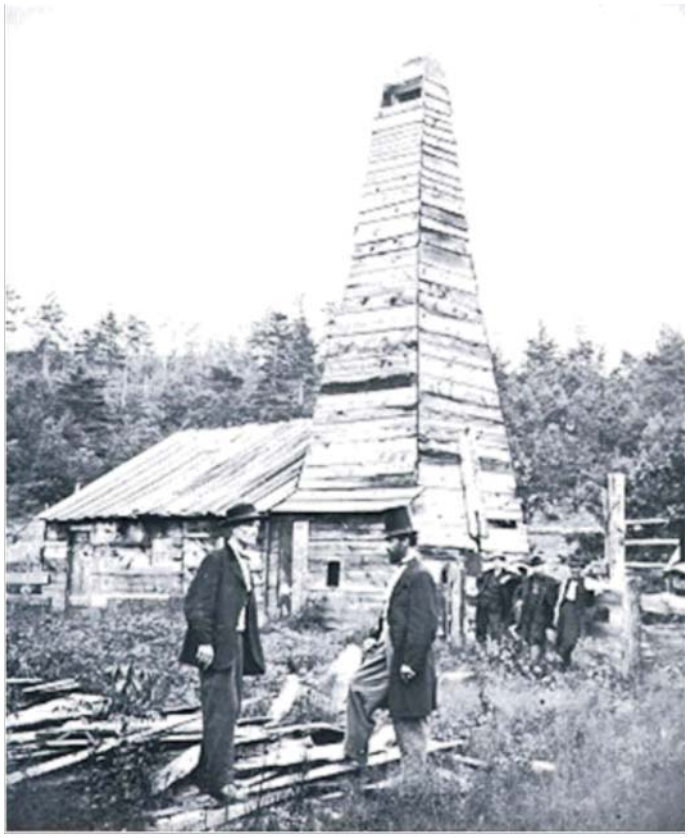


THE FIRST OIL AND GAS WELLS
by Jeff Lund

Colonel Drake and Oil

Many people are familiar with the "Drake Oil Well" drilled in 1859 in Titusville, Pennsylvania. Colonel Edwin L. Drake drilled a well using "cable tools" or a sharp metal tool suspended on cable which banged and chiseled its way down through solid rock while the debris or resulting chips of rock were "bailed" or removed by other tools.

In August 1859 Drake encountered oil that would flow in commercial quantities about 70 feet down in what the U.S Park Service National Historic Landmark Program describes as "the world's first successful oil well".



Colonel Drake's Well

The discovery resulted in a boom in northwest Pennsylvania that lasted 25 years, caused railroad construction (to ship out the oil) and was instrumental in creating many of the early large oil companies and oil barons, including John D. Rockefeller. You can visit the site today, the Drake Well Memorial Park.

Truth is, Colonel Drake was led to the area due to oil that naturally seeps at the land's surface and had been used by the Native Americans for years as medicine. Drilling near "Oil Creek" was a clue!

Natural Gas

But what about natural gas? Natural gas is very much in the news these days but its story is less well known.

We are all aware of the current "hot plays" in North America: the development of shale reservoirs for both oil and natural gas.

Huge amounts of investment in the Marcellus shale of Pennsylvania, the Eagle Ford shale of South Texas and the Haynesville shale of East Texas and northwest Louisiana are in the news daily. Even President Obama mentioned them in the State of the Union address.

One of the most active plays is the Marcellus shale. Giant deals involving non-US companies from Norway, China, the UK and India have been announced to gain positions in this play. Multi-billion dollar deals have been done by heretofore unknown small private oil companies in Pittsburgh with the likes of Chevron and Shell. Fracture stimulation of wells, something we in Texas have been doing quietly for decades, is now on the cover of the New York Times.

Colonel Drake and the Drilling Crew

Now, this "new play", the Marcellus shale, must truly be something "new", lying undiscovered beneath our feet, right? Well, where and when do you suppose the first commercial use of natural gas in North America occurred? According to the Shale Research Institute at the State University of New York at Fredonia, New York, it happened in 1825, as a result of the work of William A. Hart. Almost 30 years before Colonel Drake.

It turns out that the first use of natural gas was to light street lamps in Fredonia, New York. Fredonia is a small town near Lake Erie and only tens of miles north of Titusville, Pennsylvania. There is a marker on the village green in Fredonia installed in 1925 by the Daughters of the American Revolution to commemorate the 100th anniversary of the first use of natural gas.

According to the Shale Research Institute, Fredonia was incorporated as a village in 1829 and the official seal of the village has a five flame gas burner. Mr. Hart first piped gas (through wooden pipes) to light street lights then later to light lamps in several houses. Later, in 1857, another entrepreneur, Preston Barmore, drilled deeper wells to 120 feet but did not encounter adequate flows of gas. So Barmore lowered a canister with 8 pounds of gunpowder and set it off by dropping a red hot iron rod down the hole. The explosion caused enough fracturing that a satisfactory flow of gas resulted. The Shale Research Institute calls Barmore the "first petroleum engineer".

*(Please see continuation of **The First Oil & Gas Wells** on page 8)*

*(conclusion of **The First Oil & Gas Wells**)*

How did all this early activity come to happen? The clue to the presence of natural gas, which could be burned as a fuel, came, from the Iroquois Indians and early settlers **who noticed that bubbles in the creek running through Fredonia were flammable**, incredibly methane was entering the creek water from the rock layer the creek flows over.

What might that rock layer be? You guessed it, it's the Marcellus shale. The entire story is available at www.**fredonia**.edu/**shale**institute researched and described in fascinating detail by geology professor Dr. Gary Lash at the State University of New York.

Pennsylvania, showing location of Drake's Well

The Seal of the Village of Fredonia New York featuring a five-burner gas lamp

The Marcellus was discovered and used commercially (albeit on a small scale) in 1825 and finally, in 2004 its potential was unlocked by Range Resources testing a well drilled for other reasons, because the technology to successfully drill horizontally, fracture stimulate in multiple intervals and complete the Marcellus formation existed.

But the basic concept including drilling, fracture stimulating and building pipelines was pioneered almost 200 years ago. As a result, billions of dollars have changed hands as "deals" to acquire and trade acreage ownership and drill wells rapidly advanced to fever pace.

The huge impact of the "shale revolution" is observable in a recent announcement that some of the liquified natural gas (LNG) terminals built in the U.S. on the past few years to import natural gas are now being considered for revamping as export terminals. One of them is in Sabine Pass Texas!

Located in downtown Fredonia, the boulder proudly displays the site of the first commercial gas well in the U.S., dedicated on the 100th anniversary by the Daughters of the American Revolution.

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(Conclusion of Chairman's Corner from page 1)

Seventeen (17) of the top twenty (20) oil and gas companies in the world are NOC's (see *Figure 1*). Giant ExxonMobil Corporation, the second largest public/private company in the world, with sales over $370 billion, ranks number 14 when compared to the world's largest oil and gas companies (see *Figure 1*).

2. How much of the world's oil and gas reserves are produced by multinational oil and gas companies like ExxonMobil, Shell, BP, etc.?
   Collectively, the multi-national oil companies produce just 10% of the world's oil and gas reserves. State owned NOC's now control 75% of all crude oil production. Daily oil production is currently over 89 million barrels of oil per day.
3. Where is the growth and demand for crude oil resources?
   All we have to do is look at the growing economies of the world. When we examine the economic growth of countries like China and India, we begin to see an emerging picture of where the significant competition for future oil and gas resources resides.

The United States of America is the OPEC of coal and possibly of natural gas as well. We have vast natural resources just waiting to be developed on private, as well as offshore and onshore government controlled lands. Instead of chastising our American oil and gas companies, we can all get behind them and build an energy policy that is truly an "Energy Independence Plan".

Daniel Tearpock
Chairman/CEO

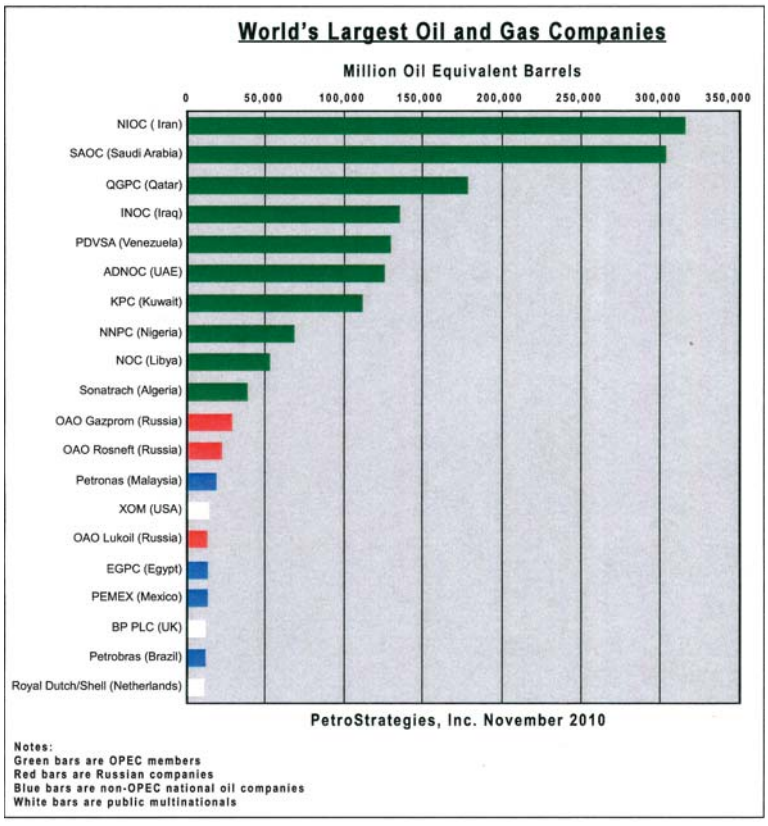

Figure 1 - Top twenty oil and gas companies in the world (taken from http://www.petrostrategies.org/Links/worlds_largest_oil_and_gas_companies)

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Changing Crews in the Middle of the Global Recession
By Hal Miller, SCA Senior Vice President of Operations

The oil and gas industry has been fretting about the imminent loss of oil finding and producing talent for years now. The generally acknowledged passage of the baby boom demographic bubble, those of us born from 1945 to 1964, into the retirement window is impacting all industries but is especially exaggerated in the oil and gas business due to slow hiring in the 1990s. The resulting dearth of mid-career, up-and-comers available to replace the retiring management teams and to ease the loss of oil finding experience is a continuing source of conversation and concern. Geoscience and engineering consulting service providers are well positioned to be a "finger-on-the-pulse" of the demand for and supply of these skills. Indications are that the current environment has softened the blow that could have occurred had the mass exodus of experience actually occurred as predicted.

Many geoscientists who have recently taken advantage of retirement opportunities remain in the workforce, some entering the consulting ranks for the first time. One could argue that in some respects the global recession came at a good time, as the dramatic shrinkage of retirement accounts has caused many geoscientists to alter or postpone their retirement plans. The reality of full or even semi-retirement at age 55 or 60 does not seem like such a good idea for many when there is a reasonable probability that their suddenly diminished retirement nest-egg will need to last for another 25 years or more. Perhaps those of us now facing the prospect of having to work a little longer should have saved (or lived) a little harder, but from an industry perspective this appears to be a good thing. Beyond the revised retirement plan factor, most geoscientists with oil finding in their blood are not happy sitting on the sidelines for long, especially when the demand for their skills and experience remains reasonably strong. Not as strong as it was in 2006 perhaps but companies are still hiring more than firing. Even the demand for entry level staff appears to continue at a moderate pace; hopefully a sign that the industry and academia are finally approaching the steady state equilibrium that allows geoscience departments to provide an optimal pool of new grads to supply the industry's needs. At the very least, it appears that employment prospects for oil and gas geoscientists are more optimistic than for the US national workforce in general.

In the consulting business, demand for senior geoscientists with specific skills and geographic experience to supplement in-house teams and mentor new employees has remained steady. The positive oil price environment is attracting large amounts of investment funding from within and outside the U.S, stimulating development of many new start ups and expansion of existing players, all in need of experienced staff. Seasoned consultants who have seen the globe and know where and where not to find hydrocarbons fit nicely into roles with these companies. Many of the majors and large independents significantly reduced or eliminated their consulting staff during 2009-2010 while attempting to preserve and reallocate their internal geoscience resources. The continuing regulatory uncertainties surrounding deepwater exploration in the Gulf of Mexico has resulted in many deepwater exploration teams being sidelined or redirected. But indications are surfacing of resurgence in 2011 as even large companies find the need to plug gaps in their skill base, caused in many cases buy ongoing retirements and repatriations. Additionally, there are clear indications of growth in many non-US companies trying to build their national staff organizations as governments around the world encourage the search for and securing of energy resources for their growing economies (a novel concept!). These companies often have experienced staff concentrated in the management ranks, and an abundance of bright and capable geoscientists in the earlier stages of their careers needing senior, hands-on geoscience consultants for technical guidance and mentoring.

It also appears that the unconventional revolution is having a significant impact on geoscience careers. As advances in horizontal drilling and multi-stage frac technology enhance our ability to make reservoirs out of what were once seals, virtually every source rock in basins around the world is now a candidate for exploration and development. Success has impacted the supply and suppressed the price on the gas side, but the hunt for these plays continues to be aggressive with an emphasis on finding the "sweet spots" and reducing costs to enhance the economics.

All of these factors — heavy investment funding, new company growth, expansion of international players outside the US, bottoming out of large company hiring slumps, and growth of the unconventional resource plays — have steadied the demand for late career geoscientists. The good news for companies large and small is that the supply of well qualified and experienced geoscientists is relatively high. The opportunity to work for a more diverse spectrum of companies, in an expanding array of plays and geographic areas, and under more flexible working arrangements (plus the need to reinforce retirement portfolios) is motivating many to work longer. A large pool of broadly experienced consultants means that companies can find specific skills and knowledge of plays or even specific fields to supplement their internal knowledge bases. There is increasing flexibility in the working relationships between individuals and companies, ranging from short term "quick hit" assignments to long term consulting relationships with the potential to evolve into full time employment. This model is well suited to the handoff from the baby boomers to subsequent generations of oil finders with less likelihood of any significant fumbles. The great crew change is developing into a more traditional transition from one generation to the next.

This article is published with permission of the Division of Professional Affairs of the America Association of Petroleum Geologists.

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SCA ON THE MOVE

SCA CO-SPONSORS HGS GUEST NIGHT AT THE MUSEUM

SCA provided sponsorship for another successful Houston Geological Society Guest Night, which took place at the Houston Museum of Natural Science on May 21st. The speaker was Derek J. Main, Lecturer in Geology at the University of Texas at Arlington. Derek presented his fascinating work at the Arlington Archosaur discovery site with a talk entitled "*Wildfire Paleoecology along the Cretaceous Coast of Texas*".

HGS members and their families attending the event enjoyed an excellent meal seated at tables located throughout the museum's many intriguing exhibits. Hal Miller, SCA's Senior Vice President acepted a plaque from the HGS acknowledging SCA's continued sponsorship of this annual event.

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A "SAFETY ATTITUDE"

On June 2, 2011 SCA distributed a new SCA Safety Manual with updated information on safety topics as well as Red Cross Emergency Preparedness Kit, in preparation for the upcoming hurricane season. The exceptional level of safety performance at SCA confirms that our employees and consultants embrace our philosophy to protect our employees, our environment, our property and avoid loss. SCA continues with its record of zero accidents in its over 23 year history.

* * * * *

SCA RECEIVES THREE AWARDS

During past activities this Spring, SCA was the recipient of three Awards for sponsoring activities at industry events, by two prestigious industry societies.

- The AAPG awarded SCA (Silver sponsor of the **Imperial Barrel Award)** special recognition as one of the Imperial Barrel Program sponsors.
- The HGS awarded SCA the **Corporate Star Award 2010-2011** for *Continued Support of the Houston Geological Society*.
- The HGS also awarded SCA a plaque in appreciation for the **HGS Short Course** "Quality Control for Subsurface Maps", conducted March 9, 2011

AAPG Imperial Barrel Award ,HGS Corporate Star Award and HGS Short Course Appreciation plaque

SCA would like to express its appreciation to AAPG and HGS for their special recognition of SCA's contribution

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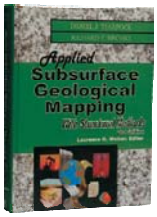
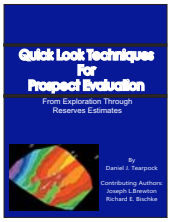
TWO INDUSTRY BEST SELLING TEXTBOOKS SOLD AROUND THE WORLD



Applied Subsurface Geological Mapping with Structural Methods, 2nd Edition (2003), one of the most demanded and referenced texts on subsurface interpretation, mapping and structural geological methods is available from SCA, Prentice-Hall, various industry associations and internet bookstores around the world.

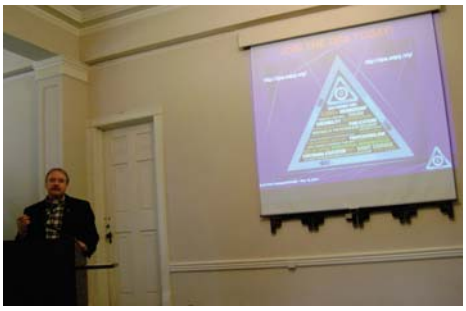
Quick Look Techniques for Prospect Evaluation is a "must have" text for anyone who screens deals, reviews interpretations and maps, evaluates prospects or potential resources or reserves.



We Practice What We Teach

Dan Tearpock as DPA President continues his ETHICS Talks

Dan Tearpock, President (2010-2011) of AAPG's Division of Professional Affairs, continued his series of Ethics Talks for the industry different societies and organizations. The latest talk was at the monthly meeting of the East Texas Geological Society, on May 18, 2011.



The meeting was very well attended by the members of the society and each one received a certificate for 1 PDH for ethics training.

2011 AAPG CONVENTION

During the 2011 AAPG Annual Convention and Exhibition celebrated in Houston in April, Dan Tearpock attended numerous meetings and functions as President of the Division of Professional Affairs, and had the privilege of handing out several awards; 1) Paul Britt, past President of DPA, 2) Distinguished Service awards to Richard Green, 3) Life Membership award to Terry Hollrah, and 4) Certificate of Merit awards to Mark Gallagher, Mike Fogarty and Jeff Brame.

*Dan Tearpock presented Terry Hollrah with a **Life Membership** Award.*

*Paul Britt received a **Past President** Award.*

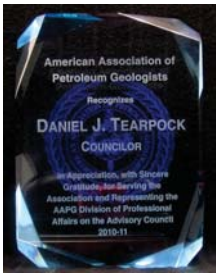
*Richard Green was presented with a **Distinguished Service** Award.*

*Mark Gallagher received a **Certificate of Merit** Award.*

*Mike Fogarty was presented with a **Certificate of Merit** Award.*

DPA 2010-11 Executive Committee, including Norma Newby, AAPG Divisions Manager

Among the numerous functions organized during the convention, the DPA Luncheon hosted Karen Alderman Harbert, President and Chief Executive Officer of the U.S.Chamber of Commerce's Institute for 21st Century Energy (Energy Institute), Washington, D.C. as their guest speaker. At the end of the luncheon, Dan Tearpock presented her with a special DPA thank you plaque.



AAPG recognized Dan Tearpock, Councilor, for serving the association and representing its Division of Professional Affairs on the Advisory Council 2010-2011.

UPCOMING E&P INDUSTRY EVENTS

August 15 - 18	SBGf, 12th International Congress of Brazilian Geophysical Society& EXPOGEF	Rio de Janeiro, Brazil
September 6 - 8	SPE Offshore Europe 2011	Aberdeen, U.K.
September 18 - 23	SEG International Exhibition and 81st Annual Meeting	San Antonio, Texas, U.S.A.
September 19 - 21	Global Pacific Partners 21st World Upstream	Geneva, Switzerland
September 28 - 30	Global Pacific Partners 16th Asia Oil Week	Singapore
October 23 - 26	AAPG 2011 International Conference & Exhibition	Milan, Italy
October 30 - November 2	SPE Annual Technical Conference & Exhibition	Denver, Colorado, U.S.A.
October 31 - November 4	Global Pacific Partners 18th Africa Oil Week	Cape Town, South Africa
November 15 - 17	EAGE-AAPG-SEG-SPE Indonesian Petroleum Technology Conference	Bangkok, Thailand

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SCA's WEBSITE

Geologists, Geophysicists and Engineers are in high demand....

Visit our website to view our job posting or to submit your resume for either consulting or direct hire positions at www.scacompanies.com.

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TO BE THE LEADER IN PETROLEUM CONSULTANCY AND TRAINING,
BY PROVIDING SUPERIOR QUALITY PRODUCTS AND SERVICES, WHILE MAINTAINING PROFITABILITY

THIS IS TO BE ACCOMPLISHED BY:

1. **Applying our proven philosophy for finding and developing oil and gas resources and reserves,**
2. **Creating an efficient work environment that is enjoyable for all,**
3. **Employing the best people available,**
4. **Maintaining state-of-the-art technology, and**
5. **Providing our clients the desired results they need.**

The results of our success are to provide social and financial benefits to our company, people, clients, industry and community.