

SPE review

magazine of the Aberdeen and London sections
of the Society of Petroleum Engineers

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MANAGING OIL AND GAS PORTFOLIOS IN UNCERTAIN MARKETS

The oil and gas industry was a global concern long before the term 'globalisation' entered the business lexicon. But the need to rationalise and optimise portfolios has never been greater as emerging markets open up to foreign investment against a backdrop of uncertainty and constrained capital markets. Dr Renu Gupta, Chair SPE London Section, and Majid Shafiq, MD Corporate Finance, FirstEnergy Capital, set the scene for the SPE London 2nd Annual Conference and Exhibition (22-23 May 2013, at Savoy Place).

Portfolio management provides oil and gas companies with a vital bridge between corporate strategy and operational planning. It allows companies to be more proactive and responsive to changing market and operational realities at each stage in the asset lifecycle, and at every level in the organisation, from corporate planners to asset teams.

It is particularly important when contending with the challenges posed by operating in

emerging markets such as East and West Africa. Here, opportunities come with additional risk in the form of political instability, and a lack of transparency and infrastructure. It is also important when looking to achieve an optimal balance across exploration, development, production and geographic spread, and in better managing price fluctuations and risk.

Crucially, portfolio management enables oil and gas companies to mitigate the myriad forms of uncertainty (and thus risk) they face – from gaining access to new reserves, technology development, and financing, to commodity price volatility, increased regulation, and stricter environmental policies. All of these factors present a barrier to monetisation of resources, company growth and consolidation, making an accurate and rigorous approach to portfolio management essential.

(cont'd on page 2)



Society of Petroleum Engineers

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SPE London 2nd Annual Conference booking details - page 10

Win a FREE place at this high-profile conference - page 14



RECORD ATTENDANCE!

As **SPE Review** was going to print, SPE Aberdeen's 4th European Well Abandonment Seminar saw a record-breaking attendance of around 217 delegates at Aberdeen Exhibition and Conference Centre, as key players in the well abandonment arena gathered to discuss the challenges, innovative solutions and latest regulations associated with this rapidly-expanding industry activity.

Report and photographs - June issue.

Brian Kiloh Photography

SPE review

The Society of Petroleum Engineers (SPE), a not-for-profit professional association of 104,000+ members from more than 123 countries worldwide, is a key resource for technical knowledge related to the oil and gas exploration, drilling and production industry.

The SPE provides services through its global events, publications and website at www.spe.org.

SPE Review is published 10 times per year by the Aberdeen and London sections of the Society of Petroleum Engineers. It is sent to over 5,000 UK SPE members, and quarterly to an additional 7,000+ European members.

If you have read this issue and would like to join the SPE and receive your own copy of **SPE Review**, as well as many other benefits – or you know a friend or colleague who would like to join – please visit www.spe.org for an application form.

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Renu Gupta



Majid Shafiq

Managing oil and gas portfolios in uncertain markets

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Financing challenges

Despite the fact that oil prices remain at record highs and well beyond the \$100-per-barrel mark, the main problem for the oil and gas industry over the last 12 to 18 months has been that financial markets have been almost closed. The equity markets proved particularly difficult in 2012. Reserves-based lending, a commonly used technique for financing assets that are already in production or where production is expected to commence shortly, has been hit hard because European banks have continued to struggle amidst concerns over the Euro and the sovereign debt crisis.

This has proved problematic for small-cap players, such as those listed on the London Stock Exchange's AIM, because they don't have production or cash-flow. They are therefore heavily reliant on the equity markets and, in the current climate, have had to finance off their own balance sheet or asset base – ie they have either had to sell assets, farm them down, or seek to merge and become bigger entities to make themselves more attractive to investors.

In addition, equity fund managers have been much more selective because they've been suffering from redemption calls from their investors. They have been putting their money into what they perceive as safer investments, namely the corporate bond market, which has experienced a huge rise in activity over the last 12 months. Nevertheless, there has been an uptick in activity in the equity markets since the beginning of the year.

Unlike small caps, the majors and mid-cap companies have remained relatively unscathed by the fallout from the financial crisis. Typically, they finance from their own balance sheets and production, and have been acquiring assets and driving a lot of the activity in the oil and gas industry. The offshore drilling sector has remained particularly buoyant.

As a result, the service companies operating the drilling rigs and other service equipment have yet to see any significant impact on their utilisation rates. However, this sector tends to lag any drop in activity overall, and one region where there has been a discernible slowdown is North America, where low gas prices have impacted on utilisation rates.

Shifting investment flows

Overall, the high price of oil has to some extent compensated for the lack of external funding available for exploration and drilling activity and ensured that investment continues to flow within the oil and gas industry.

SPE LONDON NEW WEBSITE

Visit SPE London's new website, developed using the SPE International template, at: <http://london.spe.org> or <http://connect.spe.org/london>.

There is also a link to the site from the current SPE UK and SPE London Conference websites (www.spe-uk.org; www.spelondonconference.com).

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At the same time, upstream technologies are unlocking light tight oil and shale gas resources in the US and Canada and are altering the dynamics of the global energy market. By around 2020, the US is projected to become the largest global oil producer, accelerating the switch in direction of international oil trade towards Asia. It may also become an exporter of LNG if the gas surplus from shale gas development is sustained.

This will likely drive a shift in investment from traditional regional hubs for natural gas such as Australia, to North America. The International Energy Agency (IEA) predicts a surge in unconventional supplies, mainly from tight gas and light tight oil in the United States, oil sands in Canada, natural gas liquids, as well as a jump in deepwater production in Brazil. According to the IEA, almost 30 per cent of the \$15 trillion in upstream oil and gas investment that is required over the period up to 2035 will be in North America.

From a portfolio management perspective, the rise of unconventional plays also presents new challenges around estimating quantities of reserves and resources. Gaining an accurate understanding of a reservoir's reserves and resources using sub-surface characterisation is the key challenge, especially with the advent of so many different types of reservoirs that must be produced in different ways – eg tight gas, shale gas, tight oil, heavy oil, onshore and offshore, as well as conventional in extremely hostile environments.

Looking further afield

In the current market, investors are now looking to tick a lot more boxes before they make an investment decision. They want companies that have more liquidity and that offer the potential for a high near term return. Oil and gas companies therefore need to spread risk and capital across more assets. They should also be continually looking for ways to rationalise their portfolio, to ensure attractive acreage and geology is included in their asset base. For example, tapping into North Sea opportunities is expensive as it entails offshore and sometimes deepwater operations. The region has seen some high profile failures in recent years, resulting in a pull-back from North American investors. It is also extremely competitive and heavily explored, making further discoveries of large oil and gas fields less likely. Investors are therefore looking for higher potential returns from regions like Africa and the Middle East, where there have been some excellent examples of exploration success recently.

West Africa in particular continues to attract a great deal of exploration interest, as it is seen to be relatively under-explored compared to some of the mature basins in the world (eg relative to the North Sea). Nigeria has seen a dramatic increase in activity, especially in the Niger Delta, where the majors have been forced to sell assets that are now being rejuvenated by indigenous companies and small independents. Angola is also seeing increased activity. However, both Nigeria and Angola have regulatory

challenges, as well as numerous other issues that can make 'doing business' difficult.

In contrast, most of the basins in East Africa (Mozambique, Tanzania, Kenya, and Uganda) are seeing the first wave of serious exploration. These were led by the larger independents, but the size of the discoveries and the need to monetise the gas has brought in the majors and super majors. Currently, the infrastructure (both legal and physical) is still taking shape and the main challenge will be the first serious attempt to monetise the discovered gas.

Optimising portfolios

As technology advances and new geographies open up, and as new data is recorded, oil and gas companies must be continually looking to rebalance their portfolios towards the type of asset base that is attractive to investors. Many are already doing so, with small-cap players acquiring acreage with large equity positions that they can subsequently farm down to finance. Should seismic data confirm prospectivity, this then entices the mid caps and majors to either farm-in or even acquire the small caps in order to progress with development (drilling). Tight equity markets combined with growth in the number of small caps exploring (with Africa a particular focus) has resulted in an increase in mergers and acquisition activity.

Regardless of region, however, oil and gas firms should always be looking to manage their portfolio creatively in order to ensure it remains attractive to potential investors. Asset sales and farm-outs should be considered as an alternative, and offer a lower cost of financing than issuing equity. It's also essential to have financing in place in order to be ready to undertake activities that have been committed to. In the current economic climate, the companies that are running into problems are the ones that leave it too late. The secret is to have a solution in place well in advance of an obligation to drill – whether the company in question wants to fund it 100 per cent, bring in an equity or strategic partner, or farm out part of the asset.

About 2nd SPE London Annual Conference

Renu Gupta is Chair of the SPE London Section Annual Conference, 'Managing Oil & Gas Portfolios in Uncertain Markets', which will be held on 22-23 May 2013 at Savoy Place. Majid Shafiq will be presenting on the issue of raising capital under constrained market conditions at this conference.

See page 10 for more details.

Industry talent celebrated by Offshore Achievement Awards

Top achievers from across the offshore industry were celebrated by their peers at this year's Offshore Achievement Awards (OAA) ceremony.

The 27th awards ceremony, which saw a record attendance of 530 guests, was held at the Aberdeen Exhibition and Conference Centre on 21 March, and was hosted by Scottish comedian Kevin Bridges. The awards, supported for a second consecutive year by main sponsor TAQA Bratani, were successfully re-launched in 2011 by SPE Aberdeen.

Among the winners was Oil & Gas UK Chief Executive Malcolm Webb, who was honoured with a Significant Achievement Award.

Ian Phillips, Director of CO₂ DeepStore Ltd and the SPE Aberdeen Board member who chaired the OAA organising committee, said: "The Offshore Achievement Awards is the pinnacle of the energy industry calendar and SPE Aberdeen is very proud to host this prestigious event.

"The calibre of entries we received this year was exceptional. Our judging panel of senior representatives from sponsoring companies and SPE Board

members, faced some difficult decisions, particularly in the Innovator category, where the excellence of the entries led to two companies being declared joint winners along with another being highly commended.

"It is clear that there is much to be celebrated in the offshore industry, from small companies creating a step change in safety through to huge global organisations that are producing the next generation of industry leaders."

Leo Koot, Managing Director of TAQA Bratani, added: "The awards ceremony was once again a fantastic event. This year's finalists and winners demonstrated truly innovative thinking, dedication to industry safety and drive to succeed. TAQA Bratani is delighted to support the awards and share in the celebrations."



The OAA winners



Graham Skinner and Malcolm Webb



Kevin Bridges entertains



SPE Aberdeen Board members



2013 Offshore Achievement Award Winners:

Significant Achievement: Malcolm Webb, Chief Executive, Oil & Gas UK

"I am very honoured to have been recognised by the Society of Petroleum Engineers in this way, but in truth all that I have ever achieved in my career has been the result of teamwork and so I thank not only SPE Aberdeen but also the excellent team at Oil & Gas UK for this award."

Great Large Company Award: Axis Well Technology

Great Small Company Award: ROVOP

Young Professional Award: Graham Skinner – KCA DEUTAG Drilling Ltd

Graham, a Trainee Rig Manager on KCA DEUTAG Drilling's graduate development programme, has also qualified as a risk manager and a project manager. He has managed risks on new-build land rig projects, supervised rig move activities and delivered safety on two jack-up refurbishment projects, subsequently preparing a generic shipyard HSE plan. He is studying for an MSc in Drilling and Well Engineering and, following his current assignment, will become an Assistant Rig Manager in Gabon. A respected all-rounder, Graham mentors graduates and has led the development of a structured competencies system for KCA DEUTAG. He is an SPE eMentor and a trained STEM Ambassador, delivering science, technology, engineering and maths support to schools.

Working Together Award: Maersk Oil/ Technip

Export Achievement Award: Online Electronics Limited

Safety Innovations Award: Houlder

Innovator Award:

Red Spider Technology – Joint Winner

Stork Technical Services – Joint Winner

Tendeka – Highly Commended

Emerging Technology Award: Web Rigging Services

TECHNICAL MEETINGS

ABERDEEN

LONDON

EDINBURGH

Aberdeen

SPE Distinguished Lecturer Tor Austad, of the **University of Stavanger**, will present **"Smart Water" flooding in carbonates and sandstones: a new chemical understanding of the EOR potential**, at SPE Aberdeen's end-of-session evening meeting, on **22 May (6.30-8.30pm)**, at the **Douglas Hotel**.



During the last 15 years, new research has pointed out the importance of the wetting condition of the porous medium for obtaining good displacement of oil by injected water. When injecting a 'Smart Water' with different ion composition from the initial formation water, it is possible to modify the wetting condition of the reservoir in a favourable way, which can have dramatic effects on oil recovery, especially in carbonates. In order to take the full benefit of 'Smart Water' it is important to have a good knowledge of the chemical process taking place at the rock surface. New chemical understanding about water based EOR by wettability modification will be presented in this talk, and the EOR-potential will be verified.

Tor Austad is a Professor in Reservoir Chemistry at the University of Stavanger and has served as a consultant for various oil companies and research institutes. He holds MS and PhD degrees in Physical Chemistry from the University of Bergen and has been connected to Petroleum education and research for more than 35 years.

Bookings for Aberdeen and Edinburgh meetings:
www.rodgerandco.com; tel 01224 495051; spe@rodgerandco.com
Further information: www.spe-uk.org (Aberdeen Events)

London

At the **Geological Society, Piccadilly**, on **28 May**, **SPE London Young Professionals** will launch the Section's final evening meeting of the session with their annual **Technical Showcase**.

Following the networking buffet, in a change to the programme, **Michael Byrne**, of **Senergy** will present **'The extinction of skin'**.

Michael's presentation challenges the use and abuse of skin factors in reservoir and well description. The potential to reduce or even extinguish the use of skin factors is explored and advances in formation damage understanding and in inflow modelling are proposed as tools to enable better well performance understanding and prediction. With models now exceeding 500 million cells, complex well and reservoir geometries can now be captured enabling well performance prediction without the use of the letter 'S'.

As Global Technical Head of Formation Damage at Senergy, Michael is involved in development of the first CFD models to simulate well inflow behaviour and the impact of formation damage. A former SPE Distinguished Lecturer, he is currently a technical editor for four SPE journals and will chair the next SPE European Formation Damage Conference in June.

Established in 2007, the Formation Damage group at Senergy is one of the leading independent formation damage consultancy providers. Formation damage on pore, core, well and reservoir scale are studied and modelled, and the group boasts many innovations in testing procedures and upscaling of core data.

Before dinner: 5-6.30pm

Dinner: 6.30-7.30pm

After dinner: 7.30-9pm

Booking: www.katemcmillan.co.uk; tel: 07736 070066; katespe@aol.com

Cost: £34 for SPE/PESGB/EI members, £44 non-members, £19 unemployed members, £5 students booking by Friday 24 May (£19 after).

Edinburgh

Allan Mathieson, of **Hampton Energy**, will present **'In Salah CO₂ Sequestration project'** at the SPE technical meeting in Edinburgh, on **4 June (6.30-8.30pm)**, at the offices of **Cairn Energy, 50 Lothian Road, Edinburgh EH3 9BY**.

SPE YP Aberdeen May activities

YP NEWS

Come and join the following YP Aberdeen activities this month:

9 May – **'Subsea life of field technology SIMPLIFIED'** – the popular SPE YP 'SIMPLIFIED' presentation series is back, this time with an exciting voyage into the thrilling technology world of Underwater Autonomous Vehicles. Venue: RGU city centre campus.

15 May – **'Is your future in energy?'** YP event at DEVEX 2013. Hear a panel of experts debate the future of energy in the oil and gas capital of Europe (see page 12).

30 May – SPE YP Aberdeen **'MAY HAPPY HOUR'**: join us from 7pm for a complimentary after-work drink and networking at the Revolution Bar, Belmont Street, Aberdeen.

For more information, please contact **George Grangeon-Amaral** (george.amaral@ge.com), or **Ross Taylor** (ross.taylor@maerskoil.com), or visit our **Facebook page**.



Goodbye Jai; hello Nazli and Nikhil!

It is with both regret and joy that we announce that Jai Chainani, our YP Aberdeen Chair for 2012-13 will be leaving his SPE post. Jai has been promoted to a position requiring him to relocate to Azerbaijan, where he will continue to build on his SPE work by promoting career development for young oil and gas professionals.

Jai will be fondly remembered for his contribution to the student body of Aberdeen, where he has always gone out of his way to ensure that future oil and gas professionals take a leading role in shaping the Society. He has encouraged student/industry interaction, promoted networking, and organised popular events, such as the Energy Apprentice. We wish Jai and his young family all the best in their new environment.

Jai is succeeded by new Co-Chairs Nazli Lochrie and Nikhil Shindgikar - long-standing SPE members who have been instrumental in promoting the YP vision. We welcome both to their new position, look forward to helping them build on the good work they have already put into developing our YP activities, and wish them the best of luck!

COMMITTEES ARE US!



Inspiring future industry talent

"Students are the lifeblood of the oil and gas industry and the SPE is the premier professional society. We can - and do - inspire students to join us in the industry by providing them with valuable information and opportunities," says Anthony Perry, who, along with Stuart Girling, co-chairs SPE London's Student & Scholarship Committee. Both are Past Chairs of the Section.

SPE Aberdeen's Student Development Committee Chair is Shankar Bhukya. Shankar says:

"SPE is all about networking and helping each other in the oil and gas industry. By becoming involved with SPE and serving the Student Development Committee, I feel I am giving something back to our industry."

With a history spanning four decades, both SPE London and Aberdeen Sections have long been committed to encouraging the interest and understanding of the E&P industry among students studying oil and gas industry-related subjects. They do this through a diverse and ever-evolving range of engaging student development activities.

These activities rely on a group of volunteers who bring different perspectives to the committees. They include industry professionals, officers of the SPE Student Chapters and university academic sponsors.

New volunteers are always welcome!

SPE Section Committees provide a valuable contribution to the oil and gas industry in a variety of ways, from mentoring school and university students to providing stimulating opportunities for networking and continuing professional development. Our new series showcases the inspirational activities of some of the SPE Aberdeen and London Committees, whose ongoing success relies on the skills, experience and enthusiasm of dedicated Section volunteers. This month we highlight the work of the two committees focusing on student development.

Our SPE Student Chapters

Many UK universities providing undergraduate and postgraduate courses in Petroleum Engineering are now affiliated to SPE London and Aberdeen Sections:

SPE London supports the Universities of Salford, Leeds, Manchester, Coventry, Portsmouth and Derby, London South Bank University and Imperial College London.

Student Chapters affiliated to SPE Aberdeen represent the Universities of Aberdeen and Dundee, the Robert Gordon University, Aberdeen, and Heriot-Watt University, Edinburgh.

Financial support

Both Sections have long encouraged high standards of academic achievement among Petroleum Engineers, by providing various forms of financial support.

In Aberdeen, this takes the form of Student Bursaries. In 2012, Bursaries worth a total of £15,000 were awarded to students in full-time education, studying oil and gas-related courses. These awards were divided into four awards of £2500 each and 10 awards of £500 each. Of the three successful recipients awarded £2500, one is currently in employment



University of Derby MSc field study - sponsored by SPE London



Winners of the 2012 SPE Aberdeen Student Bursaries receive their awards



University of Leeds students at a YP London Graduate Skills Workshop



SPE Aberdeen's Student Chapter technical presentation at the U

The student development committees aim to:

- collect, disseminate and exchange technical knowledge concerning the exploration, development and production of oil and gas resources and related fields for university students
- provide opportunities for university students to enhance their technical and professional competence
- liaise with the industry in providing financial support and coaching to universities and the SPE Student Chapters
- encourage university and postgraduate students to pursue and develop a successful career in the oil and gas industry.

Their main activities include:

- providing student bursaries
- participating in meetings with Student Chapter faculty members
- election of Student Chapters
- supporting student attendance at technical events
- supporting organisation of specialised conferences
- providing liaison with the industry
- supporting innovative individual initiatives.

with Maersk, a second has just gained employment with Statoil and the third is currently studying for his PhD. Winners of the SPE Aberdeen Student Bursaries for the 2012-13 academic year will be announced later this month.

SPE London provides a substantial financial donation each year to the various Student Chapters. This can be used for a variety of purposes, such as funding field trips or industry visits, travel to the monthly meetings and library books. For the past four years, SPE London has also supported the studies of two senior school students via the Arkwright Scholarships Trust - a registered charity which invites high-ability 15-16-year-old Design & Technology students planning to study maths and physics and have an interest in engineering, to apply for an Arkwright Scholarship as they start their 'A' Level/Scottish Highers courses.

Further support

The YPs of both Sections have a strong and supportive relationship with the Student Chapters, visiting them to deliver lectures and graduate skills workshops and including the students in their own technical and social activities.

Percy's paper scoops HSSE award



Coventry University SPE Student Chapter member Percy Korsah was honoured with third prize at the SPE HSSE Student Paper Contest, at the 2013 SPE Americas E&P HSSE Conference, Galveston, Texas (18-21 March). Percy's presentation focused on

remediation in constructed wetlands and its wider implication for produced water and drilling mud in the oil and gas industry. Here, he receives his certificate of award and \$250 cash prize from Professor Andrew Wojtanowicz, of Louisiana State University. *"We greatly acknowledge the funding support from SPE London, without which Percy wouldn't have been able to attend and present this paper,"* says Dr Babatunde Anifowose, Course Director, MSc Petroleum & Environmental Technology, at Coventry University.

Students are also encouraged to attend the Sections' monthly meetings at a reduced fee. Here they not only have the opportunity to gain insight into the industry via lectures on technical, commercial and topical matters by keynote speakers, including SPE Distinguished Speakers from around the world; they also have the unique chance to network with a cross-section of senior industry professionals, YPs and students from other universities.

Interested in supporting your Section's student development activities? Contact Tony Perry (ajvmperry@btinternet.com) or Stuart Girling (stuart.girling@girlingco.com) at SPE London, or Shankar Bhukya (bhukya@gmail.com) at SPE Aberdeen.



Students attend a YP meeting at the University of Aberdeen.



Manchester University students at DEVEL in Aberdeen



Would you like to be more involved with the SPE London or Aberdeen Sections?



Becoming a volunteer lets you use your knowledge and experience to influence SPE programmes and other activities. As a volunteer, you can also enhance your leadership skills while meeting and working with other SPE members. There are many opportunities to choose from, regardless of your technical interest, skills, or experience level. To find out more about our committees, visit: www.spe-uk.org and <http://london.spe.org>



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London

Avoiding the pitfalls when seeking investment



In February, Will Holland, Associate Director of Macquarie Energy Capital, had his SPE London audience thinking on their feet, with an interactive presentation, **'Attracting finance - traps for young, and old players'.**

Will's overarching message to companies seeking investment was to 'do your homework', as investment

companies differ in their approach and it is essential to pitch just the right level of technical, commercial and financial information required by the target investor.

He first reminded the audience that everyone is an investor of a kind and challenged them on how they 'pick a winner' when it comes to choosing the right property, pension provider, ISA, etc. The generally-agreed approach was to assess the associated risks and then mitigate against them using as much knowledge as possible.

In the oil and gas investment world, the key risks can be categorised as: reserves, technical, stakeholders, mechanical, political, oil/gas price, permits, partners, marketing, environmental and - above all - corporate governance/management. *"Having good - and realistic - management who are aware of the risks and what might go wrong, is one of the most important things all investors look for. I would rather have an average asset with a good management team than a good asset with poor management,"* Will said.

Turning to the qualitative side of investment, he summarised the ways in which, given the various risks, different types of investor will assess the return on a potential oil and gas investment. These include IRR (internal rate of return), NPV (net present value), ROI (return on investment), ROE (return on equity), payback period and profitability index. All refer to value, ie what an asset is expected to be worth in the future, and *"being able to value an opportunity properly means being able to properly assess the reserves, the operational risk, the capex overrun risk, etc, and this is where having enough technical expertise comes into play. While there are lots of ways of valuing opportunities - some more speculative than others - all require a degree of understanding of the industry on the part of the investor."*



Will then discussed several ways of determining value:

- A pre-development NAV (net asset value) calculation: he explained why it would be unreasonable for a company to expect to attract investment based on the predictions in the model alone, as further information on the assets would be required.
- A cash flow waterfall for a debt-funded field: again, it was clear that a more in-depth look at the asset would be required in order to understand two key risk factors - production and opex. The level of risk also depends on the type of funding available - ie pure equity, debt or a structured financial product sitting somewhere in between.
- EMV (expected monetary value): a probabilistic way of determining value of cash flow in an exploration scenario.
- Using publicly-available data derived from both corporate/farm-in transaction comparables and market comparables focusing on traded securities and explained the pitfalls of using this data.

Will summarised with a discussion of the different types of strategies and potential returns an oil and gas investor may look for in a young, a growing and an older company looking to attract funding for an exploration opportunity, an asset pre-development and a mature asset, respectively. In a young company, an investor would look for a clear strategy aligned to their own strategy, and also for skill, knowledge and previous experience on the part of the management team. Good management, who are very realistic about the risks, is also key in the case of the growing company. And for an older company, the investor would focus mainly on whether or not the risks could be mitigated against.

He concluded: *"Knowing who you are pitching to, what kind of investment deal you are seeking and what the different investors tend to look for, will save your company a lot of time and potential disappointment - so do your homework!"*



PVT masterclass: the art of painting a portrait of petroleum

In his March pre-dinner presentation, **'Reservoir fluid (PVT) analysis - value to appraisal/field development planning'**, Petrophase MD Brian Moffatt treated SPE London members to a masterclass in how to maximise the value of PVT data with a considered

'checks and balances' approach.

Brian, an expert in PVT, thermodynamic modelling, sampling, geochemistry and petroleum engineering, began with a reminder that PVT information is key for all areas of field development, ie: Exploration - composition for economics; Appraisal - contaminants, flow assurance; Development - phase behaviour for reservoir simulation, and Production - composition monitoring.

He presented a recent PVT forum survey which highlighted interest in QC methods and sampling. The talk outlined an enhanced approach for PVT data QC - ie bringing in context/application and agreement with field data - to maximise the value of the PVT information produced. An example was shown of a condensate that defied easy characterisation. This fluid had passed all traditional QC methods but gave a dewpoint higher than reservoir pressure. The data made no sense in context. A deeper analysis revealed the fluid was a volatile oil flowing below its bubble point.

Brian pointed out that PVT data errors tend to arise from:

Sampling:

- bottom hole - two-phase flow into sampler
- formation tester - OBM contamination
- separator - reservoir two-phase flow, recombination GOR, liquid carryover

Storage:

- contaminant absorption

Measurement Errors

- sample handling - loss of heavy ends from gas samples.

He discussed each 'hot spot' in detail, highlighting the various issues that can arise and then demonstrating with examples of how viewing the data in context can help eliminate errors.

In the next part of his presentation, Brian looked at how modelling key information can maximise the value of PVT information. He discussed common PVT modelling errors in terms of: matching key data; correct handling molecular weights; poor EOS performance for oil compressibility and viscosity, and mapping reservoir simulation results to a surface model.

He then addressed the question, 'Which PVT data uncertainties can most affect development?', concluding that the main problems lie with GOR measurements, phase behaviour from poor samples, and poor modelling of heavy oil viscosities. *"Liquid viscosities are not well predicted by EOS and so often correlations are used. For heavy oil the errors can be >100% - beware!"* he said.

Brian highlighted the importance of contaminants, wax, scale and asphaltene depositions, and compositions that indicate compartments. For example, contaminants and flow assurance issues can impact enormously on field development by leading to costly topsides processing facilities and also constraining export options. He cited the Buzzard field as case in point, where contaminants had significant cost implications.

Finally, he reiterated the importance of 'capturing the real picture' and compared the reservoir engineer with an artist who paints a portrait of petroleum distilling the essence of fluid behaviour, not fragments or irrelevances. *"Placing the PVT data in context is one of the best methods of Data QC,"* he concluded.



The art of painting a portrait of petroleum

London and Aberdeen



Deepwater ERD - the good, the bad and the ugly

In March, Fraser Lawson, Well Engineering Supervisor with Tullow Ghana Ltd, shared some valuable lessons on deepwater extended reach drilling (ERD) with members of the London and Aberdeen Sections, as part of his SPE Distinguished Lecturer global tour.

Fraser's enlightening presentation to the two evening programme audiences focused on the company's highly-challenging ERD experience in the 0.5 billion-barrel Jubilee field, which he described in his introduction as one of the fastest deepwater development fields ever developed. Located 60km offshore Ghana in a water depth of around 1100m, Jubilee - the country's first major oil discovery (2007) - began development drilling in March 2009 and came on stream in December 2010, producing 120,000bopd. There were 17 development wells initially in the field and further infill drilling is ongoing.

Fraser 'drilled down' into the story of ERD Well J-17 which, following a successful and event-free Phase 1 campaign, presented a number of unforeseen issues.

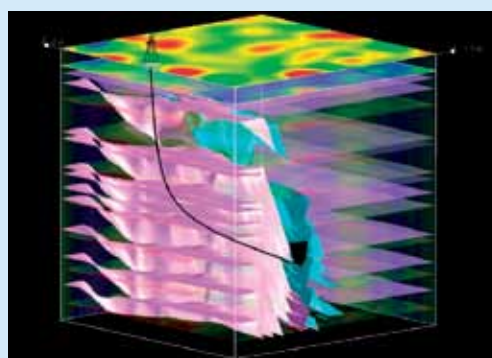
He explained that the anticipated drilling challenges associated with the well included:

- Deepwater and ERD combination
- Low frac/high ECD (equivalent circulating density)
- Riser cleaning
- Buckling in riser
- Must land casing

- High cost (deepwater drilling 'spread rate' costs > \$1million per day)/ long duration
- Crews drill vertical wells - a new experience; education and training are therefore key.

With survey uncertainties more significant for ERD wells, sizing the Drillers' Target was no mean feat: *"Our target was the size of a football field four miles away!"* In fact, after subtracting survey errors using the traditional target-sizing method, the original J-17 target was subsequently classified as 'negative' in size. However, the use of advanced In Field Referencing (IFR) resolved the issue.

IFR airborne surveys measure exactly the Earth's crustal magnetic field vector in the vicinity of the drilling area, removing a significant source of MWD (measurement while drilling) uncertainty, ie the local crustal magnetic effects. An IFR survey carried out over an 80km x 80km area



generated a 3D model of the crustal field, covering the Jubilee and future field areas. This enabled corrections to be applied real-time to J-17 while drilling and to all the other Jubilee wells, post-drilling.

As well as reducing wellbore position uncertainty, enhancing the Drillers' Target sizing and providing a model valid for future field development, the use of IFR delivered improved anti-collision planning, more accurate blow-out relief well planning and presented no drilling operational risk to implement.

The biggest challenge arose when the Drilling team were unable to successfully run the 9 5/8" casing in J-17 due to poor hole condition. They pulled the casing back to surface, only to then discover that the drill pipe had parted on the wiper trip and that the BHA (bottom hole assembly) had been lost downhole. The complex recovery operations cost them 24 days; however, a J-17 sidetrack was successfully executed to the target location, enabling the 'fast-track' Jubilee field to come on production as planned. In spite of this setback the entire drilling campaign achieved 'best-in-class' deepwater development drilling performance when compared to similar operations.

Fraser discussed more of the detailed technical work behind this achievement in the final, tutorial element of his presentation, in which he described the engineering features of the 12 1/4" BHA used for the J-17 well and shared a step-by-step insight into the hole-cleaning methodology and tripping and backreaming practices adopted. This in turn reinforced the importance of high angle engineering principles in ensuring a successful sidetrack operation.

ERD - what's different?

- | | |
|--------------------------|-----------------------|
| • Hole Cleaning | • Logging |
| • Wellbore Stability | • Well Control |
| • Torque and Drag | • ECD |
| • Surveying | • Drilling Parameters |
| • Logistics | • Equipment |
| • Bottom Hole Assemblies | • Cementing |
| • Bits | • Etc... |

...Everything is different!

SPE London and Aberdeen evening meeting presentations are available for download at the Past Events sections at: <http://london.spe.org> and www.spe-uk.org.

SPE London 2nd Annual Conference and Exhibition -

'Managing oil and gas portfolios in uncertain markets'
22-23 May, Savoy Place, London

The conference programme includes topics and themes carefully selected to be of interest to a unique mix of technical, commercial and financial professionals active in the oil and gas sector, in areas such as corporate finance, asset acquisitions and divestitures, corporate mergers and acquisitions, investment analysis, equity research, portfolio management, business development, and valuation of oil and gas assets.

Keynote speakers:

Dr Mike Watts, Deputy Chief Executive, Cairn Energy; **Didier Holleaux**, CEO, GDF Suez E&P; **Nick Cooper**, CEO, Ophir Energy; **Neil Gilmour**, VP Integrated Gas Development, Shell; **Galib Virani**, Associate Director, Afren; **Rob Leonard**, Business Development Director, AMEC; **Sarah Wharry**, Corporate Finance, Oil and Gas, RFC Ambrian; **Robert Hodges**, Tax Director, Ernst & Young; **Sastry Karra**, Executive Chairman, Inergja Petroleum; **Nick Davis**, Partner, Memery Crystal; **Eric Oudenot**, Principal, BCG; **Martin Copeland**, Managing Director - Oil and Gas, Evercore; **Majid Shafiq**, Managing Director, Corporate Finance, First Energy Capital; **Bruno Gama**, Senior Consultant, Palantir; **Simon Toole**, Head, Licensing Exploration & Development, DECC; **Gareth Burns**, Senior VP, Strategy and Business Development, Exploration, Statoil ASA.

The two-day event will round off in style with a **Gala Dinner, at Claridge's**, on 23 May, where BBC journalist, news presenter and author **Jeremy Vine** will be guest speaker.

For more information and to book online, visit:

www.SPELondonConference.com.

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Presented by Jess Stiles, this course is designed for reservoir engineers and geologist involved in modelling petroleum reservoirs, and to geoscientists working in the area of reservoir characterisation. In this unique course the causes of discrepancies in laboratory results are revealed and the importance of reservoir wettability, in defining water-oil relative permeability, is explained.

Laboratory personnel involved with SCAL measurements will find the course useful in learning how their results are used and in gaining insight into how laboratory programmes might be improved. Production geologists and petrophysicists working in integrated teams will also find the course valuable, particularly in selecting samples for analysis and assisting in relating relative permeability and capillary pressure to rock type.

www.imperial.ac.uk/cpd/core

For further details contact:

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Programme for Professional Development

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Keynote Speakers

Iman Hill – General Manager, Technical and Operational Services, Sasol
Oonagh Werngren – Operations Director, Oil & Gas UK
Sarah Cook – Project Director, Fluor Limited

Panel Session – Discuss the unique management qualities of women

Hamish Wilson – Technical Director, SLR Consulting
Deirdre O'Donnell – MD/Owner, Working Smart
Jim Ayton – Technical Services Director, OPC Limited
Jill Lewis – CEO and MD, Troika International

Workshops

WILD Women in Leadership Development – why purr when you can ROAR?

Presented by Tiffany Macedo-Dine of The WILD Consultancy

Goal Mapping – work out what really matters to you and how to get there

Presented by Stephanie Saphin of Blue Sky Arts

Career Planning and Development

Presented by Anita Edmunds of Penna

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Presented by Helen Toogood of Hot Chilli Consulting

On the Move – Working and Living in a Globalised World

Presented by Claire Snowdon of Expat Knowhow

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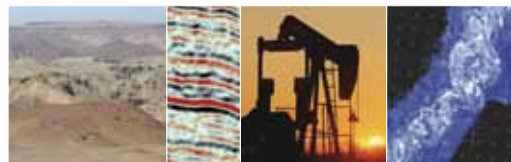


Call for Abstracts – 15 November 2013

Petroleum Geoscience of the West Africa Margin

31 March - 2 April, 2014

The Geological Society, Burlington House, Piccadilly, London



Convenors:

Teresa Sabato Ceraldi
BP

Richard Hodgkinson
Dana Petroleum

Hannah Suttill
Genel Energy

Matt Warner
BP

Petroleum Exploration along the West African margin has a long history. Discovery of commercial oil in the Niger Delta in 1956 and offshore Angola in 1966 led to these two countries becoming the largest oil producers in the region today, accounting for 5% of global daily oil production. Even with this extensive history, however, new exploration plays continue to be found with imaginative ideas & innovative technology.

In the last decade, independent oil companies have aggressively pursued new concepts – from stratigraphic traps in Ghana to recent exploration success in Cameroon & Equatorial Guinea. Independents and Majors now compete head-to-head in the more "mature" areas such as Gabon & Angola, investing in new play concepts and exploring the pre-salt, prompted by successes on the conjugate Brazilian margin. To the south, Namibia is undergoing renewed exploration activity. In short - it's an exciting time to be exploring in West Africa.

This conference will showcase the regional geology, from Morocco to South Africa, sharing insights on recent exploration successes and emerging plays, & integrating inputs from academia, industry, and national oil companies.

Call for Papers:

Please email paper and poster contributions to laura.hayward@geolsoc.org.uk and Teresa.Ceraldi@uk.bp.com by 15 November 2013

For further information please visit www.geolsoc.org.uk/westafrica14 or contact: Laura Hayward, The Geological Society, Burlington House, Piccadilly, London W1J 0BG. T:020 7434 9944 F:020 7494 0579

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Call for Abstracts – 16 September 2013

Capturing uncertainty in geomodels: Best practices and pitfalls

11-12 December, 2013

Elphinstone Hall, University of Aberdeen

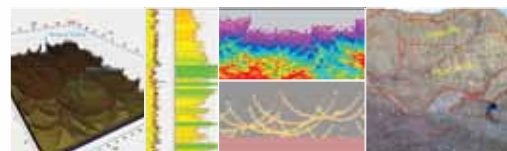
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Over recent years, the static description of hydrocarbon fields has increasingly been undertaken via construction of 3D cellular geomodels. The model builder's toolkit is now extensive, incorporating sophisticated structural framework building capabilities, numerous gridding technologies and an ever-expanding, complex geostatistical data modelling resource. However, as we develop hydrocarbon fields and not the geomodels that are built to describe them, we must ask whether the modelling paradigm is robust and whether the models illuminate or hide uncertainty.

This two-day conference will explore how geomodelling tools should be used to best effect, and when such tools mislead or do not add value. The focus will be on methods and workflows for capturing uncertainty throughout the geomodelling process, and on how to carry this uncertainty into the dynamic modelling realm. Keynote presentations and discussion sessions are planned. We invite contributions covering all aspects of uncertainty management in geomodelling, from the philosophical "why" to the detailed "how". Examples of best practice and, particularly, on how to avoid pitfalls are particularly welcome.

Call for Papers:

Please email paper and poster contributions to steve.whalley@geolsoc.org.uk and Andy.Sims@merlinenergy.co.uk by 16 September 2013

For further information please visit www.geolsoc.org.uk/geomodelling13 or contact: Steve Whalley, The Geological Society, Burlington House, Piccadilly, London W1J 0BG. T:020 7434 9944 F:020 7494 0579

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DEVEX 2013 - 10th European Production and Development Conference: 'Maximising our diverse resources' 15 & 16 May



Aberdeen Exhibition and Conference Centre

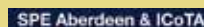
Organised jointly by SPE, PESGB, AFES and DECC, DEVEX European Production and Development Conference is a key knowledge-sharing event designed for geologists, geo-physicists, petro-physicists, reservoir engineers, petroleum engineers, production technologists, well engineers and drilling engineers.

"DEVEX offers tremendous value, a first-rate technical experience and a great opportunity to hear the latest industry opinions. This year's stimulating programme will feature 44 high-quality presentations and 20 posters from a range of disciplines," says Conference Chair Rebecca Nye, of Weatherford.

'Is your future in energy?' - 16 May (11.50am-1.20pm)

This year, at DEVEX 2013, the Young Professionals from SPE Aberdeen, PESGB Aberdeen, AFES and the Energy Institute will hold an interactive panel discussion, **'Is your future in energy?'**, chaired by Ross Taylor of SPE YP Aberdeen. Leading industry professionals and local government representatives will answer your questions and give their views on the future of the industry, in Aberdeen and globally. Each member of the audience will be given a voting pad and asked a series of questions by the panellists. Look out for the YP stand and the opportunity to win a cash prize.

Booking: www.devex-conference.org



19th SPE ICoTA European
Well Intervention Conference
13th & 14th November 2013 Aberdeen, Scotland

Aberdeen Exhibition & Conference Centre

Europe's premier forum for exchange and discussion of the latest developments in completion and well intervention techniques. The event encompasses the full range of well intervention practices, including coiled tubing, slickline, e-line and hydraulic workover, as well as specialist tools and solutions.

CALL FOR ABSTRACTS: DEADLINE 12 JULY

Presentations, which need not be full papers, will be welcome on relevant topics such as:

- Safety innovations • Data acquisition/analysis services • Coiled tubing technology • E-Line technology • Slick-line technology
- Intervention techniques & equipment development
- Subsea well interventions • Potential technologies for deepwater intervention • Lightweight rig intervention • Thru-tubing drilling and completions • Well completion and related intervention tools
- Well abandonment challenges • New technology and innovative solutions • Well integrity & operations • Cost-reduction • Surface flow measurement.

Case studies, from the UKCS or elsewhere, are particularly welcome.

Please submit an abstract of 100-200 words online at:
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For further information, contact: spe@rodgerandco.com

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SPE Summit Series Seminar: 'New Frontiers in Flow Monitoring and Control in Wells' 24 & 25 September Marcliffe Hotel, Aberdeen

With the oil and gas industry's recent adventures into downhole sensing with fibre-optic cables, DTS (Distributed Temperature Sensing) and now DAS (Distributed Acoustic Sensing) have led to new opportunities for in-well production or injection monitoring. Building on this is a new range of multiphase flow sensors that can increasingly handle mixed production of oil, water and gas with varying degrees of accuracy and precision. To take advantage of advanced sensors, we need advanced control systems to be able to react to changes in a well's production profile. Or, alternatively, the use of autonomous or reactive ICDs (Inflow Control Devices) could be used in combination, or in place of, advance wellbore sensing.

Seminar Chair Steven Fipke, of Aramco Overseas Company, says: *"We invite the petroleum engineering community to participate in this innovative SPE seminar, which provides a dynamic forum to discuss different technologies and strategies on how to best utilise these new, powerful tools to optimise each well's production, now and in the future."*

Abstracts of up to 200 words, plus title and presenter's name, should be uploaded now for consideration in the programme:
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Further information: spe@rodgerandco.com



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