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JUST HOW IMMINENT IS PEAK OIL?

I attended a reserves conference several months ago and one of the most interesting presentations was one by a Swedish professor on peak oil, the inevitable moment that worldwide oil production reaches a maximum and will start to decline. According to the professor this point will be reached in 2014, which is similar to predictions of many previous peak-oil advocates i.e. imminently! While it is remarkable that most peak-oil predictions foresee going 'over the cliff' in the very short term it isn't immediately clear why that would be, so I was particularly intrigued to understand this phenomenon a bit better.

Major parameters in the analysis are assumptions on rate of decline of producing fields, new field discovery rates and offtake levels in the future. The impact of oil price on increased recovery is generally assumed to be covered by recovery efficiency improvements as a function of oil price. However, what's generally underestimated are the sort of white swan events that are difficult to foresee such as EOR breakthroughs and the shale oil and gas 'revolutions' that are taking place right now which are enabled by a combination of evolving technologies and relatively high oil and gas sales prices.

It would be audacious to predict precisely what technological white swans can be expected during our lifetime but SPE estimates suggest that even known accumulations and existing EOR technologies will be able to meet current world demands of both oil and gas for over 100 years at oil prices exceeding 120 US\$/bbl.

Many of these technologies are the subject of SPE presentations during this season such as the recent Hess sponsored Distinguished Lecture presentation on fracture stimulation of horizontal wells, or the upcoming Chevron sponsored presentation on optimised mud systems and Maersk sponsored presentation on oil extraction from shales in Denmark. There will also be presentations on new field discoveries, such as the recent Johan Sverdrup discovery in Norway, which will continue playing an important role.

Chances are that the inevitable decline in world oil and gas production will take place later rather than sooner as increasing oil prices stimulate continued production growth. Human ingenuity has historically provided solutions to many important problems affecting society, and the energy business has a good track record in this respect. And we SPE members play a constructive role in this through education, research, development and by implementing technological advances.

Hans Horikx,
SPE Copenhagen
section chairman



FUTURE MEETINGS

FOR MORE INFORMATION REGARDING THE PROGRAMME SEE PAGE 6

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UNLEASHING of aging

By Charlotte Holst, Maersk Oil

A routine inspection at Tyra West in the Danish North Sea turned into a brief but significant shutdown due to external corrosion on a flare line. With aging facilities in the North Sea, Maersk Oil expects more shutdowns due to maintenance work. But better loss analysis and planning could give it tens of thousands of extra barrels per day across the portfolio.

A routine inspection on Friday, 31 August 2012, found external corrosion on a flare line at the Tyra West platform. X-rays showed the pipe's nominal wall thickness of 9,27mm had been reduced to 2,6mm and lower in the worst areas. As a consequence, Tyra West was shut down in a controlled manner to get it fixed. During the 6-days shutdown, oil exports were reduced by 100,000 bpd.

Tyra West is not the only Maersk Oil facility that is dealing with corrosion and other maintenance issues originating from old facilities. Other platforms in the North Sea are aging. The oldest Maersk Oil platform, Dan, has been producing for over 40 years, when platforms are normally designed for 25 years service. The age is beginning to show.

"Over the last 10 years, we have seen the general production efficiency across the entire North Sea go down. This is a good indicator of oil companies shutting down production to get something fixed, often because facilities are suffering from age," said Cameron Crawford, Director of Corporate Production Operations in Maersk Oil. The latest benchmark study from McKinsey shows efficiency among oil companies in the North Sea had fallen nine percentage points over the past 10 years. In 2011, the average up time was 78%. Maersk Oil's latest quarterly production efficiency numbers show that the Danish Business Unit had recorded 91% up time and Maersk Oil's three installations in the UK vary between 50% and 90+%.

"The target for the different installations varies, but I see room for improvement at almost all our facilities," he said.



THE FULL POTENTIAL facilities

Production losses

Oil companies lose millions of barrels of oil every year due to maintenance on old facilities. Crawford estimates that Maersk Oil could gain as much as 40,000 extra barrels per day across the entire portfolio by optimising the shutdown and maintenance work on surface facilities and by getting better at systematically reviewing well potential to create prioritised improvement plans.

“Normally, the cost of maintenance is shaped like the outline of a bath tub. In the beginning, the cost is relatively high because new platforms never operate exactly as designed. In the middle, you have a long period of low intervention cost, and in the end, the cost is again high because you are heading towards the end of the designed lifetime of the facility,” said Crawford. “Maersk Oil is trying to extend the middle period and flatten the end of the curve. To do this we need to plan better, we need to predict and prevent,” he said.

Integrated planning

The shutdown on Tyra West impacted other platforms because much of the Danish gas production is exported via the platform. For example, the Dan FG platform also had to stop production. But instead of just twiddling their thumbs, DBU staff took advantage of the opportunity and repaired a compressor that would have otherwise been done in September. In that way, the DBU avoided a future shutdown.

“We have coded all planned maintenance work with duration, due dates, shut-down codes etc. This makes it is easy for us to pull forward maintenance work that can be done if we have an unplanned shutdown. This could entail checking or repairing vital valves or compressors. This way, we ‘save’ future shutdowns or shorten their duration,” said Jens Peter Riber, Senior Director in the Technical Department in DBU. This approach is part of the Danish Business Unit’s transformation towards ‘Integrated Activity Planning’ - a process that ensures better coordination and communication between and on the platforms.

“Better planning and maintenance are key to the success of the Danish operations. In the new asset structure that DBU implemented in 2011, maintenance is one of the focus areas. We can gain a lot of ‘easy’ extra barrels if we become better at planning,” said Karsten Jensen, Production Operation Manager.

“Old facilities are – and will continue to be – a part of our operations in the North Sea.

An old platform requires more maintenance than a young one. We can never entirely predict everything and we can never completely avoid shutdowns but we aim to eliminate unplanned shutdowns. By planning better, we can maximise our production,” said Crawford. ◀

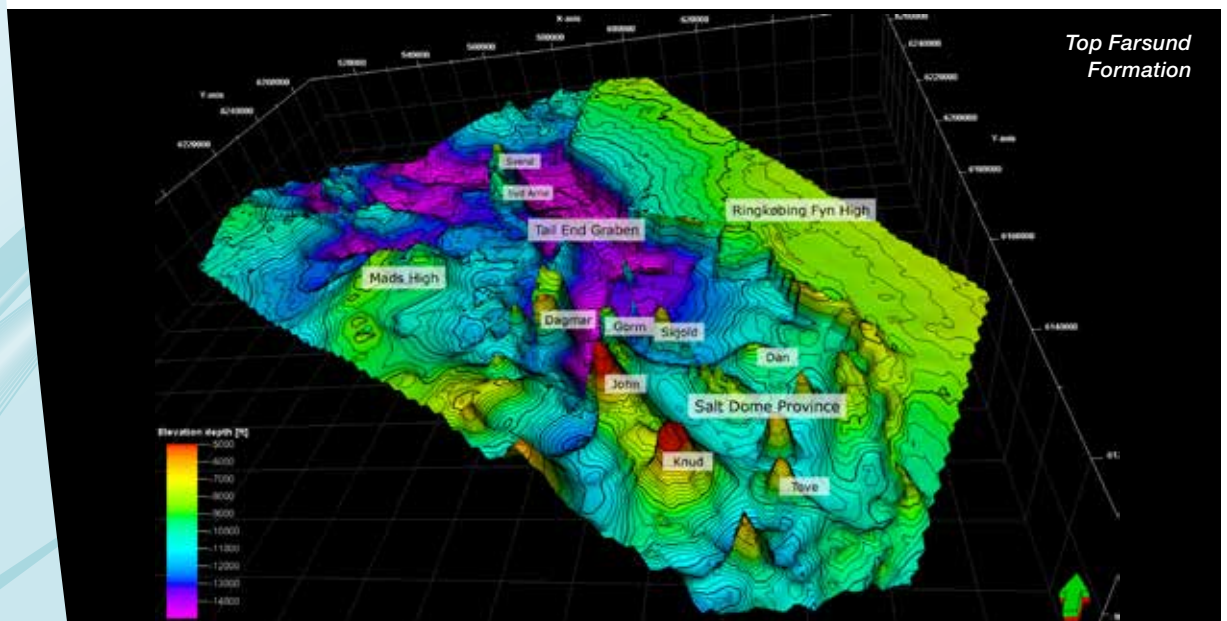


●● ABSTRACT

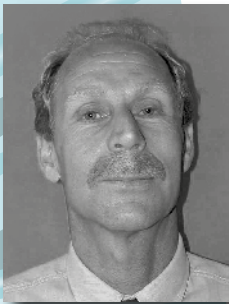
Farsund Formation; TIGHT OIL DEVELOPMENT?

The Upper Jurassic Farsund interval, a clay rich formation with interbedded layers of dolomites, sand/siltstones etc, is underlying the existing Danish offshore production infrastructure in a thick layer and is the main source rock for the Upper and Lower Cretaceous Chalk reservoirs. The interval has proven hydrocarbon presence and flow capability and it contains

considerable volumes of hydrocarbons. Would it be possible to commercially produce offshore from this unconventional resource in analogy with the onshore US unconventional revolution? What will it take to make this work? ◀



●● BIOGRAPHY



Nijs Nederveen, Maersk Oil, Danish Business Unit

Nijs Nederveen joined Maersk Oil in 1992 and is currently heading the Unconventional Hydrocarbon Team in the Subsurface Department of the Danish Business Unit. He comes from a research background and started his oil career as a Production Technologist. He holds 35 years of industry experience gained at various locations ranging from hands-on

and managerial positions with green- and brown-field development studies and implementation as well as reservoir management of producing assets in Holland, Denmark, Qatar and the UK. Nijs earned his MSc degree in Physics from the Technical University of Delft and a BSc in Business Management from the Erasmus University in Rotterdam. ◀

●● ABSTRACT

Johan Sverdrup - A NORTH SEA GIANT

Johan Sverdrup, located in Norwegian waters approximately 35 km south of Grane, is one of the most significant discoveries in the North Sea in recent years. Resource has been estimated to be 1700-3300 MMBO. To date, 2 licenses comprise the field (PL265/PL501). Statoil is the operator in PL265 (Petoro, Det Norske, Lundin) and Lundin Petroleum is the operator in PL501 (Statoil, Maersk). The Jurassic-aged reservoirs were penetrated and discovered in 2010 by the Lundin Petroleum 16/2-6 well and the discovery was named Avaldsnes. Two successful appraisal wells were subsequently drilled in the same license. It was recognized early on that the accumulation could span more than one license. In 2011, Statoil drilled a successful well in the license to the west and the accumulation was named Aldous Major. Appraisal drilling continues in each license. In 2012 a pre-Unit agreement was formed with Statoil as the Working Operator. First oil is estimated to be 2018. ◀



PROGRAMME

17:00 - 18:00
Drinks

18:00 - 19:00
Presentation and SPE News

19:00 - 21:00
Dinner

LOCATION

Maersk Oil
Esplanaden 50
1263 København K

SPEAKER

Nijs Nederveen
Maersk Oil

TOPIC

Farsund Formation;
Tight Oil Development?

DINNER SPEAKER

Alessandro Mannini
Maersk Oil

TOPIC

Johan Sverdrup
- A North Sea Giant

ENTRANCE FEE

None

REGISTRATION

Please indicate your attendance by Thursday 31 January 2013 by signing up on the internet www.spe-cph.dk

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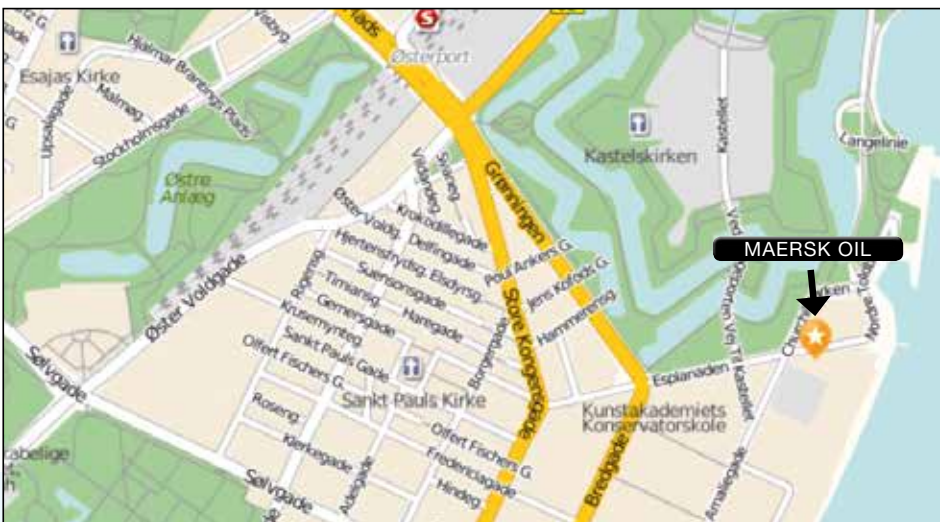


●● BIOGRAPHY



Alessandro Mannini, Maersk Oil

Alessandro is a geophysicist with almost 15 years industry experience who has worked in both exploration and production disciplines within a variety of geological settings in both operated and non-operated environments. During his career he has been involved at different levels in AVO studies, Acoustic and Elastic inversions as well as in Rock physics and Depth conversion studies. He has worked in Australia, Italy, Malaysia, England and Denmark with Eni, Hess and recently Maersk Oil. Alessandro's specialties are: Geophysical Interpretation, Depth conversion and Reservoir characterization. ◀



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SPE MEETING SCHEDULE

2012-2013

| | | |
|---------------------|--|--|
| September 11 | MAIN SPEAKER | AFTER DINNER |
| TOPIC | Putting The Energy Industry In Perspective | Safety Management – learnt the hard way Odd Sevlund |
| SPEAKER | Phil Rae - SPE DL, (InTuition Energy Associates Ltd) | |
| LOCATION | Shell Mikado House | |
| SPONSOR | SHELL | |
| October 24 | MAIN SPEAKER | AFTER DINNER |
| TOPIC | DTU Research | Overview of the large projects at CERE – Center for Energy Resources Engineering, DTU Alexander Shapiro |
| SPEAKER | DTU Ph.D Candidates: Alsu Khusainova, Esther Rosenbrand and Andrea Capolei | |
| LOCATION | DTU, Building 101 B auditorium 1 | |
| SPONSOR | DTU | |
| November 21 | MAIN SPEAKER | AFTER DINNER |
| TOPIC | Denmark's first HPHT development: Hejre | Geosteering in thin injected sands by optimised operational setup and state-of-the-art LWD - Nini East Field Thomas Stærmosse, DONG E&P |
| SPEAKER | Søren Poulsen, DONG E&P | |
| LOCATION | DONG | |
| SPONSOR | DONG | |
| January 14 | MAIN SPEAKER | AFTER DINNER |
| TOPIC | Hydraulic Fracturing of Horizontal Wells – Realizing the Paradigm Shift that has been 30 Years in Development | Oil Gas Denmark Martin Naesby (Oil Gas Denmark) |
| SPEAKER | C. Mark Pearson - SPE DL, (Liberty Resources LLC) | |
| LOCATION | Moltkes Palæ | |
| SPONSOR | Hess | |
| February 5 | MAIN SPEAKER | AFTER DINNER |
| TOPIC | Farsund Formation Tight Reservoirs | Johan Sverdrup – A North Sea Giant Alessandro Mannini, Maersk Oil |
| SPEAKER | Nijs Nederveen, Maersk Oil | |
| LOCATION | Maersk | |
| SPONSOR | Maersk | |
| March 7 | MAIN SPEAKER | AFTER DINNER |
| TOPIC | What do we have to do to a drilling fluid to maximise well productivity ? | Career management in Chevron – Technical vs. leadership path Dino Metovich, Chevron |
| SPEAKER | Stephen Vickers - SPE DL, (Baker Hughes) | |
| LOCATION | Charlottehaven | |
| SPONSOR | Chevron | |
| April 16 | MAIN SPEAKER | AFTER DINNER |
| TOPIC | A novel, annular barrier for improved zonal isolation and cement assurance | |
| SPEAKER | Lambert Dilling, Welltec | |
| LOCATION | Welltec | |
| SPONSOR | Welltec | |
| May 14 | MAIN SPEAKER | AFTER DINNER |
| TOPIC | Source Rock Potential in Denmark | Annual General Meeting |
| SPEAKER | Henrik I. Petersen, GEUS | |
| LOCATION | GEUS | |
| SPONSOR | GEUS | |
| June | MAIN SPEAKER | AFTER DINNER |
| TOPIC | SPE Summerparty | |
| SPEAKER | | |
| LOCATION | | |
| SPONSOR | Schlumberger | |

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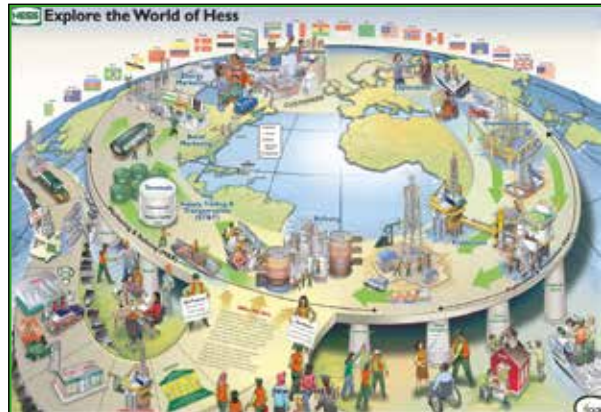
FASETT



We see beyond what others may see

Some might see a pesky garden pest. Others would analyse all available knowledge and reach the conclusion that this is a Chinese Silkworm. In Noreco that's precisely what we do - we analyse information, we interpret the results and we reach decisions based on our knowledge and understanding. In the North Sea, every day.

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ROSEBANK

The past year has been one of significant progress for the Rosebank project, with a number of milestones achieved along the road to Final Investment Decision.

First was the announcement in July that the project had entered the front end engineering and design (FEED) phase. The news was warmly welcomed by the UK government, who announced a field allowance package in the 2012 aimed at stimulating new investment in the West of Shetland region, which holds a significant portion of the UK's undeveloped oil and gas resources.

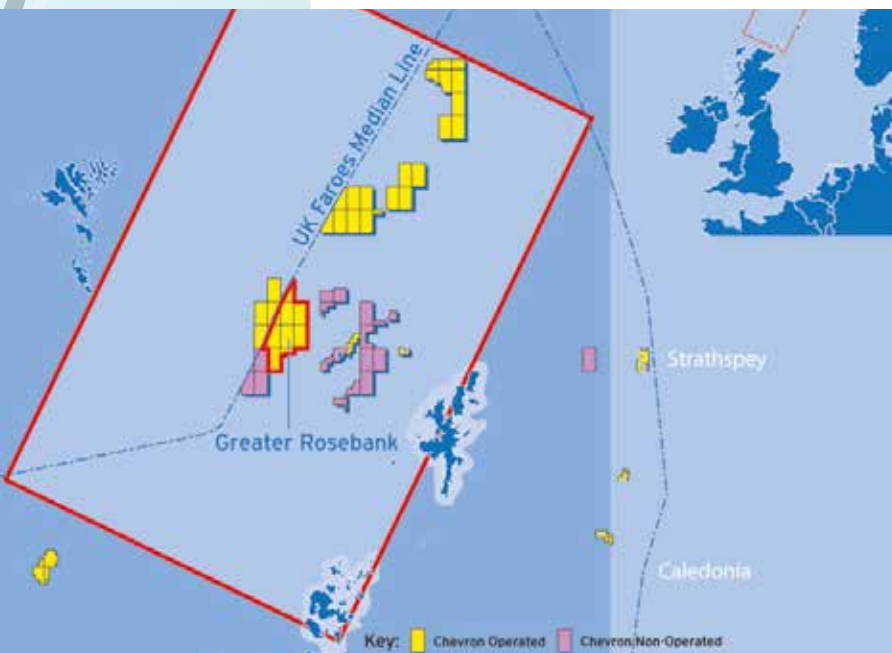
The FEED contracts for the FPSO (floating production, offloading and storage vessel) and the subsea equipment were awarded to Worley Parsons and work is now underway on in Houston, with a joint project team of some 250 Chevron and Worley Parsons people in place and moving ahead.

played in advancing the project and the support given by the UK government in creating a fiscal framework to encourage deep water development. But her strongest message was that while schedule is important, safety comes first; that the design of the facilities is critical to long term safe, reliable and environmentally responsible operations, and to the welfare of the people who will live and work on the FPSO. "People will have to live with what we design," she said, "so safety starts here."

The next contract award followed in September when the pipeline Front End Engineering Design (FEED) contract was won by JP Kenny, a company with extensive knowledge of the marine environment and pipelines in the Shetland region. At the time of the award, two pipeline routes were still under consideration – via Yell Sound, coming ashore near to the Shetland Gas Plant or a direct route from the field, running south of Shetland to the Shetland Islands Regional Gas Export (SIRGE) line and thence to the FUKA pipeline and onwards to St Fergus.

In October, the Rosebank owners selected the direct route from Rosebank to SIRGE. The decision was made after careful consideration of the need to balance a range of issues – environmental, commercial, technical, operational safety and economic aspects, and after extensive survey and data gathering work and consultation with regional stakeholders.

And finally, in late October, a five year contract for a new build semi-submersible drilling rig for Rosebank was awarded to Dolphin Drilling Ltd, a subsidiary of Fred. Olsen Energy ASA, which is listed on the Oslo Stock Exchange. The new build semi-submersible is a Moss Maritime CS 60 E design. It will be constructed by Hyundai Heavy Industries (HHI) and will bear the name, Bollsta Dolphin. ◀



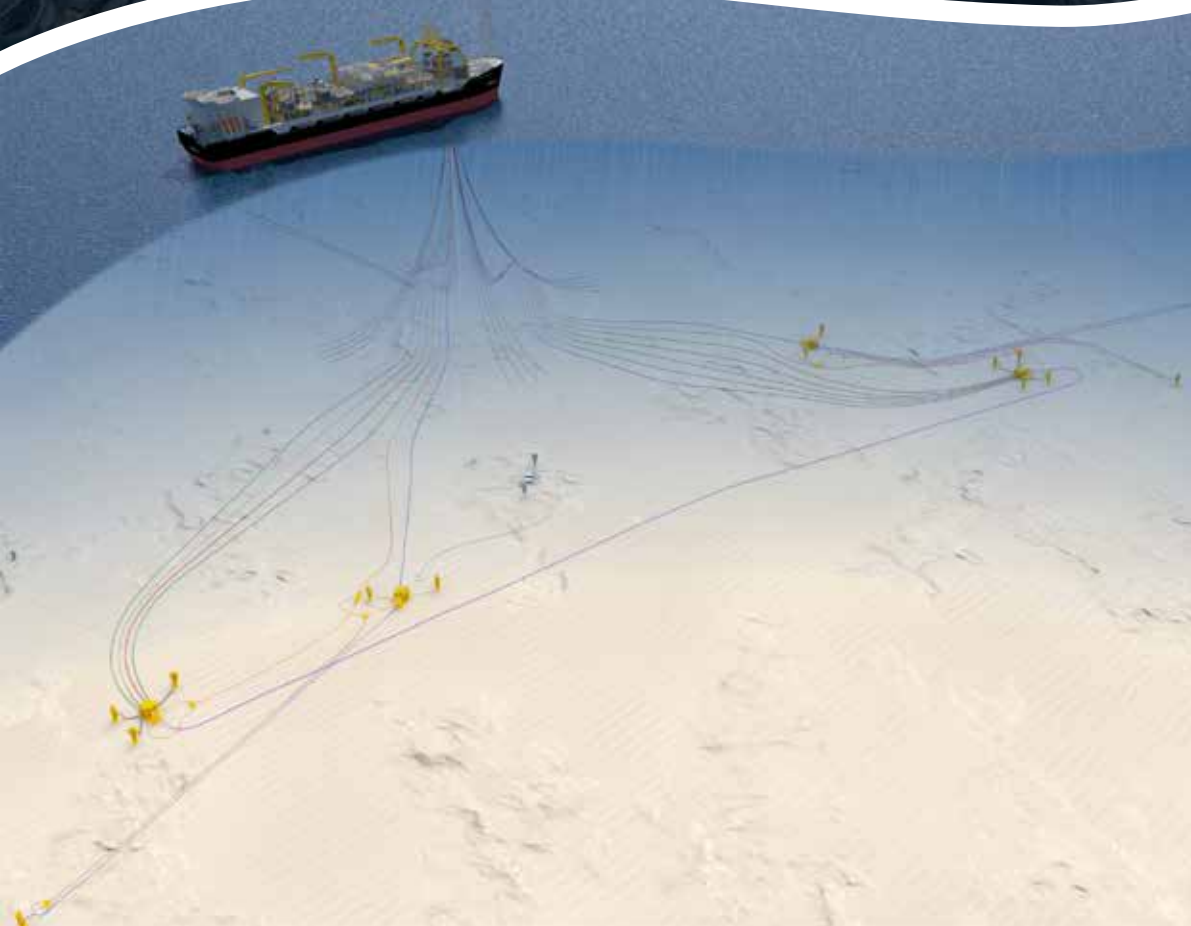
The significance of Rosebank to Chevron was highlighted by Brenda Dulaney, CUE's Managing Director, and Stacey Olson, Manager of Asset Development, when they visited the project team in October. Addressing team members, Brenda emphasised the importance of developing a 'one team' approach in the design phase, with a shared context for the project and a shared understanding of its place in Chevron's long term growth strategy. She gave a brief outline of the Rosebank story so far, stressing the challenges of its West of Shetland location; the role technological innovation has

Rosebank is some 80 miles (130 km) northwest of the Shetland Islands in water depths of approximately 3,700 feet (1,100 m). The field was discovered in 2004 in Blocks 213/26 and 213/27 and is estimated to contain 240 million barrels of total potentially recoverable oil-equivalent resources.

The field development plan comprises a Floating Production, Storage and Offloading (FPSO) vessel, two subsea production manifolds, two subsea injection manifolds, approximately 20 wells and a gas export pipeline.

The Rosebank project is a joint venture between Chevron North Sea Limited (40 percent), Statoil (U.K.) Limited (30 percent), OMV (U.K.) Limited (20 percent) and DONG Exploration & Production (U.K.) Limited (10 percent).

PROJECT



●● ABSTRACT

What do we have to do to a drilling fluid to maximize WELL PRODUCTIVITY?

Reducing formation damage to zero can be very difficult; however, it can be significantly lowered by following simple principles. Designing the correct bridging package should be seen as a very cost-effective and simple step in drastically improving a

fluid's performance. This presentation will explain this straightforward but underutilized process. If the correct information is available, it is relatively straightforward to apply certain processes to fluid design that can be a huge benefit to well productivity. ◀

●● BIOGRAPHY



Stephen Vickers, SPE DL, (Baker Hughes)

Stephen Vickers is the eastern hemisphere application engineering manager for Baker Hughes. He has worked for 25 years in the oil industry, first as a drilling engineer and then moving into well fluids and chemical engineering. ◀

SPE COPENHAGEN: STUDENT SCHOLARSHIP ANNOUNCEMENT

In keeping with its mission to support students studying petroleum engineering or related subjects SPE Copenhagen will award annual Student Scholarship of 12,000 DKK. To be eligible for the Scholarship Award, applicants must meet the following criteria:

1. Be enrolled as a master or bachelor student in Petroleum Engineering or closely related course.
2. Be interested in the subject
3. Have a good academic performance

In order to apply for the SPE Copenhagen Student Scholarship, please fill the application (http://www.spe-cph.dk/SPE_Student_Scholarship_Application.pdf) and submit it via email to Alsu Khusainova (sukh@kt.dtu.dk) as soon as possible by latest until 12.00 3rd of February, 2013. The SPE Board will select between the scholarship candidates on the 5th of February.



●● ABSTRACT.....

CAREER MANAGEMENT IN CHEVRON - TECHNICAL VS. LEADERSHIP PATH

Our industry spans the globe covering the entire spectrum of industry disciplines and presenting the world of opportunity, challenge and fulfilment. Proactive career management is the key to opening a door to a career that can be as dynamic and rewarding as you choose. So let's take a break from porosity and permeability for a second and discuss career management and some of its key components. ◀

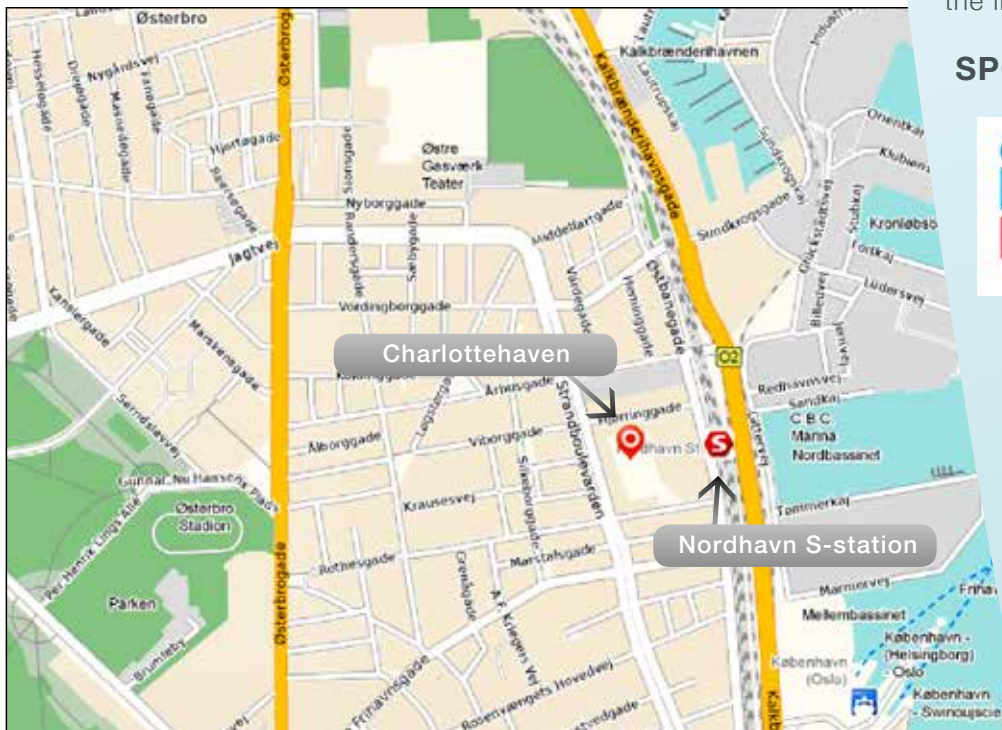


●● BIOGRAPHY.....



Dino Metovich, Chevron

Education: Petroleum Engineering from University of Louisiana MBA from Rice University. I've been with Chevron since 2002 and worked in areas of production engineering, reservoir engineering and business planning and strategy. I currently work in Aberdeen as a petroleum engineer supporting the DUC. ◀



C O P E N H A G E N
M E E T I N G
THURSDAY 7 MARCH 2013

MARCH

PROGRAMME

17:00 - 18:00

Drinks

18:00 - 19:00

Presentation and SPE News

19:00 - 21:00

Dinner

LOCATION

Charlottehaven
Hjørringgade 12C
2100 Copenhagen

SPEAKER

Stephens Vickers,
Baker Hughes SPE DL

TOPIC

What do we have to do to a drilling fluid to maximise well productivity?

DINNER SPEAKER

Dino Metovich,
Chevron

TOPIC

Career Management in Chevron
- Technical vs. Leadership path

ENTRANCE FEE

None

REGISTRATION

Please indicate your attendance by Monday 4 March by signing up on the internet www.spe-cph.dk

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