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SOCIETY OF PETROLEUM ENGINEERS

SPE NEWS

COPENHAGEN SECTION

CONTENT

A TOUGH YEAR FOR MOST. WHAT WILL 2016 BRING?

The clocks have gone back, the leaves have begun to fall and the daily bike ride is getting fresher by the day. Some things are the same every year and are consistent, other things are not. One thing we can guarantee is the SPE Copenhagen will have an interesting and full program of events for you for the remainder of the season.

Shell will see out 2015 with an insight into the Norwegian gas field, Ormen Lange. Then GEUS will host the return of Mary Van Domelen to the Danish shores in her capacity as a distinguished lecturer in the new year. Mary will present her view of how we can bridge the gap between drilling and completions and we look forward to welcoming her back to Denmark. There will be no SPE meeting in December.

I would like to thank our last couple of hosts for getting the season kicked off to a good start. Donald Purvis shed light on cement testing and was kindly hosted by Maersk Oil and Morten Stage took us through the Culzean HPHT project. The DTU showcased the bright young minds and the future of our industry with Farhad, Alay and Amalia's great presentations. We were also able to look at some fantastic posters on display and congratulations to the two prize winners Eirini and Konstantinos. And finally Martin Bendsøe, the Dean of graduate studies and international affairs took us through the cross institutional effort practiced by the DTU and other linked institutions on forwarding education in the oil and gas arena.

This time last year the OGD summit focused on how we could get more graduates and skilled hands into the industry and this year costs are being cut and so are jobs. So how do we keep the pipeline of skilled labour and graduates full in the bad times to ensure they are available in the good times? These are questions that are being thought about and attempts are being made at answering them. Truly a problem for the cross institutional effort Martin introduced us to, but also for the industry and the SPE, and we will follow the development of this journey over the next years.

Although we are barely in November as this is the last newsletter of the year (and the first of next) I would like to wish you all a merry Christmas and a Happy New Year. See you in November and again in January.

Anders Krag Norman,
SPE Copenhagen
Section Chairman

FUTURE MEETINGS

FOR MORE INFORMATION REGARDING THE PROGRAMME SEE PAGE 6

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SPE

COPENHAGEN SECTION

THE BOARD · 2015-2016 SEASON

Keeping the lights o

An innovative project in deep waters demonstrates how older gas fields can continue providing energy to power homes and businesses.

Manila, already one of the world's densest and most populated cities, is undergoing a major growth spurt. An expanding middle class is driving sales of electronic goods, cars and condominiums. More people are visiting air-conditioned shopping centres and supermarkets in the crowded Philippine capital. And with a rising population and no end in sight to the country's economic boom, policymakers in the Philippines are thinking hard about how to generate enough energy to meet the expected doubling of demand over the next 15 years.

The options include exploring for more natural gas to generate electricity, as well as buying liquefied natural gas from other countries. But a new project in deep waters off the western Philippines is demonstrating another way to meet the world's growing energy needs – by boosting the life of existing energy assets.

Today, the Malampaya offshore gas field is one of the main sources of energy for the Philippines. It provides around one third of the energy supply of the main island of Luzon, which, in turn, generates around 80% of the country's gross domestic product. But since production at Malampaya started in 2001, pressure in the gas reservoir deep beneath the seabed has dropped, potentially reducing the supply of electricity to millions of homes and businesses.

> **"It's very important that we find a way to maximise the field and keep it going as long as possible."**

"It's very important that we find a way to maximise the field and keep it going as long as possible," says Sebastian Quiniones, asset manager of Shell Philippines Exploration which operates Malampaya. To address the problem, Shell designed a so-called depletion compression platform which boosts the pressure to help keep gas flowing out of the reservoir and through the pipeline to shore. The new platform is expected to maintain the gas flow at current levels for about another decade.

Innovative features

The platform took two years to complete, involved over 1,400 workers, and is the first gas platform to be completely designed and built in the Philippines. It has several innovative features. For one, the 13,000-tonne structure had to be installed without the use of specialised vessels that normally transport and help place the offshore platform on the seabed. Few vessels were available due to the remote location of the existing Malampaya platform, located some 50 kilometres offshore from Palawan in the South China Sea.

The engineering team addressed this challenge by designing a built-in jacking system with four, 80-metre legs. Once the legs were fully extended into the water, they lifted the platform into its final position. The new compression platform and the bridge linking the existing platform to it must also withstand strong tremors, as the Malampaya field is located in an earthquake and typhoon-prone region.

"One of our challenges was designing for both these forces of nature," says Martyn Turner, Shell's head of design and engineering for the platform. Martyn and his team designed a bridge that would slide rather than remain bolted in place so that it would not break in the event of a major tremor.

n in the Philippines

Photographic Services, Shell International Ltd

The bridge linking the two platforms was designed to withstand strong tremors.

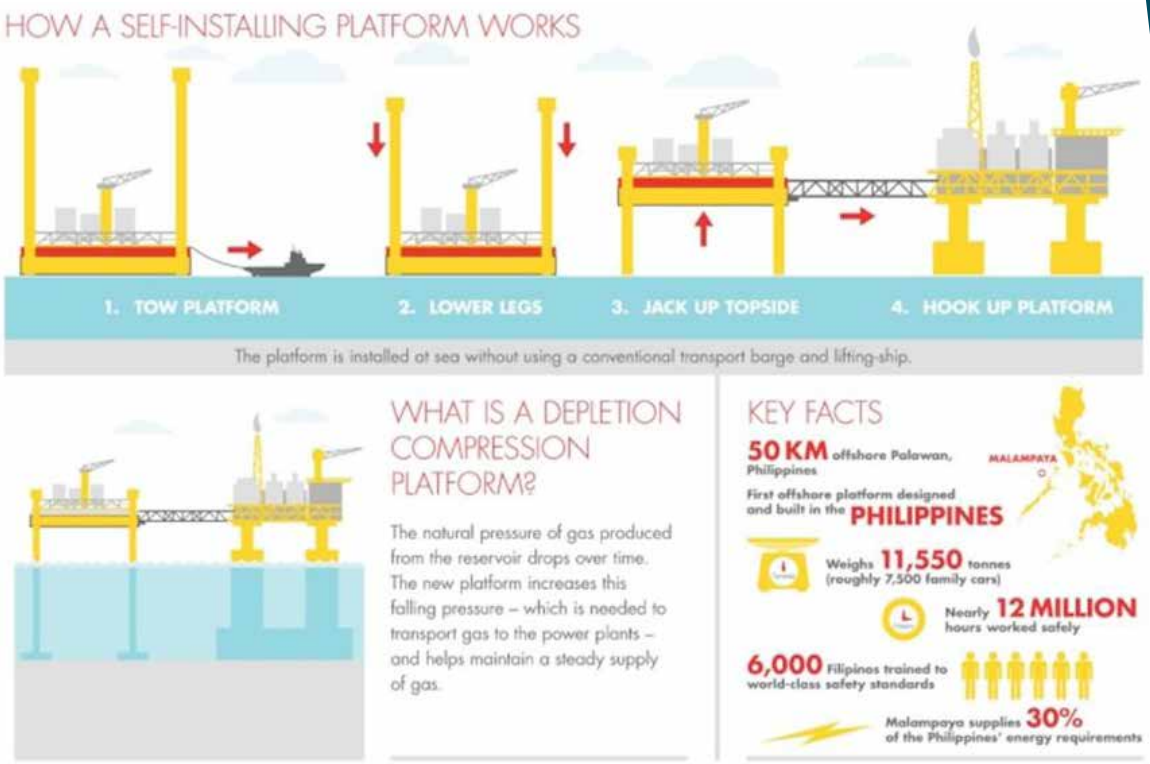
Power on

On board the platform are two powerful 26MW compressors, which are the industrial version of the engines used by aircraft such as the Boeing 747s. They compress the gas produced by the existing platform, boosting its pressure so that it can be piped to the shore. The design of Malampaya's new platform will likely be used in other remote offshore areas, says Graham Henley, Shell's vice president of operated projects.

"It's just as important to get as much oil and gas out of existing fields as we can as it is to find cost-effective solutions for new developments," says Henley. "And as responsible developers of our mature fields, we should be aiming to reach the last remaining reserves."

Malampaya Phase 3 Project

Deep-water gas-to-power, the Philippines

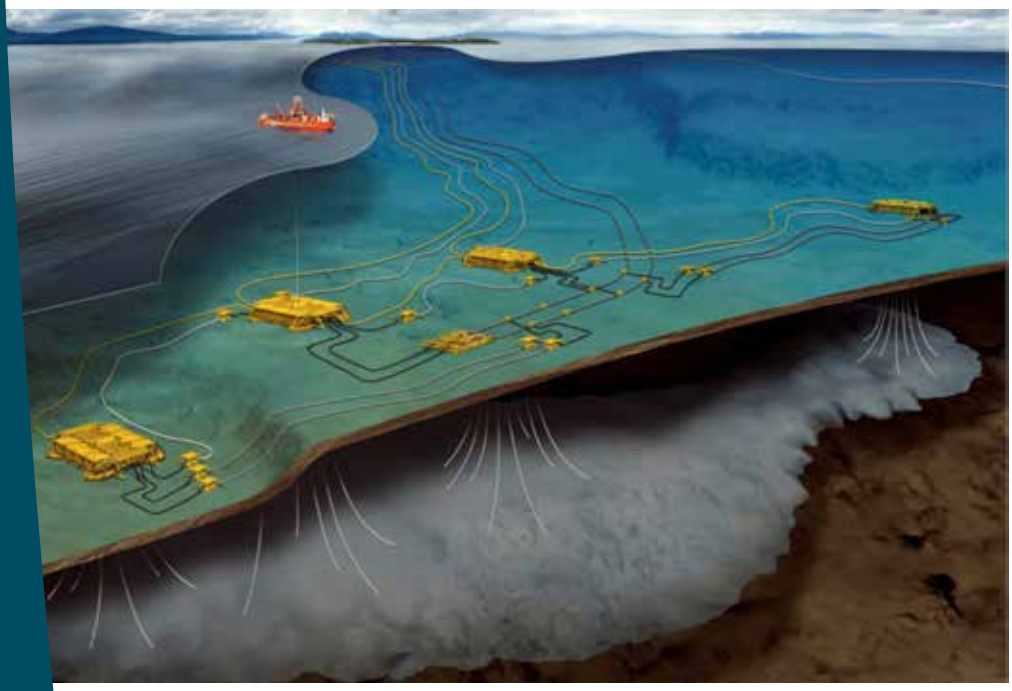


Malampaya Phase 3 Project - Infographic describes how a self-installing platform works, what a depletion compression platform is and key facts about the Malampaya project.

ABSTRACT

ORMEN LANGE DEVELOPMENT PHASE 3; **NYHAMNA EXPANSION PROJECT**

The presentation will give a general insight to the various aspects of the Norwegian Ormen Lange field with special focus on the ongoing brownfield gas plant expansion project.



Ormen Lange subsea development (~1000m water depth)

Nyhamna expansion & Ormen Lange fase 3

BIOGRAPHY

Marianne Jensen Olsnes, Shell

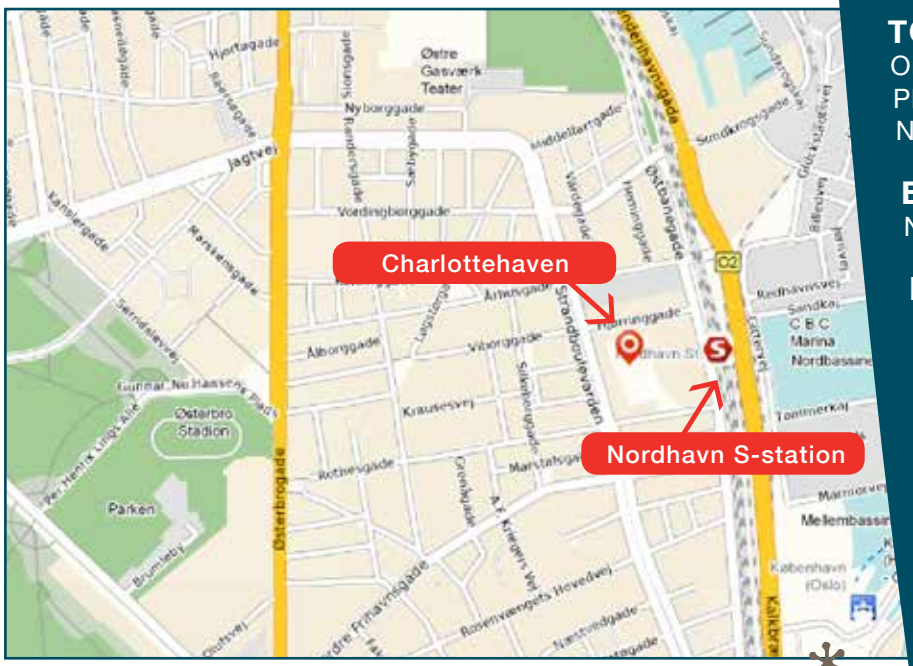
MSc in Petorleum Engineering from Texas A&M, MBA from Rotterdam School of Management.

Born and raised in the Vesterålen archipelago in the northern Norway, Marianne has worked for the oil industry since 1998, first with Saga Petroleum thereafter with Shell in the Netherlands, Germany and Norway.

Marianne has had different roles ranging from reservoir engineering, strategy analyst, Asset Lead and is currently responsible for business development and delivery of projects from the Ormen Lange field, the third largest gas field in Europe delivering 20% of UK gas supply.

Marianne has been the chairman of the board in a small Norwegian company, and is currently a member of the Shell Greenland board.

She currently lives in Stavanger, Norway, together with husband Ole and two sons Thomas (10) and Jacob (7). ◄



COPENHAGEN MEETING

TUESDAY 17 NOVEMBER 2015

NOVEMBER

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

Marianne Jensen Olsnes
Shell

TOPIC

Ormen Lange Development Phase 3;
Nyhamna Expansion Project

ENTRANCE FEE

None

REGISTRATION

Please indicate your attendance by Thursday 12 November by signing up on the internet www.spe-cph.dk

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SPE MEETING SCHEDULE 2015-2016

September 16	MAIN SPEAKER	AFTER DINNER
TOPIC	**Cement Testing: Are we Looking at the Right Things the Wrong Way?**	Culzean Project Morten Stage, Maersk Oil
SPEAKER	Donald Purvis, Consultant, SPE DL	
LOCATION	Maersk	
SPONSOR	Maersk	
October 6	**MAIN SPEAKER**	**AFTER DINNER**
TOPIC	**DTU Research Projects**	Cross-Institutional Effort on the Oil and Gas Educations Martin P. Bendsøe, DTU
SPEAKER	Farhad Varzandeh, Alay Arya and Amalia Halim	
LOCATION	DTU	
SPONSOR	DTU	
November 17	**MAIN SPEAKER**	**AFTER DINNER**
TOPIC NEW DATE	**Ormen Lange Development Phase 3; Nyhamna Expansion Project**	
SPEAKER	Marianne Jensen Olsnes, Shell	
LOCATION	Charlottehaven	
SPONSOR	Shell	
January 19	**MAIN SPEAKER**	**AFTER DINNER**
TOPIC	**Bridging the Gap between Drilling and Completions: Challenges and Solutions in Horizontal Wells**	
SPEAKER	Mary Van Domelen, Continental Resources	
LOCATION	GEUS	
SPONSOR	GEUS	
February 18	**MAIN SPEAKER**	**AFTER DINNER**
TOPIC	**The Value of Assessing Uncertainty (What you Don't Know Can Hurt You)**	
SPEAKER	Duane McVay, Texas A&M	
LOCATION		
SPONSOR	Chevron	
March 16	**MAIN SPEAKER**	**AFTER DINNER**
TOPIC		
SPEAKER		
LOCATION	DONG, Gentofte	
SPONSOR	DONG	
April	**MAIN SPEAKER**	**AFTER DINNER**
TOPIC		
SPEAKER		
LOCATION		
SPONSOR		
May	**MAIN SPEAKER**	**AFTER DINNER**
TOPIC	**Chemical Water Conformance Treatment on South Arne**	Annual General Meeting
SPEAKER	Agustin Riccio Rodriguez	
LOCATION	Moltke's Palæ	
SPONSOR	Hess	
June	**MAIN SPEAKER**	**AFTER DINNER**
TOPIC	**SPE Summer party**	
SPEAKER		
LOCATION		
SPONSOR	Schlumberger	

STEVNS KLINT ON THE UNESCO

Tove Damholt, Østsjællands Museum

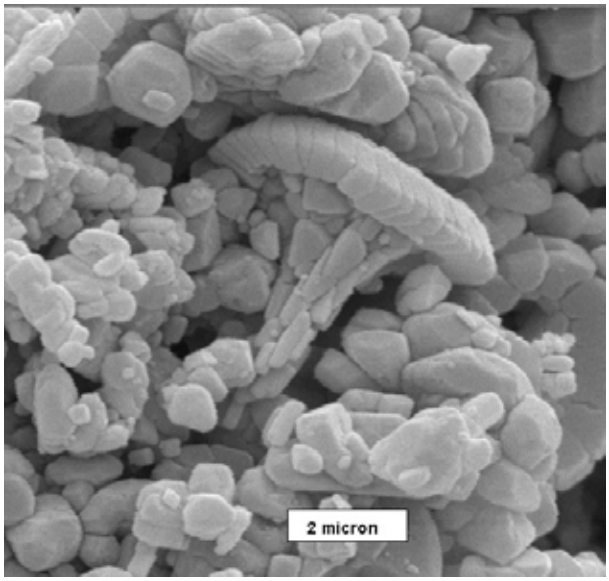
Stevns Klint.

Stevns Klint, know to many reservoir geologists and engineers for outcrop studies to the North Sea chalk reservoirs, was in June 2014 adopted on the most prestigious international list for cultural and/or natural heritage, the UNESCO World Heritage List. Now a new life of managing a world heritage site has begun with intense public attention and a large potential for generating an interest in geology.

The World Heritage Convention is an international agreement on the protection of cultural and/or natural sites with outstanding universal value. The convention forms part of the United Nation Educational, Scientific and Cultural Organization, UNESCO. Sites are adopted on the list only if they are regarded to have outstanding interest and therefore need to be preserved as part of the world heritage of mankind as a whole! Today just over one thousand sites around the World are included in the list. Less than a hundred of these are adopted because of their earth science features. Stevns Klint is now one of these.

The formal decision to adopt Stevns Klint as a world heritage site came after years of intense preparation and thorough evaluation to convince the World Heritage Committee that Stevns Klint met one of the ten strict criteria of "outstanding universal value". The application process was headed by Østsjællands Museum in collaboration with Stevns Municipality and with contributions from University of Copenhagen, GEUS and others. UNESCO finally decided to adopt Stevns Klint on the list as "a globally exceptional testimony to the effect of a meteorite impact on the history of life on Earth." It shows evidence of the impact event that occurred 66 million years ago when more than half of all species on Earth, including the dinosaurs, became extinct. Stevns Klint has iconic scientific importance due to its association with the hypothesis for asteroid-driven extinction.

The adoption offers a range of new opportunities. To geologists Stevns Klint is a well-known geological locality, and the scenic site is frequently visited by scientist, students of geology as well as reservoir geologists on excursions to describe and characterise reservoir rock. But to the general public Stevns Klint has until recently only been a regional attraction and a romantic site mostly known for the church on the edge of the cliff. With the new status as world heritage this is about to change.



SEM picture of chalk sample; Coccolites and fragments.

Following the adoption on the list Stevns Klint has experienced a 30 % increase in visitor numbers, and more importantly the visitors show a new curiosity for the geology. Now visitors want to know why Stevns Klint is on the World Heritage list. They want to see the boundary clay (Fiskeler) and want to know more about the mass extinction event documented in the sea cliff. The recognition by UNESCO has given Stevns Klint and geology a new status and new opportunities.

The new interest in Stevns Klint provides an opportunity to reach new audiences and stimulate an interest in geology. We already see an increase in the number of school classes visiting Stevns Klint and it is obvious that there is a potential for generating interest in geology among children and thus in due time to contribute to the recruitment to geosciences in higher education. To redeem this potential together with other communication opportunities is a huge task, including the establishment of a new visitor centre, communication stations along the cliff, and development of teaching materials. The adoption on the World Heritage List is a large opportunity but also an obligation to preserve and communicate this unique site.

READ MORE:

Nomination document: Damholt, T. & Surlyk. 2012 Nomination of Stevns Klint for inclusion in the World Heritage List. Østsjællands Museum, 160 pp.
http://whc.unesco.org/uploads/nominations/1416.pdf

Damholt, T. & Surlyk, F. 2014: Stevns Klint ny dansk verdensarv. Red. Gravesen, P. (3), 20 p.
http://geocenter.dk/xpdf/geoviden-3-2014.pdf (in Danish)

The Cretaceous – Tertiary Boundary.

SPE STUDENT NEWS

SPE PRESENTATION AT DTU INTRODUCTION WEEK

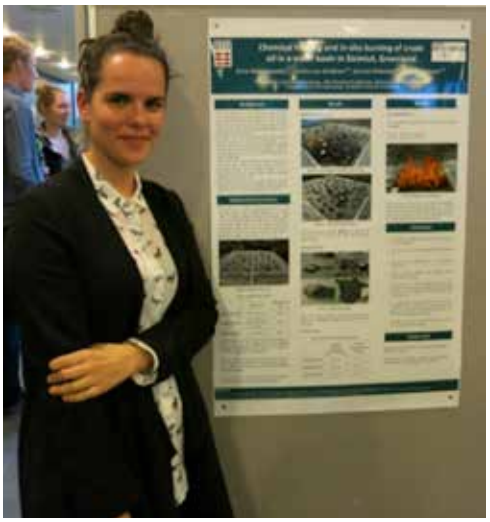
On August 28, 2015, a brief introductory presentation was given for around 500 new master students at DTU. The emphasis of the presentation was mainly on describing SPE as a non-profit organization that is not only for Petroleum Engineers but also for other majors too. During this pitch, other benefits of SPE such as scholarships, connections to professionals from different industries, and future career possibilities were also highlighted. The flyers and pamphlets briefing SPE were distributed among the new students and they were introduced to the DTU SPE Student Chapter activities and upcoming practical and social events. In addition, a session was organized to guide the new master students of Petroleum Engineering with their courses to be opted in upcoming semesters and future options.

SPE DTU STUDENT CHAPTER ANNUAL WELCOMING BBQ

On September 25, 2015, more than 45 members of SPE Student Chapter at DTU participated in the Annual Welcoming BBQ event, where the new members had the chance to meet and network with other members of DTU SPE Student Chapter. The event started with the presentation of Umut Karamahmut who is a young professional working as a reservoir engineer in Shell. In his presentation, Umut gave an insight about work directions in the Shell company and shared his career development experiences with students. The new members were also introduced to the DTU SPE Student Chapter activities and upcoming practical and social events while they were enjoying themselves with a barbecue.

STUDENT POSTER COMPETITION

On October 6, 2015, DTU SPE Student Chapter organized a poster contest during the second SPE Copenhagen section monthly meeting held at DTU. The posters were oriented towards the Enhanced Oil recovery methods, fracturing via polymers etc. and they were evaluated by three volunteers from industry, Hans Horikx (Maersk Oil), Carsten M. Nielsen (GEUS) and Anders Norman (Hess). Two Master students, Eirini Adamopoulou and Konstantinos Lymperis, were selected as a first and a second place, correspondingly. Eirini, the winner of the first prize, has spent one month in Greenland, investigating a possibility for burning the oil spills for ecological purposes. The winners of the poster contest have been awarded by an opportunity to participate at the annual SPE student conference “East meets West” taking place every year in Krakow, Poland.



Eirini Adamopoulou – Winner of the poster competition.

ABSTRACT

BRIDGING THE GAP BETWEEN DRILLING AND COMPLETIONS: CHALLENGES AND SOLUTIONS IN HORIZONTAL WELLS

Economic development of low-permeability, unconventional reservoirs has necessitated the development of advanced horizontal drilling, completion, and stimulation techniques. This presentation starts with two questions. Does completion technology lag behind drilling technology? Can we drill longer wells than we can effectively complete/stimulate? For the resource plays of today, the challenges for completion technologies to keep pace with drilling advances are different from the past. Economic, supply chain, logistics, and environmental challenges may present the largest hurdles. The presentation concludes with the questions: Are completion engineers prepared to effectively stimulate and complete a 3-mile lateral? What will future field developments look like and what kinds of new completion technologies are required? Can we bridge the gap between drilling and completion in unconventional reservoirs? ◄

BIOGRAPHY

Mary Van Domelen, Continental Resources, SPE DL

Mary Van Domelen is an engineering adviser at Continental Resources. She has 30 years of experience in research and practical application of well completions. Before joining the company, she worked for Maersk Oil and Chesapeake Energy in horizontal drilling and completion operations. She has coauthored more than 30 papers and holds several patents. Van Domelen earned a BS in chemical engineering from the University of Oklahoma. She has participated in organizing committees of SPE conferences, applied technology workshops, and forums. ◄

COPENHAGEN MEETING

TUESDAY 19 JANUARY 2016

JANUARY

PROGRAMME

17:00 - 18:00
Drinks

18:00 - 19:00
Presentation and SPE News

19:00 - 21:00
Dinner

LOCATION

GEUS
Østervoldgade 10
1350 København K

SPEAKER

Mary Van Domelen,
Continental Resources
SPE DL

TOPIC

Bridging the Gap between Drilling and Completions: Challenges and Solutions in Horizontal Wells

ENTRANCE FEE

None

REGISTRATION

Please indicate your attendance by Thursday 14 January by signing up on the internet www.spe-cph.dk

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