Volume 73 Number 45 April 2018





SOCIETY OF PETROLEUM ENGINEERS SOCIETY OF PETROLEUM ENGINEERS COPENHAGEN SECTION

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FUTURE MEETINGS FOR MORE INFORMATION REGARDING THE PROGRAMME SEE PAGE 8

THINGS CHANGE

It is hard to believe but this is already the last newsletter of the season. The trees have yet to be adorned by foliage and the less said about the temperature the better. But here we are and we still have 2 very exciting events before we end for the season.

At the start of the season we welcomed INEOS to the fold both as an E&P Company and as an operator in the Danish North Sea. Now we can bid a fond "bienvenue" to Total as an operator in the Danish North Sea and we look forward to as strong a partnership as the SPE has had with Maersk Oil for these many years.

Of course it is also the end of an era. Maersk Oil is no more as a legal entity at least but its legacy lives on and its culture and values also live on both in Total Denmark and also in a large number of other companies now employing ex-Maersk staff.

The oil and gas industry stands at a crossroads and there is perhaps a no more fitting time for the baton to be handed to the next runners.

In my current professional capacity I am humbled to be working with some of the biggest and most foreward sighted companies within the oil and gas industry as well as a number of tech companies in Silicone Valley, helping develop and execute their innovation strategies and drive forward development. Some of the projects and research I'm involved with will change the industry for the better and in some very fundamental ways.

So change is here to stay and from where I stand I can see an industry that is definately alive and kicking and will be for many years to come but mostly for those companies that truly embrace the change.

On the subject of change, should anyone wish to make their voice heard and make their mark on the SPE then feel free to put your name forward for election to the SPE board. The Copenhagen section only works because of the time, effort and dedication given by present and past board members.

We all look forward to welcoming you to the last few events of the season and the excitement and unpredictability of what next season might bring, for some probably a posting in France.

Anders Krag SPE Chairman Copenhagen Section



THE BOARD · 2017-2018 SEASON

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ABSTRACT

THE 7 SINS OF MANAGING ACOUSTIC SAND MONITORING SYSTEMS

It is a common misconception, upon installation of an acoustic sand monitoring system, that the acoustic systems should provide an accurate measurement of sand volumes and that all sand detection issues are immediately solved. The truth is, there is more to that than just installing a piece of equipment and hoping that it would provide us a crystal ball insight to the sand produced. Therefore, the aim of this presentation is to share the top 7 learnings our asset has experienced on managing acoustic sand monitoring systems.

THE 7 SINS THAT WOULD BE DISCUSSED ARE:

- 1. Knowing if it is really sand and underestimating external noise
- 2. Lack of continuous calibration of the acoustic systems
- 3. Trusting solely the calculated sand volumes
- 4. Lack of data correlation with other available field data
- 5. Understanding trends from acoustic systems does not happen overnight, practice makes perfect
- 6. Not acknowledging undetected sand (fines)
- 7. Not realising that acoustic systems are just a small part of the bigger sand management picture

In each learning, field example cases will be presented where both positive and negative results will be described and discussed. This presentation will touch upon the agreed sand management philosophy and procedures and how it has worked out for us so far. The philosophy we have adapted into the asset considers the field as a matured asset, showcasing a multidisciplinary approach.

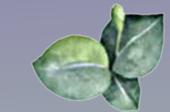
This presentation will be concluded with future work moving forward on how we can perform better with our existing knowledge on the acoustic sand monitoring systems. < BIOGRAPHY ·····



Lee Pei Yen Production Engineer at INEOS

Lee has a background in Chemical Engineering and has been in the O&G industry for 12 years. She started her career working offshore on a production platform in Malaysia, and has since taken up various roles in production optimisation and surveillance. She currently resides in Denmark with her family. Lee is an expert in analysing and finding correlations between data for production and reservoir optimisation / surveillance.





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ABSTRACT ······

HISTORY CASE:

Integrated Approach to Sand and Completion Evaluation fo in Mature Field North Sea

An integrated approach to manage sand production and evaluating the actual downhole well condition including the sand screen is very critical especially in North Sea mature field. It is divided into 2 major area; which are surface sand management and downhole evaluation. The LEAN workflow incorporate multidisciplinary approach, lesson-learnt, best practices and application of multiple latest logging technologies. Integrated risk assessment was perform to ensure no compromise in the service quality, health, safety and environment. An actual history case of mature sand producer discussed in detail to demonstrate the integrated evaluation workflow.

The well sand management incorporates the geo-mechanical model analysis and the field experience to define the optimized well operating envelope for well start up, production optimization and shut in. The well real-time surveillance and monitoring is in place for early solid production detection. Standard evaluation package is define for all solid samples.

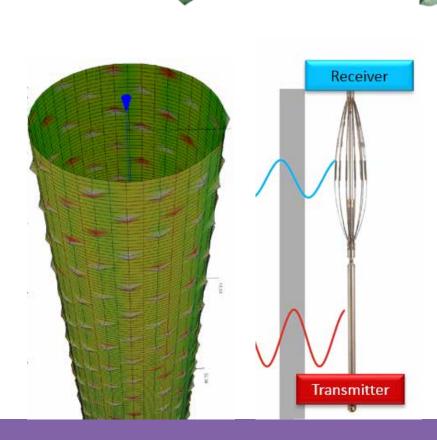
A downhole assessment of well integrity was undertaken to directly identify sand entry points and assess the condition of the stand-alone premium sand control screen. A combination of multi-sensor electromagnetic and multi-finger caliper technologies were selected in order to evaluate the integrity of the complete sand screen system, from base pipe to outer shroud and with full 360-degree circumferential coverage. The multi-finger caliper provides highly accurate measurements of the internal profile of the wellbore, while the electromagnetic measurement responds to variations in downhole component thickness utilizing an array of remote field eddy current sensors. The combination of these sensors, circumferentially positioned around the wellbore, allow identification of mechanical defects, orientation and, by cross-referencing the response of each sensor technology, provide supporting information to assist with the diagnosis of the mode of failure.

A multiple array production log subsequently deployed across the screens with the objective of correlating the three-phase inflow profile with any anomalies observed in the combined multi finger caliper and electromagnetic survey. Additionally, dual tubular (tubing and production casing) integrity evaluation was performed on the upper completion with the application of pulsed eddy current technology. This measurement provides quantitative thickness evaluation through multiple concentric tubulars, utilizing the principle of electromagnetic transient decay.

Management r Sand Producer

Included in this intervention are preventative wax removal and solid removal with wireline bailing tool and tractor. The operation encountered multiple operational challenges. The problems identifications, lesson learnt and solutions will be discuss respectively.

The multidisciplinary integrated evaluations of all the results enable identification of the most economical and technical viable solution for each sand producer wells and optimized for value creation. The short, medium and long-term solutions are define accordingly.







SPE STUDENT SECTION SCHOLARSHIP

6

The SPE Copenhagen Student Section Scholarship can be applied for once a year by students working with petroleum engineering or closely related topics.

The total amount that can be applied for is 15,000 DKK. The scholarship can be applied for by filling in the application form, which can be downloaded from the website www.spe-cph.dk from April 5 2018.

The application form should be returned to the Secretary of the SPE Copenhagen Section: Claus Marner Myllerup at cmyl@dtu.dk before 17:00 Thursday 15th May 2018. The e-mail should be marked SPE Student Scholarship.



C O P E N H A G E N M E E T I N G TUESDAY 17 APRIL 2018

PROGRAMME 17:00 - 18:00

17:00 - 1 DRINKS

18:00 - 19:00 PRESENTATION AND SPE NEWS

19:00 - 20:30 TAPAS

LOCATION

INEOS Nesa Alle 1 2820 Gentofte

SPEAKERS

Mohd Zahirin Bin Ruslan, INEOS and Lee Pei Yen, INEOS

TOPICS

Integrated Approach to Sand Management and Completion Evaluation for Sand Producer in Mature Field North Sea and The 7 Sins of Managing Acoustic Sand Monitoring Systems

ENTRANCE FEE None

REGISTRATION

Please indicate your attendance by Wednesday11 April by signing up on the internet **www.spe-cph.dk** Registration required - will be checked upon arrival.

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INEOS

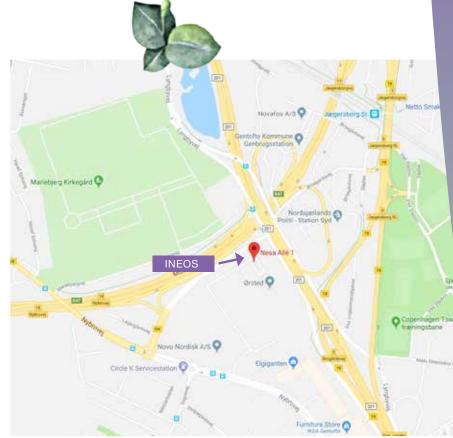


COPENHAGEN SECTION www.spe-cph.dk

Mohd Zahirin Ruslan INEOS

BIOGRAPHY

Mohd Zahirin Ruslan (Zach) joined INEOS Oil & Gas (formerly known as DONG Energy) in 2014 after almost 11 years working in multidiscipline area with Schlumberger (IPM/SPM) across the globe. Zach has been actively supporting SPE and been serving as SPE Distinguished Lecturer Committee since 2011. He has authored and co-authored multiple journal and technical papers for internal and externals.







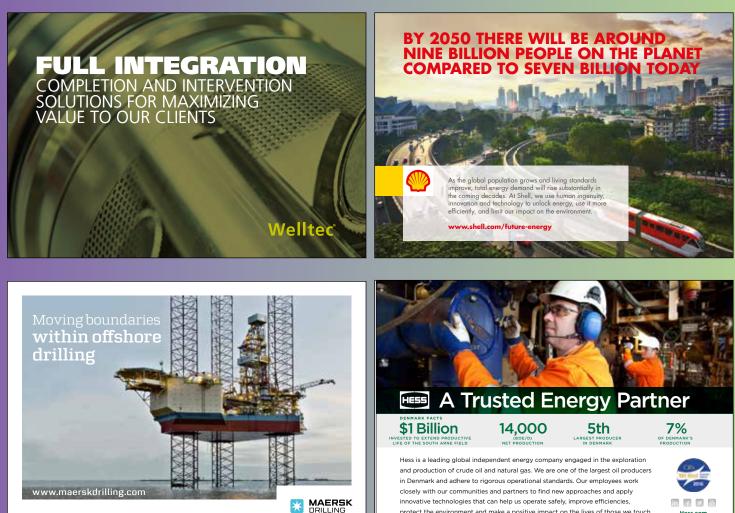
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Annual General Meeting 2017-2018 SEASON

Prior to the Chevron SPE presentation 30 May 2018 we will hold the AGM

We are always looking for new energy, ideas and input and if you think we could do anything better then we would welcome your presence on the board. If you would like to join the board of the SPE Copenhagen Section then please contact Anders Krag before the AGM.

Agenda:

- 1. 2017-2018 Season Look Back
- 2. **Financial Statement Approval**
- 3. 2018-2019 Copenhagen Board Proposal
- 4. 2018-2019 Copenhagen Board Approval
- 5. AOB





protect the environment and make a positive impact on the lives of those we tout





Captain Field

Name of Presenter: Anette Poulsen

ABSTRACT



LOOK AND SEE HOW WATERFLOOD/ POLYMER WORKS



An enhanced oil recovery (EOR) pilot was conducted by Chevron North Sea Limited ("Chevron") at the Captain Field in the UK North Sea between 2011 and 2013. Results from the polymer injection are presented along with an assessment of incremental oil recovery.

The polymer solution was selected and qualified using a combination of laboratory and yard tests to determine optimum specifications for injection. The selected polymer was initially tested in an injectivity test in 2010, followed by continuous polymer injection in 2011, after establishing a waterflood baseline. Continuous polymer injection was terminated in 2013 due to injectivity decline associated with polymer emulsion injection. An unambiguous response from the reservoir was observed with a significant uplift in oil production.

The three mechanisms of a successful polymer flood were observed and evaluated: (1) acceleration of oil production, (2) incremental oil production due to improved polymer sweep, and (3) water production and injection minimization. Our results demonstrate that waterflood recovery can be accelerated by polymer flooding. Secondly, incremental oil was produced due to increased volumetric sweep by changing the displacing phase fluid mobility with the viscosified polymer. Finally, the reduction in water production translates into reduced water handling and thereby lower operating costs.

Before and during the pilot chemical injection, production logging tools were run in the injector and producer to measure their respective outflow and inflow phase profiles along the horizontal completions. These logs confirmed that polymer promotes crossflow to make injection

EOR Pilot



rates more uniform along the wellbore. We also drilled a post-polymer observation well in the swept zone between the pilot wells. Logs from this well established remaining oil saturations to polymer that we used to confirm our calculations for polymer flood volumetric sweep. The post-polymer flood oil saturations confirmed the performance of the polymer flood.

We show a full suite of surveillance data and its use in quantitative interpretation. We also show innovative uses of the surveillance data in our interpretation methods. The results prove the subsurface and operational success of polymer flooding a heavy oil reservoir with horizontal wells, even in a harsh offshore environment such as the UK North Sea.



COPENHAGEN MEETING wednesday 30 may 2018

PROGRAMME 17:00 - 18:00 DRINKS

NOTE! NEW DATE

> 18:00 - 19:00 ANNUAL GENERAL MEETING AND PRESENTATION

19:00 - 21:00 DINNER

LOCATION Charlottehaven Hjørringgade 12C 2100 Copenhagen

SPEAKER Anette Poulsen Chevron

TOPIC Captain Field EOR Pilot

ENTRANCE FEE None

REGISTRATION Please indicate your attendance by Thursday 24 May by signing up on the internet **www.spe-cph.dk** Registration required - will be checked upon arrival.

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SECTION www.spe-cph.dk www.spe.org

MAY

INEOS IS A TOP 10 COMPANY IN THE NORTH SEA

INEOS Oil & Gas is a fast-growing entrant into the North Sea with around 100,000 boe of production and close to 560 mboe of reserves. It comprises six different businesses operating in the UK Southern North Sea and West of Shetland, Norway, and Denmark, with the capability and interest to take on further projects and growth. The North Sea continues to present new opportunities for INEOS. We have a strong track record of acquiring non-core assets and improving their efficiency and reliability, securing longterm employment and investment.



Visit our website at www.ineos.com

Save the Date!

Dear SPE Member,

You and your partner are invited to the 2018 SPE Summer party on the 8th of June at Peter Lieps Hus in Dyrehaven at 6 PM.

Please register at: https://spe-cph.nemtilmeld.dk/10/ and transfer 350 DKK per person to the SPE account at Nordea: 2274 – 5360 613 323 Please mark payment SPE –"your name"

For further information please contact: Mhansen4@slb.com