Volume 94
Number 66
April 2023

SOCIETY OF PETROLEUM ENGINEERS

SPE NEWS

COPENHAGEN SECTION

FROM THE SECTION CHAIRMAN

DEAR SPE COPENHAGEN MEMBERS,

It is with great pleasure that I welcome you to the second half of the 22/23 season and the third newsletter issue.

SPE CPH has hosted a few events so far and I want to thank you for your participation and engagement. The first half of this season ended on a great note with the event at TotalEnergies where we were shown the cutting-edge technology and immense logistics involved in the redevelopment of the Tyra Platform which will provide the much-needed natural gas for Denmark for the foreseeable future.

Monthly Events

We in the SPE CPH Board continuously look to organize meaningful events for our professional, YP and student members. We acknowledge that it is an increasingly challenging task due to the reduced number of core Oil & Gas industry players present in Denmark and this means we must adapt. The good thing is, the growing Renewable Energy Sector owes a lot to the skills and knowledge transferred in by hiring oil and gas employees and this means we can collaborate.

In February, we kicked off with an online event consisting of 2 presentations:

- Reduction of Environmental Impact of Produced Water by introducing green chemicals by **Simon Ivar Andersen**

- Compaction phases and pore collapse in chalk – The elastic phase is not elastic by **Tobias Orlander**

There were a lot of discussions and clarifying questions and I am happy that participants saw the value in the talk. A big thanks goes to DTU Offshore for arranging the speakers. Details of the quite interesting topics can be found further down on pages 8 and 9.

The next event would be hosted by Welltec this month and it is something to look forward to. This will not be the first or last time SPE Copenhagen will be hosted by Welltec and for this, we say a big thank you. An Oil & Gas professional and former great colleague Lia Khasanova will be presenting on “Insights into Welltec's New Energy And Climate Technologies Initiatives”. As usual, there will be a chance to tour Welltec’s best in class manufacturing facilities as part of the event. I encourage you all to attend.

Details of the remaining events for the rest of the season will be made available once arrangements are finalized. Our student chapter also has a number of targeted events and initiatives planned, and the SPE CPH board will continue to support them.

Student Chapter and YP

On that note, I would like to use this opportunity to congratulate our SPE DTU student chapter representatives, Christoffer Duus and Jakub Drochomirecki who competed as a team at the Petrobowl in Croatia, earning a creditable 4th place.

In addition, Jakub took 1st place in the European qualifiers of the SPE SPC master division which means he will represent our student chapter in the International Student Paper Contest during ATCE 2023. Well done, Jakub!!

On a related note, since the beginning of my tenure I have been pushing to resurrect our section's Young Processionals (YP). I recently attended the SPE/IADC International Conference in Stavanger where I gave a brief speech about the need to ensure a sustainable pipeline of talent for the future of not only our industry, but the wider energy sector. An active Student Chapter and YP section play a crucial role in fulfilling this pipeline of technical skills. I am therefore glad to announce that our YP is gradually coming alive again! Around 8 -10 YPs

have been meeting informally to deliberate on activities they can organize. I can assure them that they will have the necessary support of the Board.

I also got the chance to meet with members of the SPE Stavanger section Board and interacted with their Student's Drillbotics team.

From left to right: ***Mahmood Fani*** *- SPE Stavanger Students Section Chair,* ***Vidar Strand*** *- SPE Stavanger Section Chair,* ***Adebowale Solarin*** *- SPE Copenhagen Chair*

Model Drilling rig by the Stavanger student Chapter who won the Drillbotics 2021 competition

With ***Myriam Torres*** *SPE Stavanger Membership Chair*

BOARD ELECTIONS 2023

It is that time of the season again and we encourage members to step up and volunteer for positions on the SPE Copenhagen Board. Volunteering on the board is a great way for you to make an impact while enhancing your career and expanding your professional network.

Elections will take place at the Annual General Meeting scheduled for June 1st. For more information, contact the Chair of the Nomination Committee, Hans Horikx at horikx@dtu.dk or any other board member.

MEMBERSHIP RENEWAL

We look forward to you continuing your SPE membership. There is no doubt that we are all facing the effects of inflation, war and the energy crisis among other challenges but through it all, we have continued to inspire and support each other. We as a board will continuously work towards bringing greater value to your membership.

To renew your membership, visit:

spe.org

or click on the link:

http://go.spe.org/sectionrenew

MEMBER FEEDBACK

We on the board are always looking for ways to enhance the section and make your membership worth your while. If you have any suggestions or constructive feedback, please feel free to contact any of the Board members via

https://spe-cph.dk/

or our LinkedIn page

https://www.linkedin.com/company/spe-copenhagen-section

I look forward to seeing you over the next few months.

Yours Sincerely,

Adebowale Solarin
SPE Copenhagen Section Chairman

Adebowale Solarin
SPE Copenhagen Section Chairman

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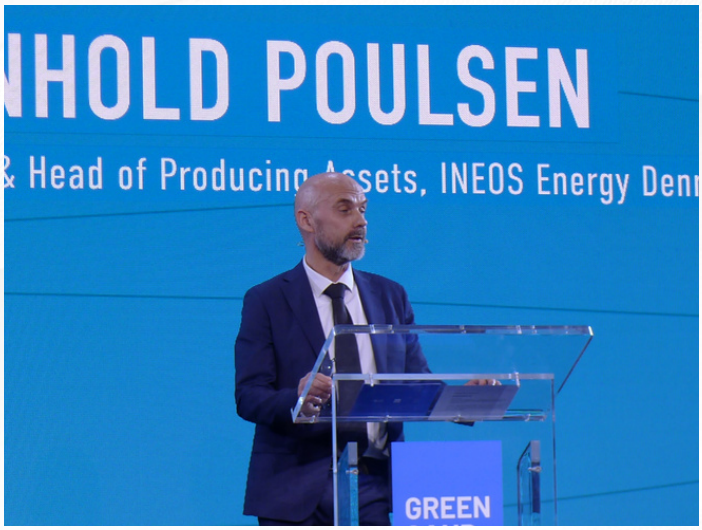
FIRST CARBON STORAGE

Crown Prince Frederik of Denmark officially starts the CO_2 injection by live communication with an engineer at the Nini West platform.

March 8th was a day that would go down in history for Denmark and Europe. It was the day when the first CO_2 was successfully pumped into the Danish subsurface.

A high-profile event was organized at the port of Esbjerg to celebrate this great accomplishment. The attendees' list included over 200 executives and technical experts from various organizations as well as policymakers across Europe; the CO_2 injection was started by Frederik, the crown-prince of Denmark.

The pilot injection of some 12,000 tons of CO_2 is one major milestone for Project Greensand. Another milestone was achieved when the operating partners of the Greensand consortium, INEOS and Wintershall, obtained the license award from the Danish government for CO_2 injection in the Nini reservoir. The next step is submitting a development and operation plans for the Nini area.



Mr Søren Reinhold Poulsen, Project Director Greensand and Head of Producing Assets, INEOS Energy Denmark.

Mr Lars Aagaard, Danish Minister for Climate, Energy and Utilities.

Once these are approved by the authorities, the final investment decision will be taken in partnership with Nordsøfonden for a full-scale CO_2 injection.

Michael Larsen, the subsurface lead for Project Greensand at INEOS, highlights that the Greensand consortium had achieved something incredible in record time. In just ten months, the entire value chain had been implemented, from capture to transportation and storage. Remarkably, the CO_2 has been transported – for the first time in history – across borders, which demonstrates how European co-operation helps mitigating carbon emissions so that our planet moves towards a greener future.

SPE Meeting

INSIGHTS INTO WELLTEC'S NEW ENERGY AND CLIMATE TECHNOLOGIES INITIATIVES

Speaker
Lia Khasanova
With 20+ years of combined experience in oil & gas sector, Lia has been exposed to diversified range of roles, starting from well cementing, construction continuing into business development, innovation and energy transition segment. Lia has strong knowledge within wells, innovation toolkit, business and strategy development and implementation.

Welltec is actively pursuing the development of leading technologies and solutions for the green energy transition. During presentation we will talk about our focus areas and some activities within. Will talk in some details about Test Flow Loop and recent activities associated with it.

SHOW SIMILAR EVENTS

PROGRAM

16:30 - 17:00
Networking and snacks & coffee

17:00 - 17:45
The exciting tour of the manufacturing facilities at Welltec

18:00 - 18:45
Presentation

19:00 - 20:30
Networking, small food and drinks

SPEAKER
Lia Khasanova

ORGANIZER
SPE-CPH
Peter Tybjerg
Phone: +45 4597 0817
pt@calsep.com

ENTRANCE FEE
None

As a leading technology partner to the energy industry, Welltec® takes a proactive role in facilitating progress and change.

Tuesday, 18 April

Please sign-up no later then 17 April 2023

Register **HERE**

WELLTEC A/S, GYDEVANG 25, 3450 ALLERØD

STENLILLE PROJECT TO ENHANCE BOREHOLE MONITORING SOLUTIONS

By Gas Storage Denmark A/S

Gas Storage Denmark has commenced with a new onshore CCS development with the goal of storing 8 million tons of CO_2 over 20-year period, beginning in 2025.

As part of CCS development concept, the **Borehole Monitoring Solutions** project is a broad collaboration between DTU, Welltec, Gas Storage Denmark, GEUS, Technion, and Noreco, funded by the Innovation Fund Denmark through the INNO-CCUS partnership. It will assess new methods as well as potential adaptations of known methods for continuous downhole monitoring in CO_2 - wells.

CCS

The CCS construction will entail drilling two new CO_2 injection wells, penetrating geological structure located 1,500m below surface in the vicinity of the Stenlille natural gas storage site that has been operated by Gas Storage Denmark for more than 30 years. One of the existing wells will be used for observational purpose to monitor migration of the CO_2 plume over time.

When developing and operating a CO_2 - storage site, it is of a major importance to ensure, document, and prove that the CO_2 is stored safely without leakages to the surface. While gas-tight sealing of the wellbore can be documented by conventional methods, continuous in-situ monitoring is necessary to document the overall storage safety and to monitor the soundness of the wells and discover potential integrity issues before they evolve into leakages.

Borehole Monitoring Project

The focus of the established consortium is on developing monitoring methods, which can enable continuous monitoring of well integrity as well as migration of the CO_2- plume near the wellbore. Hence, the project has a special focus on solutions based on the adaptation of existing wireline logging technologies and fiber optics to create a continuous monitoring application.

The project aims to find specific monitoring solutions to be implemented in given well designs for both existing and new wells. The results will be tested in the laboratory and possibly new CO_2 - wells at the CO_2- storage project in Stenlille – all findings will be summarized in a monitoring solution catalogue.

GAS STORAGE DENMARK

SPE Online Meeting

An online SPE meeting was organized by DTU on the 23rd of February with presentations by Tobias Orlander and Simon Ivar Andersen. Simon was meant to kick off the presentations but internet connection issues at his holiday residence in the south of Europe threw a temporary spanner in the works. Fortunately Tobias could jump in to take his place and start the session on time.

Tobias presentation, titled **"Compaction phases and pore collapse in chalk – The elastic phase is not elastic"** described how the various stress/strain compaction regimes can be better defined by measuring the velocity of sound waves and using the Biot coefficient derived from these measurements. This is particularly relevant to Lower Cretaceous formations in Denmark, as these reservoirs are typically produced under depletion drive (compaction) rather than under pressure maintenance drive (waterflood). Better definition of compaction behaviour can play an important role in modelling and predicting oil recovery from these chalk reservoirs.

COMPACTION PHASES AND PORE COLLAPSE IN CHALK – THE ELASTIC PHASE IS NOT ELASTIC

Speaker
Tobias Orlander
M.S. degree and PhD from the Technical University of Denmark (DTU). He is currently an assistant professor of rock mechanics and rock physics at DTU.

His teaching covers disciplines in civil as well as petroleum engineering. His research is focused on experimental rock mechanics and rock physics in the context of the physical description of poroelastic and strength properties of sedimentary rocks.

Abstract

Successful petroleum production relies partly on input to large-scale modelling based on descriptions of mechanical compaction behaviour obtained from laboratory experiments on standard core plugs (see figure). Compaction experiments commonly identify an initial linear elastic behaviour from a measured load-deformation relation. However, insight from poroelasticity (Biot's coefficient) using input of elastic wave velocities measured during laboratory compaction identifies both elastoplastic and elastic compaction phases and provides a reliable indicator of yield strength (pore collapse). Petroleum reservoirs are presumed to often experience only elastic compaction during depletion, not the elastoplastic behaviour seen in experiments. Yet, laboratory experiments can form a calibration background for large-scale models. Identifying both elastoplastic and elastic compaction phases and pore collapse from poroelasticity provides new insight to improve models and avoid the unphysical use of porosity as a controlling physical parameter.

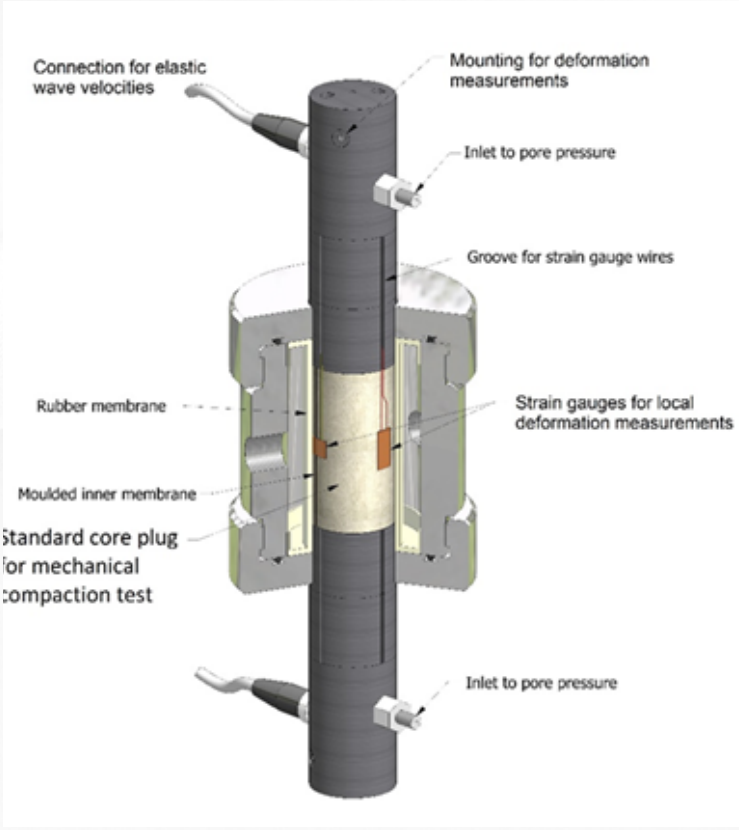


Figure 1. Test setup for mechanical compaction tests. Courtesy of Geo.

Once Simon was back on line he made a presentation on the **"Reduction of Environmental Impact of Produced Water by introducing green chemicals"**, which led to a lively discussion on the merits of tea leaves that can be used to extract green chemicals that may eventually replace conventional corrosion inhibitors. Also, sugar-based H_2S scavengers have the potential to reduce the environmental impact of a different type of production chemicals.

REDUCTION OF ENVIRONMENTAL IMPACT OF PRODUCED WATER BY INTRODUCING GREEN CHEMICALS

Speaker

Simon Ivar Andersen

Simon Ivar Andersen works at DTU Offshore (DOTC) as a professor (MSO) in Offshore produced water management research, and also as the research director

He joined DOTC in 2017. Before that he was scientific advisor in Schlumberger regarding reservoir fluid chemistry based out of Edmonton, Canada. Prior to that he was a program manager and principal scientist at Topsoe working with green chemicals developments, separation processes and more (Emerging tech). He was an associate professor in applied thermodynamics from 1997-2005 at DTU kemiteknik and got his PhD from the Dept. Physical Chemistry, DTU on asphaltene association related to flow assurance in 1990. He has worked with everything from reservoir chemistry (EOR and Flow assurance), midstream pipelining issues with heavy oils to refinery and refinery products as well as related environmental aspects of crude oil production and transportation and production chemical development and characterization. He holds 100 + papers and 14 patents (either granted or in application) and has written 100+ technical reports to the industry.

Abstract

Production chemicals in produced water from Oil & Gas production have a substantially higher impact on the environment compared to the impact of naturally occurring compounds, either when dissolved or dispersed in the discharge water. Production chemicals are a necessity in oil and gas production in order to cope with many different hazards that can jeopardize mechanical integrity of the production system and can increase costs. Chemicals are being deployed to cope with issues such as corrosion, scaling, H_2S scavenging, hydrates, asphaltenes and waxes, demulsification and water clarification, foaming and more. Without these chemicals flow assurance and fluid quality issues would be prolific. Many of the most potent chemicals in terms of efficiency, however, can have adverse effects on the environment when discharged to the ocean or brought to the refinery when dissolved in oil.

There has been a drive towards substitution of ecotoxic additives with less harmful compounds which often are named 'green chemicals' due to the labeling by environmental protection agencies. Green chemical is also a term for products of primarily biobased based origin.

At the Danish Offshore Technology Centre we fund and support the development of such green chemicals, especially those aiming at corrosion inhibition and H_2S scavenging.

We will discuss our experiences and also the fact that even a benign biorelated molecule may still lead to highly toxic products, through chemical conversion reactions or reactions during action. As a network organization we have been able to combine forces such that new products are tested not only for efficiency but at an early stage also for ecotoxicity and the impact on oil and water separation. We will provide examples of this.

A recording of both presentations is available via the following link:

https://www.youtube.com/@dtuoffshore6770/featured

Young Professional Life Offshore

By Patryk Bijak, Ross Energy, email: patryk.bijak@rossoffshore.dk

Patryk Bijak, Drilling Engineer/WSDE, Ross Energy

As a young professional in the oil and gas industry, my life is filled with exciting experiences and opportunities that I wouldn't find in a normal office job. One of the most thrilling aspects of my job is the amount of traveling I get to do. During my short time in the industry, I have already been sent to new countries to work on offshore projects, which allows me to experience new cultures and environments while gaining valuable experience in the field. It is a fast peace environment with day-one accountability on given tasks.

One of the most important aspects of my job is gaining hands-on experience on the offshore drilling rigs. It's an essential part of the job that has allowed me to learn how the equipment is operateed, identify problems, and develop solutions in a real-world setting.

As a wellsite drilling engineer, I am not only directly supporting drilling supervisor with day-to-day tasks but also keep the onshore team informed feeding it with all the information possible on operational performance and safety.
I've been fortunate enough to work alongside experienced professionals who have provided me with valuable insights into the industry and have helped me develop skills that can only be learned through experience. Working with these professionals has also given me mentors who have guided me through the early stages of my career.

Another benefit of my job is being able to use the skills and knowledge I learned at university in a practical setting. Either if it is calculating cementing volumes or string strength, applying the theoretical knowledge I learned in school to real-world problems has been both challenging and rewarding. It's also been an opportunity to develop new skills and learn new technologies that are constantly being developed in the industry.
I still hope to see the industry being more digitalized which in my opinion can help improve performance, knowledge transfer and ultimately cut costs.

Overall, being a young professional engineer in the oil and gas industry is an exciting and fulfilling career. With opportunities for travel, hands-on experience, learning from experienced professionals, and applying university knowledge to practical settings, I'm constantly challenged and rewarded in my job. I wouldn't trade this experience for anything, and I'm excited to see where my career takes me in the future.

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ROSS ENERGY
DEEPER UNDERSTANDING

EVENT CALENDAR

TOPIC	Reducing the Carbon Intensity of Drilling Operations: A Maersk Drilling Journey
SPEAKER	Lola Caballero
TYPE	Face to Face
SPONSOR	Maersk Drilling

OCTOBER 27 | 17:00 | Rebel Work Space

TOPIC	Leading the way to a carbon neutral future by building world scale clean ammonia production and carbon storages
SPEAKER	Rasmus Holmer
TYPE	Face to Face
SPONSOR	Horisont Energy

NOVEMBER 14 | 12:00 | Online

TOPIC	From Digital Rocks to Gigatonne Scale CO_2 Storage: Two Revolutions in One
SPEAKER	Samuel Krevor
TYPE	DL
SPONSOR	SPE DL

DECEMBER 8 | 17:00 | TotalEnergies

TOPIC	Tyra II
SPEAKER	
TYPE	Face to Face
SPONSOR	TotalEnergies

FEBRUARY 23 | 17:00 | Online

SPEAKER	Simon Ivar Andersen: 'Reduction of Environmental Impact of Produced Water by introducing green chemicals'
SPEAKER	Tobias Orlander: 'Compaction phases and pore collapse in chalk – The elastic phase is not elastic'
TYPE	Online
SPONSOR	DTU

APRIL 18 | 16:30 | Welltec

TOPIC	Insights into Welltec's New Energy and Climate Technologies initiatives
SPEAKER	Lia Khasanova
TYPE	Face to Face
SPONSOR	Welltec

MAY 4 | 17:00 | Rebel Workspace

TOPIC	Predicting the CO_2 propagation in geological formations from sparsely available well data
SPEAKER	Carlos Ferreira (DTU Offshore) and Michal Stepien (Noblecorp, Denmark)
TYPE	Face to Face
SPONSOR	SPE Copenhagen
Venue	Rebel Work Space

JUNE 1 | AGM & Elections

TOPIC	
SPEAKER	
TYPE	
SPONSOR	

UPCOMING CONFERENCES

SPE Copenhagen section would like to attract your attention to the following upcoming conferences

InterPore2023

22 – 25 MAY 2023
EDINBURGH, SCOTLAND

The 15th Annual international Conference on Porous Media includes a wide variety of sessions on fundamental and applied research in porous media. Abstract submission deadline is **13 December 2022**.

https://events.interpore.org/event/41/overview

A major geosciences conference in Europe invites contributions until **15 January 2023**.

https://eageannual.org

2023 EAGE ANNUAL 84TH CONFERENCE & EXHIBITION VIENNA | AUSTRIA

SPE International EUROPEC

5-8 JUNE 2023
VIENNA, AUSTRIA

TRONDHEIM CARBON CAPTURE & STORAGE CONFERENCE
TCCS 12

19 – 21 JUNE 2023
TRONDHEIM, NORWAY

The 12th Trondheim Conference on CO_2 Capture, Transport and Storage is a globally leading scientific CCS technology conference. Abstract submission deadline is **10 February 2023**.

https://www.sintef.no/projectweb/tccs-12

This conference aims to stimulate the exchange of ideas among the scientists with special interests in flow in porous media and geophysics. Abstract submission deadline is **19 December 2022**.

https://www.siam.org/conferences/cm/conference/gs23

siam 2023
Conference on Mathematical & Computational Issues in the Geosciences

19 – 22 JUNE 2023
BERGEN, NORWAY