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Copenhagen Section

Solutions. People. Energy.℠

SOCIETY OF PETROLEUM ENGINEERS

SPE NEWS

COPENHAGEN SECTION

FROM THE SECTION CHAIRMEN

DEAR SPE COPENHAGEN MEMBERS,

As I pen down these words, I am filled with a sense of gratitude and pride for the journey we have undertaken together. Serving as the Chairman of this esteemed society over the last 3 years has been one of the most rewarding experiences of my professional life. However, the time has come for me to step down and pass the baton to a new leader who will guide us into the future with fresh perspectives and renewed energy.

It is with great pleasure that I introduce our new Chairman, ***Peter Tybjerg***.

A New Section Chair Steps Forward!

With a deep commitment to our mission and a wealth of experience serving on the SPE Copenhagen Board, Peter is exceptionally well-equipped to lead our society. He brings continuity and a shared vision for the future of SPE Copenhagen.

Peter will as always be supported by the SPE CPH Board, which has also been infused with a few new and exciting arrivals. I urge all members to extend their full support to Peter during his tenure. Your continued engagement and enthusiasm are vital to the success of our society. Together, we can achieve remarkable milestones and continue to make significant contributions to the field of petroleum engineering.

Thank you for the trust and support you have shown me over the years. I am confident that under Peter's leadership, SPE Copenhagen will continue to thrive and excel.

Warm regards,

Adebowale Solarin
Outgoing Chairman

DEAR SPE COPENHAGEN,

We hope you have enjoyed the summer and have had a good start tackling the technical challenges in your daily work.

First of all, I would like to extend a special thanks to Adebowale Solarin, our Section Chair for the past three years. I joined the board during the 2020/21 season, and it has been a great experience with Ade as the chair of SPE-CPH. Ade brings tremendous energy and enthusiasm to the board meetings and has successfully made the board members more active and engaged in their work. Additionally, we now have committees for the program, newsletter, communication, membership, and young professionals, which has made decision-making easier for the board.

My ambition with the new board is to continue the same level of activity, including more special events like last season's panel debate at Rystad and the rig visit to the Noble Highlander in Esbjerg.

I would also like to thank Natalia Sol Pereyra for her outstanding work as Student Chapter President and Social Media Chair. This year, we will not have a Student Chapter Chair, as DTU has decided to close the Petroleum Engineering program. However, we still have Alexander Shapiro on the board, maintaining a good connection with students at the Center for Energy and Resources in the Department of Chemical Engineering and with researchers at DTU Offshore, where our board member Hans Horikx serves as an advisor.

It is with great pleasure that I welcome Natalia Krygier from Innargi to the team for the coming season and beyond. Natalia will be the Program Chair for this season.

The new season has started, and it was great to see so many of you at the SPE-CPH Party in central Copenhagen at DJØF Rooftop. The icebreaker and quiz kicked off the evening, and we hope some of you got the chance to meet new members. Our meetings are a great place to network and meet engineers, scientists, academics, consultants, and other professionals interested in exchanging technical knowledge.

The next meeting of this season will feature Distinguished Lecturer Andy Watt, who will give a talk titled "No Longer A Sunk Cost: Innovation & Collaboration for Decommissioning Subsea Infrastructure." You can sign up and read the abstract here: [SPE Distinguished Lecturer].

We are also working on a factory tour to NOV's facilities in Kalundborg. This trip follows up on last season's lab tour at NOV's facilities in Brøndby. It will be fascinating to see how they engineer, design, and manufacture flexible pipelines that transport oil and gas from water depths of 3 to 4 kilometers to an FPSO.

On November 13, the SPE meeting will take place at Ørsted in Gentofte, where Henrik Sørensen (Calsep) and Jon Geest Jakobsen (Ørsted) will present on the role of PVT for CO_2 Transport and Storage. Calsep will share their main findings since the presentation on Pure vs. Impure CO_2, which they gave to SPE-CPH in March 2022.

Looking forward to see many of you at this year's meetings.

Warm regards,

Peter Tybjerg
Section Chair
SPE CPH

Peter Tybjerg
SPE Copenhagen Section Chairman

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Distinguished Lecturer 2024-25 Season

SPE DISTINGUISHED LECTURER

No Longer A Sunk Cost: Innovation & Collaboration For Decommissioning Subsea Infrastructure

Andy Watt
Woodside Energy

Register HERE

THURSDAY, 10 OCTOBER

REBEL WORKSPACE | DAMPFÆRGEVEJ 27-29 5TH, 2100 COPENHAGEN

ABSTRACT:

INCLUDE "WHAT IS THE ONE IDEA YOU WOULD LIKE THE MEMBERS TO TAKE AWAY FROM THIS LECTURE?"

Decommissioning involves the timely, safe, and environmentally responsible removal, or satisfactorily dealing with, infrastructure from offshore oil and gas operations.

With a significant number of aging subsea assets, it's estimated the cost of decommissioning in Australia alone will exceed US $45 billion over the next 50 years.

Not unlike a Rubik's cube, decommissioning can seem like an unsolvable puzzle. Many sides must work together to solve a complex problem with a multitude of variables including environmental impact, safety, timing, and cost. Many decommissioned materials cannot be re-used and are not easily recycled. Collaboration and innovation are vital to help us find the right combination of solutions to achieve the best outcomes.

Universities play a crucial role in this process by providing access to cutting-edge research, knowledge, and resources. These collaborations can create an environment that fosters innovation, where academia and industry professionals can work together to share knowledge and expertise and explore new technologies and methodologies.

This lecture highlights the subsea oil and gas infrastructure decommissioning challenges we face as an industry, showcases some innovative solutions, and explains how in today's rapidly changing world, innovation and collaboration are essential for achieving success.

The key takeaway is that we must solve this puzzle together. By working collaboratively, we can create a more sustainable future, reduce costs, and achieve more efficient decommissioning.

Like solving a Rubik's cube, cooperation, collaboration, and innovation require patience and persistence, but the rewards can be great, and our subsea infrastructure will no longer be a sunk cost.

BIOGRAPHY

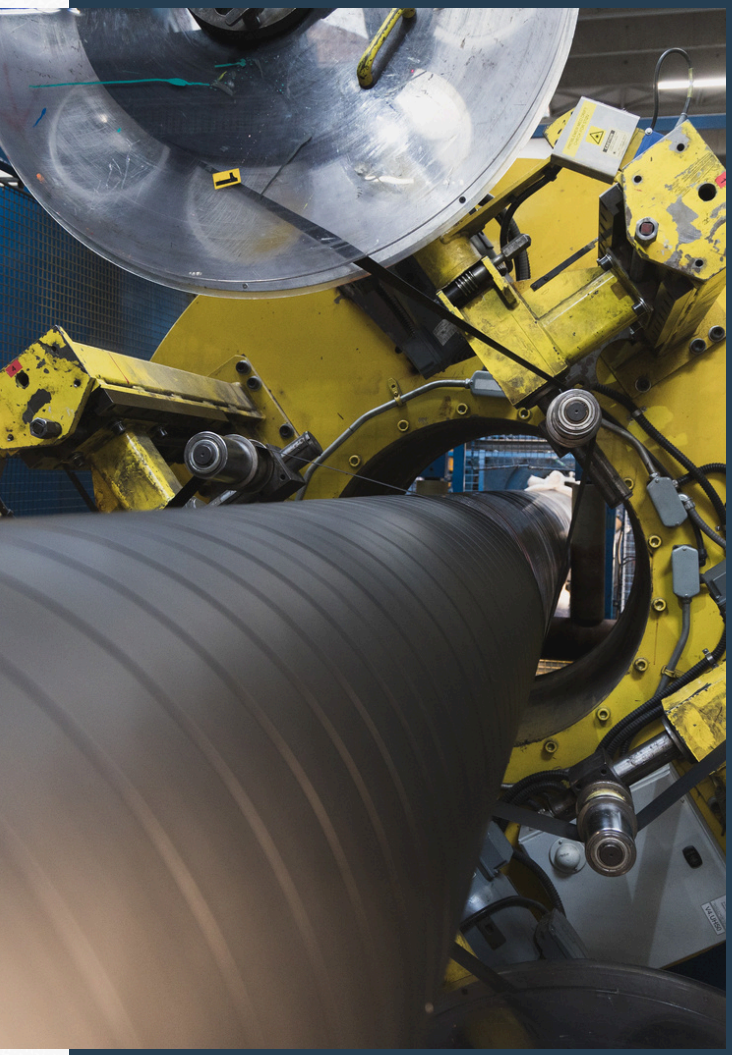
Andy Watt is an energy industry professional with over 26 years of experience in various technical roles across Australasia, North Africa, the Middle East, and Indonesia. He has expertise in land seismic operations, geophysics, reservoir engineering, forecasting, production optimization, technology, and innovation.

Currently, Andy serves as the Innovation Advisor at Woodside Energy, Australia's largest oil and gas company. In this role, he collaborates with Australian universities and industries to develop and implement innovative technical solutions.

Andy holds a Bachelor of Science (BSc) in Applied Physics and Microelectronics and is an active member of the Society of Petroleum Engineers (SPE).

Beyond the Surface:

DISCOVER NOV SUBSEA PRODUCTION SYSTEMS IN KALUNDBORG



You are invited to join us for an exclusive behind-the-scenes tour of NOV's Subsea Production System facility and manufacturing site in Kalundborg, Denmark. This is a unique opportunity to witness the innovative work driving the future of the oil and gas industry.

Kalundborg may be a lesser-known city, but it is pulsing with new life and development. Similarly, the energy sector is as vibrant and innovative as ever, powered by skilled engineers and innovative thinkers. At NOV's facility, you will immerse yourself in an exciting workplace where flexible pipes for the offshore energy industry are engineered with multiple layers of advanced technologies.

During this event you will gain invaluable insights into the ever-evolving landscape of the energy market and see firsthand how NOV is not merely a supplier, but a crucial partner committed to driving progress. Moreover, you will get the chance to meet the diverse team of professionals who go beyond the ordinary to make a meaningful difference - because at NOV, they firmly believe that "energy matters."

WEDNESDAY, 30 October 2024

PROGRAMME

13:00 - Departure Lyngby Svanekøkken

14:30 - Presentation

15:15 - Factory Tour

17:00 - Dinner and Networking

18:30 - Depart Kalundborg

20:00 - Arrival Lyngby Svanekøkken

WHAT YOU'LL DISCOVER

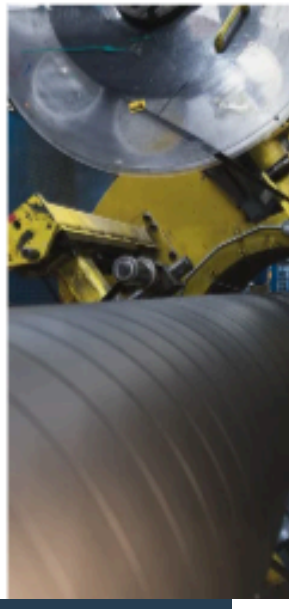
- The international reach and local impact of NOV in the rapidly expanding city of Kalundborg
- NOV's industry-leading expertise in subsea flexible pipe design, engineering, manufacturing, and quality processes
- How NOV is adapting to serve the sustainable energy sector
- NOV's innovative business model and customer-centric approach in the fast-changing market

REGISTER HERE

We look forward to welcoming you to Kalundborg and providing you with an exclusive glimpse into the future of subsea production.

We promise that at the end of the day, a flexible pipe will never look the same to you. You'll see it for the marvel of advanced engineering and manufacturing that it truly is - layer upon layer of cutting-edge technology, meticulously spooled onto a massive reel. These are products designed and built to withstand the extreme conditions found kilometers beneath the ocean's surface.

This tour will forever change how you view these critical components that keep the world powered.



SPE Meeting

THE ROLE OF PVT FOR CO_2 TRANSPORT AND STORAGE.

Impurities can play a decisive role in the design and control of the processes involved in CCS. Commonly known challenges are the inflation of the CO_2 phase envelope, influence on bulk properties like density and, last but not least, corrosion. The latter highly depends on chemical reactions governed by impurities present in low ppm amounts.

Not so often considered is the fractionation of impurities between vapor and liquid e.g. in storage tanks or ships, and potentially other locations in the CO_2 chain. As a consequence the CO_2 stream at hand may suddenly have a different level of impurities than desired. Further, cooling of the CO_2 stream during loading/offloading, transport or injection may lead to hydrate formation or liquid drop out.

Join us for an event showcasing the non-trivial phase behavior of CO_2 systems in various situations.

SPEAKERS

Jon Geest Jakobsen, Senior Process Engineer, Ørsted

Henrik Sørensen, R&D Manager, Calsep A/S

WEDNESDAY, 13 NOVEMBER

Please sign-up no later then 10 November 2024

Register HERE

ØRSTED | NESA ALLE 1, 2800 GENTOFTE

WELLTEC SHOWCASES INNOVATIONS AT ONS 2024 AND ADVANCES CCS MATERIAL TESTING

In August 2024, Welltec showcased cutting-edge intervention and completion technologies at the ONS 2024 conference, with particular attention paid to its innovative Expandable Liner Hanger solutions. This event also provided a platform for Welltec to demonstrate its ongoing leadership in the CCUS industry, with two significant occasions underscoring this focus.

The first highlight was the advanced Test Flow Loop facility, which was shortlisted as one of five finalists for the prestigious ONS 2024 Innovation Award, out of more than 120 candidates. The second was Welltec's presentation of its recent study on "Material Testing & Survivability" in Carbon Capture and Storage (CCS) environments, further establishing Welltec's commitment to well integrity and equipment reliability in this emerging industry.

Material Testing for CCS Environments

CCS is becoming a crucial tool in global climate change mitigation. As CCS wells continue to increase in number, ensuring the long-term integrity of both injector and legacy wells is paramount. Welltec's recent study emphasizes the importance of material performance in maintaining well integrity, particularly when exposed to the harsh conditions found in CCS environments.

The main concern in these environments is the corrosive impact of CO2 and its impurities on well structures. This research examined the survivability of metals and non-metallic materials, such as elastomers and polymers, under conditions mimicking long-term CO2 exposure. The study simulated downhole conditions like temperature (60°C), pressure (280 bar), and the presence of various impurities (NO2, O2, SO2, H2S), to replicate North Sea well environments.

Material Testing Methods

Metal coupons were tested for tensile strength, yield strength, hardness, and corrosion resistance using standard methodologies (ISO and ASTM). Various alloys were exposed to these conditions for 720 hours, with performance metrics including visual inspection, mass loss, and detailed corrosion assessment using energy dispersive X-ray (EDX) and light optical microscopy (LOM).

Additionally, elastomer samples were tested for tensile strength, hardness, and material degradation under the same conditions. These tests aimed to evaluate their performance under compression and tension, considering the potential for environmental degradation.

Findings and Key Results

Metals: All materials demonstrated low corrosion rates, with the highest being 0.04 mm/year for one of the low grade alloys. While some low-grade alloys deviated from Welltec Acceptance Criteria (WAC), most high-grade alloys performed well and are suitable for further applications.

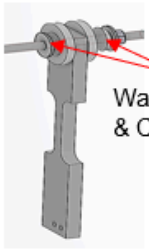
Yielded Metals: None of the yielded components exhibited corrosion cracking or elastomer degradation. However, a weld made using an outdated procedure was badly affected by the corrosive media. None of the welds made using new Welltec's procedure was damaged.

Elastomers: Visual inspections showed minimal degradation, though one elastomer (HNBR type 2) exhibited slight material decomposition. Elastomer hardness and tensile strength varied based on load conditions, with FKM compositions performing poorly under tension. PTFE and PEEK, however, met the requirements for Metal Expandable Packers (MEP) applications in CCS environments.

Conclusion and Next Steps

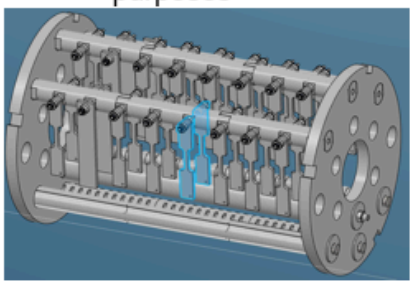
This study validated that most of Welltec's current alloys and elastomers are suitable for designing Metal Expandable Packers (MEPs) that can withstand the harsh conditions of CCS environments. However, for individual projects, additional research and testing will be necessary to ensure long-term reliability.

Welltec is dedicated to improving material performance through continued research and innovation, ensuring its products meet evolving standards for well integrity in the CCS industry. This commitment is vital to the success of global CCS projects aimed at mitigating climate change.



Metal coupons are manufactured in a dog-bone shape as per as per ASTM E8/E8M-16a for tensile investigation purposes

Here the crevice former will be assembled according to ISO 18070:2015



6 coupons from 7 metals were put into the test loop

Metals

6 coupons from 7 elastomers and 2 coupons from PEEK & PTF were put into the test loop

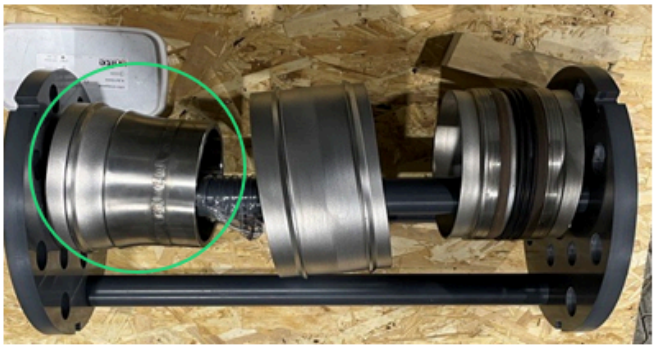
Elastomers expanded by 25% in diameter

Compressed elastomers, a sleeve would be pushed over the elastomers, compressing them in a groove

Elastomers

MEP expands by applied pressure through bore

Some parts were also welded



Three pieces of yielded steel and elastomeric assembly were tested in the flow loop from 6.75” & 8.5” sized MEPs

Yielded metals

Various materials selected for Metal Expandable Packer configurations were tested. Only the best-performing materials will be used in the design of next-generation CCS completion tools.

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Welltec®

EVENT CALENDAR

OCTOBER 10 | 17:00 - 20:00 | SLB | Face to Face

TOPIC	No Longer A Sunk Cost: Innovation & Collaboration
SPE DL	Andy Watt
HOST	Rebel Workspace | Dampfærgevej 27-29 5th floor, 2100 Copenhagen

OCTOBER 30 | 13:00 - 20:00 | NOV Kalundborg

TOPIC	Beyond the Surface: Discover NOV Subsea Production Systems in Kalundborg
HOST	NOV Kalundborg | Field trip to Kalundborg

NOVEMBER 13 | 17:00 - 20:00 | ØRSTED | Face to Face

TOPIC	The Role of PVT for CO_2 Transport and Storage
SPE DL	Jon Geest Jakobsen | Henrik Sørensen
HOST	Ørsted | Nesa Alle 1, 2800 Gentofte

Denmark's long-term energy partner

We are in the middle of a global energy and climate crisis that highlights the need for energy solutions here and now. As one of the world's largest energy companies, TotalEnergies knows that the future belongs to renewables. This is why we are in full swing transforming our business to help secure a green future for Denmark.

Our focus is on maintaining an energy-efficient and safe production of oil and gas, with the redeveloped Tyra field at the center, while leveraging our many years of experience as an energy supplier in Denmark. We will do this by expanding our activities to wind, solar, and Carbon Capture and Storage (CCS).

TotalEnergies has great ambitions to be at the forefront of green energy production with the objective of being among the world's top five players in renewables by 2030.

TotalEnergies

Follow us on Facebook: @TotalEnergiesDenmark

Learn more about the company: http://corporate.totalenergies.dk

A dynamic leader in offshore drilling

Since 1921, Noble has been a world-class offshore drilling company with industry-leading safety and operational performance. Noble focuses on deep and long-term partnerships as the foundation for driving efficiency and increasing certainty for our customers in the pursuit of operational excellence.

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NOBLE

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