



Valuable Oil & Gas capabilities in the energy transition

Dear SPE members, this is my last newsletter as Chairman of the SPE Copenhagen Board. Reflecting on my tenure as Chairman, my focus has been primarily in 3 key areas: to raise awareness about the energy transition and how O&G professionals can contribute to it; to emphasize the transformational impact and benefits of digitalization to our industry; and lastly to increase SPE Copenhagen presence in social media (LinkedIn).

On the last newsletter (http://www.spe-cph.dk/wp-content/uploads/2021/02/2012-SPE-02_2021_web.pdf), I shared my reflections on the energy transition and how it is shaping the entire energy eco-system. As I have mentioned in prior newsletters, I believe that a number of O&G companies will evolve into energy companies where they might not differentiate between energy divisions, and it will force the traditional engineering and science roles in our industry to adapt and acquire new skills.

On a recent article, McKinsey Company exposed 3 key areas of focus for oil and gas companies when facing the energy transition:

'How can we make our core hydrocarbon businesses more resilient? Should we expand into low-carbon businesses, and if so, how? How will our operating model need to change to flourish in a low-carbon world?'

While the 3 questions are very relevant, the last one will most likely spark the highest interest among O&G professionals. McKinsey's view is summarized in the below graph and shows how well both O&G companies and professionals are positioned to play an important role. The argument is focused around the abundance of capabilities in our industry that may be valuable for parts of a low-carbon energy system, namely wind, hydrogen, CCS among several others. The full article and reference can be found in this link: (<https://www.mckinsey.com/industries/oil-and-gas/our-insights/the-big-choices-for-oil-and-gas-in-navigating-the-energy-transition#>)

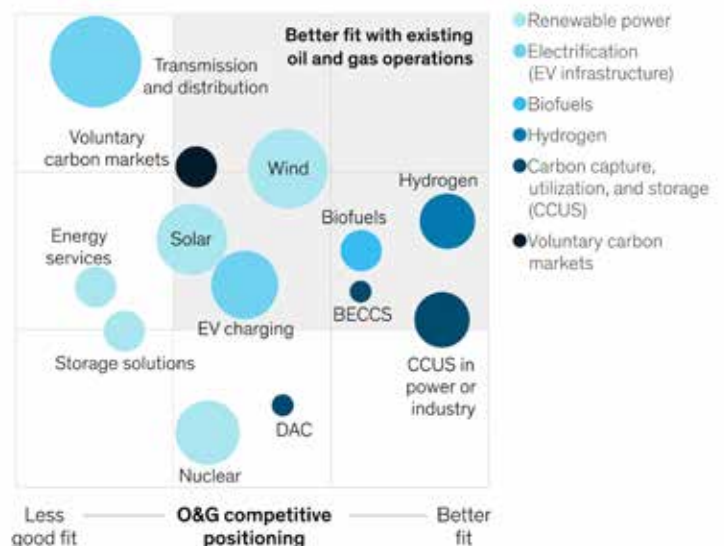
Oil and gas companies have an abundance of capabilities that may be valuable for parts of a new low-carbon energy system

Relative size of value pools, illustrative

High

Attractiveness (spread over cost of capital)

Low





Looking at the past SPE Copenhagen events, in March, Steve Freeman from Schlumberger took us through how digital solutions are enabling the energy transition. The April event is a truly example of the SPE mission to share knowledge among its members, as the SPE Copenhagen chapter joined the presentation of the SPE Stavanger chapter: the Hywind Tampen project, which is the World's first floating offshore wind farm to supply renewable energy to offshore oil and gas installation.

Total will host the event in May where Morten H. Pedersen will give an overview on the Tyra Redevelopment. Before the meeting at 16:30h, the SPE Copenhagen section Annual General Meeting (AGM) will take place and we encourage SPE members to attend.

The last event from the 2020-2021 season will be with SPE DL James Ohioma Arukhe where he will present *Active Oilfield Development while Preserving Fragile Ecosystems*.

On another topic, the SPE Student scholarship has been announced through the student chapter channels at DTU and the winner will be announced ultimo May. It is important that students actively participate in this award and feel the support from experienced professionals such as the SPE members. As a recipient of the award myself in the past, I truly believe this award is a very good way to support our industry's future talent pipeline and encourage them to join this exciting industry.

Market dynamics and oil price seem to be steady, with OPEC+ having more influence on controlling the supply side than some might have thought. It will be very exciting to see how the market reacts to a potential spike in demand after the lockdowns are lifted and how that translates into the oil price. Volatility is here to say as a minimum in the short term.

On a final note, few challenges remain for the SPE Copenhagen section with more O&G companies exiting Denmark translating into lower SPE sponsorships and memberships. I also anticipate that the SPE Copenhagen section will and should increase the focus on the energy transition in the upcoming season in one shape or another one.

Looking forward to virtually seeing you at the upcoming AGM and events. Finally, wishing all of you a very good summer.

With that, I hope I have served well our SPE Copenhagen members.

Sincerely Yours,
Jaime Casaus-Bribian
SPE Copenhagen
Section Chairman

Please remember to pay your SPE dues. If you are in work transit,
please check the link <https://www.spe.org/en/members/transition/>



Please follow us on LinkedIn to be up to date on SPE Cph events and other great stories:

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

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TYRA REDEVELOPMENT: A major offshore project at the core of Denmark's energy transition

The Tyra platforms have been at the core of Denmark's energy infrastructure for almost 40 years, processing 90% of the nation's natural gas production. Total with the Danish Underground Consortium is investing 21 billion Danish kroner to redevelop the Tyra platforms in the Danish North Sea to support Denmark's transition towards a low-carbon energy future.

The new Tyra will be a state-of-the-art facility ensuring efficient natural gas supply for decades to come and provide a second home for our offshore employees. With the use of new technology and modernized working processes, the redeveloped Tyra will reduce 30% of CO2 emissions, 90% of flaring, and improve overall operational energy efficiency.

The Tyra Redevelopment is a giant puzzle and it has a unique scope that involves the removal of old facilities, modification of existing facilities and construction of completely new facilities.

The redevelopment project started in 2018, with the first steel cut on the new platforms. At safe and well-executed offshore campaigns, the Tyra field's production has been temporarily shut-in, old Tyra facilities were removed, and new jackets were installed laying the foundation for the new Tyra. Until the restart of production in June 2023, the main project milestones ahead comprise the completion of construction, installation, hook up and commissioning of the new Tyra platforms.



1) The Tyra Redevelopment team was celebrating the successful progress of the topsides removal in summer 2020.

2) The topsides removal in progress. Precision was the core focus in the dismantling work during the first removal phase as the existing legs and wells of the platforms in the Tyra Field will be reused and extended in the new design.

3) Tyra West was lifted by Pioneering Spirit. In the second phase of the removal, pioneering Spirit, the world's largest construction ship removed each of the two main Tyra platforms in a single lift.



1) After removal, the two major platforms of the old Tyra arrived at the Modern American Recycling Services' (M.A.R.S.) yard in Frederikshavn – more than 95% is expected to be recycled and reused.

2) The jackets were installed at the Tyra field in fall 2020. As the first new structures, they lay the foundation for the redeveloped field and will be carrying the new state-of-the-art processing platform and home-away-from-home platform.

3) The helicopter deck has been successfully lifted onto the accommodation platform at the Tyra construction yard in Italy. The Tyra accommodation platform has been designed in close collaboration with offshore workers to create a home away from home. It will be installed at the Tyra field in the North Sea later this year.

Press releases with more info that have been published externally on Tyra are to be found under below links:

- Verdens største konstruktionsskib har kurs mod Tyra-feltet i den danske Nordsø | Total Denmark
- Tyra-løft skriver Danmarkshistorie: to Eiffeltårne løftet på 12 sekunder | Total Denmark
- Tyra-feltets hovedplatform ankommer til Frederiks-havn – 95% skal genanvendes | Total Denmark
- Total afslutter nedtagningen af Tyra-platforme | Total Denmark

-
- The Tyra video channel can be found here: <https://dreambroker.com/channel/9m5d3eeu>
 - The Tyra project website can be visited here: Our local projects and commitments - Total in Denmark

BIOGRAPHY



Morten Hesselager Pedersen is Vice President and Head of the Tyra Redevelopment project, and he builds on more than 20 years of industry experience working in areas such as reservoir engineering, field development planning and execution, operations and project management.

Morten has great experience in managing major oil and gas projects, and as project manager in Qatar he was responsible for the Al-Shaheen Field Development Plan (FDP) 2012, a 1.5-billion-dollar project comprising around 50 development wells, pipeline installation and various facility modification scopes.

See Morten LinkedIn and follow the Tyra Redevelopment updates:
[Morten Hesselager Pedersen | LinkedIn](#)

TEASER EVENT: Tyra Redevelopment – Virtual Talk | 11 May



Virtual meeting **MAY 11**

[Register HERE](#)

Join the virtual talk (incl. Q&A) to gain interesting technical insights about the Tyra Redevelopment: a highly complex engineering project to redevelop a natural gas platform in the Danish North Sea.

PROGRAMME

17:00 – 18:00

PRESENTATION AND SPE NEWS

TOPIC

Tyra Redevelopment: a major offshore project at the core of Denmark's energy transition

SPEAKER

Morten Hesselager Pedersen, Vice President and Head of the Tyra Redevelopment

REGISTRATION

Registration will be through SPE-I; sign-up e-mails with details will be distributed to Copenhagen & Esbjerg section members in advance of the meeting.

SPONSOR



SPE

November 11	MAIN SPEAKER	AFTER DINNER
TOPIC	Big Data and Machine Learning in Reservoir Analysis	
SPEAKER	Roland N. Horne, DL Stanford U.	
LOCATION	VIRTUAL MEETING	
SPONSOR	SPE	
December 15	MAIN SPEAKER	AFTER DINNER
TOPIC	Project Greensand	
SPEAKER	Jeanne Mia Lønstrup, Maersk Drilling and Johan Byskov Svendsen, INEOS Oil & Gas, Denmark	
LOCATION	VIRTUAL MEETING	
SPONSOR	SPE	
January 26	MAIN SPEAKER	AFTER DINNER
TOPIC	Asphaltenes – Fascination and Frustration	
SPEAKER	Rasmus R. Boesen, Calsep A/S	
LOCATION	VIRTUAL MEETING	
SPONSOR	SPE	
February 11	MAIN SPEAKER	AFTER DINNER
TOPIC	Using Scenario Planning for Decision making in the Energy Industry	
SPEAKER	Henk Krijnen, SPE DL	
LOCATION	VIRTUAL MEETING	
SPONSOR		
March 17	MAIN SPEAKER	AFTER DINNER
TOPIC	Digital Solutions Enabling the Energy Transition	
SPEAKER	Steve Freeman, Head of Energy Transition, Schlumberger	
LOCATION	VIRTUAL MEETING	
SPONSOR		
April 14	MAIN SPEAKER	AFTER DINNER
TOPIC	From Piper Alpha to Macondo and 737 Max: The Danger of a Pure Compliance Culture	
SPEAKER	From	
LOCATION	VIRTUAL MEETING	
SPONSOR		
May 11	MAIN SPEAKER	AFTER DINNER
TOPIC	Tyra Redevelopment	AGM at 16.30
SPEAKER	Morten H. Pedersen, Total	
LOCATION	VIRTUAL MEETING	
SPONSOR		
May 26	MAIN SPEAKER	AFTER DINNER
TOPIC	Active Oilfield Development While Preserving the Ecosystem	
SPEAKER	James Ohioma Arukhe, Saudi Aramco	
LOCATION	VIRTUAL MEETING	
SPONSOR		
June	MAIN SPEAKER	AFTER DINNER
TOPIC		
SPEAKER		
LOCATION		
SPONSOR		

CANCELLED


Updates from the SPE student Chapter


To ensure early alignment between students and the industry, the SPE DTU has arranged a mini-series of seminars to run throughout May and June. This consists of two talks by an invited speaker. Adebowale Solarin holds the first from Maersk Drilling. His talk is called "Making the transition from student to professional life" and aims to give the student an idea of their early career opportunities. The second talk is held by Hans Horikx, who is an advisor at the DHRTC. He will give an overview of the exciting opportunities that working in the petroleum industry brings with it.

Furthermore, the annual SPE student scholarship has been announced, and the application process has opened. This year the evaluation consists of a two-step process. The student first has to send a written project description and impress a jury with their technical knowledge and the project's contribution to the petroleum industry in general. The candidates are chosen from the first round go on to an oral interview where they are tested through a presentation of their own and questions from a board.

Making the transition from student to professional life

When? Thursday 22nd of April at 17:00
How? Online - via Zoom - link in Details


 Technical University of Denmark
 SPE Student Chapter



We have brought you a top-tier professional from Maersk Drilling to share his experiences about getting the dream job, setting your career goals and answering your questions about work-life in the petroleum industry.

Making a difference

Noreco is entering the DUC with lots of energy, competence and ambitions



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DENMARK FACTS			
\$1 Billion	14,000	5th	7%
<small>INVESTED TO EXTEND PRODUCTIVE LIFE OF THE SOUTH ARNE FIELD</small>	<small>(BOE/D) NET PRODUCTION</small>	<small>LARGEST PRODUCER IN DENMARK</small>	<small>OF DENMARK'S PRODUCTION</small>

Hess is a leading global independent energy company engaged in the exploration and production of crude oil and natural gas. We are one of the largest oil producers in Denmark and adhere to rigorous operational standards. Our employees work closely with our communities and partners to find new approaches and apply innovative technologies that can help us operate safely, improve efficiencies, protect the environment and make a positive impact on the lives of those we touch.



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Active Oilfield Development While Preserving the Ecosystem

Abstract:

Developing offshore oilfields has always been a challenge. How does one exploit such resources while preserving the sensitive environment? Balancing economic ambitions with environmental responsibility is illustrated with Manifa development, the largest offshore hydrocarbon development project, off Saudi Arabia's coast. Manifa is a huge six-reservoir field stretching 45 km by 18 km, lying in less than 15 metres of water. The field is capable of producing close to a million barrels of oil per day in a pristine environment.

Manifa field is not just a treasure trove of oil and gas, but also a delicate environmental habitat teeming with marine life including the endangered Hawksbill turtle, and a safe haven for migratory birds. As the oil lay just beneath the shallow waters, the field development presented a major environmental challenge.

In this DL presentation, the author will share best practices including several environmental impact studies conducted to minimize the environmental impact of developing an ecologically-delicate field, without sacrificing overall economics. To avoid damaging the fragile ecosystem, a radical new approach was undertaken. Integrated proactive sustainability concepts during construction, drilling, reservoir management and production that limit environmental impact will be presented. The project's outcomes exemplify that economic growth and environmental protection are not mutually exclusive through proper engagements, commitments to collaboration, and environmental stewardship. The Manifa offshore project has received several prestigious environmental and project execution awards.

Biography:



Dr. James Arukhe, Project Lead for Saudi Aramco's ambitious development in the world's fifth largest offshore oilfield will advocate balancing economic ambitions with environmental responsibility using Manifa case study. James received degrees B.Eng. Petroleum Engineering (Chevron/NNPC Scholar) University of Benin, MBA Executive, University of Lagos, and M.Sc. Petroleum Engineering (Alberta Government Scholar), University of Calgary. James received a Doctoral degree of Management in Organizational Leadership (Delta_Mu_Delta Scholar), from University of Phoenix, USA and was valedictorian for the 2015 commencement ceremony in Arizona, USA. James has published several papers on various subjects and filed three (intellectual) patents on smart wells, ESPs, and stimulation treatments.

Virtual meeting MAY 26

Don't miss this SPE Distinguished Lecturer!

PROGRAMME

16:30 – 17:30

TOPIC

Active Oilfield Development While Preserving the Ecosystem

SPEAKER

James Arukhe, Saudi Aramco

REGISTRATION

Registration will be through SPE-I; sign-up e-mails with details will be distributed to Copenhagen & Esbjerg section members in advance of the meeting.

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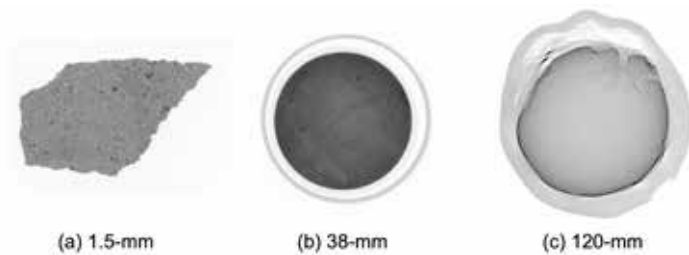
X-ray computer tomography for the petroleum studies



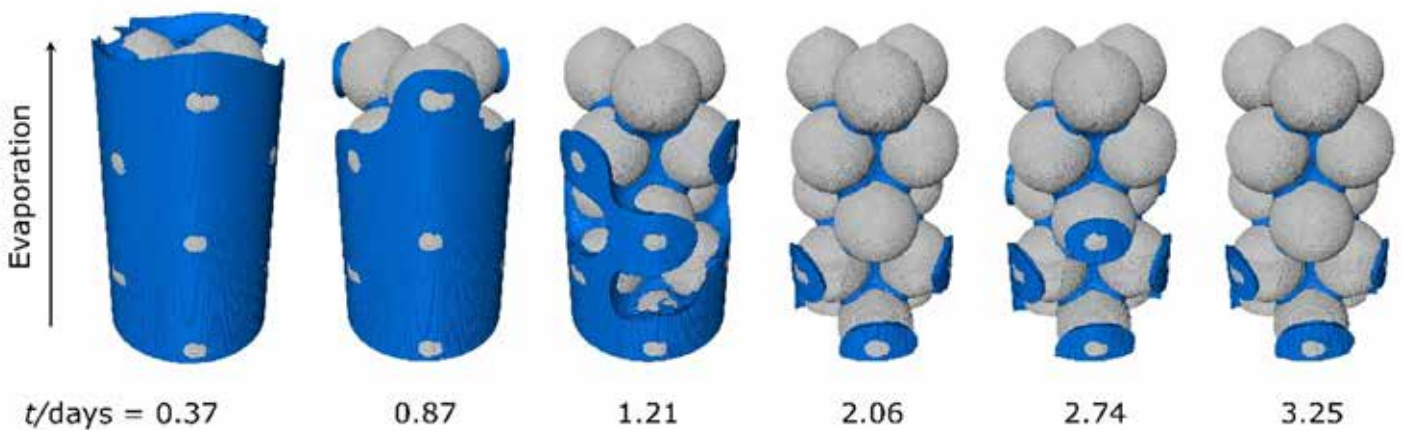
X-ray computed tomography (CT) is complementary to conventional petrophysical imaging methods. It reveals the internal structure of geomaterials non-destructively and with minor sample preparation. A key, but less appreciated, feature of X-ray CT imaging is its potential to characterize rocks at multiple length scales and observe flows of oil, gas and water in them in real time.

At the Technical University of Denmark (DTU), the X-ray CT studies are being carried out at the Centre for Oil and Gas – DTU (DHRTC), and at the Centre for Energy Resources Engineering (CERE).

The CT Laboratory of Center for Oil and Gas – DTU has modified a custom-built submicron CT scanner to enable imaging of geological samples. The scanner is now operated by an in-house software capable of imaging objects as large as 20 cm in diameter to smaller than 1 mm. The experiments with the rock samples and fluids from the North Sea petroleum reservoirs may be performed at high pressures and temperatures. The scanner has been integrated in the research of the Danish Hydrocarbon Research and Technology Center and has also been used by external users in commissioned research projects.

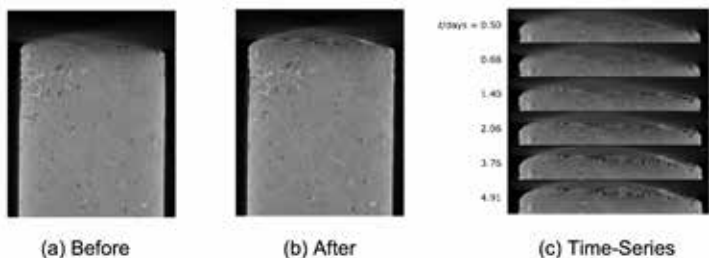


Samples of various sizes may be imaged by the Submicron CT scanner in the CT Laboratory of Center for Oil and Gas – DTU: a 1.5-mm chalk chip from Kraka (a), a standard 38-mm-diameter core plug from Halfdan (b), and a preserved whole core with a diameter of 120 mm from Halfdan (c). Imaging samples of over two orders of magnitude difference in size is now possible in the CT Laboratory.



Time-resolved evaporation of deionized water in a glass bead pack. Bead diameter is 2 mm and spatial resolution is 11.1 $\mu\text{m}/\text{pixel}$. It is possible to observe the contact angle of the water/air interface in CT images. Drying experiments were planned as a precursor to more complex flow experiments.





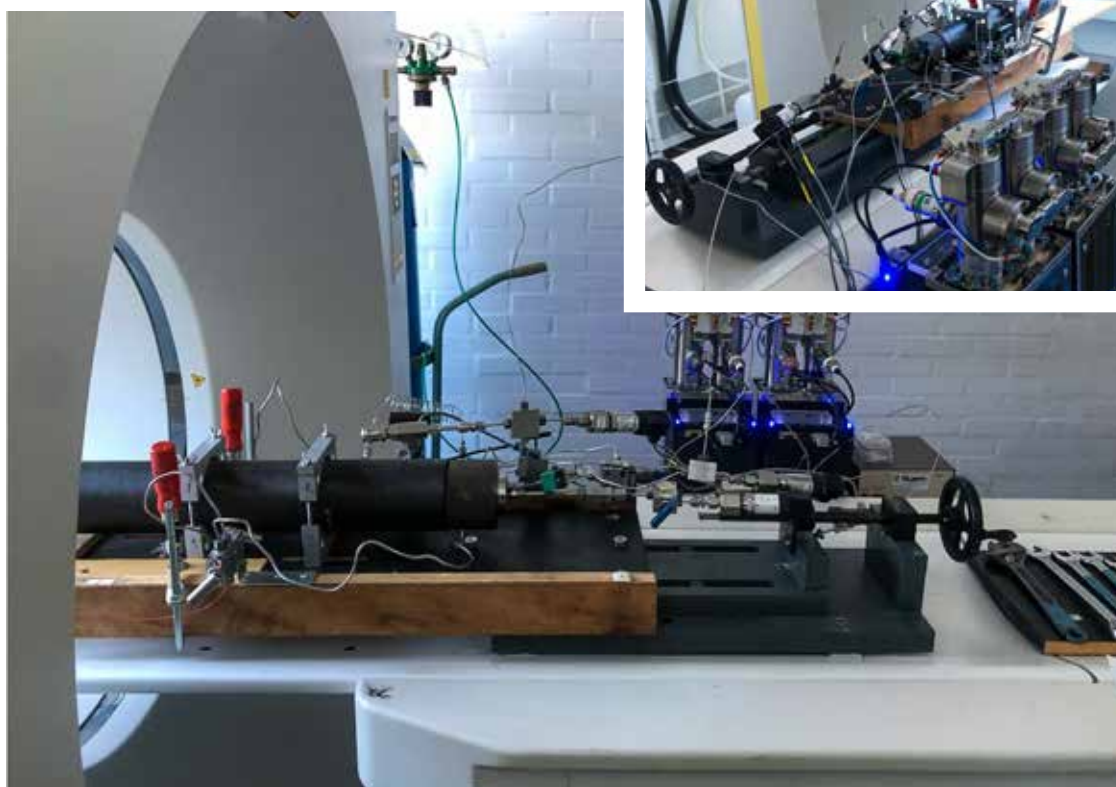
Evaporation of brine in Stevns Klint chalk leads to salt precipitation at the top surface exposed to air as time progresses from (a) to (b), with 0.8 hours for each 3D image and spatial resolution of 11.1 $\mu\text{m}/\text{pixel}$. With time, a growing porous salt structure forms at the top surface of the sample (c).

The X-ray computer tomography at the Center for Energy Resources Engineering has been applied to study many processes in porous media: diffusion, gas liberation, rock weakening, as well as multiple processes of enhanced oil recovery: smart waterflooding, surfactant flooding, carbon dioxide injection, and microbial recovery.

A striking example from the last year is application of the tomography for determination of the oil-gas relative permeabili-

ties (Ph.D. Student Wael Al-Masri). The scanner was used in these experiments in order to determine the current amounts (saturations) of oil and gas in the porous medium, as well as the saturation distributions along and across the samples. Control over saturation non-uniformity was an important part of the experiment. Another important role of the scanner, in this and other experiments, is analysis of the integrity and heterogeneity of the core samples before and after the experiments.

Setup for measurement of the oil-gas relative permeabilities at CERE-DTU



The Uses of Oil & Gas in the Medical Field

SAFETY EQUIPMENT

Rubber gloves, soap, masks, hand sanitiser...



MEDICAL EQUIPMENT

Syringe, stethoscope, band-aids, IVs, plastic protective wraps...



RESEARCH EQUIPMENT

Microscope, test tubes, safety goggles, lab burner...



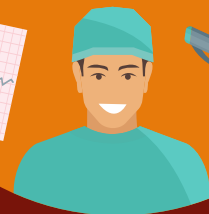
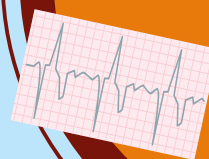
ADVANCED EQUIPMENT

Artificial limbs, artificial heart valves, respirators, MRI scanners...



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