



SOCIETY OF PETROLEUM ENGINEERS

# SPE NEWS

COPENHAGEN SECTION



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## TURNING INNOVATION FAILURE INTO SUCCESS

We ended 2019 with the event sponsored by Maersk Drilling, where Dr. Hussain Rabia (SPE DL) and Mikkel Pedersen gave insightful presentations. 2020 was kicked off with Tormod Slettemeas' presentation took us through the center stage topic of the digitalisation in the E&P industry during the event sponsored by Schlumberger. The DTU SPE student chapter made a great job organizing an entertaining Petrobowl quiz which ended up with 4 students selected to represent their student chapter at the 2020 SPE Petrobowl European Regional Qualifier in Zagreb at Annual Student Energy Congress (ASEC). From the SPE Copenhagen Board we wish them the best of luck!

March will be a busy month with two fascinating events. The first one will be sponsored by Hess and will take place on the 16th March where the second SPE DL of the 2019-2020 season, Ka-zeem A. Lawal, will present 'Vulnerability and Management of Water Injectors' covering how competitively improve the performance and longevity of water injectors, very applicable to many Danish waterflooded fields. In addition, during the af-

ter-dinner presentation Hess will share an example of how successful innovation sometimes requires failure. The second one sponsored by Welltec will take place on 31st March and will be focused on completion technology.

As explained by one of the gurus in the field Kumar Mehta, nowadays 'most people realize that failure is necessary for innovation, and failure in innovation is widely expected'. Apple, Amazon, Google, Microsoft, to name few -- companies widely regarded as the most innovative companies in the world -- have had more failures than successes, more misses than hits Mehta's mentions. The key point in common is that the most innovative companies have a culture where they learn from failure. And that's the key to move the oil and gas industry to the next level: fail safe and learn from it rather than give up at the first try and start from scratch again.

Looking forward to seeing all of you during the two March events.

Sincerely Yours,

Jaime Casaus-Bribian  
SPE Copenhagen  
Section Chairman



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>

## FUTURE MEETINGS

FOR MORE INFORMATION REGARDING THE PROGRAMME SEE PAGE 6



# SPE

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# HESS

Hess Corporation is continuing along the lean journey it started ten years ago. The company continually uses lessons learned about in one part of its business to help improve the performance of another. In Denmark, the company has been applying lean thinking for the last four years to help its South Arne operation to move toward becoming the best performing operation in the North Sea in terms of safety, environmental performance, production, and cost.

Some of the areas in which the South Arne team is focusing on to drive the step-change improvements required for its vision include implementing methods to move from corrective maintenance to preventive, and eventually predictive maintenance of its equipment and instrumentation. The team is collecting data during scheduled maintenance operations as well as breakdowns, and using this information within the framework of structured problem-solving to continually improve the up-time of its facility.

The team is also using a process known as 5S to reduce inventory and improve the safety, efficiency and cleanliness of the platform. By following 5 steps (sort, set in order, shine, standardize, and sustain), the method focuses on removing the clutter (anything that is not used regularly) and cleaning an area in order to speed up the work and make problems immediately apparent. The South Arne team is already seeing the benefits of 5S and is planning regular workshops throughout the year to continue the effort.

An important element of lean thinking which has become a strategic focus for the team involves innovation. The company has modified part of its operating philosophy to identify a Distinctive Lean & Innovative Culture as critical to its long-term success.

“Because of the focus on standardizing work, many people think that lean and innovation conflict with each other,” says Gregg Stocker, Hess Lean Advisor for Europe, “In fact, if we’re not including innovation, we’re not doing lean.” Known in lean terms as kaizen, innovation is what leads to continual improvements in performance. The key is to develop an army of innovators who are constantly looking for better ways to perform the work.

# STORY

“We need everyone to look for improvements, even when we’re meeting targets,” says Rene Frederiksen, Field Operations Manager at Hess Denmark. “To do this, we’ve got to teach people to develop and quickly test the ideas they have to improve a process.” According to Frederiksen, “once an idea is proven effective, it is standardized to ensure everyone follows the new way; then we do it again and keep doing it.”

The team is also starting to work closely with contractors to reduce waste in processes. Together, they are mapping processes and identifying roadblocks that interfere with the flow of work. Once the map is completed, the roadblocks are removed one-at-a-time to drive needed improvements in safety, quality, production, and cost. According to Jaime Casaus-Bribian, Well Services Manager at Hess Denmark, ‘joining forces with key contractors to seek a win-win situation can add tremendous value by removing common waste and identifying better ways to do business together’.

Although more energy companies are beginning to explore lean, Hess has been at it for 10 years.

Rather than focus only on the tools to address random problems, though, Stocker recommends working lean into the company’s DNA and integrating it into the way people think and the way the business is run. The daily, weekly, and monthly meetings – which Hess refers to as their operating rhythm – must be interconnected and focused on addressing the problems that interfere with meeting current targets and the long-term vision. “Rather than give status updates and pat ourselves on the back for successes, we use these meetings to identify and solve problems,” says Stocker. “Even with activities that go well, we want to know how they could have gone better.” ◀



## ABSTRACT

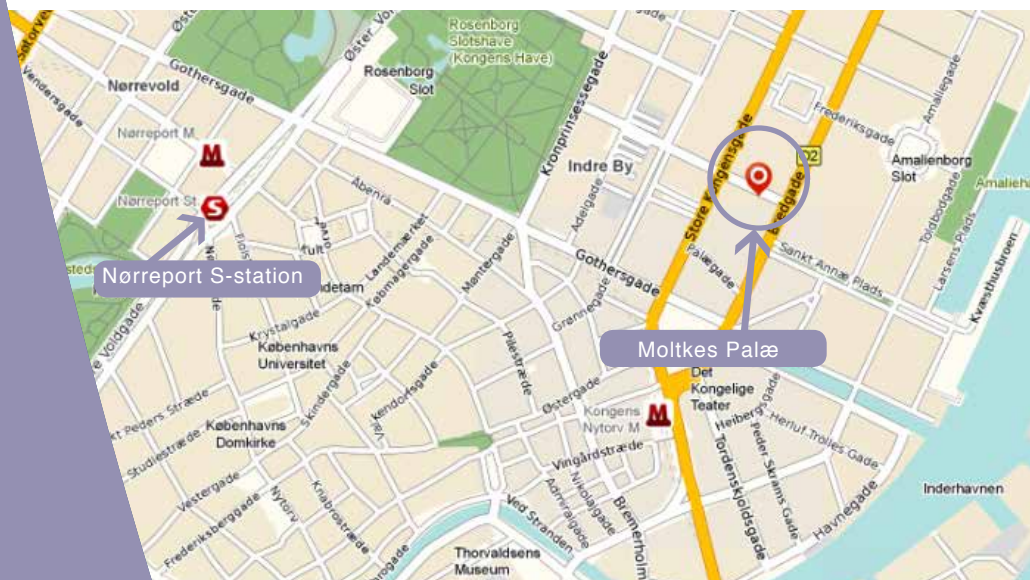
# Vulnerability and Management of Water Injectors

*Kazeem A. Lawal*

## FIRST Exploration & Petroleum Development Company Limited

Water-injection is commonly employed to supplement reservoir energy and improve sweep efficiency in oil developments. In such applications, the injectivity and longevity of water injectors drive productivity and recovery. However, injectors are vulnerable to impairments, resulting in their gradual injectivity decline and possible catastrophic failure. To maximise value from water injectors, a holistic understanding of their impairment mechanisms is imperative.

This lecture examines injector impairment, and the conditions under which an injector fails. With impairments broadly classified into hard and soft mechanisms, both classes are explored, while elucidating the main factors controlling each of these. Options to mitigate impairments are discussed, while laboratory and field examples are reviewed. The main take-away from this lecture is a better understanding of how to competitively improve the performance and longevity of water injectors. Relevant tips include (i) robust network design, well planning and delivery; (ii) high-quality injection water; (iii) effective surveillance; (iv) management of operating envelopes; and (v) maximising uptime. Accounting for injector impairments in production forecasts, as well as providing injector redundancy and intervention budgets are considered good practices to deliver credible business plans, hence safeguarding incremental reserves linked to water-injection projects. ◀



## BIOGRAPHY .....



**Kazeem A. Lawal ,**  
**SPE Distinguished Lecturer**

Following a 10-year stint in Shell Nigeria, Kazeem A. Lawal is currently the Head of Reservoir Engineering at FIRST Exploration & Petroleum Development Company, Nigeria. He holds a BSc degree in chemical engineering from the Obafemi Awolowo University (Nigeria), as well as MSc and PhD degrees in petroleum engineering from the University of Port Har-

court (Nigeria) and Imperial College London, respectively. He has extensive experience in reservoir engineering, spanning the industry, academia and consulting. He has authored more than 40 technical papers, and served as a technical reviewer for journals and conferences. He received the 2014 SPE-Africa regional award in reservoir description and dynamics. ◀

## BIOGRAPHY .....



**Jaime Casaus-Bribian, Hess**

Jaime Casaus-Bribian holds a MSc in Petroleum Engineering from DTU and a MSc in Chemical Engineering from Universitat A. Barcelona. He joined Hess in 2004 and has had different roles in various locations. He started in Denmark having different roles as production engineer then Reservoir engineer. In 2010 he moved to the Corporate HQ in New York to work in the Planning, Portfolio and Strategy team.

In 2013 he relocated to Houston to support the

West Africa fields as reservoir engineer. In 2016 he moved back to Denmark where he had team lead positions in reservoir engineering and production engineering. Currently he is the manager of the well services team. Jaime has been long linked to the SPE, starting in the YP chapter then moving to the SPE as a Board member and since June 2018 he is the SPE Chairman of the Copenhagen section. ◀

**PROGRAMME**

17:00 – 18:00  
DRINKS

18:00 – 19:00  
PRESENTATION AND SPE NEWS

19:00 – 21:00  
DINNER

**LOCATION**

Moltke's Palæ  
Dronningens Tværgade 2  
1302 Copenhagen K

**SPEAKER**

Kazeem A. Lawal, SPE  
Distinguished Lecturer

**TOPIC**

Vulnerability and Management of  
Water Injectors

**DINNER SPEAKER**

Jaime Casaus-Bribian, Hess

**TOPIC**

Abrasi-jet acid stimulation for long  
complex horizontal wells

**ENTRANCE FEE**

None

**REGISTRATION**

Registration is required.  
Please sign up by Tuesday  
10th of March at  
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SPE MEETING SCHEDULE

# 2019-2020

<b>October 22</b>	<b>MAIN SPEAKER</b>	<b>AFTER DINNER</b>
TOPIC	<b>Improving Danish oil and gas production. Digitalization and optimization in the upstream oil and gas industry.</b>	<b>Ali Eftekhari, DTU: A sustainable view of the future energy DHRTC balance of Denmark</b>
SPEAKER	Morten Jeppesen, DHRTC balance of Denmark John Bagterp Jørgensen, DTU	
LOCATION	DTU	
SPONSOR	DTU/DHRTC	
<b>November 19</b>	<b>MAIN SPEAKER</b>	<b>AFTER DINNER</b>
TOPIC	<b>The Energy Transition and DCS - still room for E&amp;P? Why Energy Transition - is climate the only driver?</b>	<b>Atle Sonesen, Noreco: Making a difference</b>
SPEAKER	Jarand Rystad, Rystad Energy	
LOCATION	Admiral Hotel	
SPONSOR	Noreco	
<b>December 3</b>	<b>MAIN SPEAKER</b>	<b>AFTER DINNER</b>
TOPIC	<b>Engineered Well Design: From Spud to Abandonment</b>	<b>Mikkel Søndergaard Pedersen, Maersk Drilling: Pioneering the Deployment of Low Emission Technology on the first Hybrid Drilling Rig</b>
SPEAKER	Hussain Rabia, EPL SPE DL	
LOCATION	Maersk Drilling	
SPONSOR	Maersk Drilling	
<b>January 23</b>	<b>MAIN SPEAKER</b>	<b>AFTER DINNER</b>
TOPIC	<b>Digitalization within E&amp;P: from promise to performance</b>	<b>Petrobowl Quiz</b>
SPEAKER	Guido van der Holt, DELFI Champion, Schlumberger	
LOCATION	Schlumberger	
SPONSOR	Schlumberger	
<b>March 16</b>	<b>MAIN SPEAKER</b>	<b>AFTER DINNER</b>
TOPIC	<b>Vulnerability and Management of Water Injectors</b>	<b>Jaimee Casaus-Bribian, Hess: Abrasi-jet acid stimulation for long complex horizontal wells</b>
SPEAKER	Kazeem A. Lawal	
LOCATION	Moltkes Palae	
SPONSOR	Hess	
<b>March 31</b>	<b>MAIN SPEAKER</b>	<b>AFTER DINNER</b>
TOPIC	<b>World's first Cement Replacement with Metal Expandable Annular Sealing</b>	
SPEAKER	Joseph Bagas, Director Well Completions, Africa	
LOCATION	Welltec	
SPONSOR	Welltec	
<b>April 14</b>	<b>MAIN SPEAKER</b>	<b>AFTER DINNER</b>
TOPIC	<b>"Reservoir Engineering While Drilling" in Horizontal Wells</b>	
SPEAKER	Shahid Azizul Haq	
LOCATION	GEUS	
SPONSOR	GEUS	
<b>May</b>	<b>MAIN SPEAKER</b>	<b>AFTER DINNER</b>
TOPIC	<b>TBD</b>	<b>Agm</b>
SPEAKER		
LOCATION	Total	
SPONSOR	Total	
<b>June</b>	<b>MAIN SPEAKER</b>	<b>AFTER DINNER</b>
TOPIC	<b>Summer Party</b>	
SPEAKER		
LOCATION		
SPONSOR	TBD	

# Young Professionals



Scrolling through LinkedIn one day I saw the call for applications for Emerging Leaders Alliance Conference. I haven't heard about this initiative before but after a quick research I saw this as a great opportunity to network and expand my soft skills toolbox.

Emerging Leaders Alliance took place from 4th to 6th November in Falls Church, Virginia. The event is a joint initiative of various international engineering societies, including SPE, that this year gathered over sixty Young Professionals from various backgrounds and cultures for three days of workshops on leadership, presentation skills, confidence and innovation. It was a truly extraordinary group and every session was highly engaging, the facilitators made sure everyone was included by asking questions and initializing team exercises. Some tasks were challenging – forcing deep introspection and uncovering insecurities – but in a good way. After all - there is no growth without a challenge.

Before attending the conference, we were required to complete a TRACOM Social Styles survey and ask our coworkers, peers or colleagues answer questions about us. Once we got the results it was easy to start being concerned about the obstacles that come with possessing given features, since majority of participants are engineers, we are by default often critical, data-driven and introvert. Luckily, we quickly learned that our social style is not something that cannot be changed, and it is just important to get to know oneself, so we can work on improving the areas that can be helpful in contacts with others.

Participation in the ELA is one of the best experiences SPE has to offer and I could not be more grateful that I have been provided with this opportunity. To all Young Professionals reading this – stay updated and keep an eye on the recruitment to next edition! ◀



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### Petrobowl Qualifier on 23rd January

On 23rd January, during SPE Copenhagen meeting held in Schlumberger office, DTU SPE student chapter organized PetroBowl qualifier. Among the industry and student participants, top 4 students with the highest scores in the PetroBowl quiz (Abdelrhman Magdy, Adrian-Constantin Duta, Pawel Rafal Grudzinski, and Patryk Bijak) were selected to be sponsored by SPE Copenhagen chapter and represent DTU SPE Student Chapter at Europe PetroBowl qualifiers in Zagreb at Annual Student Energy Congress. We wish them good luck! Collaboration between the Student Chapter and the Copenhagen SPE Section makes it possible to establish regular contacts between the students and the professionals, which is very important for the students' professional development. ◀





# World's First Cement Replacement with Metal Expandable Annular Sealing on A Highly Laminated, Deep Water Injector in West Africa

## Background

Cementing in deep water wells can present multiple challenges. Successful cement placement in deep deviated wells is inherently difficult, working against well trajectories and gravity, and additional concerns surrounding cement contamination often result in having to under-ream and drill an even deeper well to increase the cement volumes used.

To tackle this problem head-on and based on the already proven Welltec Annular Barrier (WAB), the use of metal-expandable annular sealing technology was pushed to its limit by designing the world's first truly cementless completion using the Welltec Annular Isolation (WAI) in open hole.





The project was co-developed with a large team composed of representatives from Welltec and the operator. Major milestones consisted of establishing the required specifications, performing product qualifications, developing a risk assessment and the necessary contingencies. The project was completed over a period of nine months, from inception to field deployment.

### Initial Reservoir Wellbore Interface (RWI)

An operator in West Africa facing such cementing challenges was looking for alternative solutions to optimize their drilling expenditures. Their field development is within a highly complex environment, located under 781 m of water depth and down to an oil-bearing pay zone situated in a multi-layered carbonated reservoir with high vertical heterogeneity. Reservoir pressure maintenance was being performed through water injection.

The existing RWI consists of a 4 ½" cemented liner in combination with the WAB. The plan was to then perforate the liner and stimulate the reservoir whilst ensuring optimal zonal isolation and annular sealing during the high-pressure stimulation and over the life of well for zonal water shut off requirements. As there was no contingent architecture, a failed isolation would have resulted in a non-efficient stimulation and therefore, a lost well.

Despite conventional mitigation steps, the displacement volume remained five times larger than the cement slurry. There were additional risks associated too including surrounding displacement inaccuracy and cement contamination due to free fall and mixed densities. And as the liner enters the bottom water zone, the probability of producing water during the life of well also increases.

The WAB was therefore introduced to provide cement assurance and prevent bottom water production. As a result, the wells have shown a cement integrity varying from 69% to 95%, and have not produced any water so far.

*Continues* ▶▶▶



*World's First Cement Replacement with Metal Expandable Annular Sealing on A Highly Laminated, Deep Water Injector in West Africa*

### ▶▶▶ The Well Annular Isolation (WAI) Liner and Benefits

The WAI solution was selected to maintain a good synergy between perforations, acid stimulation and diversion techniques to achieve a sustainable Productivity Index (PI) and Injectivity Index (II). The WAI liner consists of multiple metal expandable sleeves across the full reservoir length. The sleeves are assembled on a base pipe with minimal spacing in between. Once expanded, the sleeves provide zonal isolation and annular sealing. Then e-line guns are used to perforate through some of the sleeves to enable production.

The benefits of a WAI cementless completion in the field are several; it removes the need for drilling an extended rat hole, under reaming, cementing, performing a Wellbore Clean Out, and performing a dedicated CBL/VDL run. All of which, lead to a substantial cost savings and reduction of rig time because it simplifies the operations, as well as reduces the operational risks.

The first deployment has been performed on a pre-produced water injector well, helping to validate the technology for further deployment on oil producers. The WAI liner was deployed with the rig whilst the expansion and subsequent acid stimulation were completed without the rig. Production and injectivity data were analysed and compared to the PI / II to the prior cemented well designs, reaching the same target value. ◀



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**Schlumberger**

# BIOGRAPHY



**Joseph Bagal – Director Well Completions, Africa**

Joseph Bagal holds a Msc in Mechanical Engineering from Polytech' Nantes (France) and an Executive MBA from IE Business School (Spain).

In 2002, Joseph joined Schlumberger and was involved in different innovative solutions such as high density frac fluids, single trip perforate and fracture, and filtercake removal with solid acid.

In 2009, Joseph joined Areva and was involved in high volume drilling and completions for in-situ leaching.

Joseph joined Welltec in 2015 to continue his involvement in transforming the African oil & gas industry by providing completions solutions that make the wells safer and more sustainable. ◀



C O P E N H A G E N  
M E E T I N G  
T H U E S D A Y 3 1 M A R C H

MARCH

### PROGRAMME

17:00 – 17:30  
DRINKS

17:30 - 18:15  
GUIDED TOUR THROUGH  
MANUFACTURING

18:15 – 19:15  
PRESENTATION AND SPE NEWS

19:15 – 21:00  
DINNER

### LOCATION

Welltec A/S  
Gydevang 25  
3450 Allerød

### SPEAKER

Joseph Bagal

### TOPIC

World's first Cement Replacement with Metal Expandable Annular Sealing

### ENTRANCE FEE

None

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