

# Oil Review

## Africa

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Covering the Oil and Gas Industries

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**Africa in a low oil-price world**

**Africa Oil Week - defying the fall**

**Talent scouting**

**Mozambique: looking good for the long term**

**Well control**

**Promoting effective data management**

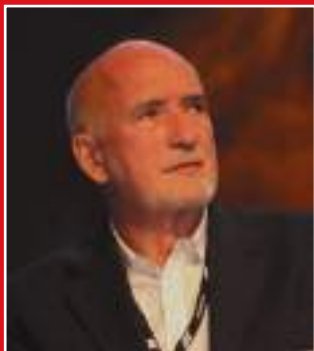
**Providing power on-site 24/7**

**Managing corrosion with micelle detection**

**Rig automation**

**Catering on- and offshore**

**Combatting criminal mobile connections**



*Dr Duncan Clark, chairman of Global Pacific and Partners. See page 14.*



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## Kenya's and Uganda's oil

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**The large deals in Mozambique's recent licensing round were for the offshore blocks.**  
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## Editor's note

AFRICA IS NOT immune from the investment crisis faced by the world's oil and gas industries. However it has a key role to play, both as a major and growing world energy supplier, and one of the few expanding consuming regions located outside Asia.

In this issue, we look at developing Uganda's and Kenya's oil discoveries, where hopefully projects might still go ahead now that a deal on the export line looks close. We also look at Mozambique, which recently held its fifth licensing round. There will inevitably be delays and news that LNG projects are having trouble securing long-term purchase commitments; however, for the long term, Mozambique will be in a good position as the probable provider of a second wave of LNG supply growth into the 2020s.

Oil and gas training remains an integral part of host nation plans to introduce more local content and create a more sustainable energy industry. Huge progress has been made but efforts to correct past imbalances are ongoing.

As always, we bring you news of the latest oil and gas developments as well as features and analysis on topical issues. Please do get in touch with your feedback and any suggestions for topics you would like to see covered.



Sky-Futures is the world leader in oil and gas drone inspections.

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## Executives' Calendar 2016

JANUARY			
26-28	<b>Offshore West Africa</b>	LAGOS	<a href="http://www.offshorewestafrica.com">www.offshorewestafrica.com</a>
27-29	<b>The 2nd Annual Powering Africa Summit</b>	WASHINGTON DC	<a href="http://www.poweringafrica-summit.com">www.poweringafrica-summit.com</a>
27-29	<b>Global Oil &amp; Gas Middle East &amp; North Africa Exhibition</b>	CAIRO	<a href="http://www.global-oilgas.com/mena">www.global-oilgas.com/mena</a>
FEBRUARY			
10-12	<b>4th East Africa Oil and Gas Summit and Exhibition</b>	NAIROBI	<a href="http://www.gep-events.com">www.gep-events.com</a>
17-18	<b>Floating LNG 2016</b>	LONDON	<a href="http://www.smi-online.co.uk">www.smi-online.co.uk</a>
22-25	<b>Nigeria Oil &amp; Gas</b>	ABUJA	<a href="http://www.cwc.com">www.cwc.com</a>
MARCH			
15-17	<b>CAPE VI, 6th African Petroleum Congress and Exhibition</b>	ABUJA	<a href="http://www.cape-africa.com">www.cape-africa.com</a>
22-24	<b>Africa Oil &amp; Gas and Energy Exhibition (AOGEE) 2016</b>	PORT HARCOURT	<a href="http://www.ficaogee.com">www.ficaogee.com</a>
APRIL			
6-8	<b>Africa Upstream 2016</b>	ACCRA	<a href="http://www.africaupstream.com">www.africaupstream.com</a>
19-21	<b>MOC 2016</b>	ALEXANDRIA	<a href="http://www.moc-egypt.com">www.moc-egypt.com</a>
20 -21	<b>Ghana Summit</b>	ACCRA	<a href="http://www.cwcghana.com">www.cwcghana.com</a>
28-29	<b>MMEC (Mozambique Mining, Oil &amp; Gas and Energy)</b>	MAPUTO	<a href="http://www.mozmec.com">www.mozmec.com</a>
MAY			
2-5	<b>OTC 2016</b>	HOUSTON	<a href="http://www.otc.net">www.otc.net</a>
12-14	<b>Oil &amp; Gas Kenya 2016</b>	NAIROBI	<a href="http://www.oilandgasonline.com">www.oilandgasonline.com</a>
12-14	<b>Power &amp; Energy Kenya 2016</b>	NAIROBI	<a href="http://www.oilandgasonline.com">www.oilandgasonline.com</a>
24-26	<b>14th Africa Independents Forum 2016</b>	LONDON	<a href="http://www.globalpacificpartners.com">www.globalpacificpartners.com</a>
JUNE			
3-5	<b>2nd Oil &amp; Gas Tanzania 2016</b>	DAR ES SALAAM	<a href="http://www.oilandgasonline.com">www.oilandgasonline.com</a>
6-7	<b>Africa Oil &amp; Power</b>	CAPE TOWN	<a href="http://www.africaoilandpower.com">www.africaoilandpower.com</a>
6-8	<b>NG Oil &amp; Gas</b>	ACCRA	<a href="http://www.10times.com">www.10times.com</a>
13-16	<b>Nigeria Oil &amp; Gas 2016</b>	ABUJA	<a href="http://www.cwcnog.com">www.cwcnog.com</a>
13-16	<b>Nigeria Power Forum Conference &amp; Exhibition</b>	ABUJA	<a href="http://www.nigeria-power.com">www.nigeria-power.com</a>
28-29	<b>Gas Africa Conference</b>	SANDTON	<a href="http://www.ingadaevents.co.za">www.ingadaevents.co.za</a>
JULY			
9-13	<b>22nd World Petroleum Congress (WPC)</b>	ISTANBUL	<a href="http://www.22wpc.com">www.22wpc.com</a>

*Readers should verify dates and location with sponsoring organisations, as this information is sometimes subject to change.*

## Offshore West Africa - the region's premier technical forum

TAKING PLACE 26-28 January 2016 at the Eko Hotel & Suites in Lagos, Offshore West Africa Conference & Exhibition will build on the success of the 2015 event, which also took place in Lagos and attracted a record-breaking international audience of almost 2,400 leading oil and gas industry professionals from more than 30 countries worldwide.



Delivering the premier technical forum focused exclusively on West African offshore exploration and production, the event will continue to feature a technical and strategic conference programme developed by an advisory board comprised of leading industry experts, as well as an exhibition showcasing products, technologies and services from global and regional oil and gas companies, held concurrently, bringing together exhibitors and attendees from around the world for three days of education, networking and new business development.

Offshore West Africa is a truly West African event and addresses key technology and development issues for the West African offshore oil and gas market, through a comprehensive educational programme and three-day exhibition and conference, with the 2016 event focusing on *Positioning for a Sustainable Future* as the core theme.

## Nigeria Oil & Gas 2016 to look at next phase

AS A NEW dawn is on the horizon for the Nigerian oil and gas industry, many questions remain unanswered. Over the past four months, the NOG management team have been engaging with the Government and industry stakeholders to define the agenda for the next phase of the industry. 2016 key topics at the conference include:

- ◆ What are the current administration's priorities for Nigeria's oil and gas industry?
- ◆ What plans are in place to increase the country's reserves?
- ◆ How can policy stimulate the development of domestic oil and gas markets?
- ◆ What are the plans to increase capacity of the refineries – taking Nigeria a step closer to supplying fuel to the domestic market and exporting internationally?

At the Nigeria Oil & Gas Finance seminar delegates will be able to meet financial institutions and investors to discuss gaining access to capital, increasing attractiveness for funding and how financing options must be developed specifically for the needs of the Nigerian oil and gas industry.

Here indigenous and international industry stakeholders and government representatives will once again gather to define the road map to increasing the in-country value gained through Nigerian Content implementation.

The NOG hosts an array of networking functions providing an unrivaled level of access to key government and industry decision makers, all under one roof.





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## Nigeria aims for PIB push

NEWLY-APPOINTED NIGERIAN Deputy Oil Minister Ibe Kachikwu is to amend the much-criticised and heavily delayed Petroleum Industry Bill (PIB) in an effort to finally ease its passage through the country's administrative system, according to a report.

Kachikwu, who is also head of state player NNPC, may remove the taxation element from the bill to speed up its much anticipated implementation, Reuters reported. The Harvard-educated lawyer was last month confirmed as Minister of State for Petroleum Resources, deputy to President Muhammadu Buhari, who retains the top oil ministry role.

At the end of the summer Kachikwu appeared to distance the PIB from any impending implementation, saying it would be put on the backburner in favour of using existing laws to revamp the country's staple but flagging oil sector.

"Because of the volume of extensive consultation and time required to make the bill a workable document, it is only natural to kick-start the reforms in the industry with the existing laws while waiting for the eventual passage of the proposed law," the former overseer of compliance in Nigeria for Texaco and ExxonMobil said in August.

He also said at the time that the PIB would have to be adapted to take into account the current oil price environment.

Given a mandate to revamp the industry and build bridges with disgruntled international oil companies, Kachikwu has aimed to shore up the value chain on mega-schemes, drive down the cost of producing a barrel of oil from US\$27 to below US\$20, revive abandoned fields for immediate return and "focus on integrity projects — all the low hanging fruit".

The proposed bill aims to reform the oil and gas sector but political issues have caused its passage into law to be held up for years.

## Study reveals need for greater collaboration

A NEW REPORT reveals that whilst the current environment is creating opportunities for innovation, almost half of oil and gas executives admit they have fallen short of their



innovation goals. The number of respondents saying they have fallen short has almost doubled as the oil price has gone down, with only 26 per cent saying they had fallen short in Spring 2014. These findings form part of the Technology Radar 2015 report recently launched by Lloyd's Register Energy. The report, *Innovating in a New Environment*, combines Lloyd's Register Energy's expert knowledge with third party insights, to provide data-driven findings on the role of innovation in the current and future upstream oil and gas industry. Through interviews with senior industry practitioners and a global survey of oil and gas professionals, it provides a compelling case for increased technological innovation.

"The oil and gas industry is undergoing a period of significant uncertainty", said John Wishart, group energy director, Lloyd's Register. "The oil price slowdown is clearly impacting investment in innovation initiatives. However, our report finds that contrary to perceived wisdom, innovation has a crucial role to play in the current environment, where it creates operational efficiencies and is cost-effective."

"To innovate properly and achieve business goals companies must address a number of common challenges, including collaborating more openly, using data more effectively and changing traditional mind-sets", continued Wishart. "Encouragingly, our findings show that overall the industry understands the need for innovation and has begun reaching out to other sectors to gain technological insight."

## CIS supports South African energy enterprises

WITH SIGNS OF renewed momentum in the government's oceanic economy initiative, Operation Phakisa, local industry attention is focusing on offshore oil, gas, energy and related maritime opportunities opening up along South Africa's extensive coastline.



The Saldanha Bay Industrial Development Zone.

Two major co-located trade exhibitions — Oil & Gas Africa 2016 and Maritime & Offshore Marine Africa 2016 — provide a perfect platform to showcase products and services, and build business networks in these sectors. "These two exhibitions provide an effective, versatile networking platform and product showcase for all companies and stakeholders exploring business opportunities through the South African Government's Operation Phakisa initiative," said show organiser John Thomson.

"Operation Phakisa aims to leverage multiple opportunities from South Africa's strategic global location and extensive coastline. Its potential value has been estimated at R177bn (US\$12.6bn) by 2033, and over 130,000 jobs will be created."

Over nine billion rand will be invested in the Saldanha Bay industrial development zone in the Western Cape to develop it as an oil and gas hub, including oil rig repair and support vessel maintenance facilities. In addition, the R660mn Burgan fuel storage facility in the port of Cape Town has been approved and construction is underway.

Laura Peinke, a business leader at the Saldanha Bay Industrial Development Zone, observed that Operation Phakisa was contributing to the major infrastructure upgrades carried out by Transnet at all ports in the country.

## Africa Oil & Power breaks the mold

THE INAUGURAL EDITION of the Africa Oil & Power conference will be held 6-7 June 2016 at the Westin Hotel in Cape Town, South Africa.

Endorsed by the Ministry of Mines, Industry and Energy of Equatorial Guinea and hosted by Centurion Law Firm, Africa Oil & Power is an invitation-only event that strives to redefine energy conferences.

It draws a premier crowd of ministers and senior level government officials and top executives of private sector companies spanning the entire value chain, including upstream, downstream, power generation and legal/finance.

The goal of Africa Oil & Power will be to maximise networking and transaction-making opportunities. The event will provide sponsors and delegates with deal rooms and speed networking and matchmaking sessions based on common interests.

"Africa Oil & Power will be a game changer for B2B oil and gas events," said NJ Ayuk, CEO of Centurion Law Group, the event's host sponsor. "It offers an engaging content experience and a true opportunity for business executives to make deals. Centurion is proud to support this landmark event."

The debate panel format will draw together key decision makers from select countries in an unscripted setting. Much of the content will be framed around what the industry has done to adjust to a sustained climate of low oil prices and keeping projects on track.

Africa Oil & Power will be the first energy conference with panels made up exclusively of African oil and gas ministers and heads of national companies. The 6 June programme will feature a market spotlight on Equatorial Guinea with project and investment opportunities presented by government and industry leadership.

Already confirmed as speakers are HE Gabriel Mbanga Obiang Lima, Minister of Mines, Industry and Energy of Equatorial Guinea; Etienne Dieudonné Ngoubou, Minister of Petroleum and Hydrocarbons of Gabon; Alex Mould, CEO of the Ghana National Petroleum Corporation; and Nick Cooper, CEO of Ophir.

"The idea for this event was to create an immersive content experience built around the most authoritative speakers in their field," said Guillaume Doane, CEO of the Africa Branding Corporation, the event organiser.

"The invitation-only format allows us to hand-pick like-minded people with a great potential to strike agreements on the spot."



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## Partnership for Weatherford and Maersk

WEATHERFORD SECURE DRILLING Services and Maersk Training have entered a strategic partnership to enhance scenario-based training and competency for critical wells. The training will provide Weatherford personnel with improved preparation and aptitude to help prevent well-control events and nonproductive time when operating in extreme drilling environments.

Weatherford is a recognised leader in advanced drilling techniques such as managed pressure drilling (MPD) and early kick detection (EKD). The company recently introduced the OneSync software platform, which enhances planning, simulation and control during MPD, EKD, and many other drilling and completions scenarios. The software platform builds on the field-proven Microflux control system – the cornerstone of Weatherford's MPD portfolio.

Maersk Training will fully integrate the MPD simulator application of the OneSync platform into its drilling simulators to enable comprehensive MPD and well-control planning and scenario-based training. Maersk Training is the industry's leading provider of advanced simulation-based well-control training with a focus on rig-team interaction and the influence of human factors on an offshore operational environment.

## Douglas Westwood acquired by ESIA

ENERGY SOFTWARE INTELLIGENCE Analytics (ESIA) has completed the acquisition of Douglas Westwood Limited (DWL). The acquisition represents ESIA's next step in delivering a growth strategy for the company that includes a mix of new product development and acquisitions.

ESIA's strategic vision is to create best-in-class solutions for its customers, and the addition of the consulting and analytical services from Douglas Westwood extends ESIA's reach into the oilfield services market (OFS). Formed in January 2015, ESIA is assembling a portfolio of businesses that deliver data, research, and insight for the global energy E&P markets and support services. ESIA has acquired three companies since its formation, with Douglas Westwood being the fourth.

"The acquisition of Douglas Westwood is a significant step in the development of ESIA, effectively doubling the size of our business and bringing global coverage," Gavin Prise, chairman of ESIA, said. "Through Hannon Westwood, Novas and Richmond Energy Partners, we have a deep and expanding expertise in the E&P space. Following this latest acquisition, we are now able to offer market intelligence solutions across the full supply chain and provide access to the exceptional team of internationally experienced individuals within Douglas Westwood."

## Ocean Installer secures Aje field work

OCEAN INSTALLER HAS been awarded a contract for field development work in Nigeria for Folawiyo Aje Services Ltd (FASL). The contract starts with immediate effect. Ocean Installer will perform the offshore construction of the Aje Ph1 project off the coast of Nigeria. The scope of work includes mooring buoy installation and hook up, flowline and umbilical installation. "We are very pleased to have been awarded our second major contract in West Africa. This proves our Africa strategy is fruitful and

allows us to further strengthen our foothold and develop our relationship with clients active in the region. We are looking forward to joining efforts with Ariosh Engineering on this project to ensure a safe, high quality and efficient execution," said Steinar Riise, CEO of Ocean Installer.

Offshore operations will be performed by the construction support vessel Normand Vision and start Q1 2016. Engineering for the project will be performed across Ocean Installers offices in Stavanger, Aberdeen



Normand Vision will perform the offshore operations.

and Houston in order to meet the demanding schedule of the project, the company said.

## Need for increased technical innovation

A NEW REPORT reveals that whilst the current environment is creating opportunities for innovation, almost half of oil and gas executives admit they have fallen short of their innovation goals. The number of respondents saying they have fallen short has almost doubled as the oil price has gone down, with only 26 per cent saying they had fallen short in Spring 2014.

These findings form part of the Technology Radar 2015 report launched by Lloyd's Register Energy. The report, *Innovating in a New Environment*, combines Lloyd's Register Energy's expert knowledge with third-party insights, to provide data-driven findings on the role of innovation in the current and future upstream oil and gas industry. Through interviews with senior industry practitioners and a global survey of oil and gas professionals, it provides a compelling case for increased technological innovation.

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report finds that contrary to perceived wisdom, innovation has a crucial role to play in the current environment, where it creates operational efficiencies and is cost-effective."

"To innovate properly and achieve business goals, companies must address a number of common challenges, including collaborating more openly, using data more effectively and changing traditional mind-sets", continued Wishart. "Encouragingly, our findings show that overall the industry understands the need for innovation and has begun reaching out to other sectors to gain technological insight."

In the opening part of Technology Radar 2015, the report considers the role for innovation in the changing innovation landscape and concludes that the cyclical downturn should be a driver of innovation, not a barrier. Crucially for industry professionals, the report outlines three scenarios for how different oil prices may affect innovation, examining the types of innovation that will be prioritised in each scenario. The majority of oil and gas executives believe the oil price will sit between US\$50-

US\$70 in the next year, with the highest percentage (27 per cent) believing it will hover around US\$70. This will in many cases hinder investment in innovation.

The report also looks at how executives are placing increasing emphasis on collaboration, both internally and outside of the industry, as they adapt technology from other sectors. Two-thirds of respondents say they are under pressure to collaborate with other organisations within the sector. When they do collaborate, upstream companies focus on the early stages of a project, and often around safety. The report reveals an overarching cultural shift is still required to fully integrate genuine collaboration in innovation.

Finally, in part three the role for data collection and analytics in driving innovation is assessed, finding that more advanced data collection and analytics are a must have in the current low oil price environment. Lack of data and systems integration across different parts of the business are huge barriers to successful data collection and analytics, with silos the biggest cause of the issue.





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Times are tough but now's the time to invest says the IEA's latest "World Energy Outlook".

# Africa in a low oil-price world

**A**FRICA IS NOT immune from the investment crisis faced by the world's oil and gas industries. That is one of the main conclusions we draw from the International Energy Agency's WEO-2015 report\*. This was presented to the press on 10 November. "Low prices should give no cause for complacency on energy security", the autonomous Paris-based group's annual round-up says.

The key need is for continuing investment based on "the need to compensate for the inevitable declines in output at today's oil and gas fields."

"Production from today's fields is set to fall by around two-thirds, a far more rapid decline than anything seen (or foreseeable) on the demand side." Both West and North African producers are certainly central to resolving the supply insecurity this implies; now is clearly the time that continuing investment is most needed here.

On the brighter side, the OECD's (industrialised countries) energy monitors say they see clear signs that a much needed "energy transition" is underway, as long as a "strong direction" emerges from this month's UN climate-change talks in Paris. A question to executive director Fatih Birol at the press launch elicited an statement about the development of renewable resources – in tandem with more material for export, especially from the East – here. And the whole international event took place just before a new government was finally sworn in in Abuja, nerve centre of Africa's largest oil-producing country. Crude oil is of course the most troubled form in which energy is shipped right now.

**A period of low oil prices is the moment to reinforce our capacity to deal with future energy security threats.**

Under this the elected leader of Africa's key energy exporter, President Muhammadu Buhari, has taken over direct control of the Petroleum Resources Ministry, with NNPC Group MD, Dr Ibe Kachikwu, being crucially appointed as his deputy. There's no doubt about the intention to lay the foundations for meaningful restructuring at the heart of the industry in this development. This game-changing move sets out the position of the goalposts nicely for an eagerly awaited 2016 Budget in which oil and gas affairs will probably



*The key need is for continuing investment based on "the need to compensate for the inevitable declines in output at today's oil and gas fields."*

feature even more prominently than usual. Of course that's our view; the IEA never comments on domestic issues like this.

One of Dr Birol's main conclusions at the WEO launch was that "Low prices bring gains to consumers, but can also sow the seeds of future risks to energy security". Another was that these, along with environmental concerns, continue to loom as major challenges. "International co-operation on energy has never been more vital", he said.

## Africa has key role to play

There is no doubt that Africa has a key role to play in all of this, both as a major and a growing world energy supplier (and a huge one in net terms; this region's carbon footprint is minimal), and one of the few expanding consuming regions located outside of Asia. More sub-Saharan countries actually benefit from low oil prices than feel the pinch at times like these.

The real danger, says the independent consumer-driven Agency, is that an extended period of today's low prices will heighten reliance on a small number of low-cost producers, or "risk a sharp rebound if investment falls short". International dependence on Middle Eastern oil exports - including from Iran now that the sanctions issue has been resolved - could eventually escalate to a level last seen back in the 1970s, when so many of today's troubles were sown. And all this is happening as India (investigated in depth in this year's WEO report) takes over from China as the largest source of all-forms of energy consumption growth anywhere.

"Now is not the time to relax," said Dr Birol. "Quite the opposite; a period of low oil prices is the moment to reinforce our capacity to deal with future energy security threats." He specifically cited the ongoing developments in Mozambique and Tanzania which will consolidate sub-Saharan Africa (SSA)'s position as a significant gas exporter.

In a report which traditionally takes the long view, overall world energy demand is expected to grow by nearly a third by 2040, with all of this being driven by developing countries including some here in SSA. More energy-efficient technologies will be needed to sustain this, the IEA says, but a prolonged period of the sort of prices we are seeing today could "undercut this crucial pillar of the energy transition ... 15 per cent of [potential] energy savings are lost in a low oil price scenario".

And the really good news for consumers is that Africa's prospects of completely by-passing the OECD's destructive process of energy development (based on burning climate-changing coal and oil) are excellent. This is part of the transition referred to above.

Oil prices are a worry, Dr Birol said, but so is the fact that more than half of the world's population still have no access to mains electricity. There's a good chance this can be significantly righted here by implementing renewable programmes. This means that Africa will be the first region anywhere on earth for this to be achieved by climate-saving means. ■

\*World Energy Outlook 2015; [www.iea.org](http://www.iea.org)

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When industry figures met in Cape Town for the annual African Oil Week, foremost in their thinking was the precipitous fall of the oil price and its consequences.  
Report by Stephen Williams

# Defying the fall

**I** F LAST YEAR'S 2014 Africa Oil Week can be characterised as somewhat downbeat, the shock of a plummeting oil price yet to be fully absorbed by the delegates assembling at Cape Town's International Conference Centre, the 2015 edition of this, the continent's premier oil conference, was a little different.

The oil price still over-shadowed many of the conversations, but the new reality of a sub-US\$50 barrel had sunk in. And making the best of a less than ideal crude market was the order of the day.

It may have been something akin to whistling in the dark, but some comfort was to be taken in the resilience of the oil majors' share prices on the world's equity markets, as evidenced by an eight per cent rise in Standard & Poor's Global Oil Index. This rise is in sharp contrast to the 60 per cent plus oil price fall recorded since June 2014 when a perfect storm of Chinese demand falling thanks to an economic slowdown, and US shale fields' booming production, both resulted in a serious over supply pushing down prices.

Many of the super-majors experienced a financial bloodbath, their stocks a sea of red. French major Total fell by more than 20 per cent; the US's ExxonMobil by 24 per cent; and UK-based BP by 30 per cent.

The markets were of the view that the oil companies could well be left with significant 'stranded assets', ie, hydrocarbon assets that might have been viable when oil was at US\$100+ per barrel, but an unrealistic financial proposition when oil was less than half that price.

Famously, London's Financial Times reported that the oil and gas industry might be looking at a US\$3 trillion black hole, equating the situation to that of the sub-prime housing crisis of 2007/8, ready to blow up the world's already fragile economy.

## Looking for value and opportunity

However, investors are always looking for value and opportunity, which is often found when taking a counter-intuitive view. Consequently, an opinion took hold that every cloud has a silver lining, and there might be an argument for buying oil stocks in readiness for the day when the oil price recovers.

In the meantime, the reasoning was the 'stranded asset' hypothesis would, in all likelihood, create a scenario where the oil companies decide to squeeze out further efficiencies – becoming, as the saying has it, meaner and leaner. When eventually an upturn did materialise, the



*Dr Duncan Clark, chairman of Global Pacific & Partners.*

companies would be that much more profitable.

The problem with that development, as many of the delegates at the African Oil Week must have realised, was that this would mean a lean time for those myriad oil service companies that supply logistics, drilling and refining equipment, and technology systems, as oil companies exert pricing pressure in a classic buyer's market.

Whether or not organising the premier Africa oil conference might be classified as an industry service, it is certainly true that the success of the Africa Oil Week is primarily due to the vision and tireless energy of Dr Duncan Clarke and Babette van Gessel, the chairman and chief executive respectively of Global Pacific & Partners.

So it was something of a surprise to learn that

**It is certainly true that the oil industry is facing a number of headwinds above and beyond the fall of the oil price.**

in the spring of 2014, the company had entered an agreement to sell a 50.1 per cent stake for some US\$24mn to ITE, with put and call options in place over a maximum of 10 years, to enable ITE to acquire the remainder of the shares. The overall consideration was to be capped at a maximum of US\$75mn.

ITE is a conference organiser with a particular focus on Eastern Europe and Russia but which has a stellar track record including organising the UNCTAD African Oil and Gas, Minerals, Trade and Finance Conference & Exhibition.

When Oil Review Africa asked Dr Clarke about the deal, he said that the synergy between the two groups was just about perfect; and that Global Pacific & Partners would be able to give greater focus to the consultancy and advisory

services side of the business.

It is certainly true that the oil industry is facing a number of headwinds above and beyond the fall of the oil price. Not only are there a number of geopolitical factors to take into account, not least the tensions in the Middle East or, for that matter, the South Pacific through which one-third of the global oil trade traverses, but closer to home we are experiencing terrorism threats across Africa, from Boko Haram in Nigeria to the Al Shabab group, an affiliate of Al Qaida, active in East Africa.

Should these murderous groupings turn their full attention to the oil industry, the consequences would be disastrous.

But there is again another threat to the hydrocarbon industry, posed by an environmentalist lobby who found full voice at the Paris COP21 meeting talking place just days after the Africa Oil Week.

Dr Clarke, in addressing the conference had a George W Bush moment (expressing a sentiment similar to the "you are either with us or against us" phrase) when he referred to the environmentalists as "enemies of the industry". However, the prospects of a reinvigorated carbon market and even a concerted move towards a renewable energy future arising from the Paris meeting need not be seen as necessarily antithetical to the fossil fuel industry.

Rather, as most experts concede, the world's energy future will be a mix of conventional and renewable systems, perhaps employing carbon capture technologies relying on the geological expertise gleaned from the reservoir technology of the oil industry, or on cleaner feedstocks such as natural gas.

Whatever the future, oil and gas is hardly likely to disappear overnight, nor the skills and innovation, celebrated by the Africa Oil Week, and that underpin today's industry. ■





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Low oil prices will present a formidable obstacle to development of Uganda's and Kenya's oil discoveries, but projects might still go ahead now that a deal on the export line looks close. Some political deal-making in and between Uganda and Kenya will be necessary for a deal to be reached, but with project costs falling, speed could be of the essence.

## Developing Uganda's and Kenya's oil discoveries

**E**AST AFRICA'S ONSHORE oil promise has now been a few years in the making. The first Ugandan oil discoveries were made in 2006, while in 2010-12 discoveries were also made in Kenya. Optimism was naturally very high with oil around US\$100/barrel. However even today, IOCs seem keen to move forward – at least in theory.

The main obstacle for FIDs (Final Investment Decision) and development progress is export lines from what, in effect, for now, remain stranded assets. The difficulty in agreeing an export line has several layers. In Uganda, for a long time, there was disagreement between IOCs and the government, with the former preferring export of all the crude to a sea coast and the latter advocating that all or most of the crude would supply an integrated refining project, supplying refined products for the wider East and Central African region.

Ugandan hopes for a large export refinery have since abated, as realism about the limits of regional demand and costly logistics have set in. Plans have been gradually revised down to a possible small 30,000 bpd refinery, which would leave most crude available for export. Patient reluctance from IOCs to commit to developing the oilfields in western Uganda as long as the government pushed for an integrated refinery deal, clearly helped to bring realism into the government's calculations on this point. IOCs were adamant that the economics of a regional export refinery, given the underdeveloped logistics and the weak regional market, were unattractive.

**A bilateral agreement between the two countries settled for a 1,500 km route from the Albertine Basin to Lamu.**

### Finding an export route

Yet, finding an export route for the crude has proved tricky. The waxy Ugandan crude raises the technical requirements on the pipeline from the simplest technical options, which will be reflected in the project's cost.

Agreeing on a route through Kenya and on Kenyan transit fees has also proved difficult. Political security has become an issue too. After having been regarded as one of Africa's most



Kenyan and Ugandan officials have agreed on a northern route for the pipeline.

stable economies for decades, the political situation in Kenya has changed for the worse over the past 10 years. Militant infiltration from Somalia is one issue, which in the past few years has coe to pose a significant security risk to one of the proposed pipeline routes – the one to Kenya's northern port of Lamu.

Fundamentally worse is the political instability and internal violence which erupted in 2007-2008 following the contested presidential elections. Effects from that conflict continue to simmer and investors have not been entirely confident something similar could not happen again.

Another reason for why the export pipeline project has not got off the ground is that Kenya is unclear whether to combine the Ugandan export project with its own need for a link to northwestern Kenya.

Initially, Uganda and Kenya had a preference for the Ugandan crude to move through a pipeline passing Nairobi and reaching the sea at the port of Mombasa, while Kenyan crude would run in a northern corridor to Lamu, which, from northwestern Kenya, could be extended to South

Sudan - and in the case of discoveries – also to southern Ethiopia.

The latter project was launched as the LAPSET (Lamu Port - South Sudan - Ethiopia Transport Corridor) scheme. However, Kenya only has so far proven-up 0.6mn barrels of reserves, including other volumes in order to make the project feasible from the onset.

Finding investors for two different export lines proved hard and proposals for one trunk pipeline from a Kenyan port to central Kenya, then splitting off to northwestern Kenya and Uganda, respectively, have gained industry-wide traction. The main price for any pipeline deal has, however, been a South Sudan extension, providing comparatively large baseload volumes of crude from day one from the established, but landlocked, producer.

South Sudan is in desperate need for export route diversification, in order to end its dependence on Sudan – from which it split in 2012 following a long struggle for independence. South Sudan, however, soon after its independence, sunk into its own civil war,





Uganda and Kenya have tentatively set their hopes for the pipeline to be completed by 2019.

damaging its oil industry, paralysing its political decision-making and stripping it of an ability to raise project finance for a large infrastructure scheme.

**Lamu also has better deepwater qualities as a port, when developed.**

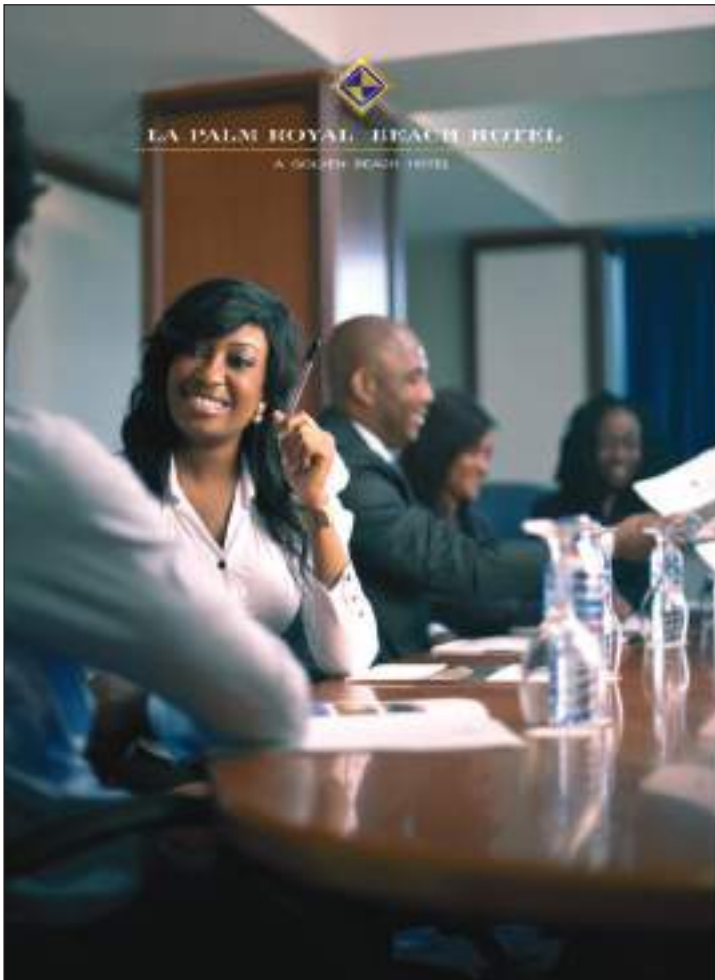
With negotiations over a bilateral pipeline agreement between Uganda and Kenya being complicated enough, including a tripartite agreement involving a fractured and chaotic South Sudan has proven virtually impossible, leading that part of the deal to stall.

Bilateral agreement settled

In the past summer, there was finally a breakthrough, during a state visit by Kenyan

President Uhuru Kenyatta to his Ugandan counterpart Yoweri Museveni in early August. A bilateral agreement between the two countries settled for a 1,500 km route bringing Ugandan crude from the Albertine Basin in the west through Lokichar in Kenya's Turkana County, where discoveries are currently being appraised, and on to Lamu. The so-called northern route will require more security guarantees and security force deployment commitments from the Kenyan state. However it has the benefit of passing through sparsely populated and largely non-agricultural lands, lowering land costs and the risk of land disputes. Lamu also has better deepwater qualities as a port, when developed. Moreover, the agreed package saw Kenya supporting the Ugandan refinery project, with a mention of constructing parallel product export pipes being included in the intergovernmental agreement.

Confusingly, the breakthrough was followed by the Ugandan government, early autumn, announcing the launch of a study for another pipeline route over Tanzania instead. The much longer option was touted as a safer alternative, however, largely derided as uneconomic by the industry. It is likely the study was commissioned by the Ugandans as a way to prove internally that



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Ethiopia's southeastern potential in the vast Ogaden area remains largely untested.

the Lamu route was indeed preferable, now that it appears the Mombasa option has been closed.

### The next challenge

The next challenge will be stitching together a complete financing package. The IOCs involved have differing capabilities, depending on their size. Majors Total and Chinese NOC CNOOC both have experience from large infrastructure projects and access to world-scale government and non-government institutions. Mid-sized Tullow Oil and junior Africa Oil are smaller and particularly the latter could well come to farm down its northwest Kenyan exposure further. The World Bank earlier this year pledged support for the US\$4bn project, but only to the extent of around US\$16.1mn – a tranche widely considered insufficient.

Securing more multi-lateral funding and third-party government finance guarantees is an important initial task. Given the overall risks involved, the reluctance of private finance to commit without the added stability which the specifically Western and East Asian government buy-in represents, is understandable. The project's economic impact in unlocking an important revenue stream for the whole region, however, would likely mean that offering the signal value for development go-ahead, should be an attractive proposition for multilateral and government trade finance agencies.

## Getting funding in place and commencing work is of the essence.

Investor reluctance over the choice of Lamu as end-port also seems to have diminished and that is not only because of the much less complicated land issues along the route.

The route to Mombasa is, to be sure, less exposed to militant Somali incursions, but the main reason for scepticism was that the port of Lamu needs much more investment and development, while Mombasa has more existing oil loading capacity to start with.

The cost issue is, however, turning out to be an

interesting aspect of the project. While the mid-2014 oil price rout seemed to suggest stalemate for all large-scale investments in new basins like Uganda's and Kenya's, an effect of the global capital expenditure cuts in the industry has been the development of a vast overcapacity in the oil service and oil industry construction sector.

Moving in a short time frame from overheating to overcapacity, service and engineering companies are scrambling to preserve market share and consequentially competing hard on prices.

### Essential to get funding in place

If Uganda and Kenya could get the project off the ground in the coming year, it would be possible to capture and lock in much of the project cost decline of recent months throughout the project's development span. In fact, getting funding in place and commencing work is of the essence, as the oilfield development work is already being delayed in order not to come onstream prematurely.

Uganda's planned 30,000 bpd refinery is slated to be completed in 2017, although the project is likely to have slipped well into 2018 and, until that refinery commences operations, no outlet for first production from Uganda's Kingfisher field exists.

Uganda and Kenya have tentatively set their hopes for the pipeline to be completed by 2019; however, some industry sources say that the project is unlikely to be complete before 2020 or 2021 and even question the Ugandan refinery's ability to start up before 2020.

### Settlement of disputes in Uganda

Settlement of the tax and contract term disputes between Uganda and its oil companies, particularly Tullow Oil, earlier this year has nevertheless paved the way for the government to again hope for new exploration interest.

It is hoped that the 6.5bn barrel reserve base could still see more growth if the Albertine basin is explored further. Low oil prices might mean exploration interest in Uganda remains subdued for the moment, perhaps waiting the government out for sweetened terms. Presidential elections early next year mean that there might be more room for

compromise come mid-next year.

Kenya's oil projects are not as long in the waiting, but also stranded without the pipeline. So far, it seems IOCs remain committed to moving ahead with development despite the low oil price, not least given the remaining exploration potential in the area and the expected first-mover advantage on securing further licenses. Ideally, the northwest Kenyan spur would have been extended to South Sudan from the beginning, but some also hope for a future Ethiopian spur to add further economic benefit to the project.

Ethiopia's southeastern potential in the vast Ogaden area remains largely untested. Hitherto it is mainly the northern part of the Ogaden which has been explored, on the southern border of the self-declared republic of Somaliland. Whether southeastern Ethiopia actually holds any commercially viable oil reserves remains to be seen, so it is far too early to make any calculations on that basis for the project.

Should there be discoveries, the threshold for them to become commercial will lower significantly given relative proximity to the pipeline. Kenya's regional role as a producer and main conduit of regional oil exports would then become very significant.

The prize, however, remains the South Sudanese exports if they could be secured to go through a Kenyan pipeline and port. While for the foreseeable future not much larger than the Ugandan plateau production is currently in planning, South Sudan's existing export capacity would in almost one stroke turn the pipeline venture from essentially still a gamble on further discoveries, particularly in Kenya, to being immediately viable.

Given South Sudan's interest in breaking free from the Sudanese transit stranglehold, there is a case for the IOCs and NOCs involved in South Sudan's troubled production to invest in the Kenya-Uganda venture and an extension to South Sudan even while the South Sudanese government remains paralysed. However, as the distance needed to be constructed in South Sudan is considerable and security so perilous, such an investment could well turn out not ever being recouped.

In the medium term, the Kenya-Uganda oil pipeline project will have to rely solely on the two countries' own emerging oil export capacity for its economy, which is why further delays remain a risk, if investors want to wait out additional exploration and particularly ongoing appraisal results before committing.

At the same time locking in current depressed project costs would make sense, which should give investors and financiers an impetus to commit. The economic and political prize for the region is significant, and, for Kenya, if all its transit potential could be fulfilled, also of vast enhancement to its geopolitical position. It would, however require that the government does not neglect its obligation to provide security for the project, as only one successful strike against a construction crew fairly early in the project could derail it. ■



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Oil and gas training remains an integral part of host nation plans to introduce more local content and create a more sustainable energy industry. It means investors must raise their game if they are to meet ever higher expectations.

## Talent scouting

**W**HILE TECHNOLOGY CONTINUES to underpin ever more complex energy sector operations, both upstream and downstream, the future of Africa's oil and gas industry is still critically linked with the development of its people.

Harnessing local talent, and expanding the skills and competencies of the domestic workforce, are essentials in the creation of a sustainable and viable long-term energy industry.

In key producing states like Nigeria - which boasts the continent's largest population, estimated at 178mn people, but arguably its greatest number of poverty-linked problems - the development of new skills and more jobs in the oil sector for local people is one of the government's top priorities.

Huge progress has been made, but efforts to correct past imbalances are ongoing.

The same is true in Angola and other West African states, as it is elsewhere in the region, and indeed other impoverished hydrocarbon-rich energy producers the world over, from Brunei to Brazil.

In Nigeria, major players like Shell now boast huge depth in the numbers of local workers they employ in key facilities and offices across the country.

Like all the other big international firms active in the country - Total, Exxon, Eni/Agip, Chevron - it offers local employment opportunities throughout its business, from senior management through to technical, engineering, professional and manual positions.

Shell and all of these global companies have invested heavily to open up their businesses to the local workforce, with multiple training schemes and, at the very top, allowing entry via graduate career paths and through undergraduate sponsorship.

Yet it remains a hot political topic, and criticism continues that more can and should be done if Nigeria's oil and gas industry is to ever truly be representative and inclusive.

### Expert training

Still, the times have changed significantly through the years to redress the balance in how major corporations put together very large projects.

ExxonMobil's Erha North Phase 2, for example, which came on stream in September 2015, included more than US\$2bn worth of work for Nigerian contractors, for goods and services, including subsea equipment, facilities and offshore installation.



*Africa's extractive industries are committed to local content - An oil worker stands on the deck of a tanker at Bonga offshore oil field outside Lagos. (Image courtesy: Reuters)*

## The industry now offers extensive training options across an enormous range of oil and gas industry niches.

It reflects the general rise in competence and ability among local industry and workers.

"These contracts are bringing direct and indirect benefits to the Nigerian economy through project spending and employment, consistent with project objectives," said Neil W Duffin, president of ExxonMobil Development Company.

Without prior training opportunities and skills development, it is unlikely that Nigerian firms would have been able to even pitch for the business in the first place.

Led by the big multinationals, the industry now offers extensive training options across an enormous range of oil and gas industry niches.

This includes all areas of the industry, including offshore work, increasingly important both in West Africa and in an emerging East Africa.

Training support even spans anti-piracy measures, a problem that has dogged shipping, particularly in West Africa and in the prolific Niger Delta.

US and British marines recently completed a training programme for a number of West African states, including Nigeria and Angola, to beef up the defences against piracy and illicit trafficking throughout the Gulf of Guinea.

### Smaller firms

But the same message has filtered through to all layers of the industry, with the major players exerting their own influence on contractors and smaller firms to deliver more in terms of local content and job creation.

UK-based firm AGR, which has managed over 500 well projects globally, more than 40 of which have been in Africa, is keenly aware of the challenges involved.

Speaking at a recent industry conference, Ian Burdis, AGR's executive vice president for the UK and West Africa, discussed the importance of developing and retaining local skills in other niche markets like Sudan.

"Throughout our history in Africa, AGR has been actively contributing to the training and development of local skills by knowledge sharing and the transfer of experience," he said.

"Through the Norwegian Agency for Development Co-operation (NORAD), we assisted the South Sudanese government with the development of local technical personnel whilst conducting the technical project for the onshore Heglig oilfield."

More recently, AGR's well management team last year supervised well planning, logistics and operational execution on projects in Morocco, Tunisia and Benin.

Other examples of the firm's knowledge transfer include work in Ghana, another of Africa's emerging oil and gas producers, with the Ghana





*New oil and gas producers in eastern Africa are hoping to learn from some of the mistakes seen of the west coast. (Photo courtesy: World Bank)*

**The recent oil and gas discoveries in eastern African countries offer an unprecedented opportunity for economic growth and development.**

National Petroleum Corporation (GNPC), and in Namibia, with the National Petroleum Corporation of Namibia (Namcor). These projects both involving secondment of technical staff to AGR's UK offices.

"Both projects confirm our belief that a local talent pool is critical to business success," Burdis added.

He said the company is currently delivering economics and risk analysis courses in Nigeria, coaching for new developments in East Africa and providing well engineering classes in Egypt.

New markets

Indeed, new oil and gas producers in eastern Africa are hoping to learn from some of the mistakes seen on the west coast.

And there's plenty of support available from bilateral sources, especially Europe.

The UK's Department for International Development (DFID) and the German Ministry for Economic Co-operation and Development (BMZ) recently launched an initiative to equip local populations with the skills needed to seize job opportunities in the region's nascent oil and gas sector.

The Skills for Oil and Gas Africa (SOGA) initiative will focus on Kenya, Uganda, Tanzania and Mozambique, where a string of major hydrocarbon discoveries have been made in recent years.

It will work with both the private sector and host governments to deliver support to training institutions, establishing business enterprise development centres and assist local people to win contracts to supply goods and services to the industry.

The five-year project is expected to help

32,000 local people to get sustainable jobs in the sector over the next five years.

"The recent oil and gas discoveries in Kenya and eastern African countries offer an unprecedented opportunity for economic growth and development," said Hendrik Linneweber, country director for Kenya at the German Development Co-operation Agency (Deutsche Gesellschaft für Internationale Zusammenarbeit).

"In the next two years, the oil and gas industry will have a huge demand of technical skills and there is an urgent need to qualify and prepare these people for future jobs".

An inception phase of the programme was conducted between January and September 2015 in all of the four countries involved, with the scheme set to run until at least 2019.

It's a good indication of how serious all industry parties are about the need for training. ■

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A skilled and safe workforce is key to operating efficiently and remaining competitive in the current climate, says David Doig, group chief executive, OPITO International.

## A standards-based approach to training

**T**HE REPERCUSSIONS OF the sharp decline in oil price are being felt globally but, in this new era of cost-cutting and increasing efficiency, the industry must ensure it keeps its people safe and continues to develop the skills of the workforce.

In times of cost reduction all too often, and wrongly, training and development budgets are prime targets for budget cuts. But sweeping cuts in these areas are often born from ignorance of the real harm they cause and only serve as short term measures. History shows that the true cost of cuts in training come back to haunt us later in the form of skills shortages and wage inflation.

Hazards and risk remain the same regardless of the oil price, and a lower oil price must not mean that they are managed differently.

A robust people strategy must be applied in a downturn to keep the workforce safe and ensure the operator is well placed and has a competitive edge to take advantage of the upturn when it arrives, as it undoubtedly will, given the history of the industry.

It is the smart organisations who realise that in times of cost cutting and a drive for increased efficiency, it is our people who are the key to our success. It is a highly skilled, safe and motivated workforce that will ensure the industry remains competitive. Even in the current climate, production operations will continue, as will the need for maintenance. If we take a cynical view that maintenance activities will be reduced, then the need to ensure the workforce is trained and competent becomes greater.

Doing more with less will be the way of the future for some years, and by taking a standards-based approach to training through skills and training standards body OPITO, companies can ensure the workforce has the right skills, operates safely and is therefore much more efficient.

David Doig, group chief executive for OPITO said: "With operators looking for ways to cut costs in the current climate it is imperative that there are no compromises when it comes to ensuring the safety of the workforce. It is a challenging time but the economic conditions cannot be a reason to relax standards - not when the cost of making mistakes are too high in terms of loss of life or damage to the environment.

"Hazards and risk remain the same regardless of the oil price and a lower BOE must not mean that they are managed differently. It is the smart organisations who realise that in times of turbulence, a highly skilled, safe and motivated workforce is critical to remain competitive. Production operations will continue as will the need for maintenance. If we take a cynical view that maintenance activities will be reduced then the need to ensure the workforce is trained and competent becomes even greater."

**It is imperative that there are no compromises when it comes to ensuring the safety of the workforce.**

### Securing the industry's future

It's a bit of an understatement to say that there's a huge cloud over the whole industry right now as chief executives worry about keeping their businesses afloat but it's the cutting of apprenticeship and graduate programmes, the loss of the next generation of oil and gas workers that we need to put higher up the industry's priority list if we are to ensure the



*It is a highly skilled, safe and motivated workforce that will ensure the industry remains competitive. (Image courtesy: Fluor Corp)*

sector has a sustainable future, according to John McDonald, UK managing director of Opito.

"In order to secure the future of the oil and gas industry, we need to continue empowering and encouraging a steady pipeline of talent to come through even in challenging times. Past experience has shown us that ignoring this can lead to bigger and more costly issues in the long term."

Modern apprenticeships can bring about significant benefits to businesses in developing a skilled workforce from within an organisation. After all, how else – and to whom – are the most skilled and experienced personnel a decade or less away from retirement going to impart all those years of learning their expert trade knowledge to?

Apprenticeships allow employers to make sure that the on-the-job training is relevant and gives the trainee much needed hands-on experience as well as a chance to apply their new skillset in a working environment.

It also gives them the opportunity to demonstrate the competence required for a career whether it is onshore or offshore – let's not forget the many modern apprenticeships available for office based personnel.

Slashing apprenticeship budgets, in many cases, can be a false economy – short term gain but at what cost for the years ahead? In times of cost cutting and a drive for increased efficiency, people are the key to all successful businesses.

If there's not a steady pipeline coming through, you face the prospect of having to offer inflated wages to attract personnel when a future skills gap emerges, said McDonald.

The firms taking a long-term approach continuing with their apprenticeship programmes, graduate schemes and engagement with local school pupils, helping to develop what will one day become the new backbone of this industry, are the ones who will not fall short when we recover, regroup and reform from the current situation.

With scope on the horizon for new opportunities in other disciplines such as decommissioning, the digitalisation of oil fields and higher investment in technology, if we don't continue to do what we can as an industry to attract, train and develop our young people, we will pay the very high price of losing another generation in years to come. Cutting investment for the future should be a last resort, McDonald added.

### Second Nigerian training provider

OPITO is now making Nigeria safer for oil and gas workers with the accreditation of a second training company.

Cegelec Oil and Gas, based in Ogere, Nigeria, has secured approval from OPITO to deliver mechanical, electrical and instrument training to standards recognised by the oil and gas industry globally.

Cegelec Oil and Gas has been initially approved to deliver mechanical, electrical and instrument and control Level 2 training and expects to conduct additional OPITO-approved courses going forward. The training provider is currently in the process of seeking OPITO accreditation for Process Operations training for production trainees.

### Cutting investment for the future should be a last resort.

"Africa's proven oil reserves have grown by nearly 120 per cent over the past 30 years and it's estimated that at least another 100bn barrels are yet to be discovered. If the continent's oil producing countries are expected to meet these targets, they need a highly skilled and safe workforce," said David Doig.

"Whether a school leaver in Nigeria or an existing offshore worker in Kuala Lumpur, individuals will now be able to gain qualifications in



Individuals in Nigeria will now be able to gain qualifications in processing hydrocarbons, electrical and mechanical maintenance and instrumentation which will be recognised by oil and gas companies worldwide. (Image courtesy: Sweet Crude)

processing hydrocarbons, electrical and mechanical maintenance and instrumentation and controls which will be recognised by oil and gas companies worldwide."

A not-for-profit organisation, OPITO is wholly owned by the oil and gas industry and responsible for ensuring it has a safe, skilled and competent workforce. The organisation develops the highest training standards to improve offshore safety. With operations centres in Aberdeen, Dubai, Kuala Lumpur and Houston, OPITO delivers standards, qualifications and workforce development frameworks used by employers in 42 countries worldwide. ■

### GE Marine upgrades training simulator at Egyptian maritime centre

IN 2012, THE AAST-GE DP Center was established through a joint effort between GE and the Arab Academy for Science, Technology & Maritime Transport (AASTMT) in northern Egypt for the training of mariners. Operated by AASTMT, the facility joins a group of only 12 centres in the world that are qualified by the Nautical Institute to offer Sea Time Reduction courses. This means that trainees are credited with 30 days of sea time when they complete five days of intensive training in the Class A dynamic positioning (DP) simulator.

Selected to continue supplying and operating the simulator as a joint project with the Academy for the next five years, GE has upgraded the facility with GE



Marine's Class A training simulator.

Since its inauguration, the centre has trained up to 800 students to become certified in operating DP systems, AASTMT said.

In order to run this Class A simulator the centre is utilising hardware and software

from GE Marine, including its C-series dynamic positioning and a simulator system.

Applied Research International is the preferred simulator supplier for GE's DP training projects, GE Marine said.

The centre will also be equipped with a new Class A offshore crane simulator, the first of its kind for local operators to obtain offshore crane training in the Arab world.

"With over 900 of our DP systems deployed worldwide, the training centre in Egypt will add to our capability in training future mariners for more efficient and safe maritime operations and also help meet the needs of the offshore and petroleum services in the Middle East and beyond," said Tim Schweikert, VP, GE Marine.

### Caterpillar launches free e-learning website for future technicians in Africa

CATERPILLAR HAS LAUNCHED the pilot-phase of the Technicians for Africa Project, an e-learning website for people who aspire to become technicians in Nigeria, Mozambique and DR Congo. The website, which is available in French, Portuguese and English, is leveraging Caterpillar's existing, state-of-the-art e-learning solutions and makes them available for anyone in the three countries who has the ambition to develop a career as a heavy equipment technician. "This is just one of the ways that we're looking to boost the skills in the industry as a whole. There is a vital need for skilled labour across these sectors in Africa. We are proud to see the launch of this initiative," said David Picard, regional manager responsible for Caterpillar's distribution in Africa.

The pilot websites in English, French and Portuguese have already been launched and during the pilot stage they will be available in Nigeria, DR Congo and Mozambique. The access to the basic

Caterpillar Technician curriculum is free. Those who register for the curriculum will have the opportunity to upgrade their knowledge, and upon successful completion of the curriculum, will earn a certificate of completion.

"Many school leavers cannot enter the job market because they have been unable to receive enough technical knowledge when they leave school. In schools, the latest technical information isn't always available," explained Maurice Manders, Caterpillar's learning and development manager and also team leader of the e-learning project. "Offering an Internet-based basic learning curriculum that is available to schools and students is an efficient solution to this challenge," he added.

The web-site's URL is:

<https://techniciansforafrica.caterpillaruniversity.com>



## Aminex seeks vessel for deepwater Tanzania 3D seismic survey

AMINEX HAS STARTED a re-tendering process for acquisition of 3D seismic over the deepwater part of the Nyuni Area PSA offshore Tanzania.

Subject to vessel availability, the programme could start during the next suitable weather window in 2016.

In August state-owned Tanzanian Petroleum Development Corp (TPDC) confirmed that Tanzania's Ministry of Energy and Mines had agreed

to defer Nyuni's two exploration wells commitment into the four-year first extension period which ends in October 2019. Aminex has submitted a relinquishment plan which should maintain optionality through retention of virtually all the deepwater blocks, while retaining key blocks on the continental shelf, including Nyuni and Fanjove Islands. This remains subject to TPDC approval.

However, RAK Gas has served notice of its

intention to withdraw from the Nyuni Area PSA and not to participate in the first extension period. This would raise Aminex's interest in the license to 92.5 per cent.

The company says it is unlikely to be in a position to drill an expensive deepwater well in the Nyuni Area without bringing in a larger farm-in partner, although the possibility of drilling wells on the shelf more economically remains an option.

## ION completes 2D seismic survey offshore Namibia

ION GEOPHYSICAL HAS completed the interpretation of a 2D seismic survey on block 2113A in the Walvis basin offshore Namibia, Nabirm Energy Services announced.

The license block covers 5,750 sq km, with 3,600 sq km located offshore and 2,150 sq km located onshore.

Using M/V BGP Pioneer, BGP International acquired the survey. Earlier this year, the same vessel completed ION Geophysical's NamibiaSPAN 2D survey. BGP Pioneer acquired 684 line km of 2D seismic data plus ship borne gravity and magnetic data within block 2113A. The survey was acquired with a single nine-km cable towed eight metres below the sea surface. Acquisition was completed in March. Parallel Geoscience processed the 2D seismic data in April and May 2015. ION Geophysical was contracted to perform the 2D seismic interpretation.

Nabirm said that the objective of the seismic interpretation was to identify key depositional features, structural features, and anomalous reflection packages. The most significant surface within the dataset is a strong reflector at the top of a thick succession of low frequency reflectors.

Using the NamibiaSPAN 2D data, these horizons were correlated into block 2113A. In addition to these regional horizons, local surfaces were identified from the PEL 58 2D seismic survey exploration grid. Additionally, ION mapped six leads with total Pmean unrisked



recoverable resources of more than 520mn barrels. The stratigraphic lead designated Ondo is the largest and of principal interest, with a Pmean of around 230mn barrels. The stratigraphic lead designated Ekiti is slightly smaller and exceeds 200mn barrels. The oil was confirmed to be a light 40° API.

Nabirm is currently offering block 2113A for farm-out. It was awarded petroleum exploration license 0058, which included block 2113A, in July 2013. NAMCOR is Nabirm's partner on block 2113A.

## Fugro wins three-year positioning contract

FUGRO HAS BEEN awarded a three-year contract by PGS for the provision of precise satellite positioning systems for its entire seismic vessel fleet.

Fugro, the world's leading provider of precise satellite positioning to the offshore oil and gas industry, will supply PGS vessels with a number of completely independent Global Navigation Satellite Systems (GNSS). These systems include Fugro's recently launched Starfix.G4 - the first commercial GNSS service to utilise all available GNSS systems (GPS, GLONASS, Galileo and BeiDou), giving sub-decimetre accuracy - and Starfix.G2+, a global service offering centimetre accuracy in both position and height.

In addition to precise vessel positioning, PGS will benefit from a new generation of positioning technology for their seismic sources and tailbuoys. Meeting the high demand for robustness and quality in the offshore industry, this proactive technology provides independent decimetre and centimetre positions and heights for remote (seismic source and tailbuoy) operations.

Cerys James, VP technical at PGS, remarked, "Reliable, precise positioning technology is essential for modern seismic operations. The solution supplied by Fugro will ensure our entire fleet has highly accurate vessel positioning, along with precise source and streamer positioning."

## EPI to support GNPC seismic exploration

EPI GROUP (EPI) GHANAIAN Joint Venture Company – EPI SonarTusk – has signed a contract to provide project management consultancy to support seismic exploration by Ghana National Petroleum Corporation (GNPC) in the Voltaian Basin. The two-year contract will see EPI support the first onshore exploration in Ghana for nearly 40 years, and is intended to acquire a regional 2D seismic programme within the 104,000 sq km basin.

The Voltaian Basin covers approximately 40 per cent of Ghana's land mass. It is a sedimentary Neoproterozoic basin, with a number of similarities to areas in North Africa and elsewhere, which are already producing significant volumes of hydrocarbons. Exploration in such a basin carries higher risk than most conventional petroleum plays because of its age and probable geological history. Adding to the challenge is the basin being home to the Volta Lake – the world's largest man-made lake by surface area.

Under the terms of the contract, EPI will bring together a team of project managers, geophysicists, surveyors, QC consultants and environmentalists to define the scope of work to be carried out. It will then manage a tender process, from creating tender documents, evaluating bids from acquisition companies, and assisting GNPC in the selection and supervision of the chosen contractors. EPI will additionally develop the scope of work to process and manipulate the acquired seismic data, and support GNPC in the selection and supervision of contractors.



"We are pleased to inform you that Tolmann is now an OPITO approved training provider for TBOSIET, THUET AND TFOET courses respectively. We are indeed grateful for your support over the years."

**We also offer the following courses at our Training Facility among others:**

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Basic Fire Fighting & Self Rescue  
Basic First Aid & CPR  
TFOET  
AED

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Advanced First Aid  
IMIST  
STCW 95  
PSCRB  
COXSWAIN

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Fork Lift  
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Mozambique saw some muted investor interest in its recent licensing round. Given the state of the oil and gas markets, however, there is reason for regarding that as success. Interestingly, IOCs chose unexplored offshore basins, over the recently proven-up Rovuma basin, indicating a preference for the long game in LNG and a rather pessimistic view on midterm LNG supply and demand balances

## Looking good for the long term

**H**AVING FOR A long time been regarded an uninteresting upstream play, Mozambique's offshore deepwater burst onto the global gas scene in 2010 and 2011, after Italy's Eni, US' Anadarko and Norway's Statoil made large gas discoveries in the area. Success spread through the Rovuma basin to waters in neighbouring Tanzania and within a relatively short time more than 100 tcf of recoverable gas reserves were proven up and LNG export projects launched. Despite the oil price downturn since mid-2014, work is ongoing in Rovuma waters, although there are signs of slippages.

A floating liquefaction plant (FLNG) is still on schedule to come onstream at Eni's Coral project in 2019, while Anadarko's hopes for an FLNG installation to be completed the same year at the Golfinho discovery might by now have been pushed into 2020. An FID was targeted for completion this year, but might be signed in the earlier parts of 2016. Targets for an Anadarko-led large 12 mmtpa onshore-located LNG plant have been set to 2022, but here signs of slippage are really starting to abound, not least because long-term LNG offtake commitments are proving hard to secure.

### Investment interest slow

While the discoveries in Rovuma have so far been a success story, expectations for further exploration investment in deepwater gas-prone tracts are rather low, given the state of the oil price. Moreover, a string of Australian LNG projects are coming onstream from this year and onwards, lifting the Pacific basin producer from a production of less than 30 mmtpa of LNG in 2014 to over 120 mmtpa around 2021-2022. That kind of growth, making Australia the world's largest LNG exporter by the start of the 2020s, is bound to put a damp cloth over other LNG production investments in particularly the Pacific Basin.

The addition of further projects, mainly in the US – drawing on the ample and cheap US supply of shale gas – is likely to fuel a fight for East Asian market shares further. These volumes are also likely to end up in Europe, as global LNG prices take a hit from the abundance of supply and fall closer to European levels.

For a high-cost producer just entering markets, such as Mozambique, this is not particularly good news. Mozambique's LNG exports will commence just as Australia is starting to reach its planned export capacity peak



*Mozambique's gas comes mostly from the offshore deep water. (Image source: Photo Club of Mozambique)*

### Upstream developers in Mozambique will have to build all infrastructure virtually from scratch and bring in everything from the outside.

and fight for a market share from a relatively similar cost base.

Like Australia, Mozambique's gas comes mostly from the offshore deep water. Unlike Australia, however, Mozambique has not suffered from the same level of project cost inflation over the past decade.

Nevertheless, upstream developers in Mozambique will have to build all infrastructure virtually from scratch and bring in everything from machinery, technology and skills from the outside. While projects getting underway in Mozambique might now benefit from the upstream project cost deflation currently sweeping the globe, the demands coming from pioneering gas production and liquefaction in this, by the upstream industry previously untouched area, will be very costly.

This is probably the main reason why investment interest in the Rovuma basin at this time was so low, while it remained sufficient for acreage in less tested areas to be picked up. Rovuma has been proved as a gas-prone prospect,

so being on the clock to develop new gas discoveries in a relatively saturated market some years from now, with few excuses for inaction given nearby developments, could easily become a very unenviable position for an oil and gas company. Better then to direct remaining capex budgets to some other interesting geological prospects in Mozambique, which could hold more liquids or at least come under less pressure for rapid development, should more gas be discovered.

In times of high oil and gas prices, it is often underestimated to what extent making a discovery in untested and undeveloped waters, far from any existing infrastructure, generally provides the explorer/developer with a certain "early procrastination" right.

It is often very hard for a regulator or license issuer to revoke the license for a company having made a first discovery in an otherwise untested area, as others will then be reluctant to enter. Moreover, it is hard to prove inaction on behalf of the explorer/operator, as the company has an information advantage regarding the geology and reserves. In addition, deciding whether a find is commercial or non-commercial could fall outside of the inexperienced agency's capacity as well as its capability.

### Fifth licensing round a success

With that in mind, it is not that surprising that interest in the Rovuma basin was scant in Mozambique's fifth licensing round. Given the size of capex cuts announced in the industry over



the past six months, there is reason to see the award of six out of 15 blocks as a success.

Two onshore blocks were awarded, with South Africa's Sasol snapping up the PTS-C block in Pande Temane, together with Mozambique's state-owned ENH. A consortium of Delonex, Indian Oil Corp and ENH secured the Area P5-A license onshore Palmeira. But the large deals were for the offshore blocks.

A consortium of Eni, Sasol, Statoil and ENH won the block A5-A offshore Angoche. The exploration tie-up between ExxonMobil and Russia's state-dominated Rosneft secured the other Angoche block on offer, the A5-B. The partnership further secured two blocks in the Zambesi Delta basin further south (Z5-C and Z5-D), committing to an exploration spend of around US\$527mn at the three deepwater blocks. ExxonMobil will hold a 60 per cent operating stake in the venture, with Rosneft holding 20 per cent and ENH taking the remaining 20 per cent on behalf of the state.

All offshore blocks are to be surveyed with 2D and 3D seismics, as well as FTG (Full Tensor Gravity) and high resolutions magnetics programmes, while eight offshore wells have been committed to. ExxonMobil and Rosneft will drill two wells each in the A5-B and Z5-C and one in Z5-D, while the Eni-led consortium has agreed



*Pipeline carrying natural gas from Mozambique to South Africa.*

to drill three deepwater wells in their block. The onshore licenses were awarded with only one commitment well each.

Continued investment for next five years

All in all, this means that Mozambique will see continued investment in both development and exploration over the coming four to five years at least, which in the current price climate really testifies to the large potential oil and gas companies see there. Still, there will inevitably be delays and news that LNG projects are having trouble securing long-term purchase commitments are not surprising, given the market onslaught from Australia and, to some extent, the US, in the coming few years.

**For the long term, this leaves Mozambique in a quite good position, as the probable provider of a second wave of LNG supply growth.**

There was news earlier this autumn that Eni had sold some LNG in advance, with an oil link pricing the LNG closely to the LNG due out from the US around the same time. According to widely quoted estimates of forthcoming US LNG prices in the last month, this could mean Mozambique LNG being priced at around US\$5.50/mmBtu, which, only recently would have been regarded as rather cheap for a Pacific Basin FLNG deepwater development. Times change, however, and LNG demand growth in Asia might well receive a vitamin shot from the abundance of LNG in the coming years, not unlike the oil demand reaction witnessed, particularly in Asia, over the past 18 months.

For the long term, this leaves Mozambique in a quite good position, as the probable provider of a second wave of LNG supply growth a bit into the 2020s. Before then, there is some reason to expect further project delays, however. ■

# WHASSAN



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## Kosmos' second discovery off Mauritania

KOSMOS ENERGY HAS made a second play-extending gas discovery in block C-8 offshore Mauritania. The Atwood Achiever drillship drilled the Marsouin-1 exploration well in about 2,400 metres of water. Based on preliminary analysis of drilling and wireline logging results, Marsouin-1 encountered at least 70 metres of net gas pay in Upper and Lower Cenomanian intervals comprised of excellent quality reservoir sands.



The Atwood Achiever drillship.

The Marsouin-1 gas discovery is about 60 km north of the basin-opening Tortue-1 gas discovery (renamed Ahmeyim).

Kosmos Energy chairman and CEO Andrew G Inglis said: "Marsouin-1 is our second major discovery of 2015, extending our 100 per cent success rate in the outboard Cretaceous petroleum system offshore Mauritania and Senegal. Well-to-seismic calibration has significantly de-risked the discovered resource base, as well as future prospects in the basin.

"Importantly, the well results have validated our charge model and given us growing confidence in our ability to predict the oil and gas potential of this emerging, large-scale petroleum system. We have a disciplined exploration and appraisal programme planned to further unlock the basin." Atwood Achiever will now proceed to the Ahmeyim-2 location in the southern part of Mauritania's block C-8 where it will drill the top-hole section of the well. The drillship is then expected to sail to Senegal where it will spud Guembeul-1, the first in a series of wells to delineate the Greater Tortue area, before year-end.

## Sirius commissions Niger Delta offshore gas study

NIGERIAN INDEPENDENT SIRIUS Group has contracted Penspen to perform an engineering study involving monetisation of gas reserves from oil fields in the offshore Niger Delta.

One of the main considerations is the potential development of gas reserves from the OML 122 field, 40 km from the coastline of southern Nigeria.

The study is part of Project Dawn, a three-year, US\$1.2-bn programme that includes construction of a pipeline network to deliver natural gas to the Escravos-Lagos pipeline system, designed and built under Penspen's supervision over two decades ago.

Penspen's work will include an evaluation of the OML-122 field development, subsea gas pipeline, and onshore central processing facility. The study will seek to determine the extent of new pipeline and facilities required, and quantify the overall investment required for the project.

Gas from Project Dawn will supply power plants and other industrial users in Nigeria, providing 250mn cfd under the gas sale and purchase agreement between Sirius Oilfield Support Services and NNPC subsidiary Nigerian Gas Co.



OML 122.

## Ophir close to LNG deals offshore EG

OPHIR ENERGY HAS contracted Fugro to provide survey services for planned FLNG facilities and associated infrastructure for the Fortuna project in block R offshore Equatorial Guinea.

Under the contract Fugro will deploy three of its specialist vessels - Fugro Searcher, Fugro Scout and Fugro Frontier - to perform autonomous underwater vehicle (AUV) surveys as well as geotechnical, environmental and metocean surveys.

The significant survey programme will take place at the Fortuna Project to the west of Bioko Island, where Ophir is planning a large FLNG installation and associated subsea structures. With the surveys beginning in November, the offshore operations are scheduled for completion in January 2016.

Meanwhile Ophir has finalised commercial terms for its Fortuna floating LNG (FLNG) project offshore Equatorial Guinea and is in the process of signing heads of agreement (HoAs) for LNG offtake with a group of counterparties. All are globally established LNG buyers.

The offtake contracts provide the flexibility to deliver the gas to either the Atlantic or Pacific basin. Total requested demand under the HoAs has substantially exceeded the available offtake from the project.



Fugro Searcher. (Image courtesy: Fugro)

## Eni proves more gas in presalt play offshore Congo

ENI HAS DISCOVERED potentially large volumes of gas and condensates with its latest exploration well offshore Congo. Nkala Marine-1 was drilled in 38 metres of water on the Marine XII block, 20 km offshore and three km from the company's producing Nene Marine field. Eni estimates possible in-place reserves of 250-350mn boe.

During a test, the well flowed more than 300,000 cmpd of gas and associated condensates. There was a major gas and condensates build-up in the presalt clastic geological sequence of lower Cretaceous age, crossing a



hydrocarbon column of 240 metres.

Eni plans further delineation wells, and the partners will undertake studies for a commercial development, taking in various oil and gas discoveries in the block.

The company estimates combined resources from these finds at around 5.8bn boe. Production from the block started last December and is currently around 15,000 boepd.

Eni Congo operates Marine XII in partnership with New Age and Congolese state company Société Nationale des Pétroles du Congo (SNPC).

## Panoro completes Aje well operations

PANORO ENERGY HAS completed well operations on the Aje field in the OML 113 license offshore Nigeria.

The Aje-4 well, previously drilled in 2008, has been completed as an oil production well. This follows the completion of the Aje-5 production well, with both wells being perforated in the Cenomanian oil bearing zones with positive indications of well productivity based on the short flow-backs carried out during the completion programmes.



Subsea trees were installed on both wells, and the wells are now suspended ready for connection to the oil production facilities, prior to commencement of production. The company said that Scarabeo 3 is being demobilised.

Based on the well results and updated perforation modeling, the company says it is confident that it should meet its indicated daily production guidance.

CEO John Hamilton said: "We are very pleased to have now successfully concluded the well operations phase of the Aje Cenomanian oil development and are encouraged with the reported well results. We have achieved a major milestone to de-risk the project and are looking forward to starting commercial production towards the end of January 2016, following which we can begin generating positive cash flow."

## ExxonMobil's Liberia return gives a boost

EXXONMOBIL IS BACK in Liberia. Block 13 was signed up in 2013 but operations were placed on hold when the Ebola virus was detected in nearby Guinea and spread throughout the region — with Sierra Leone and Liberia the hardest hit.

The reopening of its office in Monrovia is a signal it is now safe to return to one of the continent's most prospective untapped oil frontiers — a huge swath of the West Africa Margin revitalised when Tullow Oil and Kosmos Energy declared intent to develop Ghana's Tano basin discoveries in 2007.

Country manager in Monrovia Steve Buck indicated a readiness to drill before the end of 2016. This is music to the ears of President Ellen Johnson Sirleaf, who now has every incentive to push through the reforming draft Petroleum Code, long delayed in a legislature preoccupied with factional infighting.

Much rides on ExxonMobil's debut well, Mesurado-1, which the supermajor and partner Canadian Overseas Petroleum hope will confirm commercial hydrocarbons.

Chevron is also poised to resume operations.

Perhaps the weakest link is the National Oil Company of Liberia (Nocal), where yet another chief executive, Randolph McClain, has been retired by Sirleaf. This time, his operations chief Althea Sherman has been put in charge to restructure the bankrupt player.

In terms of regional momentum, neighbouring Côte d'Ivoire already aims to double Ghana's current oil output of some 105,000 bpd before the end of the decade.

Explorers are now champing at the bit to expand deep-water drilling to the west around the the Windward Coast towards Sierra Leone, where Chevron plans to drill in blocks BFI8A and FL8B, reviving that dormant play.

So, with luck, Nubia's traumatised generation may yet benefit from future oil and gas revenues.



## Onshore exploration revived in Ghana

A TWO-YEAR CONTRACT between EPI SonarTusk and Ghana National Petroleum Corporation (GNPC) heralds the first onshore exploration in Ghana for nearly 40 years.

The contract will support 2D seismic exploration of the Voltaian Basin, which is located in Ghana's south-central region and covers an area of 104,000 sq km, or 40 per cent of the country's total land mass. Hydrocarbon exploration in this region is particularly challenging because of the basin's age, probable geological history and the presence of the Volta Lake, the largest man-made lake by surface area in the world. It is a sedimentary Neoproterozoic basin with similarities to areas in North Africa which are already producing hydrocarbons.

EPI SonarTusk, which is EPI Group's Ghanaian joint venture company, will provide project management consultancy services to support the exploration activities of GNPC. Under the terms of the contract, EPI SonarTusk will define the scope of work required with the assistance of project managers, geophysicists, surveyors, QC consultants and environmentalists. A tender process will then follow, involving the creation of tender documents and the evaluation of bids. EPI SonarTusk and GNPC will then work together to select and supervise the successful contractors. Processing and manipulating seismic data will also be part of EPI SonarTusk's remit.

## Lekoil set to lift stake in Ogo offshore Nigeria

LEKOIL HAS AGREED to acquire Afren's 22.86 per cent interest in OPL 310 offshore Nigeria, which includes the potentially large Ogo oil and gas discovery, for US\$13mn.

Currently Lekoil Nigeria has a 17.4 per cent stake in the license via its subsidiary, Mayfair Assets and Trust, and a further 30 per cent economic interest earned through a farm-in agreement signed in 2013 with Afren.

Assuming ministerial approval for the transaction, Optimum Petroleum Development Co will remain operator with Lekoil acting as its technical and financial partner.

Following the initial discovery well in June

2013, 3D seismic was acquired over the remaining 80 per cent of OPL 310 and interpretation of the seismic is in progress. The partners plan to commission a detailed work programme for 2016.

The license is within the Upper Cretaceous fairway that runs along the West African Transform Margin, and extends from the shallow water continental shelf to deepwater.

It is also close to the West African Gas Pipeline, which provides a ready outlet for development of gas discoveries.

According to Afren's review, Ogo-1, drilled

into a four-way dip-closed structure in the Turonian to Albian sandstone reservoirs, was one of the world's largest discoveries of 2013.

It encountered a gross hydrocarbon section of 160 metres, with 66 metres of net stacked pay, and the side track that followed penetrated hydrocarbon intervals in the same reservoirs.

Afren, which entered administration on 31 July 2015, estimated recoverable resources in the 774-1,180mn boe range, with upside potential for light oil or condensate-rich gas in the syn-rift play.



# AFRICAN RIG COUNT

The Infield Systems Ltd. Rig Count tracks industry-wide offshore rigs engaged in drilling and related operations, which include drilling, logging, cementing, coring, well testing, waiting on weather, running casing and blowout preventer (BOP) testing.

## NOVEMBER 2015 - OFFSHORE

Country	NOVEMBER 15	OCTOBER 15	VARIANCE	NOVEMBER 14	OCTOBER 14	VARIANCE
	Offshore	Offshore	From Last Month	Offshore	Offshore	From Last Month
ANGOLA	16	19	-3	20	22	-2
NIGERIA	13	13	0	15	15	0
GABON	5	5	0	5	6	-1
CONGO (BRAZZAVILLE)	4	4	0	5	5	0
MOZAMBIQUE	0	0	0	1	1	0
GHANA	3	3	0	2	2	0
CAMEROON	1	1	0	3	3	1
EGYPT	12	13	-1	16	16	0
TUNISIA	1	1	0	2	2	0
SOUTH AFRICA	1	1	0	1	2	-1
TANZANIA	1	1	0	2	2	0
EQUATORIAL GUINEA	0	0	0	1	2	0
NAMIBIA	0	0	0	0	0	0
LIBERIA	0	0	0	1	1	0
LIBYA	1	1	0	2	2	0
COTE D'IVOIRE	2	1	1	1	1	0
SENEGAL	1	0	1	1	1	0
BENIN	0	0	0	2	1	1
KENYA	0	0	0	0	0	0
MOROCCO	1	1	0	2	2	0
MAURITANIA	0	0	0	0	0	0
<b>TOTAL</b>	<b>62</b>	<b>64</b>	<b>-2</b>	<b>82</b>	<b>86</b>	<b>-4</b>

Source: Infield Systems Ltd.

## Marlin platform starts production

RAK PETROLEUM HAS announced the start of production by operator Foxtrot International from a second platform on block CI-27 offshore Côte d'Ivoire

Marlin-B1ST, the first well of five planned development wells, is currently flowing an average of 1,100 bpd of 26° API oil through a 35/64 inch choke. The well encountered 62 metres of gross pay in the Cenomanian interval; an 18.5 metre section of this interval was oil bearing, of which a 6.4 metre section has been perforated. It was drilled in 100 metres of water and reached a total depth of 2,660 metres. Drilling of the top holes of the remaining wells in this phase of the development programme is ongoing.

The Marlin platform was installed in April 2015 as part of a four-year, US\$1bn expansion programme to bring the Marlin oil and gas field and the Manta gas field on production. The platform will double



Foxtrot International has started production on block CI-27.

block CI-27's hydrocarbons treatment capacity and increase the supply and the reliability of gas deliveries. The first platform on the block has been in operation since 1999 and processes gas and liquids from the Foxtrot and Mahi fields.

Foxtrot International operates block CI-27 with a 24 per cent direct stake. Other partners on the block are the state oil company, PETROCI (40 per cent), SECI (24 per cent) and ENERCI (12 per cent). Foxtrot International also has a 27.27 per cent interest in ENERCI.

RAK Petroleum has a one-third ownership of Foxtrot International through Mondoil Enterprises, whose overall stake in block CI-27 is 9.1 per cent.

In 2015, gas production from block CI-27 till the end of Q3 averaged 145mn cfd. Production of oil and condensates from the block averaged just below 1,000 bpd before the new well started.

# WELL FLUID

## SERVICES LIMITED

### Think Well Testing, Think Well Fluid Services



Well Fluid Services Limited was incorporated in 2001 as a wholly indigenous Oil Service Company to serve the Oil & Gas industry in Africa and beyond. Our services include:

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- Data Quality validation
- Production Operator Supply to man production platforms
- Effluent Water Treatment

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## Bowleven to buy into KNDL, Ruvuma PSA

AFRICA-FOCUSED OIL and gas exploration group Bowleven has announced that it plans to acquire a 25 per cent interest in the Kiliwani North Development License (KNDL) and a 50 per cent interest in the Ruvuma PSA, in Tanzania.

The company has signed a conditional heads of terms agreement with Aminex PLC for the acquisition of the asset interests, which includes an aggregate gross consideration of up to US\$28mn. Pre-transaction, Aminex holds a 55.575 per cent operated interest in KNDL, with RAK Gas holding a 23.75 per cent interest, Solo Oil holding a 6.175 per cent interest, Bounty Oil & Gas holding a 9.5 per cent interest and TPDC holding a five per cent interest. Aminex also holds a 75 per cent operated interest in the Ruvuma PSA, pre-transaction, with Solo Oil holding the remaining 25 per cent.

Kevin Hart, chief executive at Bowleven plc, commented in a company statement: "The decision to enter into this heads of terms with Aminex follows the extensive screening of a large number of opportunities in Africa. Consistent with the group's strategy, the deal affords Bowleven the opportunity to participate in highly attractive production and material appraisal/exploration assets without compromising its robust balance sheet and strong capital discipline.

"In particular, the onshore Ruvuma acreage mirrors the near-term in-situ gas-to-power development possibilities being progressed at Bomono, whilst the extensive, material prospective resources open up the opportunity for substantial future gas sales via the existing proximal processing infrastructure and pipeline. During the forthcoming period of exclusivity, we look forward to working closely with Aminex in order to finalise the proposed transaction."

## Octant Energy acquires assets in East Africa

OCTANT ENERGY CORP has entered into three agreements with subsidiary companies of Afren to acquire assets in Kenya and Tanzania

The assets acquired by Canada-based Octant include Block L17/L18 and Block 1 in Kenya, and the Tanga Block in Tanzania. The acquisition is important for the development of these assets and the region, especially following Afren going into administration earlier this year. The deal ensures that a team with regional experience and knowledge takes forward the respective production sharing contracts (PSC) and continues delivery of near-term actionable items on these assets.

Richard Schmitt, president of Octant said: "I am encouraged to be working with assets I know well from my past experiences. This portfolio that Octant has secured is pivotal in the future development of Kenya and Tanzania as they further move towards energy security and domestic growth. For me, being a part of East African growth and development again is a great opportunity and privilege."

The acquisition of the PSCs by Octant remains conditional on customary approvals from the respective governments. Once approval is received, Octant will complete the acquisition of the PSCs from Afren within seven days. At present, Octant is evaluating its future capital requirements with respect to the three PSCs.

## Sterling farms in offshore Mauritania concession

STERLING ENERGY HAS completed a farm-in to the production-sharing contract (PSC), operated by Tullow, for block C-10 offshore Mauritania. The 10,725-sq km PSC, awarded in 2011, is in the second phase of the exploration period, due to expire on 30 November, 2017, with a minimum work obligation of one exploration well. Block C-10 spans water depths of 50-2,400 metres, with full legacy 3D seismic coverage.

Sterling says Tullow has matured a drill-ready Neocomian carbonate prospect in 100 metres of water, likely to be drilled in 2017 at a cost less than the originally budgeted US\$77mn.

## Total starts up Moho 1b

TOTAL HAS BROUGHT the Moho Phase 1b project, which is located 74 km off the coast of Pointe-Noire in the Republic of the Congo, on-stream.

Part of the Moho Bilondo license operated by Total E&P Congo with a 53.5 per cent participating interest, Moho Phase 1b has a production capacity of 40,000 boed. The other partners in the project are Chevron Overseas (Congo) Limited, with a 31.5 per cent interest, and the Société Nationale des Pétroles du Congo, with a 15 per cent interest.

Total president exploration & production, Arnaud Breuillac, commented in a company statement:

"Moho Phase 1b is our ninth start-up since the beginning of the year and will contribute to our strong production growth in the years to come. The start-up of this project, in line with the original schedule, constitutes a further success for Total's growth strategy in deep offshore, particularly in West Africa. It follows the start-up of Dalia Phase 1A on Angola's Block 17 in July this year and more recently, the Lianzi field which straddles the deep offshore of Congo and Angola."

Moho Phase 1b, located in water depths ranging from 610 to 914 metres, involves the drilling of 11 new subsea wells and the installation of two subsea multiphase pumps. It is tied back to the existing Floating Production Unit (FPU) of the Moho Bilondo field, which has been producing since 2008. The nearby Moho Nord development, launched concurrently with Moho Phase 1b in 2013, is ongoing and will add a further 100,000 boed of capacity.

Present in the Republic of the Congo for almost 50 years, Total is the country's leading oil producer. Total E&P Congo operates 10 of the 23 producing fields, accounting for nearly 50 per cent of national output. The Group's equity production averaged 95,000 boed in 2014.

## Bowleven buys into Tanzania

BOWLEVEN is expanding its African oil and gas empire into Tanzania in a deal worth up to \$US28mn. The company said it has agreed to buy stakes in two licences in the East African country from Aminex to secure a low cost entry into the fast-expanding Tanzanian gas market. The deal is the first agreed by Bowleven since the company completed a US\$250m stake sale in Cameroon in March. This left the company with plenty of cash on its balance sheet at a time when oil and gas firms are grappling with the fallout from the slump in the crude price.

Last week Bowleven's CFO Kerry Crawford said the firm had been inundated with calls from investment bankers trying to sell its oil and gas assets as the downturn in the sector encourages deal activity. Bowleven's CEO, Kevin Hart, said the deal with Aminex followed the extensive screening of a large number of opportunities in Africa.

"The deal affords Bowleven the opportunity to participate in highly attractive production and material appraisal/exploration assets without compromising its robust balance sheet and strong capital discipline," said Mr Hart.

The company has agreed to acquire a 25 per cent interest in the Kilwani North gas field, on which production facilities have been installed. The field is expected to come onstream following completion of the adjacent Songo Songo gas processing plant. Bowleven said the plant is expected to be completed shortly.

The company could use the cash generated from production to fund activity in other areas. Bowleven has interests in Cameroon, Kenya and Zambia but no producing assets.

The company has agreed to acquire a 50 per cent interest in the Ruvuma licence from Aminex. It said this offers the potential for near-term production following drilling planned for 2016, alongside the possibility of significant exploration upside. Mr Hart said Bowleven looks forward to working closely with Aminex in order to finalise the proposed transaction.

Bowleven has agreed to pay US\$8.5mn cash, US\$5mn shares and to cover US\$10mn of Aminex's costs on the licences. It will pay up to a further US\$4.5mn if targets are met.



# CLOSE VISUAL INSPECTIONS & SURVEY

## Using Remotely Operated Aerial Vehicles (ROAVs)

### ABOUT US

PFL Engineering Services Limited is a wholly indigenous Nigerian company with focus on Rope Access, Scaffolding, Tensioned Netting, Inspections, Lifting Equipment Inspection, Fabrication, Blasting & Painting, Emergency Response Services, Technical Manpower and Training Services.

We are certified members of IRATA (Industrial Rope Access Trade Association) as Operators and Trainers, LEEA (Lifting Equipments Engineers Association) as Operators and Trainers.

We also have international reputable certifications in ISO 9001:2008, ISO 14001:2004 and OHSAS 18001:2007 reference standards.

### THE OPPORTUNITIES OF ROAVs

#### IMPROVE SAFETY

Reduction or elimination of working at height  
Reduce the use of helicopters

#### SAVE MONEY

Reduce use/cost of helicopters, scaffolding, binoculars, rope access  
Reduction or elimination of PoB issues (when operating from a boat)

#### INCREASE EFFICIENCY

Shorter setup and faster inspection time  
Clear representation of asset condition using visible and thermal imagery

#### Corporate Headquarters

Plot 32 Block 100, Furo Ezimora Street, Lekki Scheme 1,  
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#### Divisional Headquarters / Training Base

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Email: [training@pflengineering.com](mailto:training@pflengineering.com)





## Creating effective connections

HYDRATIGHT HAS BUILT expertise in the Norwegian Continental Shelf and offshore Brazil, which it has now transferred to West Africa. Its subsea connectors range includes remote connectors for deepwater applications. They offer the same strength, integrity and reliability as the rest of the mechanical connectors range but in a deepwater specific design which requires no diver intervention.

They are a mechanical alternative to hyperbaric welding and use a unique gripping and sealing system that does not affect the integrity of the pipe. They have been a core product of the Hydratight range since the 1980s and have been developed to meet the increasing challenges of the global offshore market. With an expected 60,000 nautical km of pipelines due to be laid worldwide by 2019, connector technology will continue to provide engineering solutions for pipeline repair. Older pipelines are understandably at a greater risk of failure as 40 per cent of malfunctions come from erosion or corrosion.



Hydratight's subsea connector.

However, crowded subsea oilfields are also at risk from any number of incidences, dropped objects, stuck pigs or dragged anchors. Repairing a buckled or damaged section of pipeline or riser in such harsh conditions takes hard-won expertise. Hydratight has honed this process over the last three decades and as well as testing and deploying the equipment in other global locations, it also has the manpower who have managed similar projects. A joint collaboration with Norwegian specialists, Connector Subsea Solutions, further extends capabilities to include all installation tooling and ancillaries. Hydratight's remote connectors have been successfully used in world-first applications of deepwater repairs and tie-ins, including 4", 12", 16" and 30" pipelines. They have a minimum 30 year design life and are DNV GL, Lloyds and American Bureau of Shipping (ABS) approved.

### Ready for the future

Diverless pipeline repair is only one of many technologies ready to penetrate the African market. Developed by Connector Subsea Solutions, the Riser Cleaning and Inspection Tool (RCIT) is now an integral component within the Hydratight offering. This service ensures the removal of excessive sea-growth, reducing the weight on the riser and pipeline systems, improving the system dynamics and ensuring continued field life. Inspection provides assurance of continued system integrity. Should damage be discovered, the size, depth, location and severity can be recorded. The technology is currently under contract to perform on hundreds of flexible risers offshore Brazil.

The African market requires more of these proven technologies to allow it to flourish to its full potential and meet its own and the world's steady demand for hydrocarbons.

*James Rowley, Global Subsea Market development manager and Paul Hughes, Global Subsea Market leader at Hydratight.*

## Three-year award in Angola strengthens Harkand's position in West Africa

HARKAND AND ITS local consortium partner TOS Angola Lda has secured a three-year contract to deliver inspection, repair and maintenance (IRM) services in Angola for a major international oil company operating in the West Africa region.

The recently upgraded multi-purpose dive support vessel (DSV) *Swordfish* has been mobilised to support the project and provide air, surface gas and saturation diving services for the work in Cabinda, Angola.

Following the recent US\$10.5mn upgrade to the diving systems, the DSV *Swordfish* is fully compliant to the highest standards of the International Marine Contractors Association (IMCA) including a 15-man diving system, three-man bell, self-propelled hyperbaric lifeboat (SPHL) and a dedicated hyperbaric rescue facility (HRF).

Harkand's managing director for North America and Africa, AJ Jain said: "This is a new consortium for Harkand in another West Africa region; we are extremely proud to have been selected by our client to support their IRM activities offshore Cabinda.

"The block we will be working in is of extreme importance to Angola's petroleum industry therefore we understand the importance of maintaining production to our client and expect to



Harkand Swordfish DSV2.

fully support all their subsea inspection, repair and maintenance needs in the safest and most cost efficient manner utilising the DSV *Swordfish*."

Harkand's recently appointed general manager for Africa, Doug Fieldgate, has extensive experience in this region and has a clear understanding of the challenges involved in delivering a world class safe service to the block as well as the region.

Doug said, "Harkand is working closely with our consortium partner and client to ensure we develop local capacities by maximising the use of nationals and implementing skills transfer

programmes. Our efforts to achieve this goal has been demonstrated in the execution of projects in Ghana and Nigeria and will remain a top priority as we move into Angola.

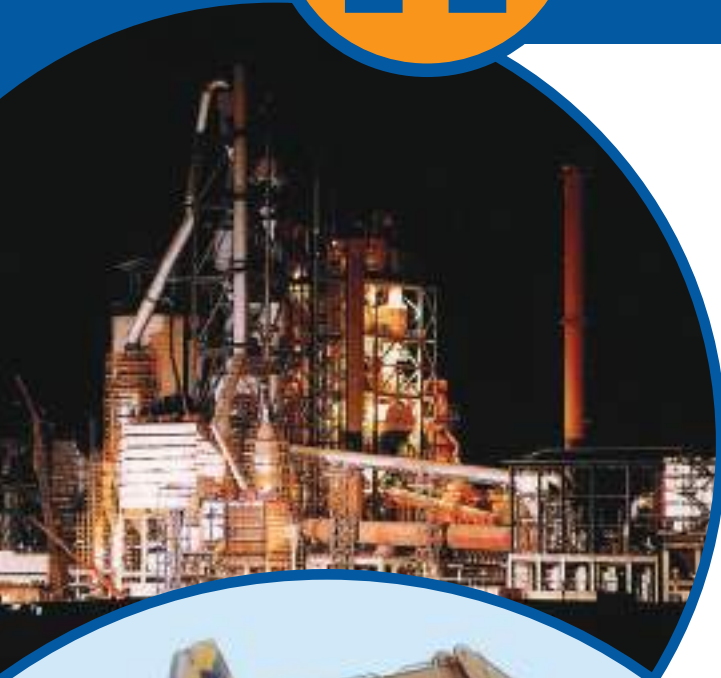
"Group TOS Lda is a local Angolan company which specialises in marine and offshore sectors. TOS will provide all local logistical efforts, including all local personnel required to complete this work programme safely."

Harkand has a global fleet of IMCA-compliant multi-purpose subsea construction vessels which are equipped with active heave compensated (AHC) cranes, heavy duty workclass remotely operated vehicles (ROVs) and full survey spreads – each of Harkand's vessels is exceptionally proficient in providing IRM and light construction work in the harshest environments including the North Sea, Gulf of Mexico and Africa.

Harkand provides offshore vessels, ROVs, diving, survey services, project management and engineering to the oil and gas and renewables industries. Headquartered in London with operations bases in Aberdeen, Houston, Mexico, Nigeria, Ghana and Angola, Harkand aims to be the leading subsea IRM and light construction contractor globally.



# RELIABILITY IN OIL WELL CEMENTS



Oil Well Cement (OWC) produced by Oman Cement Company (S.A.O.G) under accurate temperatures is an obvious choice for oil well cementing worldwide and now it is ready to face the challenges of highly specialized arctic and horizontal cementing:

- Conforms to the American Petroleum Institute (API) specification – 10A Class-G- (HSR), Class-B- (HSR) and Class-A- (O) grades.
- Tested and used by worldwide cementing companies
- Easy to disperse resulting in considerable cost savings
- First choice of major oilfield companies
- Exported to GC Countries, Iraq, Yemen, Libya, Sudan, Tanzania, Turkmenistan, Ethiopia, Pakistan, India, Bangladesh and Syria.

Oman Cement manufacturing facility operates on world class quality management system ISO 9001 and environmental management system ISO 14001. Quality control is online and laboratory automation systems consist of online x-ray spectrometers and robotic samplers, linked to process controllers and a raw mill proportioning system.

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Well control expertise underpins safe drilling operations in Africa's upstream oil and gas industry. It means training for all eventualities is key.

# All under control

**A**FRICA'S UPSTREAM INDUSTRY has blossomed in recent decades, a feat only possible where there is a strong safety track record.

Safety and accident prevention remain the highest priorities the world over for all energy industry players, whether in Africa or Asia, or anywhere else.

It illustrates the critical importance of well control activities wherever drilling is taking place, onshore or offshore.

Indeed, well control is integral in the prevention of blow outs, perhaps the most deadly and destructive of potential disasters facing oil drillers in the field.

The Deepwater Horizon tragedy in the US Gulf of Mexico in 2010 was triggered by a blow out at the subsea Macondo well, leaving 11 people dead and more injured, and causing a huge oil slick across the whole area.

Trawling through the history books, Africa has had its share of blowouts too, albeit with a slightly lower profile.

These include the Adriatic IV jack-up rig and Temsah gas platform off the Egyptian coast in 2004, and, even further back, the Funiwa-5 well which led to more pollution in Nigeria's Niger Delta back in 1980.

At its heart, good well control means proper training and understanding to prevent any of this from happening.

Leading training providers like the International Well Control Forum (IWCF), Intertek, and the International Association of Drilling Contractors (IADC) - which recently re-defined its well control training programme, WellSharp - and others, collectively offer a whole suite of well control education modules to the industry, incorporating both highly practical and theoretical components.

Ultimately, it is this rigorous training that helps to facilitate Africa's still impressive upstream safety record.

## Training and standards

A new level of well control training was also introduced this year, piloted by Seadrill, that for the first time combines simulated advanced technical content with human behavioural and psychological aspects.

"These techniques are used extensively by the aerospace and medical industries, but have still not been widely adopted by oil and gas, despite the known pressures and consequences of dealing with a well blow out," said David Gouldin, Seadrill's



*The Deepwater Horizon tragedy was triggered by a blow out at the subsea Macondo well, leaving 11 people dead and more injured, and causing a huge oil slick across the whole area.*

drilling and well control manager.

"Combining behavioural training with bespoke technical content makes this a learning experience unlike standard well control training. It's tough and demanding, but it will, without a doubt, drive up competency."

The enhanced training was developed by Maersk Training under the guidance of the IWCF and facilitated at Maersk Training's centre in Denmark.

Seadrill, which is also active in Africa and other global oil producing regions, is to carry out further courses before rolling it out to its 9,000 strong workforce.

It's a response to calls for a sharper focus on human factors in the drilling and well control process, an area given little regard until now.

## Joined up thinking

Industry groups such as the International Association of Oil and Gas Producers (IOGP) are also co-ordinating efforts to understand blow outs better, in order to provide more accurate information and effective training.

This includes a well control database for oil services companies and drillers to feed data into

**Good well control means proper training and understanding to prevent any of this from happening.**

following any reported incidents, to promote sharing and learning of information.

It believes there is still a void of information on these kinds of incidents, making it difficult to fix a problem where the full scale of what's involved is not understood. The initiative will help industry learn more effectively from real life situations where a well has been compromised.

IWCF's chief technical officer David Conroy, who also participated in the Seadrill pilot project, said there remains an industry assumption that the majority of well kicks happen during drilling.

In reality, he says, around 70 per cent occur during other well operations, such as tripping and cementing.

"So it is crucial that training reflects the reality of well operations," he said. "The Seadrill training will challenge any candidate and that is what we

There is a strong interest in new technologies too, including remote well control monitoring.

Others involve tie-ups with big international firms, such as Indigo Drilling Limited, jointly owned by US-based Transocean, one of the world's top offshore drillers, and a group of Nigerian investors.

More is to come as Nigerian firms take an ever greater share of local oil and gas industry business.

### Industry potential

But the scale of this industry - which is now stretching into frontier spots off eastern Africa, as well as sustained development in West Africa - means there is plenty of work for others too, especially for the major global drilling services contractors like Halliburton and Baker Hughes.

Halliburton, for instance, has been active throughout Africa for decades and has worked on countless upstream projects both for international partners and state-owned operators.

In Algeria, its expert well control unit Boots & Coots has been on a long-term retainer agreement with state firm Sonatrach providing various risk management services to help reduce overall well construction risk and improve training.

And, as in other parts of the industry, there is a strong interest in new technologies too, including remote well control monitoring.

That could mean co-piloting a well taking place hundreds of miles away offshore.

It means there is still a role to be played for all participants in this space, as the industry strives to better an almost spotless safety record. ■



Simulator training underway during the pilot scheme at Maersk Training's centre in Denmark. (Image courtesy: IWCF)

want to deliver; a step change in well control competency which is required by IOGP, particularly as operations venture into ever more challenging frontiers."

One member of IOGP's specialist Wells Committee, Huw Roberts, who is also a drilling manager at E.ON E&P, called it a "leap forward in well control training", which importantly "combines the interactions between people as well as their technical competency".

### Indigenous firms

While the likes of Seadrill and others are big international players, much of this new expertise is also filtering down to indigenous companies too.

In Nigeria especially, and in other locations, the local oil services industry has grown as more content and value from the country's oil and gas industry is circulated among domestic businesses.

Warri-based Weafri Well Services, one of a growing number of Nigerian contenders, provides well control and other services, such as pipeline pigging and cementing, to the local upstream industry.

Other notable names active in this niche include Petron Drilling, Maerlin Limited, Cardinal Drilling and Century Group.

Nigeria also has its own training firms as well, such as Charkin in Port Harcourt, a maritime and offshore centre that offers introductory well control training and other courses. Tolmann Allied Services, also in Port Harcourt, is an approved invigilation centre for OPITO IMIST, an essential course for all new entrants in the oil and gas industry.

These companies are together making a fresh contribution to improved performance and safer operations for the local, and regional, drilling industry.

## Total deploy Sonardyne LBL acoustic network at Kaombo in record-breaking time

FOLLOWING ON FROM the installation of a Long BaseLine (LBL) acoustic positioning network at the giant Egina oil field off the coast of Nigeria, French oil major Total and its project partners have repeated their success using the same Sonardyne Fusion 6G technology offshore Angola at the even larger, even deeper, Kaombo oil field.

The campaign to deploy, calibrate and make ready for work the field-wide array of transponder frames, was completed in just 31 days using the seabed component of a Fusion 6G system. This was half the time budgeted for, a figure that is thought to have set a new unofficial record for this scale of operation.

Covering an area of around 1,300 sq km, Kaombo lies in water depths up to 1,750 metres. Development of the field will involve the drilling of 59 subsea wells, connected by more than 290 km of subsea lines leading to two FPSO vessels. The majority of subsea construction work is scheduled for 2016-2017, which will be supported by the permanent transponder frame network. First oil for the initial FPSO is expected in 2017, with production from the other two FPSOs likely to reach an average of 230,000 bpd in normal operating conditions out of an estimated reserve of 660mn barrels.

Fusion is Sonardyne's sixth generation (6G) LBL technology platform, specified globally for its ability to meet the most stringent of subsea

survey and construction positioning tolerances. Thanks to its unique Wideband 2 digital signal architecture, common tasks such as template installation, touch-down monitoring and spool piece metrologies can be completed quickly, efficiently and precisely regardless of the water depth.

The exceptionally fast deployment of Fusion 6G at Kaombo has been attributed in part to the extensive project planning workshops hosted by project partner Technip in France. Attended by teams from Total, Technip and Fugro, together with personnel from Sonardyne's Survey Support Group (SSG), the sessions were used to review the full scale of the operation and consider the most efficient and cost-effective configuration of the LBL transponder frame network.

Deciding the quantity, specification and location for each transponder within a seabed array is crucial to the success of any LBL project. As the contractor for the Kaombo SURF (Subsea, Umbilicals, Risers and Flowlines) package, Technip conducted the LBL array planning themselves, a process that involved confirming that there was clear line of sight between neighbouring transponders and modelling acoustic network coverage at specific locations. By using the same specialist software as the SSG, Technip survey team was able to then share their proposed array design with Sonardyne for verification, thereby further increasing confidence in the plan prior to mobilisation.



Antoine Milan, executive partner Chemicals & Petroleum - Global Business Services, IBM Middle East and Africa, discusses strategies for the effective use and management of data.

# Promoting effective data management

**D**ATA MANAGEMENT IS a well-recognised imperative in the oil and gas industry. We believe effective data management comes down to achieving two objectives. First, developing the ability to identify and respond to incidents or issues faster, and making timely and good decisions to fix those issues. Second, developing deep insights into asset performance to make appropriate adjustments, in order to operate those assets at their optimum capacity.

Effective data management addresses both of these objectives at four levers:

- ◆ Relevant data collection - Relevant data is needed to run existing operations, but is the data correct, comprehensive and complete?
- ◆ Trustworthy data quality - When data is trustworthy, users become more confident about its value and more likely to act on it.
- ◆ Efficient access to data - How do you access the data efficiently without losing time trying to convert data into meaningful analysis and sharing it?
- ◆ Amenability to analytics - Amenability to analytics ensures that turning insights into performance can be quickly developed.

**Organisations must first analyse how data management supports their business strategy and what data the company really needs to manage.**

If all four levers are functioning optimally, a well-oiled data machinery is in place that constantly churns and delivers intelligent information to the operational workforce.

We find three emerging challenges that we believe will shape data management initiatives within the industry.

\* The O&G industry is witnessing an unprecedented amount of data growth. We see more sensors on the seabed, wellheads and equipment, more fibre optics inside the wells and pipelines and more seismic data being collected. Efficiently storing and accessing this data and providing it to end users is and remains a key challenge.

\* Second, the industry workforce is becoming highly global, mobile and collaborative.



*Antoine Milan, executive partner chemicals & petroleum - Global Business Services, IBM Middle East & Africa.*

Employees are demanding the ability to access data anytime, anywhere and from any device, which brings on an ever increasing challenge — data security.

\* Third, decision makers are increasingly asking “I have so much data, but what can I do with it all?” Typically the answer is analytics, but converting all of that big data into on-demand, easily-accessible insights can be a daunting proposition.

To overcome these challenges, the industry needs to embrace a few basic principles. This includes fostering a data driven organisational culture led by executives, creating and applying solid data governance, and a holistic approach to data architecture that ensures efficient data storage and seamless data flow across their enterprise. These principles may seem obvious but based on our experience these are the ones that trip up most organisations.

## Get the basics first

We believe that before embarking on any serious data management initiative, organisations must get the basics out of their way. First, they should analyse how data management supports their business strategy and what data the company

really needs to manage. This requires close involvement and stewardship from the business. We still see in many organisations such initiatives driven by IT, when in fact this should be accomplished through strong collaboration between the business and IT. It is only when the business truly believes that they own the data and are responsible for its quality and correct usage that we start seeing success.

Second, any data management initiative should be backed by an unambiguous business case that explains how data management will deliver value to business, to avoid the risk of being shot down when things change internally within the organisation or when external market pressures occur.

## The “right” team is essential

Third, data management programmes should be led and delivered by the “right” team. We often see a tendency to relegate the implementation task to IT teams with minimal involvement from the business when in fact representation from business users, IT/IM and architecture community is needed.

Last is a committed executive governance that enforces accountability, ensures efficient resource allocation and clears the obstacles in the way of implementation teams.

We believe that the selection of the “right” data platform and architecture is important to such initiatives but ultimately, the execution and the correct methodology are key.

IBM’s Watson is a perfect example on how industries, including Oil & Gas, are tackling the challenges of Big Data. For example, in the world’s first research collaboration to leverage cognitive technologies to transform the oil and gas industry, IBM and Repsol are jointly developing two prototype cognitive applications specifically designed to augment Repsol’s strategic decision making in the optimisation of oil reservoir production and in the acquisition of new oil fields. IBM researchers and developers have also collaborated with experts from Statoil on developing a solution that will use industry frameworks combined with advanced analytics to enable real-time monitoring of environmental data, and early detection of and response to operational events surrounding offshore installations. IBM is further working with partners such as SAP, Apple, Twitter, Facebook, and many others to further advance analytics for enterprise customers. ■



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The genset is the beating heart of any oil or gas installation. A conventional diesel-fuelled combination is the standard against which the rest are compared.

## Providing power on-site 24/7

**U**NDER CONSTRUCTION OR in commercial production, no energy facilities can function without an adequate source of on-site power, available 24/7. The properly-sized and appropriately-rated diesel generating set is by far the most reliable way of providing this.

A typical mid-range set rated at 100kVA produces the standard 415V at around 110A. This is achieved by means of a 6-7 litre turbocharged diesel rotating at 1500 rpm or more, which will have to be supplied with at least 25 litres of fuel per hour. High-capacity gas-turbine systems, often installed to provide combined heat and power whenever demand is high enough and a suitable source of associated gas is available to drive them, are beyond the scope of this article. However, we discuss separately low-cost mobile gensets that are so popular with boat operators and construction contractors; these usually run on volatile gasoline which is a fuel most rig operators are keen to avoid (see box).

Consisting of a fuel tank, heavily built reciprocating prime mover, tailored exhaust and cooling systems, with a matched alternator and various ancillaries, including a control system and sound-attenuating canopy, such as three-phase 50 Hz or 60 Hz equipment are widely available in sizes up to 2500 kVA. These systems are often designed to fit neatly into a standard shipping container. Install a matching and synchronised bank of these and, effectively, a standalone power station capable of operating in 'island' mode has been created. But it is important to specify whether continuous (primary) or standby power is needed.

### To rent or buy?

The expected duty cycle and power demand must be planned for from the outset as well as the typical range of atmospheric conditions that will be experienced. A key decision has to be made about whether to rent or buy, both sectors of the genset supply trade being well represented in the Gulf. Several provide user-friendly software, including online tools and apps, for making this far-reaching decision. Specifiers must also be clear about whether a permanent attachment to the grid is eventually to be made, another matter which requires advice.

Gensets have to provide the required power consistently and without self-harm, according to the rating and potential applications designated by the manufacturer. In occasional-use mode an overload factor, typically 10 per cent, is often stated as well.

The rating specifications that should be checked out when selecting include primary operation (unlimited running hours) with a load variable within specified limits, including a short-term overload limit. These sets can safely be used on any production rig or vessel once up and running; they are generally not suitable for use during the construction/installation phase. They can be combined with equipment rated for continuous-load use for peak shaving purposes (eg, start-up of multiple pumps or drilling mechanisms), as long as all alternators involved are synchronised.

The base-load operation rating relates to the supply of power on a continuous basis against a constant load, no sustained overload capability having been built in.

The standby rating is based on equipment suited to the supply of emergency power on a temporary basis, typically after a normal grid or primary-system failure. No sustained overload capability applies.

Thus a single set might be rated by the manufacturer as 800 kVA for continuous use, 1000 kVA for standby application, with an intermediate prime power rating of just 850 kVA. All equipment should be supplied with a data sheet/manual or affixed plate specifying these limits. These usage definitions are detailed within the genset category of all international standards systems such as ISO and DIN.

Through their local agents, all diesel-set suppliers provide detailed instructions and supervision for the all-important installation process of brand-new equipment,



Cummins' 100 kVA diesel generating set.

whether the set is large or small. Ignore this and both maintenance and depreciation costs can rise alarmingly, along with the lifetime cost of power supplied.

Guidelines supplied to the potential customer cover such matters as equipment selection, electrical considerations like peak (eg, motor starting) and steady-running loads, cooling and combustion air requirements, how to store fuel safely, dealing with noise and nuisance hazards, exhaust-system design and performance, starting arrangements and information about the built-in hard- and software for system control. ■

## Low-cost mobile gensets

MOST CONSTRUCTION CONTRACTORS include a small gasoline-fuelled engine generator among the equipment stored on the vehicles they use daily. Usually rated at less than 4kVA, these compact and mobile machines, either two- or four stroke, are handy for various routine tasks such as trench de-watering, powering hand-held tools and emergency lighting. They are invaluable as an instant source of power on any kind of production platform or rig, as long as the fuel can be stored safely.

With very low purchase costs, their maintenance requirements tend to get overlooked, resulting in failure when they are most needed. Investing in a well-known brand always makes sense.

The maintenance programme is much the same as for any small internal-combustion powered vehicle; independent roadside workshops often specialise in 'small engine care' – just an hour's work perhaps twice a year. Choose one displaying the right manufacturer logos; that way you will know that OEM-approved replaceables such as spark plugs and filters will be fitted – and lubricants of the right grade and quality, of course.

The key requirement with all small engines that do not rely on compression for ignition is to make sure the electrics are kept in top (and dry) order. Check regularly that all connections are clean, bright and tight, with no fraying of or dirt accumulation on the insulated leads. If a battery is fitted for starting, make sure the electrolyte levels are correctly maintained. Start the set-up at least once a week and run it until the operating temperature has been reached (but not exceeded; the cleanliness of a forced-air cooling system is important). Fitting a new plug with a tight HT lead is one of the best ways of improving starting performance. And if the machine has not been used for a long time, a tank of fresh moisture-free fuel can work wonders.

Very small engine generators often have to function in dusty conditions, so the cleanliness of air, fuel and lubricant filters is critical. A stock of spares should be included in the tool kit which travels with the machine. And, needless to say, small generating sets with tiny sump capacities only last beyond the end of the week if the engine lubricant level is checked every single day.

## OMS completes pipe measurement for Kaombo ultra-deepwater offshore project

OIL AND GAS pipe measurement specialist, Optical Metrology Services (OMS), has completed a series of pipe measurement surveys for the Kaombo ultra-deep offshore project – the largest subsea oil and gas project in the world. The scope of work involved end dimensioning, numbering and colour banding of deepsea, fatigue-critical flowline pipe, Steel Catenary Risers (SCR) and long seam welded line pipe.

The Kaombo project involves the development of six of the 12 fields discovered at Block 32, around 260 km offshore Luanda. The project is located in an 800 sq km site in the central and southeast part of the block. The project involves the drilling of 59 subsea wells, which will be connected via 300 km of subsea pipelines to two FPSO vessels. Associated gas from the fields will be transferred to the Angola LNG plant in Soyo. Production is expected to start in 2017, with production capacity expected to be 230,000 bpd.

Marcus Smiles, client solutions executive at OMS commented: "OMS is really excited to be involved in such an important deepsea development project – currently the largest of its kind in the world. By measuring every pipe



end and then colour banding these to a calibration block group code [in accordance with calibration blocks to be used for the AUT inspection] 'golden joints' can be allocated to the more critical sections of the deepsea pipeline. Identifying and marking pipe ends in this way will improve operational logistics for the customer, ensuring the least possible disruption and handling to their pipe fit-up and welding processes, which in turn will minimise project cost and delays."

OMS was contracted to perform onshore pipe end dimensioning of more than 10,000 pipe ends. The work was carried out in three separate mobilisations. Five OMS engineers were deployed

for 10 weeks at the Bredero Shaw pipe yard in Batam Island, Indonesia, to measure more than 9,000 pipe ends. In addition, two OMS engineers were deployed for two weeks at the Socotherm pipe facility in Sicily, where an a further 750 pipe ends were measured. OMS also deployed four engineers for two weeks in Brazil, where an additional 800 pipe ends were measured.

For end dimensioning, OMS utilised its own AutoTool laser measurement tool, which is capable of recording more than 2,000 internal and external measurements around each pipe end in less than 20 seconds. This tool is accurate to 0.05mm and enables OMS staff to measure hundreds of pipe ends in a single shift. This means less time on site, minimising project delays and costs for the customer. The AutoTool is a non-contact laser-based measurement system that is provided to the customer as a service together with trained operators.

The end dimensioning results were a critical part of the customer's pipe design studies and pre-qualification tests. The scope involved measuring, numbering and colour banding of pipe ends, including the linking of pipe numbers with pipe measurement files.

## Lock-out hazards to prevent accidents

AT ANY GIVEN time in South Africa, three million workers are exposed to the hazards posed by volatile energies such as gas, fluids or steam, which are contained in various types of machinery undergoing routine servicing and maintenance. Craft workers, electricians, machine operators, and labourers are injured and even killed on the job from exposure to hazardous energy. The most effective means of minimising these risks is by securing and controlling the energy sources with an effective lock-out/tag-out (LOTO) system.

A LOTO system prevents unexpected start-up or release of stored energy by securing a padlock to a clamp in order to lock the machine being serviced or maintained. After being locked, a tag is placed on the machine to indicate that it should not be turned on.

North Safety export manager, Hayley Arnesen, explained that LOTO systems are used in industry and research settings to ensure that dangerous machines are properly shut off and not started up again prior to the completion of maintenance or servicing work, in order to avoid danger.

"The lack of a LOTO system, or improper handling of the system, may result in injuries that include; electrocution, burns, crushing, cutting, laceration, amputation, or fracturing of body parts. The unexpected start-ups can also cause extensive damage to the machinery itself, adding to the expense of equipment repairs and replacement to the total cost involved," she warned.

Arnesen stressed that trained personnel should always manage the LOTO system. "For instance, if a steam valve automatically gets turned on, it might burn the workers who are repairing a downstream connection in the piping. Another scenario is the sudden release of a jammed conveyor system, which can result in the crushing of workers, if not properly managed," she said.

According to Arnesen, it is the responsibility of the employer to develop and implement an energy control procedure that provides authorised and affected employees with the same level of protection as a personal lock-out or tag-out device.

North offers a wide variety of padlocks that are available in nylon, aluminium, steel and brass body options. Nylon body padlocks are best-suited to electrical applications, due to the non-conductive properties of the material.

## FPSO fabrication facility to begin operations

IN A SIGNIFICANT development for IOCs operating in the Gulf of Guinea, large scale and complex steel fabrication will now be offered in Nigeria from a new purpose-built facility. Dorman Long Engineering Nigeria Ltd and INTELS Nigeria Ltd are partnering to launch a state-of-the-art fabrication facility based in Onne Port. This marks the first time that floating production storage offloading (FPSO) units will have access to fabrication and related services from facilities built specifically for that purpose alongside their operations in the Gulf of Guinea region.

More broadly, the facility will be equipped to serve the needs of West Africa's oil and gas, power, and telecoms industries, as well as heavy industries. The facility will include a 17,500 sq m covered workshop featuring the following:

- ◆ CNC plasma cutting machines and plate rolling
- ◆ Machine of 0-50mm & 51-150mm thick
- ◆ Plate edge bevelling machines
- ◆ Oxy-fuel Track cutting machines
- ◆ Pipe cutting & edge bevelling machines
- ◆ Portable oxy-fuel cutting machines
- ◆ 300 tonnes hydraulic press brakes
- ◆ Plate edge milling machines and dish end forming machines
- ◆ 50 tonnes/sq m quayside heavy lift load-out facility
- ◆ Open fabrication areas of 86,000 sq m, with further outside fabrication areas available as required
- ◆ Blasting and painting workshop
- ◆ Covered secured warehousing and maintenance workshop
- ◆ Steel stocking area

Dr Timi Austen-Peters, chairman of Dorman Long, stated, "The oil and gas industry has long needed such facilities closer to their West Africa operations. As a company, we are pleased to be part of such a significant development for the industry and the region." He continued, "This is also an important development for Nigeria – it will mean significant job creation, skills and technology transfer, and capacity building. We are investing in Nigeria, for Nigeria."

With corrosion an ever-present threat to assets both onshore and offshore, operators must proactively take corrosion prevention measures to ensure long-term integrity.

# Using micelle detection to manage corrosion

**P**IPELINE CORROSION MANAGEMENT has attracted ever-increasing attention over the past couple of decades due to a number of high-profile pipeline failures. Corrosion is a costly business, and pipelines are increasingly subjected to corrosion stresses caused by transporting multiple products, empty periods during product changeover and below capacity flow. Risk assessment strategies and pipeline integrity management programmes, therefore, have gained greater importance.

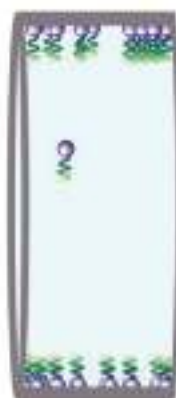
The management of internal corrosion typically involves monitoring a number of properties of a system using, for example, coupon testing, residual inhibitor monitoring, corrosion rate probes and intelligent pigs. These options are often combined to minimise the risk of integrity failure due to corrosion. Treatment of fluids to eliminate moisture, carbon dioxide, hydrogen sulphide, oxygen and solids levels in transported materials can also be implemented as part of an effective mitigation progress. Other elements of importance in corrosion management strategies include the use of special coatings, cathodic protection systems and chemical inhibitors. The combination of these preventative methods, along with monitoring and inspection regimes (for example the use of in-line inspection tools, hydrostatic testing, direct assessment), corrosion monitoring techniques (for example probes and coupon testing), risk assessments and active maintenance programmes comprise an integrated integrity management system.

**Corrosion inhibitors are complex and variable, as are the systems in which they function.**

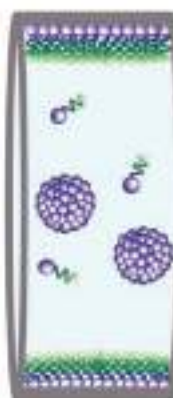
## Protective barrier

One important component of corrosion management is the use of corrosion inhibitors, which form a protective barrier on the vulnerable surfaces and protect the infrastructure from corrosive attack. Organic film-forming corrosion inhibitors, the type of inhibitor commonly used in the upstream oil and gas industry, do not associate permanently. Rather, inhibitor stock in the bulk fluid must be present to maintain film integrity.

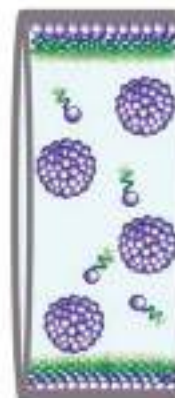
Corrosion inhibitors are complex and variable, as are the systems in which they function. It is



Under-dosed;  
threat of corrosion



Optimally dosed;  
inhibitor working  
to maximum  
effectiveness



Over-dosed; threat  
of environmental  
damage

therefore important to optimise the dosage based upon field measurements rather than simulations. Chemical dosage may be determined by laboratory testing, yet conditions in the field can differ significantly from those that can be set upon the laboratory, for example with regard to pressure, temperature and the complex mix of treatment chemicals, solids, oil and water.

Traditionally, field optimisation has been very difficult to achieve due to the difficulties in making field measurements. Field residual analysis is difficult to accurately conduct in a useful timeframe and the results are difficult to relate to function. Corrosion rate measurements are an excellent way of determining the functional dose relationship, but the localised nature and relatively slow response can make such optimisation studies impractical.

Furthermore, when systems change – for example, with changing water cut, or wells being brought on or taken offline – dosage may need to be modified to remain optimal. A technology that determines optimum dose onsite would lead to improved integrity management, potential chemical savings and potential benefits as regards oil in water separation, given the surfactant nature of the inhibitors.

## The science

The presence of micelles, microscopic groups of corrosion inhibitor molecules, is an indicator for effectiveness of the dose of corrosion inhibitor. These micelles form when the dose of corrosion

inhibitor reaches the “critical micelle concentration” (CMC).

Reports have demonstrated a link between the CMC of surfactant type corrosion inhibitors and the inhibitory effect. Below the CMC, the film consists of a non-continuous surface, which can be penetrated and allow corrosion to occur. Above the CMC, the film is denser and multi-layers can form. There is a significant drop in increasing inhibitor performance at concentrations above the CMC, and so in most circumstances it can be thought of as the optimal does of corrosion inhibitor.

To help in the fight against pipeline and process equipment corrosion, LUX Assure, a UK-based chemical monitoring specialist for the oil and gas industry, has developed CoMic. This is a revolutionary technology which provides information on optimal dosage of corrosion inhibitors. It’s a combined technology and service covering consumable markers, its customised equipment and critical data analysis. It provides significantly increased risk assurance in relation to internal corrosion, premature loss of containment and life extension. CoMic is used onsite, avoiding sample degradation caused in the transit.

The technology represents a new front in the fight against pipeline and process equipment corrosion with the potential to save millions spent on chemicals annually while mitigating risk. CoMic has been deployed at UK assets and further afield in order to improve corrosion management. ■





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What do rig inspection and drilling have in common? They're both at the centre of efforts to use automation to make rigs safer and more effective places to work. However, as Vaughan O'Grady discovers, automation efforts in each case are progressing at very different speeds.

## Two views of rig automation

**S**OME DEGREE OF automation on rigs has undoubted advantages. The two most obvious are that safety concerns are diminished and money is saved.

And in some areas of the rig this is already happening. But the speed at which it is happening rather depends on the application.

Take inspection. Increasingly this is being done by drones — also known as UAVs (unmanned aerial vehicles) or UASs (unmanned aircraft systems). They can be used for inspecting and monitoring offshore rigs, pipelines, storage tanks, flare stacks and other infrastructure. The pipeline version is likely to require a fixed wing unit. The rest are, as Colin Snow, CEO and founder of research and advisory group Drone Analyst, said, “small quadcopters (four rotors), hexacopters (six) or octacopters (eight); they just hover in place, have cameras, and the cameras zoom [so] they can get in close”.

Worried about rust? Possible storm damage? Send a drone to have a look. It's quicker than humans at assessing the state of a rig and better able to cope with cold, rain or high winds. And if it does fall into the sea you don't necessarily need to rescue it.

### Great cost savings with drones

Also, said Snow, it can save a lot of money. For example, he says, when the flare stack has to be inspected, and crew is assigned to the job “they have to shut it down. They have to let it cool down and then they send somebody up and they do a visual inspection and work out what parts need to be replaced”. A drone can do that without a shutdown. And, as Snow pointed out, both the flare stack and other pieces of infrastructure have to be inspected at regular intervals. “This is where the energy companies are finding great cost savings,” he points out.

And yet drones aren't particularly complex or expensive. “They're just radio-controlled units operating in the same spectrum that you would if you were a hobbyist,” said Snow. However they don't do this on their own; this is not a completely automated function. It takes some skill to operate correctly. “You're putting them down underneath [the rig] in very tight spaces. You're not just sending them out and doing an inspection. It is sophisticated.”

But they are small and light and can work with and carry simple technology — the cameras used are not much more sophisticated than a camcorder. They can carry infra-red sensors too,



*Sky-Futures is the world leader in oil and gas drone inspections.*

where required. Above all, they are much, much quicker than humans. There are limitations, of course. “Regulations don't allow beyond visual line of sight operations,” Snow said. But there are continuing advances too; “things like object recognition and sense-and-avoid technology on the drones, stereoscopic cameras to prevent them crashing into anything... incremental pieces of technology that allow for closer-in inspections.”

The leading company in this field is Sky Futures. Chris Blackford, the company's COO, said: “We cut our teeth in the North Sea — on production platforms that are, in some cases, more than 40 years old. We have offices in London, Aberdeen, Houston, Kuala Lumpur and Abu Dhabi. We operate in about 85 per cent of the world's oil markets and about 80 per cent of that work is offshore inspection work.”

West Africa is not yet part of its portfolio, (although, unrelated to Sky Futures, Nigeria has announced plans to use drones to prevent oil theft by monitoring movement of vessels in Nigerian waters).

**Drones are small and light and can work with and carry simple technology.**

### Rig inspection drones

The drone rig inspection market has a lot going for it and Blackford thinks it's going to get even better — and more intelligent. A drone, for example, might be trained to fly around specific structures and to operate on command without a human flying it, or — somewhat further down the line — could be designed to make certain decisions alone, like being aware of the damage a storm can do and checking a structure after the storm passes.

With few regulatory questions to worry about, relatively low costs and no obvious drawbacks, the advance of inspection drones is clearly set to continue.

### Drilling automation more complex

By contrast the much more complex business of drilling automation has made some impressive advances, but will nevertheless move at a fairly measured pace.

The incentives for drilling automation are admittedly similar to those driving drone use: cost control and safety. Eric Cayeux, chief scientist drilling and well modelling of IRIS (International Research Institute of Stavanger\*\*), explains, “There are some variations that can be observed for drilling complex wells and people want to have better control of the costs. But



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*DrillScene is a model-based diagnosis system based on real-time data, produced by IRIS.*

safety is definitely one of the major aspects — trying to avoid having many people on the drill floor and being able to automatise.”

However, outside places like the North Sea, he said, the number of people on the drill floor is “the same as many decades ago. There’s still a lot of manual work and not much embracing of the use of mechanisation at all”. When it comes to adapting to some technologies the oil industry “is very slow...it’s not unusual to have 10 years from the start of the research to getting something which is ready for implementation”.

He continued, “Even if new drilling technology is ready for industrialisation or implementation there are many bottlenecks because of incompatibilities between different rigs.” Most of all, though, unlike drones, this is a much more dangerous area of rig work. “You need to really prove that the prototype or first version you are implementing is safe before you can use it.”

Humans are still involved, however. There will need to be an experienced driller to ‘drive’ an automated drill, usually from a control room on the rig. Could that eventually become one person monitoring many different rigs working autonomously? “That’s really very long term: there are many steps before we get to that vision,” said Cayeux.

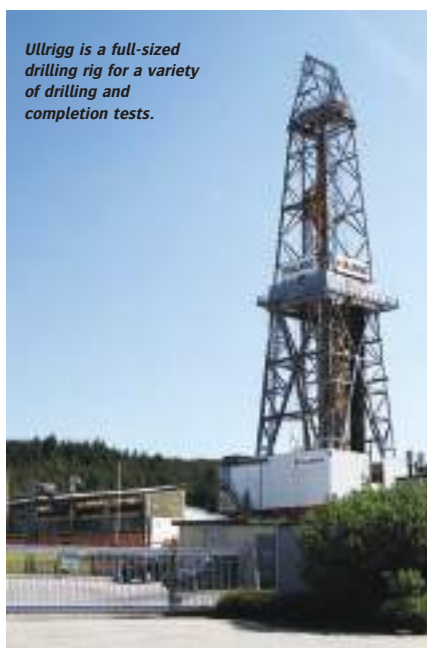
Which is hardly surprising. Shale gas and shale oil are fairly predictable, but they are not the norm. Drilling conditions are rarely similar. A mature field, for instance, which may experience subsidence or where the cap rock has been over pressurised and the reservoir is depleted, is much more demanding — not least if you want to get to the nooks and crannies where oil or gas can actually be found.

Cayeux added, “Deepwater often means very narrow pressure windows. So the margins that you have to drill are very small and the smallest mistake escalates very quickly. You have two gradients: the pressure gradient coming from water and the pressure gradient coming from the build-

## There will need to be an experienced driller to ‘drive’ an automated drill, usually from a control room on the rig.

up of pressure inside the earth.” Shallow water, by contrast, may be easier “but even in shallow water or onshore you may have very complex wells to drill: very snaky, or extremely long”.

And there are few indicators of what’s downhole. Most of the sensors are placed at the rig side and a few close to the bit, perhaps. Thus, in a seven or eight km-long hole that’s completely dark “you really need to use models



*Ullrigg is a full-sized drilling rig for a variety of drilling and completion tests.*

to try to understand what is happening and try to control the process. And this is quite challenging because you can’t calibrate much because you don’t have very much information measured”. Nevertheless that is what IRIS tries to do.

Cayeux explained: “We work both on modelling, for example, and maybe on things that are not yet ready for implementation or industrialisation. Our contribution so far has been on using physical models of the drilling process in real time, which is a challenge because of the speed at which complex calculations need to be done and the fact that you have very little information.” It is a balancing act of sorts, between aiming for the fastest performance and avoiding high-level risk.

Nevertheless, IRIS has achieved, and continues to achieve, a great deal, including commercial products like DrillScene Advanced Monitoring, an exception-based method for detecting deteriorating hole conditions that may lead to significant drilling problems, and DrillTronics, a real time system for monitoring, diagnostics and control of the drilling process. It can also offer the services of Ullrigg, a full-sized drilling rig for a variety of drilling and completion tests. Cayeux himself was awarded Statoil’s research prize in 2012 for his work within automated drilling.

Given the complexity of its work, IRIS has been helped a lot by advances in processing power. “When we started our research project in 2004, we couldn’t have made it work with the computer power that was available at that time,” Cayeux says. There’s no doubt that automating the drilling process is a difficult business from a technical and computing point of view. But there’s also an organisational problem: there are many companies involved, among them the drilling contractor, several service companies and the operating companies. “And,” says Cayeux, “the goal of each of them is not necessarily the same. Trying to automate may mean that you want to have all of them working together for the same goal — and that’s a challenge... People will not analyse the changes in organisation and work processes before the technology is in place. But when it is in place it’s very hard to change processes and organisation.”

It is perhaps unfair to compare rig inspection to one of the more risky and complex areas of rig work. Nevertheless, they do have in common the hope that, at a time of diminished margins and greater safety concerns as we work further from shore and drill deeper than ever, continuing automation will make both of them less expensive, more effective and above all safer. ■

*“Drone Analyst Research and Advisors is a research and consulting firm supporting all participants in the commercial UAS industry.  
<http://droneanalyst.com>*

*\*\*IRIS (International Research Institute of Stavanger) is an independent research institute whose main areas of focus are improved oil recovery, automated drilling and environmental monitoring. [www.iris.no](http://www.iris.no)*

DURING THE 2015 African Oil Week in Cape Town, the managing director of Combifloat, Bas de Jong, found time to speak to *Oil Review Africa's* Stephen Williams.

# Floating modular construction equipment

## Can you describe your company and what it is that you do?

We are suppliers of floating, modular construction systems. It is a little like giant Lego. At its heart is a steel infrastructure that is very strong, able to bear 15 tonnes per square metre. We assemble these into platforms and pontoons with up to a 1,000 tonne payload. The way we operate is to liaise with the client to understand their project and then to design what they need, from initial concept to finding their optimum operational and technical solutions.

We are a very strong company with a healthy balance sheet. We turn over about EUR30mn (US\$32mn) annually, and have extensive stocks in hand so we can respond to our clients needs very quickly.

## I understand you are in the process of designing a new jack-up platform. Can you tell us about this?

Absolutely. It is a semi-modular platform with a carrying capacity of nearly 2,000 tonnes, measuring 45x60 metres. It has four sections so that it can be moved through most of the world's canals, and is still able to be mobilised and demobilised in a cost-effective manner. It can be operated in water depths of up to 65 metres. That's our next generation jack-up, currently with Veritas for class approval.

## Do you have a big presence in Africa?

Indeed, we are all over Africa. We serve the oil and gas sector in terms of drilling, cabling, pipe-laying; as well as undertaking marine construction



All Combifloat pontoons are easy to assemble and offer extreme levels of durability.

work – everything from dredging and trenching, to building jetties and floating bridges. It is a big portfolio of products.

## And going forward, what do you consider the main challenges your company faces?

I think it is, especially in the oil and gas industry, being able to persuade potential clients to start thinking outside the box and grasp that sometimes very basic engineering can be just as efficient as something very complicated. ■

## PDi secures US\$2.3mn contract in Nigeria

LEADING PROVIDER OF multi-discipline engineering, project management and project services to the international energy industry, Project Development International (PDi) has secured a US\$2.3mn contract with Nigerian oil service company Marine Platforms Ltd (MPL), to provide technical support to the Chevron Agbami Phase 3 transport, installation and pre-commissioning project.

Due for completion in early Q2 2016, MPL has appointed PDi to support with onshore and offshore installation engineering activities in the Agbami Field, Nigeria's largest deepwater development, located in central Niger Delta, Nigeria.

The agreement involves PDi working alongside the MPL engineering team in their Lagos office to provide both project and structural engineering services, as well as installation analysis and offshore support. PDi will also provide specialist support in pre-commissioning, survey, geotechnical and procurement when required.

Commenting on the project, Mark Gillespie, managing director at PDi, said: "We're delighted to be strengthening our long standing relationship with MPL on this challenging



Mark Gillespie, PDi managing director and Taofik Adegbite, MPL CEO in Lagos.

project. Continuing our successful support of MPL in Nigeria and delivery of expert engineering services on international projects of this significance is clear testament to the team's global capabilities.

"On this project PDi will provide a dedicated project engineering team in MPL's office in Lagos who will work on a rotational basis with the indigenous MPL engineering team and be supported by project management and discipline engineering teams in the UK. The Lagos team will include individuals with Structural Engineering and Installation Analysis capability."

PDi has worked with MPL for more than five years on numerous international engineering worksopes, supporting and delivering on projects including Agbami Jumper Installation, Bonga Jumper Installation and BOOR Recovery.

Taofik Adegbite, CEO AT MPL, said: "We have established a strong working relationship with PDi and value the dedicated teams, engineering support and track record here in Nigeria. At MPL we adhere to the highest standards of professionalism and strive to exceed the expectations of our clients through integrity, maintaining a very strict safety culture and quality service delivery, standards we know are shared with the team at PDi."

MPL has chartered the Polar Onyx and hired other project equipment to execute the offshore installation activities, with PDi providing the onshore and offshore installation engineering support.

"We are still operating in a very challenging global market, but by combining expertise and understanding where there are opportunities to collaborate on projects of this nature, we are succeeding in progressing our biggest asset – our highly skilled and knowledgeable team of engineers" concluded Gillespie.

The provision of catering and hospitality services in extreme conditions for communities working on offshore platforms and marine vessels.

# Serving onshore and offshore oil and gas staff

**T**HE ENERGY BUSINESS is huge and ever-expanding. The need for high-quality services and hygiene security are mandatory for international energy companies. Catering and hospitality service providers need to provide quality solutions in extreme conditions. Oil and gas operations need canteens, self-service and bar facilities, and housekeeping services for communities working away from home, supporting and serving staff in oil & gas exploration and production, on oil rigs and pipe-laying barges at sea. Such staff need to feel totally at home.

**Catering and hospitality contractors need a tight structure and a strong leader to succeed.**

## Experience and engagement

Understanding the rigours of working with major oil and gas companies is critical qualification. An example of a leading firm in this field, with a long history of top-level engagement with clients, Ligabue supplies to offshore and onshore operations and offers a high degree of specialisation, technical expertise and market experience. The group delivers full catering services on board oil platforms and has collaborated with major oil companies including Eni, Saipem, Exxon Mobil and Transocean. Ligabue



*The Ligabue group is synonymous with full catering services on-board oil platforms.*

offers oil companies operating in remote sites a reliable and enduring partnership, delivering tailor-made solutions and strategies to satisfy not only general or regular needs, but also the difficult and diverse requirements.

Companies such as Ligabue must recruit specialised personnel if they are to compete for oil and gas operations, which are noted for

demanding the highest standards of every contractor. They need the "right person for the right job", to quote Ligabue's own mantra. They need people who can work as part of a team to meet the needs of the place and the customer. They need team members who are highly specialised in their particular jobs, speak various languages, and are capable of providing solutions for even the most challenging situations.

And they need to be organised. As Ligabue's record shows, whether in Algeria or the European domains of the Mediterranean Sea, catering and hospitality contractors need a tight structure and a strong leader to succeed. In each field of work or in each community, depending on the number of people present, staff must ideally consist of a camp chief or sector head, an administrative worker and perhaps also a warehouse person, a head of special services, a chef with various cooks, and a rooms and lodgings chief.

## The quality of service

Of course, the product is not just the people employed. Contractors must, for example, get the food right. Service providers must carefully study, plan and prepare the most appropriate menus and diets for human well-being, taking into account ethnic groups and different religions.

Companies such as Ligabue do this by studying the nutritional and dietary requirements of the communities they serve, and also the ideal nutritional preparations for particular working conditions. They study the food and the drink, but they also focus on operational environments, geographical characteristics and local customs. The North African, Mediterranean scenario is, in Ligabue's case, an easy fit. The company promotes healthy Mediterranean cuisine as its base, and looks to add quality and contextual variations where it can, starting from the selection of products from the best producers and brands.

Hence, recruiting the right people, the best culinary specialists, is vital, especially when it comes to transforming raw food into gourmet specialities. A contractor's chefs and their teams are an invaluable cultural and professional asset. And local knowledge is critical, too. Whatever the conditions, however extreme, whether it is a site in a deserts or on an equatorial water, it is a vital part of the service to adopt the concept of "local content", to use local staff and products, not only to serve the working community most appropriately but also to contribute to the development of the local economy. ■



*Food in remote sites needs to be of the right quality and variety. RA International have offices in Kenya, Uganda, Ghana, Sierra Leone, Somalia, Sudan and Mali. (Image courtesy: RA International)*



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## TEN hardware coming together off Ghana

THE TRIPLE-FIELD deepwater TEN development offshore Ghana is more than 75 per cent complete and remains on schedule and on budget for first oil in mid-2016, according to Tullow.

The FPSO is mechanically complete and commissioning work is under way. The vessel is due to sail from Singapore in early January and arrive in Ghana during 1Q 2016.

Subsea fabrication work has been completed and subsea installation of this equipment is roughly 60 per cent complete. Work on the start-up wells is also progressing with the fourth of 10 well completions currently being installed.

At the ongoing Jubilee field development, well capacity is undergoing enhancement with completion of the final Phase 1A wells. One production well came onstream in September, another is due onstream in December, and a water injector should come online early next year.

The Jubilee partners also continue to work with the government of Ghana on submitting a Greater Jubilee full field development plan by year-end: this will take in the Mahogany and Teak discoveries.

## Ocean Installer secures Aje Field work

**OILFIELD SERVICES FIRM** Ocean Installer has been awarded a contract for offshore construction work on the Aje Ph1 project, offshore Nigeria, by Folawiyo Aje Services Limited (FASL).

As part of the contract, which is effective immediately, Ocean Installer will carry out mooring buoy installation and hook up work, as well as flowline and umbilical installation. FASL functions as a technical advisor to the Aje field operator Yinka Folawiyo Petroleum.

Steinar Riise, CEO of Ocean Installer, commented in a company statement:

"We are very pleased to have been awarded our second major contract in West Africa. This proves our Africa strategy is fruitful and allows us to further strengthen our foothold and develop our relationship with clients active in the region."

## Offshore and onshore catering in Nigeria

FIRST AND FOREMOST, to provide catering services to the O&G sector you MUST comply with the Nigerian Content Development Act 2010, which basically restricts catering services to companies that are 100 per cent owned by Nigerians. There are of course several other statutory registrations one must obtain to operate in the O&G sector through agencies of the Nigerian National Petroleum Company (NNPC).

The typical onshore client is operating a refinery, process plant, a fabrication/construction yard or a camp/residential Estate, which could be from 100 people to a 1,000 or more.

Offshore clients, basically at sea, are located on rigs, platforms, FPS's, work vessels or on house boats.

Industrial catering is a matter of scale; it implies the presence of mass production, industrial cooking equipment, division of labour, efficient logistics and supply chain for materials, written processes and procedures, standardised techniques to achieve consistency needed when cooking for large numbers, training and retraining of personnel, health and safety policies and the monitoring thereof. All of these require highly trained personnel and structure.

Onshore catering is typically easier to manage than offshore catering. Being on land and thus within easy access to markets, logistics is easier to execute and catering emergencies are easier to solve.

Being at sea is a different ball game; there you are 100's km and more, out at sea, where the environment can become hostile very quickly, where, if you run out of stocks, you can't just nip round the corner to replenish supplies, where equipment must be kept in top shape and accidents must be avoided at all costs.

### What challenges does one face.

The scale of catering required is determined by the size of the workforce you are required to serve. Usually client personnel, divided into blue collar and white collar, is a multi-ethnic, multi-national community, thus there is a varied dietary requirement. The menu ranges from basic meals to continental. So the chef must be versatile and experienced, but, your first problem is finding an experienced efficient manager. The bane of Nigerian business today is finding good managers at all levels, this problem pervades a majority of sectors in Nigeria today.

The staffing challenge extends, not only to managers and chefs, but to the range of staff required to achieve the commercial and professional objectives of the job. Once staff have been identified and trained in your methods you need to keep them so that all that time effort and money expended on training is not lured away by your competition.

Another challenge faced in this particular sector is the need to balance the employment of your key staff with requirements for Local Content. By law, we are required to engage with the local communities in the area of operation and provide right of first refusal opportunities in several facets of our business. Thus from supply of fresh or dry materials to manpower we must turn to the local communities to see what resources are available. The communities tend to demand compliance with this policy vigorously, the problem is finding skilled candidates from these communities to fill senior positions and balancing that with the need to ensure competency.

Due to the multinational mix of the workforce the menu offered requires a fair amount of ingredients that are not produced locally nor available in the client's location, we have to secure reliable local suppliers who produce or stock sufficient quantities of key ingredients, or you fall foul of the NC compliance monthly reports. At Whassan, we also find it necessary to support local producers of fresh ingredients who do not have the financial or management skills required to support the volume of fresh produce required by large camps. An additional challenge is maintaining quality. Rigorous inspections have to be carried out before purchase to ensure only the best quality is accepted. Whassan's supply chain department is constantly searching for new sources of supply to avoid shortages of seasonal products or the frequent scarcity situations that can suddenly arise and push market prices up, and hurt the bottom line.

HSE plays an important part in daily operations, more so with the catering industry. At Whassan this is an area of our operations we pay special attention to. It is so easy to slip up. The HSE officer has to keep on his or her toes to forestall what is a "contractual faux pas".

It can be challenging to monitor kitchen crew made up of a variety of skilled to unskilled personnel, more so if some are new to your operations, especially if recruited from local communities. Nevertheless it's a challenge that must be met at all costs.

**David Ayo Harper, country business development manager, Whassan Nigeria Ltd**



*From supply of fresh or dry materials to manpower we must turn to the local communities to see what resources are available.*



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## Sub-Saharan Africa launches biggest gas engine power project

CUMMINS COGENERATION LTD (CCL) will construct a 140MW gas fired power plant in sub-Saharan Africa, according to CCL chairman Deepak Khilnani. The plant is the first phase of a 300MW power purchase agreement to supply energy to the Ghanaian Grid and is set to be the biggest gas engine power project in sub-Saharan Africa.



The US\$180mn gas engine-driven power project takes off in Ghana.

CCL is set to roll out the technology in Ghana in 2016, the company revealed.

“Since the discovery of Ghana’s natural gas reserves, it has been expected that gas will play a prominent role in the country’s energy sector. As a leading organisation in this industry, CCL is thrilled to be taking steps towards meeting Ghana’s energy needs,” stated Khilnani. According to the chairman, local workforces will be contracted to construct, operate and maintain the plant.

“We want to utilise the energy and talent of local Ghanaians to make this project a social, as well as an economic success. We firmly believe it will have a positive impact on both short- and long-term local employment,” said Khilnani.

Cummins Power Generation Nigeria Limited has been seeking investment opportunities in larger grid connected independent power projects and is expected to finalise agreements for two large projects in the Delta region of Nigeria.

## Amarinth pump for Sonatrach refinery

AMARINTH HAS DELIVERED a bespoke 2.8 metre vertical hydrocarbon condensate pump to Sonatrach in Algeria as a direct plug-and-play replacement for an existing unreliable pump.



Sonatrach turned to Amarith to deliver this pump for a refinery in Algeria. Recognising Amarith’s success in delivering engineered API pumps for challenging duties on tight deadlines and its leadership position in industrial pumps, Sonatrach, when faced with an unacceptable failure rate with another manufacturer’s pump, asked Amarith if the pump could be replaced but without changing any of the existing plant or pipework.

The high failure rate of the existing pump meant that a replacement was required very quickly amidst concerns that the refinery could be shut down if a catastrophic failure of the old pump occurred. To meet the deadline, Amarith selected one of its proven T-Series vertical pumps, an industrial pump with an API pedigree, which it could tailor to Sonatrach’s requirements.

Amarinth designed an oversized mounting plate to enable the new pump to fit directly into the existing plant and also modified various fittings and fixings to suit the existing pipework. Combining its extensive knowledge of both the oil and gas sector and industrial markets, Amarith successfully delivered a high-quality, cost-effective and extremely reliable solution to Sonatrach before the existing pump caused any further issues. The plug-and-play solution, requiring no changes to the associated plant or pipework, resulted in minimal disruption to the refinery during installation and commissioning.

## Equatorial Guinea in storage MoU

THE MINISTRY OF Mines, Industry and Energy, representing the Government of Equatorial Guinea, has signed a Memorandum of Understanding (MoU) with three companies to build a crude oil and petroleum products storage tank farm on Bioko Island, Equatorial Guinea.

In an expansion of the previous project plan, the Bioko Oil Terminal will incorporate a significant amount of crude oil storage space, as well as storage for associated petroleum products. It will serve the Gulf of Guinea region and facilitate processing and export to consumers regionally and globally. The MoU establishes the terms of co-operation among the Ministry and the three companies – Taleveras Group, Gunvor Group and the Strategic Fuel Fund will jointly participate in the Bioko Oil Terminal development. The tank farm will be operated by the Strategic Fuel Fund, which operates Saldanha Bay in South Africa, one of the world’s largest petroleum storage facilities.

Upon announcing the new MoU, minister of mines, industry and energy, HE Gabriel Mbaga Obiang Lima, stated: “The Bioko Oil Terminal will serve the enormous demand for storage in the currently underserved Gulf of Guinea region. This is a definitive step forward for our nation’s petroleum industry and economic diversification agenda. We are proud to announce that the national bank of Equatorial Guinea, BANGE, will be involved in the financing of the project.”

South African oil and gas company SacOil, which is active in upstream, midstream and downstream projects across Africa, including Egypt, the DRC, Malawi, Mozambique and Botswana, will join the consortium.

“The entry of a fourth partner company into the Bioko Oil Terminal project signals the international interest in this facility, which will serve the huge demand for petroleum storage in the Gulf of Guinea region,” said Minister of Mines, Industry and Energy H.E. Gabriel Mbaga Obiang Lima, at the MoU signing.

## Fluor ethane cracker project hits milestone

FLUOR CORPORATION HAS completed the tallest lift on its US Gulf Coast Petrochemicals Project for Chevron Phillips Chemical Company LP (Chevron Phillips Chemical).

Fluor, in a joint venture with JGC, is performing the engineering, procurement and construction of a 1.5mn-metric-ton-per-year ethane cracker and associated offsite components at Chevron Phillips Chemical’s existing Cedar Bayou complex in Baytown, Texas. Fluor direct-hire craft workers are executing construction for the project, which is the first greenfield cracker project in the USA in more than a decade and will be one of the largest crackers in the US when completed.



Construction has begun on the world-class furnaces and aboveground piping systems.

Over the past three months, Fluor has executed nine mega-lifts at the site by erecting the major pieces of equipment that will be used in the plant’s operations. Each lift was more than 275 tons, with three of the lifts weighing more than 500 tons. The final lift, to erect a C2 splitter (used for olefin separation) that is part of the ethane cracker, was more than 250 feet tall and weighed more than 570 tons. Two best-in-class cranes were needed to lift the unit, which weighs more than 300 cars. All nine lifts were completed safely and on schedule. “Achieving this milestone is a testament to the dedication and commitment of our 2,500 craft workers currently at the site,” said Jim Brittain, president of Fluor’s Energy & Chemicals business in the Americas. “We are deploying our full suite of integrated solutions—including our self-perform construction expertise, innovative construction execution methodologies and unique scaffolding partnership — to meet Chevron Phillips Chemical’s cost and schedule goals.”

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## ABS grants AIP for MES FPSO design

ABS HAS GRANTED Mitsui Engineering & Shipbuilding Co Ltd (MES) approval in principle (AIP) for a floating production, storage and offloading (FPSO) vessel design and an innovative construction concept.

This work is the result of an ABS/MES joint development project that began in March 2015. The “noah-flex modular design” for the FPSO and the flexible construction procedure “noah-flex modular construction” were granted AIP on 15 September.

The noah-flex modular construction processes consists of multiple steps that take place in parallel to shorten the construction time efficiently, with keel laying marking the commencement of construction.

The first step of the project is FPSO design and hull construction, including propulsion and relevant machinery equipment/systems, which could be carried out by MES in Japan, while construction of the oil storage component takes place at another yard, possibly outside Japan.

Following this process, the topside facilities will be subsequently/simultaneously fabricated in a different or the same shipyard and installed on the elongated hull, after which the completed FPSO will move to the specified operation site for hook-up and commissioning.

The FPSO design will be reviewed for compliance with the ABS rules and applicable international/national regulations to make sure the unit is in full compliance, particularly when executing transits from one shipyard to another during construction.

## Ghana begins building 3rd FPSO vessel

GHANA HAS BEGUN building its third Floating Production Storage and Offloading (FPSO) vessel as part of moves to make the country an oil hub in West Africa.

This comes after the country completed the OCTIP Sankofa gas project negotiations at a cost of US\$7bn endorsed by the World Bank and IFC. The FPSO construction, which is expected to be completed and delivered by the last quarter of 2016, is expected to produce some 45,000 bpd of crude oil by 2017 and some 170mn cfd of gas by 2018.

Eni and Vitol are the operators of the Sankofa fields while the Ghana National Petroleum Corporation (GNPC) is partnering them on behalf of Ghana.

The Minister of Petroleum, Emmanuel Armah Kofi Buah, said the upstream petroleum sector is now a major contributor to the GDP, becoming second

to the mining sector.

“The OCTIP Sankofa gas project has been negotiated and concluded,” he stated.

The third FPSO for Ghana is currently under construction for this project following the approval of the plan of development. I can say that the upstream oil and gas is contributing greatly to the development of this country by becoming the next major contributor to our GDP as second to mining.

“The sector is one which has helped shaped our economy in times when we have challenges.”

This has led to the five per cent growth the World Bank is projecting for the country going forward at a time when the sub-region and the African continent is projected to grow at the slower pace, Minister of Petroleum, Emmanuel Armah Kofi Buah said.

## Magnetrol's ThermoTel TA2

MAGNETROL HAS RELEASED on sale its ThermoTel TA2 thermal mass flow meter with Foundation fieldbus digital output communications. This addition signifies the growth of the TA2 and the Magnetrol commitment to continued success in flow. The TA2 with Foundation fieldbus offers all of the advantages of the standard TA2, such as:

- ◆ Dual gas calibration with two unique curves (Ex: propane and natural gas)
- ◆ Field adjustability to install in different gas types or adjust for different gas mixes
- ◆ Calibration verification procedure provides cost savings due to decreased process downtime and unnecessary recalibrations
- ◆ Internal resettable and non-resettable totalisers
- ◆ Strong signal at low flows and low pressures with high turndown
- ◆ ISO 17025 and NIST traceable calibrations

ThermoTel TA2, in conjunction with the Eclipse Model 706 guided wave radar, E3 Module level and Orion Enhanced Jupiter magnetostrictive level transmitters, form the Magnetrol fieldbus family.



Magnetrol's Foundation Fieldbus.

## Oil and wind have joined forces in win-win JIP

THE CONCEPT OF using wind power for offshore oil and gas applications is one step closer to realisation. WIN WIN, a DNV GL-led joint industry project (JIP), is running with the following seven participants: ExxonMobil, ENI Norge, Nexen Petroleum UK Ltd, Statoil, VNG, PG Flow Solutions and ORE Catapult. Initial DNV GL studies showed that a standalone wind-powered water-injection system could become cost competitive for various types of applications, particularly for water injection far from the production platform and when costly retrofitting is not an option. DNV GL launched the WIN WIN JIP to help develop the concept further.

“We’ve had a fantastic response from the industry and are very pleased that seven important players from both industries have joined the JIP. Together, they cover the value

chain from wind production and operation, to pump manufacturing, to five oil and gas operators,” said Johan Sandberg, segment leader – Floating Wind Turbines at DNV GL and the project sponsor.

“We are very satisfied that DNV GL has taken the initiative to form a JIP, and brought on board several of our peers from the oil and gas industry. The overall concept needs maturing up to a point where it can be considered a viable option in field development studies,” said Hanne Wigum, manager for Statoil’s renewables research group.

The project is now in the phase where the technical concept is being developed and the technical feasibility assessed in detail. Two of the main challenges being addressed are the off-grid operation of the system and the reservoir’s response to

variable injection rates.

“Once the technical hurdles are cleared, the concept’s economic viability will be analysed using relevant and realistic cases provided by the JIP partners. Initial results are promising, and with the operators on board we are able to test the concept on real cases,” Sandberg continued.

“In parallel with finalising the initial technical and economic assessment of the concept, we are now thinking about the next steps, both looking for other relevant applications of the system and making sure the WIN WIN concept moves from the drawing board to a prototype and actual realisation in a project,” he added.

The JIP has been up and running since the beginning of the year and is scheduled to be completed in the first quarter of 2016.



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Ghanaian communications agency introduces an interconnect clearing house to check SIMbox fraud.

# Combatting more criminal mobile connections

**F**OLLOWING A SPATE of arrests made by Ghana's telecommunications regulator, the National Communications Authority (NCA), and the country's police, the Ghanaian government has decided to introduce an interconnect clearing house (ICH), which will ultimately monitor all incoming foreign calls and thereby find a solution to the multimillion fraud that is being perpetrated against government and the telcos which both have lost millions of dollars each year. Industry insiders and tax authorities are estimating that the fraudsters last year alone made US\$40mn through their illegal activities, while those arrested since January 2015 are said to have illegally made at least US\$30mn.

## Criminal conversations

The form of fraud committed, through subscriber identification modules (SIMs), utilises voice over Internet Protocol (VoIP) technology, which allows telephone calls to be made over computer networks like the Internet, converting analogue voice signals into digital data packets and supporting real-time, two-way transmissions of conversations using IP. These calls can be made on the Internet using a VoIP service provider and standard computer audio systems - or, alternatively, through ordinary telephones, which use special adapters to connect to a home computer network based on the H.323 technology standard.

In an earlier bid to plug the huge revenue losses, the Ghana Revenue Authority (GRA) contracted Subah Info Solutions in 2010 to electronically monitor revenue generated by the telcos to enable GRA calculate and collect the right taxes from the companies. The contract was worth US\$100mn per year.

Subah Info Solutions subsequently brought into the country a superior tracking technology that led to the arrests earlier in 2015, where the fraudsters were alleged to be in possession of tens of thousands of SIM cards of various local telcos even though the law requires that every SIM card sold should be duly registered to the user using only state generated identity cards – driver's license, voter's identity card or an

**The slimmer the profit gap, the smaller the market space for the SIM Box fraudsters to survive profitably.**



*It should be mandatory for all service providers to connect through the ICH.*

international passport – and cannot be activated unless the registration process is done to activate the cards.

The authorities are therefore worried about how single entities in the SIM-box business came to possess thousands of activated but unregistered SIM cards without the requisite official registration processes.

In the view of Ghana's communications minister, Dr Omame Boamah, the chain of relations between service providers and the fraudsters in the acquisition of the SIM cards cannot be overlooked. His view has been supported by several industry experts who have concluded that the highly lucrative underground multi-million dollars SIM-box business cannot possibly be perpetrated without active collaborators from the mainstream telecom sector and possibly from the NCA.

"We cannot at this stage extricate the chain completely from this (SIM box fraud) because every telco must have the responsibility for every SIM card that it produced for its operations," Dr Boamah said.

However, Kwaku Sakyi Addo, chief executive officer of the Ghana Chamber of Telecommunications, the industry's mouthpiece, has denied that any telco is actively involved in SIM box fraud. He said, "I can say on behalf of my members that no network operator is actively participating in this illegal business."

Instead, he blamed the lax verification regime of Ghanaian identity cards, stating: "When people

buy SIM cards and when they submit ID cards the SIM card vendor or network operative agent cannot determine the validity or otherwise of the ID card that the individual is presenting.

"They don't have any way of verifying whether or not the ID card is authentic, so the problem that we are seeing regarding identification is a manifestation of a deeper problem and it is not peculiar to a network operator."

Before these arrests, there was a rising resentment about the operations of Subah, which some have attributed to fears that the company will expose this illegitimate business being run by some highly influential Ghanaians. According to industry experts, the SIM box fraud is perpetrated in such a way that incoming international call numbers are displayed on mobile phones as local calls because the incoming foreign call is handed over to the recipient's phone by another local number from an illegal SIM Box being operated in the country.

These SIM Boxes bypass the licensed and approved telecommunication gateways to hand over to the recipient's number using the Internet. SIM Boxes use VoIP technology which is used in applications such as Viber, Skype, WeChat, Line, Facebook Messenger and many others.

## Closing the gap

According to experts, the main reason for the fraud is the difference between the International Call Rate (US\$0.19 per minute) and the Local Call Rate (US\$0.03 per minute) and they believe a

reduction in the difference will discourage the fraudsters from engaging in this illegal business.

However, the NCA thinks irrespective of the amount of the call rate difference, SIM Box fraudsters will always ply their trade.

Obviously, creating a gap of profit for the fraudsters to deem it a trade of bountiful returns is the evil head that must be cut off by all parties losing revenues. The slimmer the profit gap, the smaller the market space for the SIM Box fraudsters to survive profitably as they cite Nigeria and South Africa where this rate gap is negligible (US\$0.04 and US\$0.00 respectively), as examples as to why SIM Box fraud is non-existent.

This business, according to the NCA, is only possible locally because of the international co-operation from the countries where the calls originate from and the best way to check it is to investigate the call-source parties so they will not be able to terminate the calls via the Internet. The NCA has called for preventive gateways the government can use to reduce or discourage people from engaging in SIM Box fraud as the equipment used is imported as a computer component. They are therefore asking for stringent controls over their importation and registration with more information on the importer, their line of businesses and purposes of importation while the security agencies must ensure that these devices are used for the approved services.

### SIM Boxes use VoIP technology which is used in applications such as Viber, Skype, WeChat, Line, Facebook Messenger and many others.

They pointed out that since every telecom device is supposed to be certified by the NCA it is within the power of the regulator in association with the security agencies to make sure that these devices are imported by identifiable entities for the approved uses.

Though all SIM cards must be registered by the users using approved identification documents, many were surprised and will want to know how the suspects were able to purchase up to 3,000 SIM cards from retailers – this shows that there is a loophole in the registration process which must be sealed. The Communications Minister agreed and suggested that people should be limited to register up to 10 SIM cards, but the registration process must be critically monitored and must have security tiers so names that have a certain number of cards registered to them will be checked with the numbers used to terminate the international calls.

#### Identifying data

Eyome Ackah, an industry professional, believes that Ghana needs a centralised database for all



**SIM cards must be registered by the users using approved identification documents.**

registrations hosted by NCA as this will reduce the porous nature of the existing registration process so that “every registration is recorded in that database so if a single ID card is registering multiple numbers, this could be detected easily”.

One solution the telcos have come up with is for their customers to report those numbers used to hand over the international calls to them by sending a text to a short code provided by the NCA where the reported numbers will be given to the respective telcos for deactivation.

The government is thinking, however, about long-term issues, as it has decided to license a qualified entity to set up its interconnect clearing house, which will among other things provide a common, independent mechanism for the billing and settlement of interconnect accounting traffic for all existing and future operators in a particular country or region.

In order to ensure that this service is non-discriminatory, the ‘Interconnect Clearing House’ (ICH) must be independent and it should be mandatory for all service providers to connect through the ICH the rationale being to take advantage of a centralised national platform to address other industry challenges such as lack of technical redress to the issues of stolen phones, uncertain subscriber identity, and to facilitate connectivity with other platforms.

The licensed ICH, which shall be maintained independently from other licenses, will also prevent capital flight and loss of revenue to government by localising required value added services currently being provided by interconnect exchanges outside the country.

In addition it will monitor volumes of all traffic for service providers including routing or switching of traffic between them, routing or switching international traffic between international carriers and international gateway operators and also routing of Short Messaging

Service (SMS), Voice Message Service (VMS) or any other value added services or applications.

The ICH will also provide International Mobile Subscriber Identity services, Equipment Identity Registry services and provide anti-fraud management and revenue assurance systems including a common infrastructure for government agencies to host ICT systems and applications to store confidential data among many others. It will also account for revenues to government as well as provide technical support to enforce all telecommunications tax revenue laws, plug leakages and under-declarations in government revenue and also monitor mobile financial transactions including mobile money.

However, ICH critics have raised concerns about the implementation of the idea insisting the project must be thoroughly discussed and a national consensus reached bearing in mind that telecommunication licenses are national assets and the citizenry ought to be assured by Government that all such assets will be harnessed and put to proper use to enable the nation to gain optimum benefit.

Though they praised the government’s efforts to push the local content participation and capacity building in business sectors forward, they also expressed their misgivings because they “are currently not convinced that the process of developing and implementing the ICH policy has been thoroughly thought through”, believing that engaging an ICH potentially runs contrary to the legal regime governing interconnection since the law makes no room for a centralised ICH. So far, the government’s response has been to publish an advertisement inviting bids from potential operators of the ICH and such a business entity that wins the job will be majority owned by Ghanaians. ■

*Kafui Gale-Zoyiku*



## Introduction of Seep Explorer and GLOGOS

CGG GEOCONSULTING HAS acquired GLOGOS, the Global Onshore Gas-Oil Seeps data set, from Gas Consult. GLOGOS will be incorporated into the new Seep Explorer, creating the world's only onshore and offshore fully-attributed GIS-based seeps product suite for regional-to-prospect source de-risking.



**Combined coverage of GLOGOS, FFD and FRogi Seeps, adding verification data to the Global Offshore Seepage Database.**

Hydrocarbon seep detection from satellite imaging maps the location and repeatability of naturally occurring oil seepage offshore and is a recognised and valuable tool for new ventures and exploration teams and has been adopted by the majority of the major international oil companies

The main component of Seep Explorer is NPA Satellite Mapping's GOSD, the Global Offshore Seeps Database in GeoConsulting's portfolio of products. Additional layers of data have been developed for GOSD to provide validation and further information on the origin of the seeps. These include a Fluid Features Database (FFD) of seabed fluid escape features and onshore seeps from Robertson's FRogi dataset which characterises the hydrocarbons. With more than 20 years of interpretation on over 23,000 satellite scenes covering all offshore basins in the current database, GOSD is recognised as the premier product in the industry.

## Schlumberger and Ikon Science to improve reservoir characterisation

SCHLUMBERGER AND IKON Science have announced an agreement to further develop the existing quantitative seismic interpretation capability in the Petrel E&P software platform. The collaboration will make high-value seismic workflows fully available to customers and allow easy access to advanced reservoir characterisation tools.

Bringing key capabilities of the RokDoc software platform, developed by Ikon Science, into the Petrel platform will enable geoscientists to derive enhanced geologic understanding from seismic data. The new workflows will democratise what was once considered only an undertaking for specialists, enabling all geoscientists and petroleum engineers to use the workflows for prospect or field development.

"Based on this agreement, we will co-develop our existing quantitative seismic interpretation technology offering in a complementary way, while continuing to involve WesternGeco, our seismic acquisition and processing business unit, to make these advanced reservoir characterisation workflows accessible to more users," said Uwem Ukpong, president, Software Integrated Solutions, Schlumberger.

"Ikon Science has embraced the application of RokDoc technology using the Petrel platform by developing plug-ins that perform key elements of rock physics, quantitative interpretation (QI) and geopressure workflows. These developments support the Ikon Science vision of providing the next wave of the QI workflows to the geoscientist by optimising the information extracted from modern seismic and well data," said Martyn Millwood Hargrave, CEO, Ikon Science. "The collaboration will improve the user's experience and increase productivity by bringing a suite of key workflows directly integrated from RokDoc to the Petrel quantitative interpretation offering."

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