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EUROPEAN OIL&GAS

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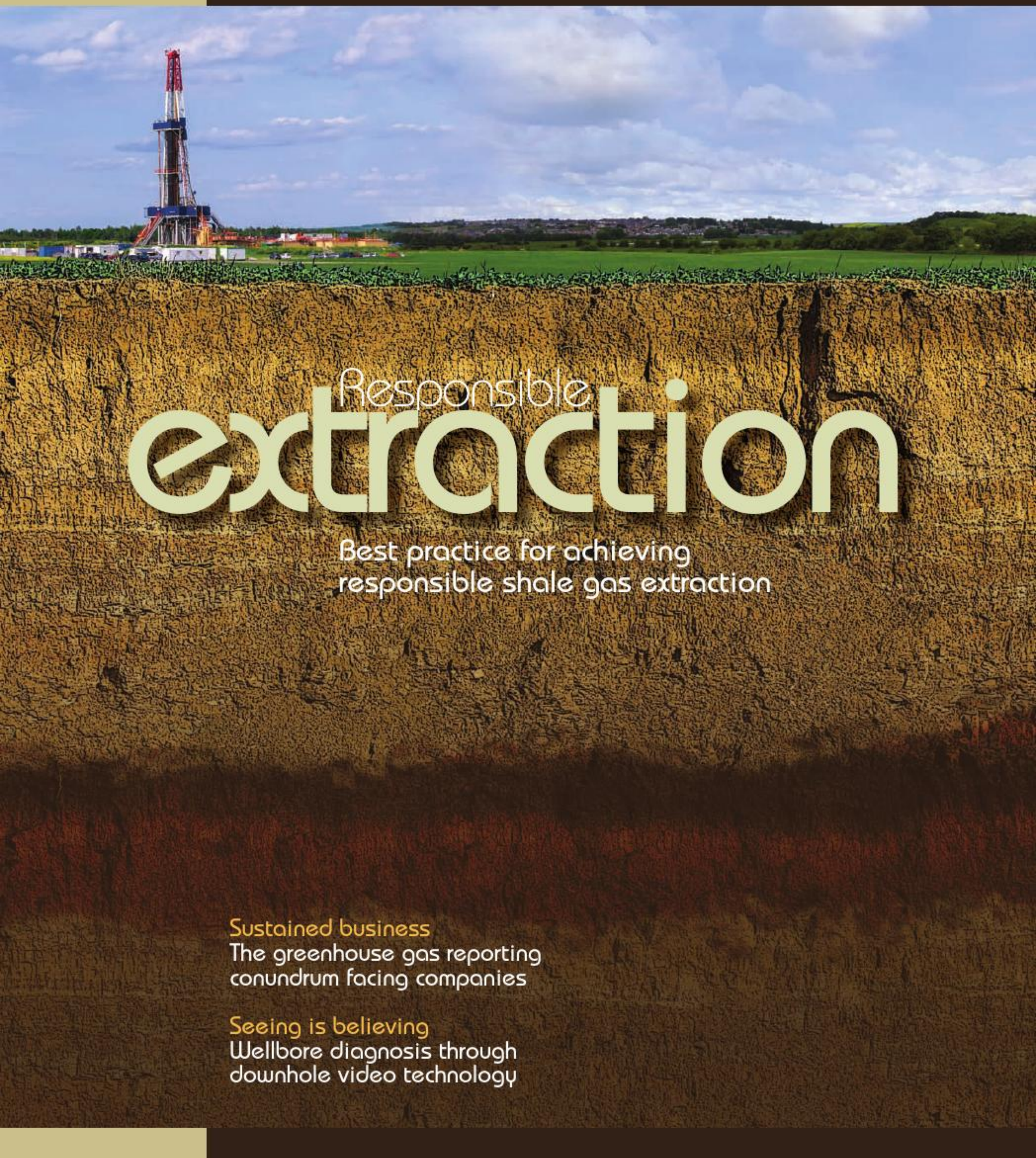

Responsible extraction

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"if best practice is closely followed, operators can change many of the more difficult misconceptions that cloud a viable source of energy"

Fracking. It's a subject that has brought much controversy to the UK and Europe, and despite drilling companies suggesting that there may be trillions of cubic feet of shale gas underneath parts of northern England, public concern and opposition remains high.

While it seems unlikely that energy companies will be able to turn around public opinion overnight it is absolutely vital that they understand and employ the highest standards and best practice if they are to stand any chance of exploiting shale gas.

In our cover story this issue Henry Lang of Golder Associates shares his recipe for best practice in shale gas extraction, highlighting that: "If operators can take appropriate precautions, hydraulic fracturing can be closely monitored, closely regulated and accurately reported."

Naturally, there is much to consider in such a complex operation, but if companies can get it right then perhaps we will see shale gas become part of the UK's future energy mix. As Henry says: "if best practice is closely followed, operators can change many of the more difficult misconceptions that cloud a viable source of energy and bring Europe a step closer to achieving its energy targets."

EDITORS LIBBIE HAMMOND & MATT HIGH

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Responsible extraction

RESPONSIBLE SHALE GAS EXTRACTION REQUIRES TWO THINGS ABOVE ALL ELSE: CAREFULLY ANALYSED RESERVOIRS AND COMPREHENSIVE WATER MANAGEMENT STRATEGIES. **HENRY LANG** OF GOLDER ASSOCIATES HAS THE RECIPE FOR BEST PRACTICE

Unconventional gas extraction has set North America in good stead for energy security for the coming century, yet the practice continues to face scrutiny in Europe. While the public image of hydraulic fracturing is unlikely to be turned around overnight, it is imperative that operators and regulators use the available tools and information to implement best practice.

In this growing industry, there is much to be gained by operators understanding and employing the highest technical standards. If operators take appropriate precautions, hydraulic fracturing can be monitored, closely regulated and accurately reported. By establishing a clearer and more comprehensive understanding of how hydraulic fracturing can be undertaken responsibly, European operators stand to gain much. Operational best practice in analysing reservoirs and managing the water lifecycle will lead to increased business opportunities and improved well economics.

Analysing the reservoir

Designing vertical and horizontal wells for unconventional gas exploration and extraction should not be underestimated as an engineering challenge. No shales are the same and hydraulic stimulation will inevitably create different reactions even within the same shale play. Without accurate mapping of the reservoir, this process is difficult to predict and can become a major headache for operators.

Using Discrete Fracture Network (DFN) software to analyse the reservoir goes a long way in minimising the risks, even for the complex European shale geology. Europe has, broadly speaking, a more challenging geology than North America: shale gas deposits tend to be smaller, deeper and more faulted on this side of the Atlantic. A 3D simulation approach based on input of geomechanical data, seismic attributes and other local features provides a visualisation of the drilling process revealing the presence of any critically stressed fractures.

Figure 1 shows an example of how FracMan – the world's most comprehensive DFN-technology – assesses a reservoir this way. The analysis generated is subsequently compared to measured microseismic data to calibrate it and make sure it is accurate. Golder has developed this technology over more than 25 years in partnership with clients, geoscientists and technical experts, to create the very highest level of fracture software currently available. With the analysis, operators can identify the structural characteristics of the reservoir before drilling, as well as defining the extent of the induced fractures within the formation, providing a means to demonstrate how the fracturing process is managed to local stakeholders.

Once the reservoir has been analysed, the next step is constructing a well to the highest standard. This is essential because without good cementing and casing, even exceptional designs are worthless. Not only will correct

well completion and best practice throughout the process help prevent the migration of natural gas into water-bearing formations, it is also in the best interests of the investor from a technical and economical point of view, since any escape of the gas flow outside of the wellbore will result in significant economical loses and could even cause abandonment of the well. Local opposition to hydraulic fracturing is often based on fears of such contamination. This is a critical step to manage the risk.

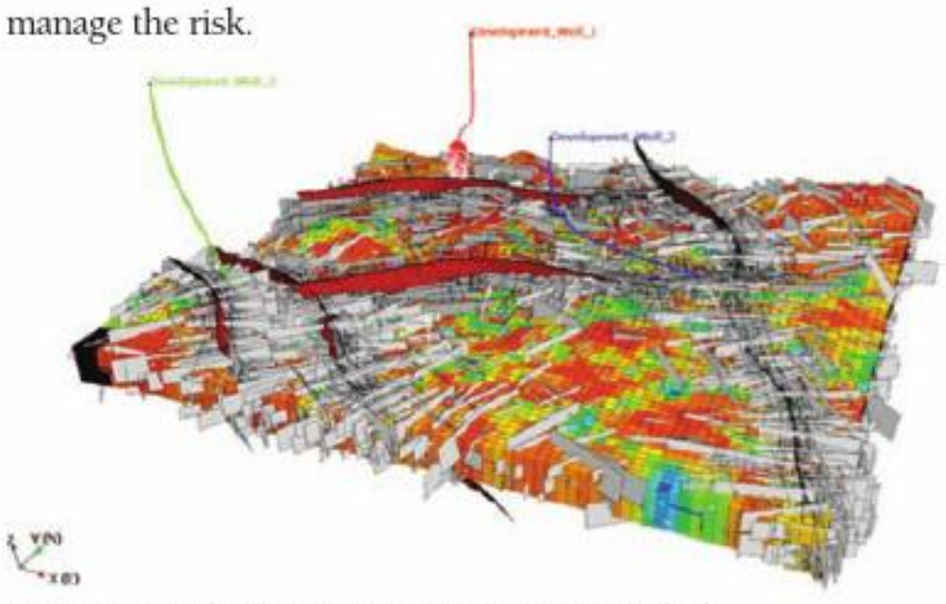


Figure 1: FracMan Naturally Fractured Reservoir Model

Water management

Perhaps the most pressing issue for unconventional gas operators is water management. The proactive way to deal with this is through the project supply chain. Different aspects of water management are traditionally handled by different teams; but if operators are able to develop an integrated approach, they can better identify risks, potential weak links, explore alternatives and develop practical mitigation solutions. See Figure 2 for the full water lifecycle.

Using a dynamic simulation model to calculate the current and future water demands of a project will let operators compare different scenarios for water management. Golder develops dynamic system simulation models that represent and integrate all stages of water supply, use, and treatment over the full lifecycle of a project. This gives operators the complete view of water management, helps them adapt to changing conditions and aligns them with the IPIECA guidance on industry best practice for water management.

Importantly, every potential water source scheme has to be assessed thoroughly for each project – there is no "one-size-fits-all" solution. The essential thing is to tailor water management solutions to local conditions. These will always vary, but competition with other industries and local residents for water is a common concern; securing your own supply while impacting local farmers' irrigation sources is hardly a viable solution. It is also important to be aware of local and national regulations on water use and disposal in the operating area. On a broader level, EU legislation requires member states to have an overall policy on managing their water resources.

Transportation becomes a further concern if nearby surface and ground water resources are not sufficient, which operators should expect as this is often the case. Water will

then have to be supplied via pipelines or lorries, depending on accessibility and infrastructure – while local water storage must also be developed. During initial stages of operations, transport vehicles will normally be the means of choice; but as shale extraction continues, pipelines may become more suitable, even though this will increase capital expenditure.

Lastly, it is vital that the industry recognises the correct scale of water management. A persistent shale myth is that hydraulic fracturing uses worryingly large amounts of water. To realise that this is incorrect, we need to understand the broader context of industrial water usage. This can be easily illustrated from a UK standpoint: A typical hydraulic fracture stimulation will use approximately 1–5000 m³ of water – to put this in perspective, it is somewhere between a half and two Olympic swimming pools. As an example, if we assume operators drill 20 wells a year and stimulate 20 stages in each well, they will use at most 2,000,000 m³ per year. This is around seven per cent of the current UK onshore oil and gas industry water production rate.

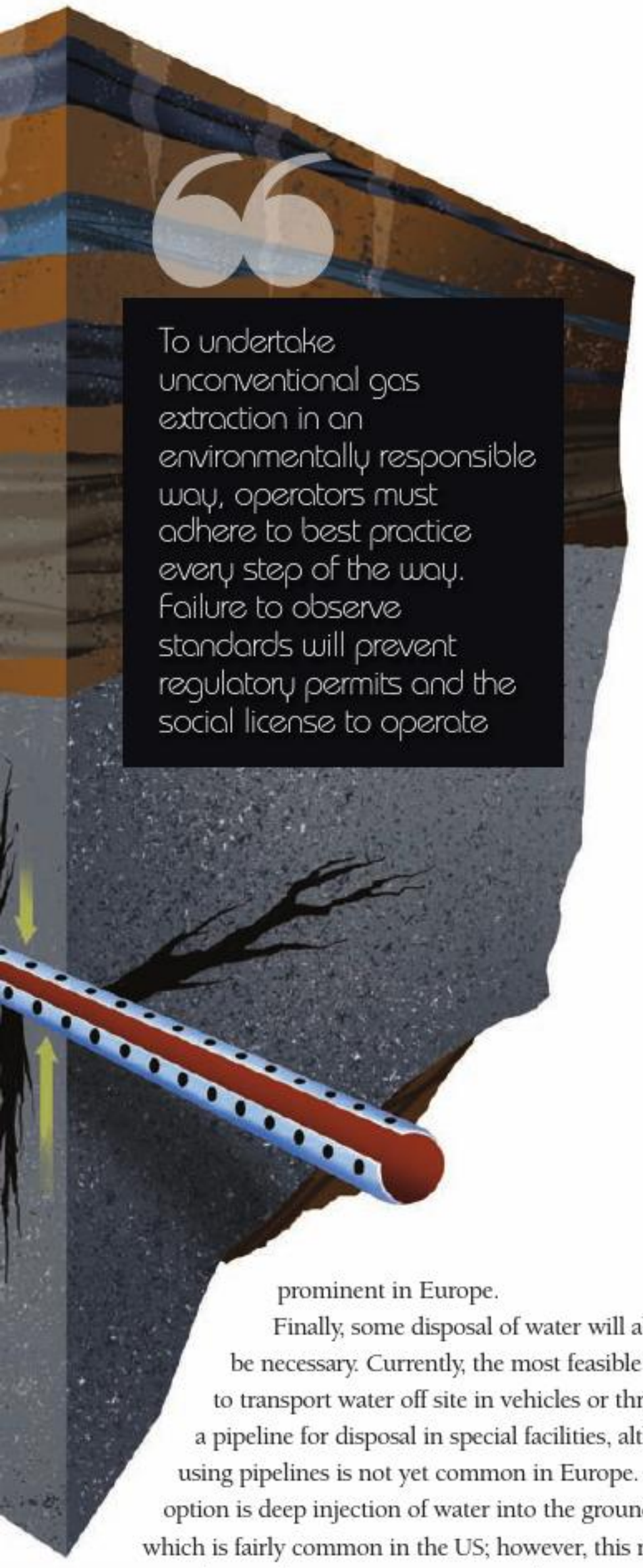
Figure 2: The water lifecycle

Flowback and produced water

An integral part of water management is the treatment, reuse and disposal of flowback and produced water recurring after stimulation. On average, ten to 40 per cent of injected water flows back within one to four weeks. Flowback is then replaced by produced water, which comes from the rock formation itself. Flowback and produced water create environmental risks that must be considered as part of hydraulic fracturing and is another area where operators can allay many fears by demonstrating best practice.

Firstly, the early flowback and later produced water must be kept in lined reservoirs or tanks with leak control systems, on site or in a centralised location. The storage space must not only have sufficient capacity for storing all the water while allowing for precipitation, but also be able to withstand storms and rough weather. The most common form of impact to groundwater is surface releases of water, so appropriate storage is essential. Both flowback and produced water can be reused several times for subsequent hydraulic fracturing operations before it has to be cleaned; this is a good way of decreasing competition with other water users. Produced water, however, is generally not suitable for other uses without significant treatment, as it comes from hydrocarbon bearing formations.

Secondly, operators need to shape their treatment and reuse approach based on their overall water strategy. Meticulous planning of the supply chain can save money, minimise risk and secure sustainability. There is a growing emphasis in the industry on the recycling and reuse of water, leading to advances in technology. Specialised plants capable of cleaning flowback and produced water already exist, but not necessarily in the same locations where operators extract gas. Mobile treatment centres are then typically used. An issue that is becoming increasingly scrutinised by the industry is the fact that existing laws in Europe pre-date the "shale boom". In some new instances the implementation of these laws can be unclear and will possibly change as hydraulic fracturing becomes more



prominent in Europe.

Finally, some disposal of water will always be necessary. Currently, the most feasible way is to transport water off site in vehicles or through a pipeline for disposal in special facilities, although using pipelines is not yet common in Europe. Another option is deep injection of water into the ground, which is fairly common in the US; however, this re-raises issues of groundwater contamination and is at present not possible in Europe because it is a direct contravention of the EU's Water Framework Directive. Other possibilities are evaporation ponds or direct disposal on site following extensive treatment; however, local communities are likely to resist this vehemently, and Northern and Eastern Europe, where exploration is currently most advanced, do not have the appropriate climate for evaporation ponds. It is also important to have a back-up solution, such as emergency storage facilities, in case the chosen disposal method becomes temporarily unavailable.

By establishing these plans early, and understanding the water lifecycle, hydraulic fracturing is far more likely to satisfy social, environmental and regulatory demands.

Responsibility, responsibility, responsibility

To undertake unconventional gas extraction in an environmentally responsible way, operators must adhere to best practice every step of the way. Failure to observe standards will prevent regulatory permits and the social license to operate. However, if best practice is closely followed, operators can change many of the more difficult misconceptions that cloud a viable source of energy and bring Europe a step closer to achieving its energy targets. Being aware of all the pitfalls takes time, but not being aware of them is costly.

By adopting best practice, operators will not only establish a better reputation and significantly increase business opportunities, but will, over time, also begin to change the perception of the industry as a whole. From analysing with DFN-technology to creating watertight water management strategies, everything has to be of the highest standard and planned well in advance. With these in place, responsible shale gas development is achievable. O&G

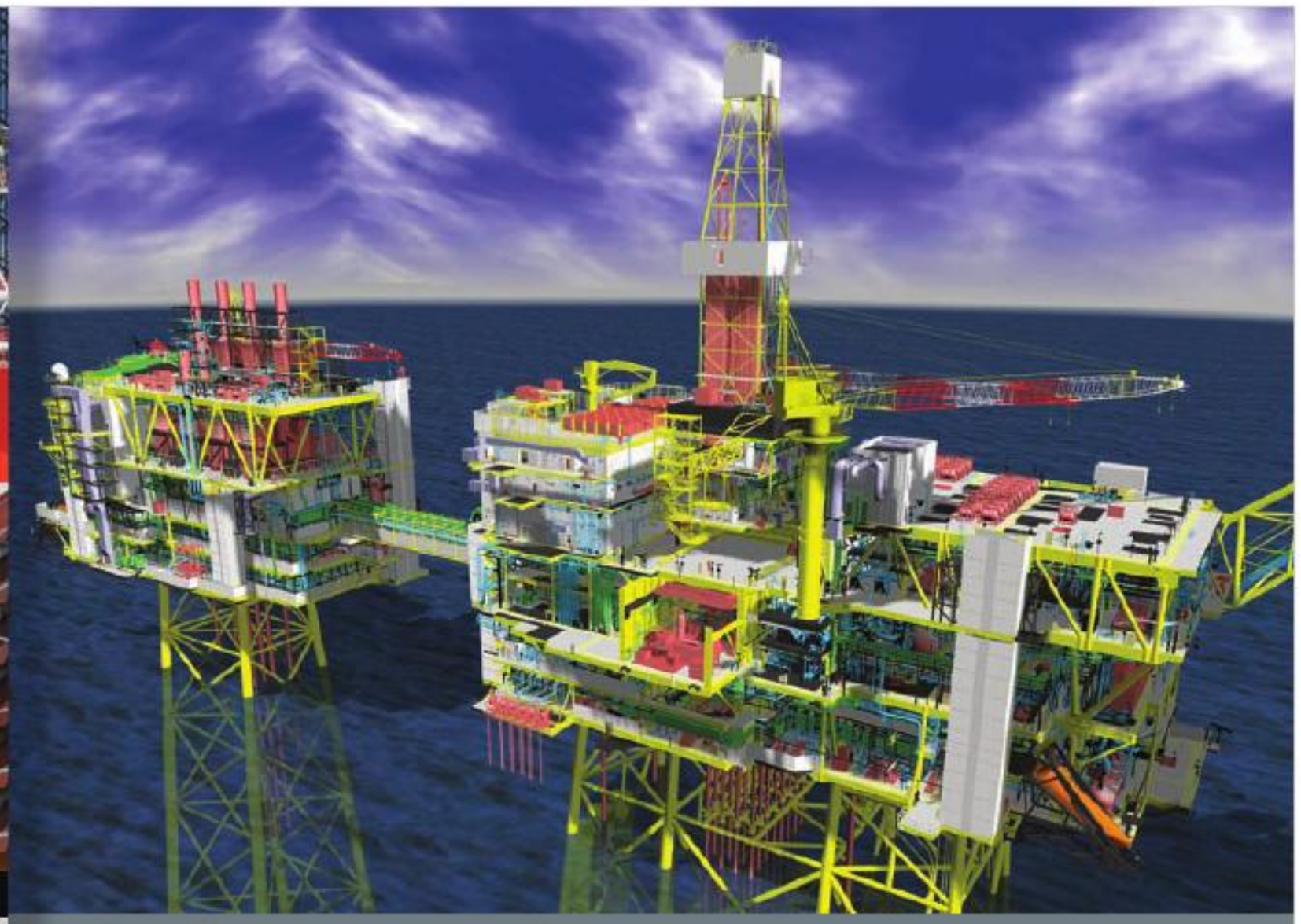
Above: Anodes being assembled

Taking the lead

Aberdeen based 3sun Group has been awarded a marine operations and management contract by Statoil, worth £1 million. The six month contract, which commenced last month [June], will be based within the Outer Harbour of East Port, Great Yarmouth, and marks the first time 3sun Group has worked with Statoil and supported on a major project for the marine sector.

3sun Group will take a lead role on the project, assembling anodes onto specialist frames designed to be used to transport assemblies offshore for deployment to the seabed around each of the 88 wind turbine foundations on the Sheringham Shoal wind farm, located 21km off the North Norfolk coast, UK.

Stuart Brand, 3sun Group operations director, said: "This is a significant contract win for the Group and a real coup. The scope of work and the contract value signifies the extent of our technical abilities and further underpins our reputation for delivering a high quality service and execution. We are delighted to establish a working relationship with Statoil through this project and we look forward to continuing to support the company in the future as it grows its operations within the UK and Europe within the energy sector."



Safety and security

Synectics has designed and delivered an end-to-end surveillance solution for Clair Ridge – the £4.5bn second phase development project taking place in the North Sea's Clair field.

Located 75km west of the UK's Shetland Islands, Clair Ridge is the most recent high profile project to feature in Synectics' North Sea portfolio, which also includes developments such as Jasmine/Judy, Golden Eagle, Shell Gannet, Shell Clipper, Erskine and Elgin.

The Clair Ridge development, due for full platform topside installation in 2015, will consist of two bridge-linked platforms - a drilling and production platform, and a second for quarters and utilities.

Working in partnership with IT and telecommunications company Page Europa, Synectics' IP-based system - utilising Synergy integrated security management software - will provide complete surveillance across both platforms for safety and security processes.

Amedeo Simonetto from Synectics said: "As well as providing detailed coverage for both hazardous and non-hazardous platform areas, the system we've supplied is centrally controllable and will integrate effectively with multiple third-party systems including the Driller's CCTV system. With plans to utilise Clair Ridge as a hub for further expansion and development of the field, the system we've developed is 'future proof' as it is flexible enough to cope with additional demands."

Quality and strength

KCA Deutag, has been awarded a $170 million contract by Sonangol Pesquisa e Produção, S.A., for the provision of the Ben Rinnes jack-up rig in Angola. The two-year agreement, which comes with a two-year extension option, will see KCA Deutag's offshore division provide drilling and completion services, in various offshore locations in Angola. The contract will employ around one hundred people, the majority of whom will be Angolan nationals.

The Ben Rinnes is one of two jack-ups in KCA Deutag's rig fleet. The rig has been operating in Gabon since January 2013, where it completed a multi-well drilling programme. It has achieved an excellent performance record, celebrating six years Lost Time Incident (LTI) free in April 2014.

Rune Lorentzen, president of KCA Deutag's offshore division said: "We are extremely proud to partner with Angola's national oil company. This award is a reflection of the quality and strength of our operations across the globe, and our approach to working with our customers to understand their needs and provide them with drilling solutions for the future.

"Angola is the second largest oil producer in Africa and it continues to be a major hub of activity for KCA Deutag. We have worked hard to build a strong presence within the region and this contract will only serve to enhance our operations even further."

Above: (L to R): Callum Livingstone, graduate engineer; Murray Smith, graduate engineer; Colleen Bowie, business modern apprentice; and Fraser Anderson, graduate engineer at ACE Winches

Investing in people

ACE Winches, the leading deck machinery specialist, has become the first organisation ever to achieve the Investors in Young People (IIYP) accreditation. It is the only people management standard that focuses on an employer's recruitment and retention of young people, which launched this month in partnership with the Scottish Government. The recognition comes as the company's ACE Winch Academy, which provides training for all aspects of winch and specialist lifting operations, grows on a global scale and the recent Wood Commission report highlights that there are 53,000 young people not in education, employment or training in Scotland.

The exclusive accreditation makes ACE Winches eligible to use and display the Investors in Young People logo and plaque, and enjoy its benefits including recruitment, development, retention and wider business enhancements.

Alfie Cheyne, CEO commented: "ACE Winches is committed to engaging and developing young people through schools, work experience, apprenticeships, trainee and graduate schemes. We are delighted to be the first organisation to achieve Investors in Young People accreditation globally.

"It will allow us to gain feedback against our business priorities of sustained global growth, profitability and innovation and also aid in securing the long-term future of our workforce and their families."

New opportunities

AGR, the leading independent well management company, is urging operators in the North Sea to capitalise on increasing availability and falling rig rates.

During the company's annual rig briefing to operators in London this month delegates heard that a softening rig market means that operators need to grasp this opportunity to secure a rig for their drilling projects - at a significantly lower cost than the high rates seen recently.

AGR rig team leader, Duncan Weir, discussed the cost-cutting initiatives many operators are embarking on in response to the recent surge in rig demand. This has resulted in options lapsing and excess time being available on long-term contracts, meaning sublet time emerging and even early termination of contracts. He urged operators to progress future drilling activity where possible if they are to make the most of these rate reductions and availability.

He said: "It's accepted that there are difficult times ahead for drilling contractors. The dip in North Sea activity offers significant opportunities to capitalise on lower rig rates. We're seeing reduced day rates as well as mobilisation and de-mobilisation numbers across the board and availability is steadily increasing. This situation provides new opportunities."

Above: James Paton, managing director of ADIL

Continued growth

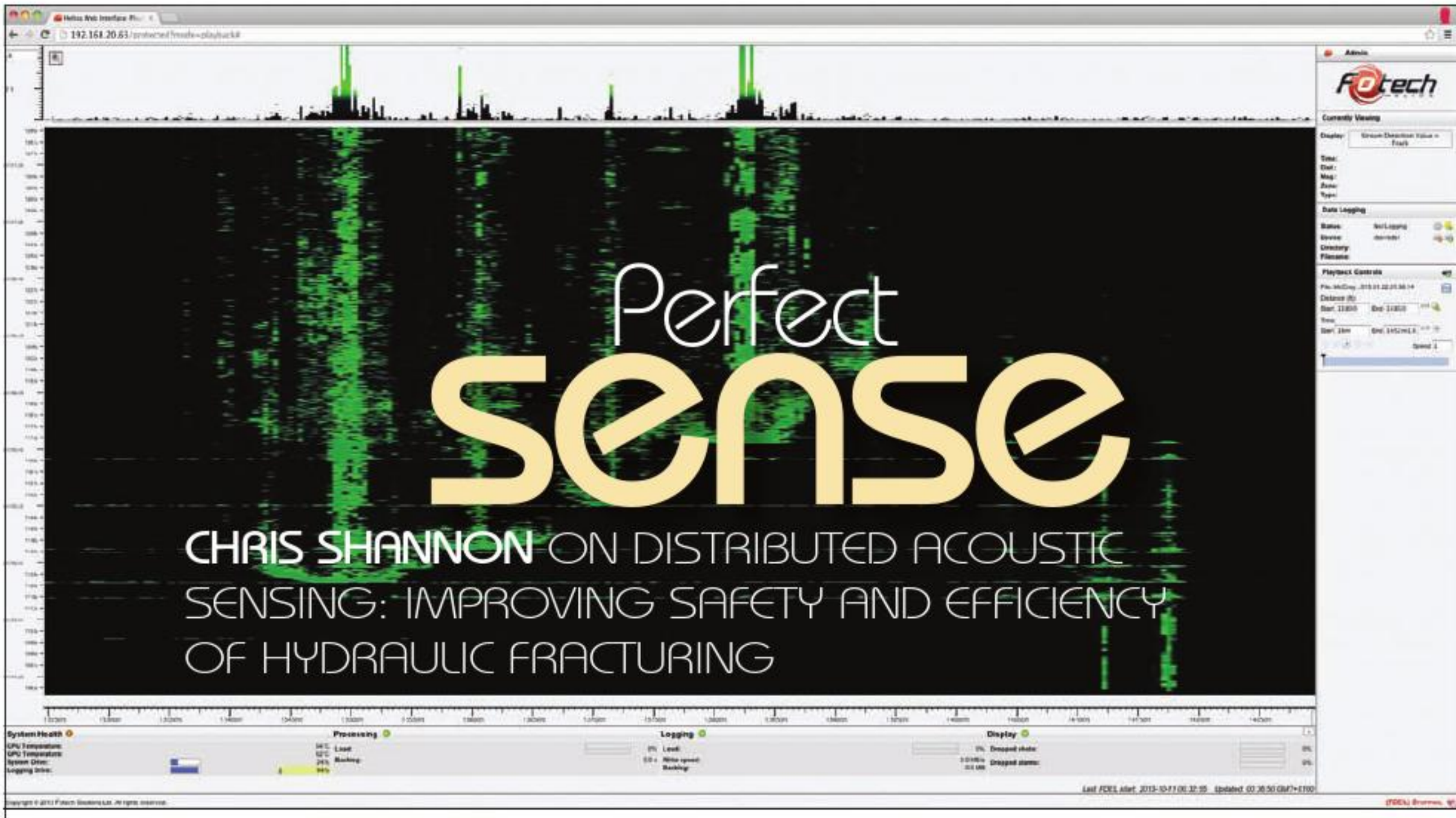
ADIL, the leading independent energy consultancy, has capped a successful first six months of 2014 with contract wins totalling in excess of £3 million across its Aberdeen and London operations.

The company, which has secured projects with four new clients during Q1 and Q2, has seen the most significant growth from its London office and across its operations and improvements division.

The wins put ADIL, which reported a 50 per cent rise in revenue to £31 million in its 2013/14 financial results, on track for meeting its ambitious growth target for this year. "Our London office is playing an increasingly important role as we look to expand our international network and capitalise on the growing global demand for development and operations management services," said managing director James Paton.

"This, combined with the continued strength of the North Sea market for technical support in the operations and improvements sector, both from large multi-national and small independent operators alike, has resulted in a rising demand for our services and positions us well for meeting the next milestone in our continued growth strategy."

The clutch of contracts has also seen ADIL provide project and development support for a number of North Sea campaigns and netted the first wins for its recently created business solutions division.



As the oil and gas industry exploits more unconventional sources and deploys more complex techniques, from hydraulic fracturing to floating LNG, the challenge of gaining high quality real-time intelligence to inform and accelerate decision-making at every stage of the extraction process increases.

Once in a while an innovation in technology will create a breakthrough. In the 1990s it was Distributed Temperature Sensing (DTS), starting in university laboratories but now commonplace worldwide. The breakthrough technology of this decade is Distributed Acoustic Sensing (DAS).

DAS uses a fibre optic cable to detect acoustic vibrations so that engineers can 'visualise' and record what is going on downhole at every point of the well in real-time. This gives well engineers greater clarity than ever before and allows them to focus time and effort on value-adding activity and, ultimately, increasing recovery.

One of the techniques that stands to benefit most from DAS technology is hydraulic fracturing – a method of extraction that still suffers from significant limitations in terms of monitoring and analysis of the drilling operation.

The challenge of visibility

The process of drilling down into the earth before a high-pressure mixture of water, sand and chemicals are injected into the rock, allowing the gas to flow out to the head of the well has been well established in several countries including the US and Canada.

However, concerns about the safety of the technique remain, with some high profile bans in countries such as France and Germany. Much of these concerns centre on the fact that to date engineers have had almost no visibility of the fracturing process. As well as giving rise to safety and environmental concerns, this lack of visibility is also a major issue for the well operators as it limits their ability to achieve optimal recovery from wells.

In a standard fracturing operation each potential production zone in the well is separately exposed to the fracturing fluid conveyed at high pressure through perforations, open sleeves or other methods. Conventional design of a fracturing operation pumps a certain volume of fluid, at pressure, into the well, directed specifically at the zone to be fractured and only this zone. In each separate production zone there are only so many perforations, or a limited area of borehole, that are open to the fracturing fluid at any one time.

Based on a lack of information, the assumption is made of a multi-zone hydraulic fracturing operation that every section of each zone will take the same volume of fracturing fluid equally, as though the formation was homogeneously permeable. In fact great variation in relative permeabilities can occur even across a single zone, affecting future production rates.

Obviously, homogenous formations are not the norm and so, with some heterogeneity, some fractured areas perform much better than other fractured areas, even within the same zone.

To date, even with tools such as DTS, the process of optimising the fracturing process has only really been possible through labour intensive and time consuming trial

Below
Chris Shannon, CEO of Fotech Solutions

and error testing. Clearly this is not an ideal situation and has meant that there remains significant uncertainty around key fracturing completion and production performance indicators such as fracture propagation and geometry, interference and deliverability.

DAS - removing the guesswork

DAS provides a tool to deliver a new dimension of knowledge during the fracturing process. A cost effective solution that allows the fracturing engineer to have vital information regarding the efficiency of the process - reducing uncertainty and allowing an optimised fracturing job to be delivered. This additional information can be gained from each stage of the fracturing process.

In the initial fracture stimulation phase DAS can give engineers a far greater understanding of fracture propagation and geometry. This includes building an understanding of the fracture operation itself, including ball seating, guns firing and perforation, before gaining visibility of the fracturing activity and propagation, potentially including the sensing of fluid flow in the active zone. This gives the engineer a real time log of the fracturing operation to an accuracy of 1-2 metres, providing an indication of fracture success in the exposed formation. DAS provides engineers with information that can help with decisions on the operations of the present fracture or future operations in the well. It can also give valuable information for the next well in the same formation or zone.

Post-fracture, DAS can also be used to detect the flow-back of the fluid from the formation to the well. A comparison of results from these two operations enables a great amount to be deduced and understood about the fractured formation. By monitoring this early production flow-back engineers can look at correlations between fracture treatment and flow-back quantities, or whether the back flow contribution profile changes over time.

DAS allows the engineer to determine, with documentary evidence, not only which areas are taking the fracture fluid in the first place, but also indicates how and where the permeability has been improved over the period of the fracturing operation. This information can indicate potential variations in production and which areas may under perform, increasing confidence in predicted production.

Longer term production monitoring with DAS helps engineers track changing production profiles to identify and address production issues before they can impact on performance.

Environmental benefits

This real-time feedback gives engineers far greater control. Not only does this benefit production but it also allows engineers to be far less 'aggressive' when conducting fracturing procedures.

Returning to the earlier example of differential fracture success in a given fracturing zone, the fact DAS can clearly identify which zones have not successfully fractured means that engineers do not have to continue fracturing the whole well repeatedly. Instead, repeat fracturing efforts can be far more targeted, only in the zones that were not successful initially. Crucially this means that there is less subsurface disturbance, less fracturing fluid being used and ultimately less chance for issues to arise.

By installing the fibre down hole DAS also provides an additional benefit as it can be used to not only monitor the fracture zones, but also the cement casing of the wellbore itself. As a result DAS can be used to detect possible leaks and to ensure that gas and fluid are not escaping from the well.

Increasing security and recovery

By simultaneously listening at every point in the well, monitoring real-time down hole fluid flow during fracturing operations, DAS can provide data and interpretative tools that have not been possible until now. This increased intelligence gives the fibre-enabled well huge advantages over the conventional well.

That is not to say that DAS is a silver bullet - it should not be seen as a replacement for existing monitoring tools. Instead it adds a powerful new element to the tools at the disposal of engineers. For example, when correlated with Distributed Temperature Sensing and Surface Microseismic sensors, DAS creates a multi-dimensional, real-time dynamic profile of well conditions. Combining DAS with other existing technologies in this way can provide a comprehensive monitoring solution, delivering valuable insight into both completion and production issues - affecting real time decision making, improving overall efficiencies and increasing safety.

However, the additional data that DAS can provide is the crucial element in reducing assumptions in fracturing operations. In so doing DAS stands to enhance the production efficiency of the fracturing process as well as the safety of the procedure; helping to address some of the environmental concerns that hydraulic fracturing has aroused. It is for the combination of these benefits that DAS can quite reasonably be called the breakthrough technology of this decade for the oil and gas industry. OGG

Sustained business

RICHARD TIPPER ON THE GREENHOUSE GAS REPORTING CONUNDRUM FACING OIL AND GAS COMPANIES

Monitoring greenhouse gas (GHG) emissions in the supply chain is now routine practice in the oil and gas sector. But as stakeholders demand greater transparency and new forms of energy production emerge, how can the industry tackle the challenge of accurately and cost effectively monitoring environmental impacts across complex supply chains?

Part of the answer may lie in education. As the call for reassurance and information about sustainability, from consumers, investors and regulators alike, continues to grow, many oil and gas sector industry insiders are asking themselves: "do stakeholders actually understand the data and the implications for our sector?" Unfortunately, it would seem that all too often the answer is no. After all, it is only possible to have a sensible conversation about where improvements can be made on the basis of a good understanding of the nature of the problem.

A key challenge is the fact that the collection, analysis and dissemination of information relating to environmental impacts increases as supply chains become more complex. As the industry diversifies into other forms of energy production, the wider implications around, for example, deforestation, biodiversity and water scarcity, means companies will be expected to collect and share meaningful high-resolution data on an ongoing basis. One potential strategy could see companies acquire data remotely from orbiting satellites and harness this input by using web-based technologies. This makes it possible to acquire, store and analyse near-real time data in high resolution or over vast geographical areas, taking advantage of ubiquitous web browsers and cloud-based processing and storage.

Companies will increasingly be expected to make better-informed procurement decisions and transform such insight into a valuable communication tool that builds trust with investors, shareholders and customers. In parallel, a greater focus must be placed on explaining why environmental impact data varies between companies, geographies and production assets, and the fact that some companies that report higher emissions are not necessarily less efficient or less well managed.

Below
Richard Tipper, chairman of Ecometrica

Here are three recommendations addressing these issues:

1. The structure and role of the company within the supply chain

Company structure and its role within the production supply chain will have a significant impact on the reported levels of greenhouse gas emissions and other environmental impacts. The way in which emissions are commonly attributed to the major operator, rather than split on an equity basis is arguably a better reflection of the potential financial impact of carbon pricing. However, investors may find it difficult to understand the overall message if some facilities report emissions on an operational basis, while others do so on an equity basis.

Inter-company comparisons and benchmarks are often of dubious value given the range of company structures, areas of operation and activities undertaken within the supply chain. Companies that are vertically integrated will exhibit very different sustainability profiles from horizontal specialists.

In general, it will be more useful to look at environmental performance over time, to see whether a company is making real progress. Even so, this approach will also require careful interpretation of the data, as any changes may reflect market changes, for example, entry to or exit from certain geographic areas. BG Group is one example of a company that provides a good explanation of the operating context for its water usage in Australia, which allows data to be viewed in the context of how the company responds to the particular biophysical challenges and regulatory environment.

Recommendation 1: Companies should ensure that they explain to external stakeholders how the structure and role of the organisation is reflected in the environmental data, which should include the rationale behind the accounting boundaries. While upstream and downstream emissions may not be attributable to the company in question, it is important to understand how carbon pricing on those emissions could impact business relationships and the value of the company's services.

Any changes to emissions and other reported impacts over time, and how these relate to company structures or markets

in which they operate, as well as changes caused by technical changes, such as new technology or improved management, should also be made clear.

2. The type and condition of production assets

It is not widely appreciated outside the industry that production assets vary widely in their gas composition, with big differences in the amount of water and CO_2 associated with natural gas and oil flows. This natural variation results in differences of upstream greenhouse gas intensity that are not necessarily related to the energy efficiency of operations. Furthermore, the energy requirements for production change over the lifetime of a field, with mature assets requiring progressively higher energy inputs per unit of extraction.

While not always appreciated by regulators and other external observers, the fundamental economics of refining are pretty much aligned with minimising greenhouse gas emissions per unit of output. The oil and gas industry is constantly working to optimise and improve efficiency in order to minimise the quantity and quality of feedstock consumed in the delivery of the end product. This economic driver is largely consistent with the aim of reducing greenhouse gas emissions, but there is a lack of understanding of the constraints or opportunities faced by companies in different theatres of operation.

In terms of environmental reporting, the operating context and the nature of the assets is rarely explained in a way that investors or other stakeholders could understand and make the connection to environmental performance.

Recommendation 2: Companies should explain how the type and condition of production assets they own or operate is reflected in the environmental data. This is important as part of the process to communicate the forward plan for the business, in particular, the anticipated areas of growth, retirement of old assets and the impact of such actions. This will allow the numbers to be better understood within the context of the strategic focus of the business.

3. Investment decision making

A final area that is poorly understood (perhaps because it is poorly explained) is the role that environmental impacts, greenhouse gas emissions in particular, have in any investment process. At present, Shell appears to be the leader in explaining how investment decisions are stress-tested against a range of future carbon prices. Ideally, such a process

> As the industry diversifies into other forms of energy production, the wider implications around, for example, deforestation, biodiversity and water scarcity, means companies will be expected to collect and share meaningful high-resolution data on an ongoing basis

would be developed and expanded across the industry.

Energy economist Andrew Leach from the University of Alberta has already calculated that oil sands operators could readily afford carbon pricing of $30 to $50 per tonne of CO_2e, based on profits of $400 to $500 per tonne CO_2e emissions.

Royal Dutch Shell has, for over a decade, been using a carbon price of $40 per tonne when evaluating potential projects, as a precautionary step to ensure projects make long-term economic sense. The value of this approach is now being borne out in the context of potential Canadian federal carbon pricing for large emitters. The ability for companies to use carbon pricing as a spur for technical innovation is likely to be a key factor in future successes, particularly in North American markets.

Recommendation 3: Companies should adopt, develop and communicate the concept of carbon price stress testing relating to prospective developments. This will allow operators to show how investment decisions can stand up to future carbon pricing that may result from international constraints of levels of GHGs in the atmosphere. Improving communication in this area would help investors understand how resilient companies are to the 'stranded assets' concept, put forward by Caldecott and others at the Smith School of Enterprise and the Environment at the University of Oxford.

The active monitoring and dissemination of environmental impacts will play a key role in building tomorrow's successful, sustainable energy businesses. However, raw data alone is unlikely to paint a picture that takes the structural, operational and strategic complexities of the industry into account. In response, oil and gas companies must ensure they work with all stakeholders, to foster a deeper understanding of the multitude of factors influencing such insight. OGG

Light speed protection

IAN HODKINSON SHARES HIS EXPERIENCE OF USING ARC PROTECTION RELAYS WITH FIBRE OPTIC SENSORS TO REDUCE THE RISK FROM ARC FLASH INCIDENTS

Guidelines and standards introduced recently by bodies such as the Institute of Electrical and Electronic Engineers and the US Occupational Safety and health Administration have prompted an increased awareness in the risks posed by arc flash incidents.

Although relatively rare, electric arcing poses significant threats to the oil and gas sector, firstly to life and limb of operators, but also to valuable process continuity and finally to essential electrical equipment.

Arcing is the passage of electric current through air or another dielectric. It takes the form of plasma that can reach temperatures five times hotter than the surface of the sun, as well as emit light 2000 times brighter than normal office light. The increase in temperature leads to a sudden expansion of gases, which creates explosive forces, and the high temperatures can lead to the formation of toxic chemicals, representing additional hazards during an incident and in its aftermath.

The root cause of an arc forming in an industrial or utility power distribution system can be human error, mechanical fault, pollution or animal ingress, to name but a few.

And as an arc flash propagates, its energy and temperature rapidly intensify. In only a couple of hundred milliseconds, an arc can produce enough heat to burn through copper and steel. So by improving detection time and tripping the current to reduce arc time to a minimum, operators can stop arc flash incidents before they can propagate.

The key to reducing arc time and energy and to improving safety is ultra-fast detection. By improving the detection time by just a few milliseconds, operators can reduce hazard levels and requirements for PPE (Personal Protective Equipment). The ultimate goal is to reduce arcing times to 40 ms or less, at which point they do not result in personal injury or major damage to switchgear.

A good arc protection system will provide fast and reliable detection. In addition, it should be simple to install and offer supervision of an entire installation, as well as other benefits such as circuit breaker failure protection and simple but flexible relaying, especially for complex systems, as well as self-monitoring.

Safety at the speed of light

Originally developed in the 1990s, ABB's first arc flash relays used one or two single-point lenses in the high-voltage compartments where a potential arc flash may occur. In around 2000, ABB improved its relays with the REA series of arc flash detection system, which integrate a long unclad fibre-optic sensor that can absorb light throughout its length instead of individual lenses.

The latest update for the REA series is that DNV GL, the world's largest ship and offshore type approval organisation, has approved the system for installation onboard ship and offshore units.

Long fibre-optic sensor

The fibre-optic sensor is the key to ultra-fast arc detection. It will pick up the sudden intense light caused by an arc flash anywhere along its length and trip the circuit quickly.

As a standalone relay, the REA system does not need to co-ordinate with other protection systems, cutting out the potential for delay. And as a single sensor, it can cover the same protection zone as conventional bus differential protection and is straightforward and lower in cost to install than individual single point sensors.

The long fibre of up to 60 metres can overcome any shadowing by surrounding switchgear so that it takes action on an arc flash the instant it arises. In addition, if the fibre sensor is configured in a loop, the system can provide a health check of its own integrity and continuity on a regular basis by continually sending a light pulse around the loop and raise an alarm for manual intervention if a problem is detected. Finally, it's possible to retrofit such sensors to existing switchboards as well as integrate them into new installations.

The relay is ideally suited to modern vacuum and SF6 insulated circuit breakers where the fault interruption takes place inside a sealed container. And with proper precautions, an optical relay may also be applied to air magnetic breakers.

In operation

By combining the fibre-optic arc flash sensor and IGBT over-current sensor, the REA systems deliver a miniscule

tripping time of 2.5 ms.

When a flash and defined over-current occur simultaneously, the relay will break the circuit, quenching the arc quickly and effectively, although its also possible to set the relay to trip by light alone. Different current threshold levels can be set for phase and ground fault currents. High-speed insulated gate bipolar transistors (IGBTs) provide two fully trip-rated outputs rather than relatively slow conventional dry contacts.

Thousands of REA systems with fibre-optic sensors have been installed worldwide in utilities, marine, oil and gas, and industrial settings, with at least two installations being documented as preventing serious damage to medium-voltage switchgear following an arc flash incident.

But in the oil and gas sector the real savings can be measured from protecting valuable process continuity and personnel.

Retrofitted on the Osi oil storage barge

BHP Billiton's Osi oil storage barge has an installation of the REA Arc Protection System to protect the crew and equipment. An in depth study by a third party engineering consultancy identified a significant risk to BHP Billiton's personnel and equipment in the event of an arc fault on the Osi's low voltage boards and switchgear.

The retrofit solution installed by ABB Service uses a long fibre-optic loop sensor to cover a three-section switchboard and two bus ducts. The fibre is crossed at the bus tie breaker, allowing selectivity and the ability to keep parts of the electrical supply system operating if a fault were to occur in one area. Only a short outage was required during installation, facilitated by the ease of installation of the REA system.

Compact solution

The equipment has also been installed on the main distribution substation for Total's Lindsey Oil Refinery (LOR) in North Lincolnshire. Located at the heart of the refinery, the 11 kV substation includes 26 panels of medium voltage switchgear, protection and control equipment and back-up batteries as well as the REA arc flash relay equipment.

The substation has been designed to fit inside a single six metre container that has been reinforced to withstand blast shockwaves and ensure power continuity in the case of an explosive event at the refinery.

ABB's ability to fit the substation into the six metre standard container was instrumental in winning the contract. A vital factor in achieving this was the REA arc-flash protection system, which eliminated the need for a conventional (and space consuming) high impedance bus-zone protection scheme.

Life saving

Steve Scala, an ABB Service protection and control expert, can claim that an arc flash protection system saved his life. Having retrofitted an REA relay system to 13.8 kV switchgear at a major university in the US, Steve returned to site to host a tour of the completed work for a small group.

During the group's time inside the enclosure, an arc fault occurred in one of the switchgear line-ups and the REA system performed its duty, sensing the arc light and fault current within 2.5 millisecond and opening the source breaker within 50.2 milliseconds. The REA's performance meant that Steve and his visitors walked out unharmed and the equipment was fully restored within 12 hours. O&G

Seeing is believing

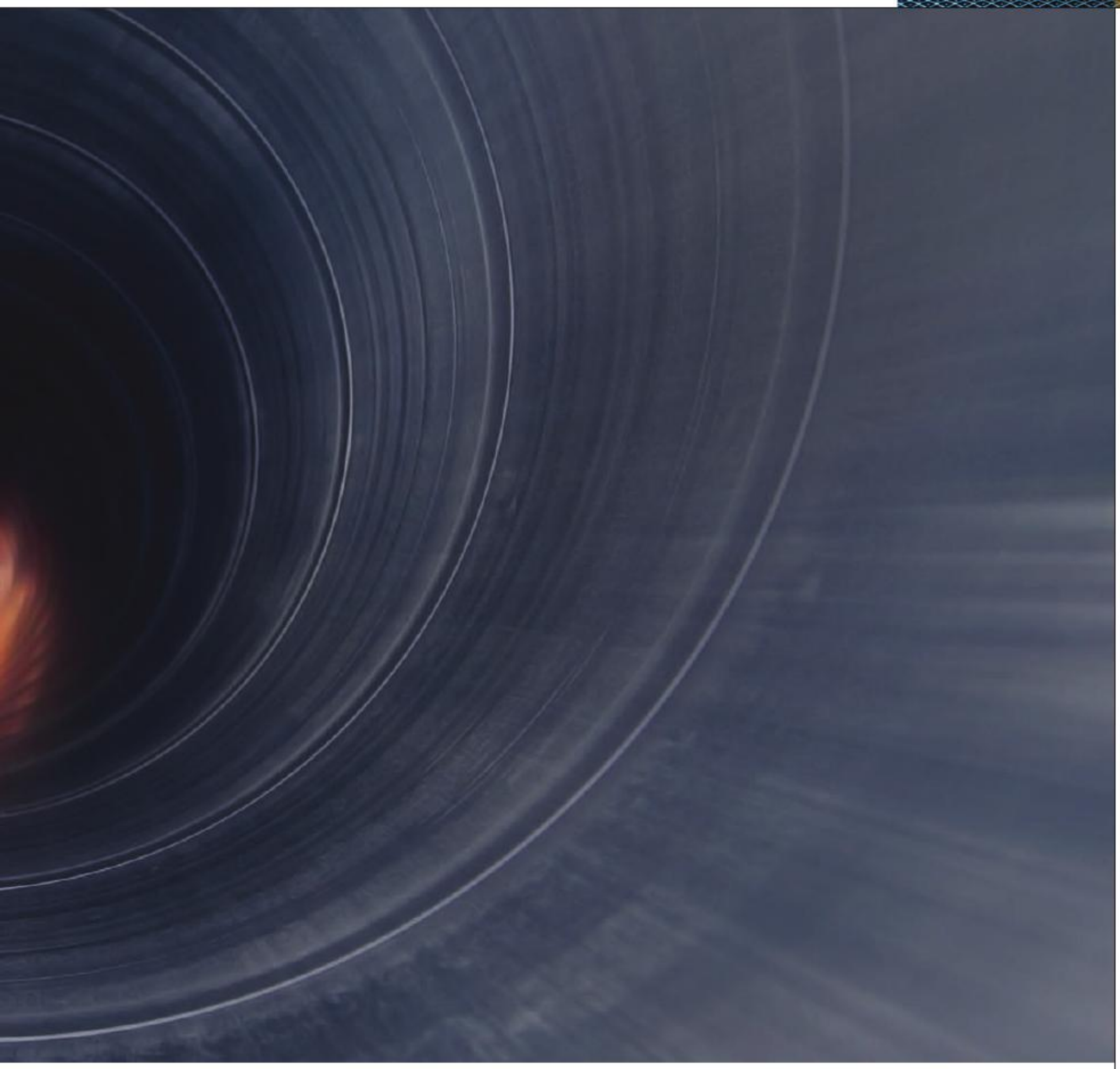
WELLBORE DIAGNOSIS THROUGH DOWNHOLE VIDEO TECHNOLOGY MADE CLEAR, BY FRANCIS NEILL

In an ideal world, oil and gas operators would have no problems in their wells, much as in our everyday lives we would rather not to have to visit the doctor. However, the reality is that unless we are very lucky we have to visit the doctor and, similarly, wells have problems that require diagnosis. Traditionally the tools for diagnosing problems in the wellbore have been limited and the equipment which is used, including lead impression blocks, colloquially known as 'confusion blocks,' has remained broadly unchanged for 50 years. Fishing for dropped objects or selecting the correct mill bit has relied on specialised individuals with 'experience' rather than modern technology. Would you go to a doctor who uses obsolete technology? Probably not. Then why do we still use guesswork when dealing with multi-million dollar assets?

Video technology has come a long way over the last ten years and has become commonplace in everyday life. We can stream high-quality video from our smartphones to anywhere in the world. We can watch HD TV on our laptops. In medicine, micro-cameras are used as key diagnostic tools and, in a different type of application, video technology is used by the military on drones to identify targets.

Though video technology has advanced in other sectors, the use of video as a downhole diagnostic tool in the oil and gas industry has been limited due to poor technology, lack of expertise and the need for a clear fluid for visibility. Thus stands the reliance on 'confusion blocks' and 'expertise.'

However, the last five years have seen significant development of both the underlying technology and the operational experience so that acceptance of downhole video technology as a key wellbore diagnostic tool is now rapidly growing. Today, downhole cameras are routinely used to



depths up to 10,000m and temperatures up to 125°C. In the last 12 months more than 1500 downhole runs have been made globally for a wide range of applications including:

- Assisting in fishing operations
- Identifying and assessing corrosion and well integrity issues
- Confirming the performance of sub-surface safety valves
- Monitoring scale and salt build-up
- Determining frac sleeve status
- Inspecting completion equipment including screens and hangers
- Evaluating gas or water entry into the wellbore

Advancements in downhole video technology

Downhole video cameras can now be deployed on electric line, slickline, coil tubing or drill pipe as the application requires. Electric line cameras such as EV's Optis HD E-line camera have both downview and sideview cameras in a 43mm toolstring with the latest LED technology for lighting. Considerable research has gone into optimising both lenses and lighting arrangements for the challenging conditions at the bottom of the wellbore. Optis HD E-line can stream colour video at up to 25 frames per second up 10,000m of mono-conductor cable. Slickline cameras can record up to five hours of full colour video. Similarly, coil tubing can be used to deploy either e-line or memory cameras with the added advantage of being able to pump a clear fluid through the coil tubing and out into the zone of interest.

Temperature has been for a long time a constraint as video technology uses high-speed electronics and complex CCD chips. Standard tools are rated to 125°C today with new technology moving the temperature rating up 140°C and 175°C ratings for special applications. O&G

Statoil case study

On Statoil's Snorre platform, EV's Televiewer camera was used to assist in a complex fishing operation. Televiewer combines EV's electric line camera technology with Baker Hughes's Telecoil system to deliver real-time images on coil tubing while maintaining the ability to pump fluids and drop balls.

In this case, an oil well had been shut-in due to the loss of two well tractors in the well. The reason for the losses was not fully understood and it was not clear what the downhole situation was. Significant contingency planning was undertaken by Statoil with the decision being to enter the well first of all with EV's Televiewer camera deployed on Telecoil. Figure 1 shows the bottom of the Televiewer assembly with the camera in the middle, the LED lighting around the lens and on the outside the ports through which fluid pumped from surface exits.

Figure 1

The well was circulated to brine in order to provide a clear medium and the images from the camera as it was run in the well were transmitted to surface and, from there, streamed in real time into the customer's Stavanger offices so that the well engineers could see what was happening in real time. As we like to say, "seeing is believing."

Figure 2 shows the images from the camera at 4567m down the wellbore. Clearly visible is a birdcaged electric line fish. These images allowed Statoil to develop a strategy to recover the wireline fish. After a first run where some wire was recovered, a subsequent run was made and Figure 3 shows that the cable is now in a ball within the well. Eventually Statoil successfully recovered all the fish and the well was put back on production.

Case study from a fracked well

Nearly all shale gas wells are horizontal and fracked. The high pressures occurring during fracking can cause occasional failure of wellbore equipment, resulting in the frack not being completed as expected. In this case from North America, unusual pressure responses during fracking operations had led the operator to deploy EV's HD E-line camera on e-coil to investigate.

Figure 4 shows a sliding sleeve, which is in the expected open position. The low side of the well is to the right of the picture with a small amount of oil entering through the sliding sleeve at the highside of the well on the left side. On the low side the fluid is produced water, with the interface to gas condensate above clearly seen.

> Temperature has been for a long time a constraint as video technology uses high-speed electronics and complex CCD chips. Standard tools are rated to 125°C today with new technology moving the temperature rating up 140°C and 175°C ratings for special applications

Further down the well the cause of the unexpected pressure responses became apparent. In Figure 5 the downview camera clearly identifies casing damage caused by the failure of a packer. The holes are obvious and in real time fluid can be seen entering the wellbore. Figure 6 is a close-up of the damage using the sideview camera. The scouring effects of the frack sand can be clearly seen.

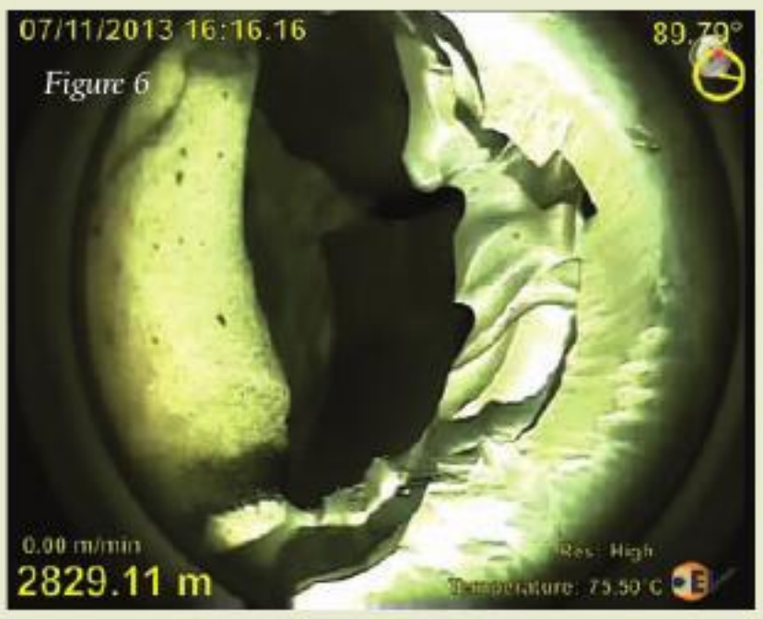


Figure 6

Future of downhole video technology within oil and gas

Successfully running downhole cameras requires not only the latest technology, but also the expertise to ensure that the operational procedures are optimised to ensure good image quality. Gas wells and water injector wells are relatively simple scenarios; oil wells require wellbore conditioning and are more complex. In a completion environment, the fluid will be generally clear but in a producing environment, a clear fluid has to be pumped to displace the oil.

While downhole cameras have been available for many years, their technology is continually developing. Continued research and development is ongoing into increased temperature ratings, understanding fluid clarity and integrating video with traditional sensors such as pressure and temperature. Technology and learning is being taken from the media and defence industries. For example, systems developed to remove the misting due to clouds in drone video are now being applied to remove similar misting in wellbore conditions. New markets are being developed as oil and gas companies find that a visual image can simplify decision making, reduce lost time and improve safety.

EV

Francis Neill is CEO of EV, the global market leader in downhole video applications for the oil and gas industry. Its video cameras are deployed in wells up to depths of 10,000m, temperatures of 175°C and pressures of up to 15,000psi to record images within the well. EV invests heavily in R&D to develop video technology for these extreme applications, manufacturing equipment in Norfolk in the UK before shipping it to locations worldwide. Its engineers then run the cameras in land and offshore, producing video images that allow oil and gas operators to correctly diagnose problems in their wells.

For further information please visit:
evcam.com

Positive change

The ONS conference and exhibition is widely regarded as one of the world's most important and highly respected oil, gas and energy events. Held in Stavanger, Norway, it is an event that brings together the key players in the international oil and gas industry, ministers and officials from key oil and gas producing countries, and leading decision makers. All of whom meet to discuss and debate the big questions facing the industry, share vital knowledge and experience, and work together to shape the future of the energy world.

This year's event, ONS 2014, is to be held between the 25th and 28th August and is set to build on successful shows of previous years. The main theme for this year is Changes, and the conference will deal with the main challenges and changes facing the industry over the coming years. This will include speeches and forums debating what the future holds for the industry, looking at new technology and innovative solutions, new forms of energy and new energy solutions, and what may be the next potential milestones for the global energy sector.

The conference will be held over three days and will combine plenary and panel sessions looking at areas including:

- What are the key changes?
- Mega projects - mega opportunities
- We must work smarter - but change hurts
- The NCS - huge possibilities, but is the price too high
- How to get more out of mature fields
- The new centre of attention: The Middle East
- Sneak peek into the future: What will happen in the next 40 years?
- Building great companies - HitecVision & Statoil Technology Invest Energy Finance Symposium

One of the key speakers at ONS 2014's conference will be president and CEO of Saudi Aramco, Khalid A. Al-Falih. Saudi Aramco is the company with the largest proven oil reserves in the world, a leading industrial enterprise in the fast-growing Kingdom of Saudi Arabia, and the world's largest producer and exporter of crude oil. "Al-Falih's participation at ONS is a great honour for us, and it says something about our global importance," said president and CEO of ONS, Leif Johan Sevland.

Alongside the excellent conference programme will be the ONS exhibition, a vast meeting space where all of the leading businesses are represented with stands displaying their latest technology and innovations. The exhibition, which in 2012 featured 1263 exhibiting companies, 34 exhibiting nations, 109 participating nations, 69,913 visitors, and covered 21,077 sq. m, is expected to be even bigger this year. With 24,000 sq. m. dedicated to exhibiting companies in 2014 this year's exhibition will provide direct access to a vibrant and busy offshore sector that will see increasing investment over the coming years.

ONS is dedicated to building a strong future for the energy industry, believing that 'tomorrow's leaders are young people today'. Accordingly, ONS Young is taking place to provide an important meeting place for the young faces in the sector, where they can find information about companies that could provide future employment, learn from the experiences and knowledge of seasoned professionals, and liaise with recruitment agencies and educational institutions.

Naturally, there is so much to participate in at ONS that the only way to truly experience it is by visiting. As we draw closer to the event it remains the hottest ticket in the oil and gas sector, so mark it in your diaries and we hope to see you there.

> Alongside the excellent conference programme will be the ONS exhibition, a vast meeting space where all of the leading businesses are represented with stands displaying their latest technology and innovations

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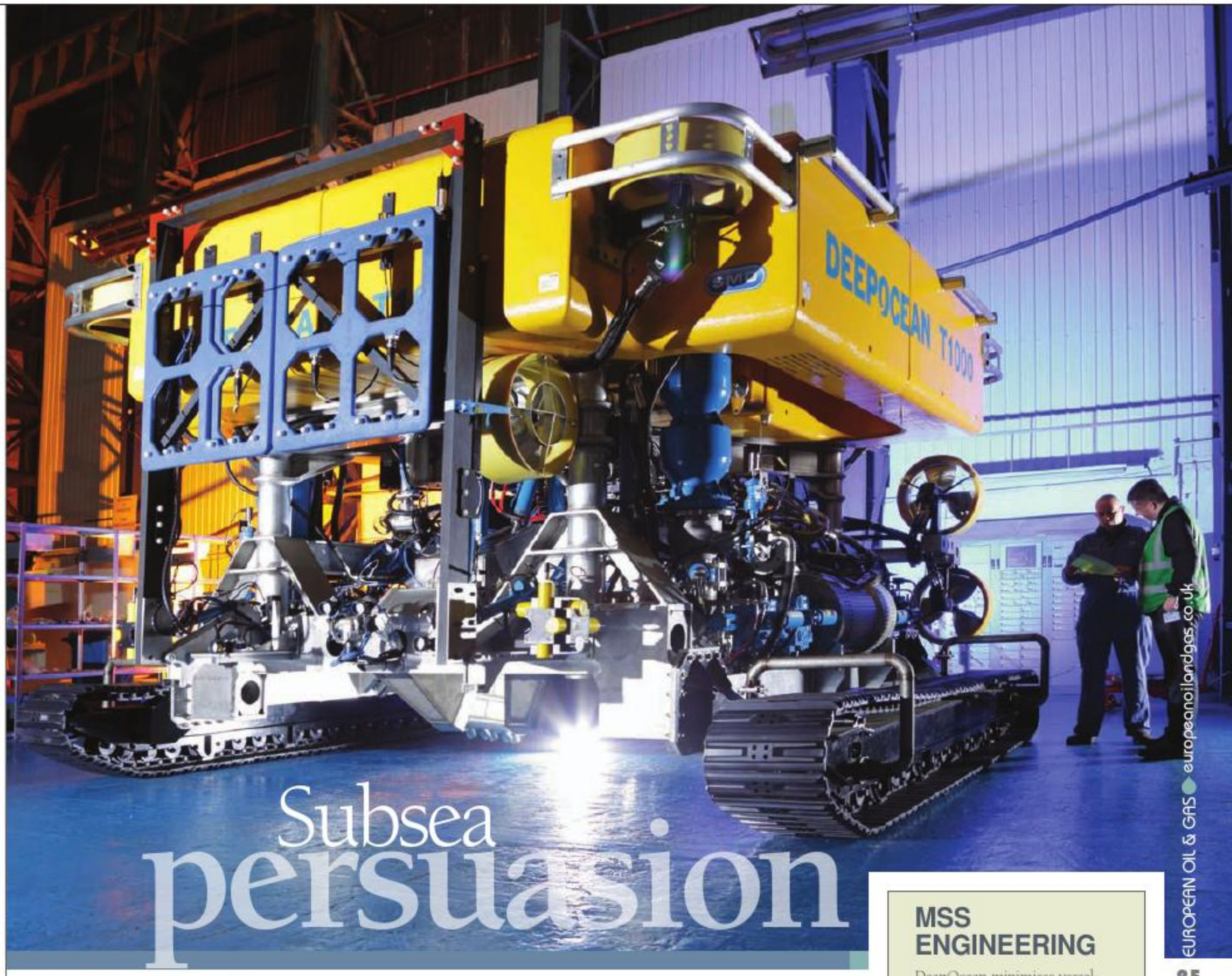

Subsea persuasion

Operating in the oil and gas, offshore renewable and power transmission industries, DeepOcean Group is an efficient offshore service provider with a global presence. Delivering safe, high quality, innovative services and technologies for the subsea industry has become second nature to the Group that was first established in 2011.

The group was formed following the merger of DeepOcean AS, founded in 1999 and CTC Marine Projects. Furthermore, in 2013 DeepOcean acquired a 50 per cent interest in ADUS, forming ADUS DeepOcean extending its offering to the provision of 3D subsea imagery of structures such as offshore facilities, wind turbine foundations and seabed architecture.

With an extensive track record, DeepOcean offers a breadth of subsea services including survey and seabed mapping, subsea installation, seabed intervention, inspection, maintenance and repair (IMR), and decommissioning. This strong portfolio of services, coupled with a fleet of owned and controlled specialised equipment and multi-purpose support spreads, enables DeepOcean to bundle its subsea services to deliver cost-effective, tailored solutions to meet individual client needs. DeepOcean strives for customer focus and operational excellence, which is supported by a global team of highly professional and experienced project teams operating from offices in Norway, UK, Holland, Brazil, Mexico and Singapore.

Delivering innovative engineering solutions and turnkey project management for complex offshore operations, in 2014 the Group announced a number of substantial developments. "The first of which is that we have chartered a new build vessel which can install very long lengths of umbilical, flexible pipe and power cable. The new vessel, to be delivered in Q1 2016 by Maersk will be equipped with a 7000 tonne carousel and a 100 tonne subsea crane. This is a really state-of-the-art vessel for the laying of long power cables or umbilicals," says Pierre Boyde, commercial and business development director.

The Group also entered into a five and a half year charter agreement starting in March

MSS ENGINEERING

DeepOcean minimises vessel time in port and maximises time in field by re-engineering deck configurations rapidly. MSS Engineering, based in the North East near the River Tees, plays a key supporting role by providing high quality cost effective engineering services during mobilisations, demobilisations and in the field.

The Health & Safety team at DeepOcean has commended MSS 'on a very good work ethic and safety conscience workforce.' Tony Dixon and Andy Johnston are key figures in the specialist MSS Engineering team and with the support of MSS HSE manager Raff Distasi they ensure that everyone involved with MSS's client service appreciates that work is always carried out safely, delivered accurately and on time. Tony Dixon summarised: "DeepOcean is one of our blue chip clients and the MSS team pride themselves on the relationship of trust that has been built up".

2016 for a new build SURF installation vessel, enhancing the current service offering in the Subsea Umbilicals Risers and Flowlines segment in the North Sea.

The new 150m SALT design vessel will further strengthen the company's standing with a 150 tonne capacity Vertical Lay System, 3000 te underdeck carousel as well as 400 tonne active heave compensated knuckle boom crane with an extended reach that can lift 600 tonnes in double fall mode.

In the build up to the announcement in October 2013 the company had undertaken a period of strengthening its SURF organisation in Norway and the UK from which it will manage the projects.

Over the last two years it has hired approximately 450 new employees, upgraded its owned and chartered vessel fleet, increased the number of mission equipment and generated strong financial results while maintaining a solid balance sheet. Pierre noted that the investments include technology: "As part of DeepOcean's ongoing development we have recently been investing in a new state-of-the-art Launch and Recovery system for one of our trenching vehicles. The A-frame was provided by OSBIT Power and the winch by ACE Winches," he stated.

The business has also established itself in the geotechnical drilling market, acquiring a drilling rig from which it can undertake exploratory geotechnical drilling. "We completed this acquisition in line with a strategic alliance with a company called GeoQuip who can also provide drilling support services," adds Pierre. The offshore geotechnical services market is undersupplied and through its alliance with GeoQuip and its relationships with key customers worldwide, DeepOcean is well positioned to become a preferred geotechnical service provider and a viable alternative to the current segment leader in the North Sea.

With several of its vessels in the fleet able to deploy the geotechnical drilling rig, including the recently delivered subsea support vessel MV Deep Helder, the business is already targeting a number of opportunities in the offshore renewable and oil and gas sectors to get this important initiative started. The synergies between the two companies in partnership will result in being able to offer clients high quality seabed drilling and testing services, particularly in deep water and challenging environments such as the Arctic, providing much needed global competition. The new rig is a heave compensated, offshore geotechnical deepwater drilling rig built and commissioned in 2011, capable of operating in water depths over 600

FHP

As part of our planned growth and to meet the demands of our increased product range and scope FHP Ltd has recently completed a move into a bespoke Manufacturing Unit on the Neptune Energy Park. The new facility includes overhead cranes an assembly yard and direct access to a deep water quay.

FHP continues to both build and hire out cable/pipe lay systems, winches and HPUs. We also design and build specialist electro-hydraulic systems

Our close working relationship has seen DeepOcean take advantage of our significant hire fleet, mainly using our LCEs and operators to successfully complete many cable lay projects.

metres and drilling with a combined water and borehole depth of 850 metres.

A major milestone for the business was reached in 2013 when it was awarded the single largest contract in its history. Under the five-year agreement with Statoil it will cover subsea inspection, maintenance and repair (IMR) services on all Statoil operated fields on the Norwegian Shelf. As part of the contract DeepOcean provided a vessel of MT6022 design, as Pierre highlights: "Delivery of REM Ocean was completed in March 2014 as scheduled and it has been a good start to the contract."

In June 2013, the business announced a further contract with Statoil under a joint venture agreement with Technip. The contract will cover subsea services, comprising maintenance and preparation of equipment utilised for PRS, ensuring pipeline contingency for the PRS Pool members currently covering up to 15,000km of pipeline. "Under this contract we maintain a high state of readiness, utilising the diverless repair system, which would allow Statoil and the team of operators that contribute to be able to repair a pipe line at short notice should there be a severe incident.

"We have got a reputation for delivering IMR projects to a high quality, encompassing key strengths in terms of inspection and reporting, and also being able to provide innovative solutions to carry out repairs in difficult areas. It goes far beyond a standard inspection service. We can usually come up with innovative diverless based repair services, something that is demonstrated through our long track record of ten years of consistent delivery for Statoil and a well-established reputation for quality. This reputation has enabled us to develop new customers such as Dong Energy, as well as other important operators in the UK, Danish and Dutch sectors of the North Sea," explains Pierre.

Recognising the importance of the supply chain in achieving successful execution of projects, DeepOcean has established key suppliers that it has come to rely on. Commenting on the valuable nature of the support, Pierre points out: "Commitment to HSE and quality and timely delivery are the key features that we look for in our subcontractors."

DeepOcean is positioned in good stead with a skilled engineering, installation and inspection capacity, supported by the customer-focused attitude and the ability to turn around difficult projects on short time scales. The company also values the importance of re-investing into

> With an extensive track record, DeepOcean offers a breadth of subsea services including survey and seabed mapping, subsea installation, seabed intervention, inspection, maintenance and repair (IMR), and decommissioning

equipment, and continually invests in new state-of-the-art vessels that allow it to take on more complex projects. "Our fleet of subsea trenching equipment is world leading, and at the moment we don't think we have a competitor that touches us on our range of services in the subsea trenching segment," highlights Pierre.

With a strong order book in place as the business moves towards 2015, there is an even healthier market outlook for 2016. However, as DeepOcean continues to grow, the question of attracting the right talent to support such growth poses future concern. "Offshore technical expertise is in reasonably short supply, so keeping control of costs but at the same time having key technical talent available is one of the key challenges for the subsea industry at the moment. We have apprenticeships schemes for surveyors and equipment technicians which is one of the most important areas for training up the new generations of ROV and subsea equipment operators," says Pierre.

In 2013, to further support their recruitment strategy, DeepOcean identified an opportunity to attract highly competent and experienced engineers from other industry sectors, providing them with the skills required for a successful career in the subsea industry. This programme complements its on-going junior equipment technician and graduate development programmes, highlighting its commitment to training and development. "Alongside training, our main focus as we move forward is securing additional work for our portfolio ensuring that we continue high quality execution of our existing projects for existing customers," Pierre concludes. OGG

ACE WINCHES

UK based ACE Winches has founded its strong reputation as a global leading deck machinery specialist by focusing on innovation, quality, and excellence in delivery and safety. Its strategy has been to invest significantly in its research and development capabilities whilst building excellent relationships with DeepOcean and other offshore service providers. By supplying both bespoke and standard products, the company provides exceptional service to clients operating on SURF installation and IMR projects.

DeepOcean Group
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Services
Offshore engineering solutions and project management

A vital link

Above
Cable reels for BP Shah Deniz, ready to be shipped away from Nexans' plant in Halden, Norway

Bottom right
Umbilicals to the Jack St Malo project ready to be transported from Nexans' Halden plant in Norway

Below
Drums with Nexans' cables to BP Shah Deniz field, ready to be loaded outside Nexans' plant in Halden, Norway

Nexans Norway has been operating in the international cabling market since 1915 when the core interests were first founded. As part of the Nexans Group, the Oslo headquartered business has in recent years significantly expanded in line with the industry. "We are one of the largest cable manufacturers in the world. One of our main focuses is on offshore oil and gas and subsea developments, to which we supply umbilicals, topside and subsea cables, Direct Electrical Heating (DEH) systems, ROV umbilicals, seismic systems and fibre optic submarine cables," says Ragnvald Graff, sales and marketing director of Nexans Norway.

"We have several major projects under execution as well as some good prospects for new contracts. Nexans' ten-year framework agreement with BP has some major projects on the horizon, which will be initiated in the near future.

"Through this BP agreement we are supplying our Direct Electrical Heating (DEH) cable systems which will be installed to help in maintaining the reliable flow of products from the Shah Deniz field, located in the Azerbaijan sector of the Caspian Sea," announces Ragnvald. Due for completion by the end of the year, the project will see the first batch of deliveries of a total of 130 km of the cable system to provide flow assurance for ten subsea flow lines, worth approximately 100 million euros. The framework agreement covers the supply of umbilical cables, DEH systems, accessories and services for various deepwater oil and gas projects across the globe.

In 2013 Nexans was awarded a major contract by OneSubsea to design, manufacture and supply an integrated power umbilical solution and associated termination hardware for Exxon Mobil Corporation's Julia oil field development in the deepwater Gulf of Mexico. "We are in the process of manufacturing umbilicals for this project, providing a 23 kilometre power umbilical to the Gulf of Mexico" says Ragnvald. The innovative power umbilical combines power cables and umbilicals in a single cross-section, which will be installed in water depths in excess of 2000 metres to tieback the Julia field subsea systems to a semisubmersible production unit.

Nexans pioneered the development of power umbilicals that integrate the functions of power cables and umbilicals in a single cable, enabling a high-voltage (HV) supply to be provided for deepwater projects. The power umbilical includes a number of steel tubes, as well as fibre optic elements and signal cables for control and monitoring purposes. For the Julia project, the power umbilical will operate subsea pumps supplied by OneSubsea.

In December 2012 Nexans was awarded a contract from Statoil to supply static and dynamic umbilicals for three developments on the Norwegian continental shelf, further extended in 2013 to include delivery to a fourth field. The 'Statoil Standard' umbilicals are made up of electrical and fibre optic cables in addition to hydraulic and chemical lines.

In the spring/summer of 2014, Nexans delivered the four umbilicals and power umbilicals to be installed at the Aasgard field for Statoil in the Norwegian North Sea. The total deliveries for

the Aasgard project is 160 km of advanced subsea umbilicals. Over the past 12 months there have been a number of projects in the offshore sector which have been delayed or cancelled, a trend which was less common previously. However, utilising its strong position and reputation amongst some major players in the industry Nexans' business continues to operate successfully.

As well as maintaining the company's interests in the standard product markets in which it operates, Ragnvald additionally highlights the growing area of the submarine fibre optic market: "Wherever people are in the world, there is now an expectation of full coverage and access to data transmission capacity, both offshore and in areas that previously lacked broadband connections. More cable connections therefore need to be installed to meet these requirements. We supply Unrepeated Optical Cables (URC-1) that is produced with various types of armouring, depending on the installation area. One cable may incorporate several armouring types along its length depending on the varying requirements along the cable routes. It can be installed in water depths down to 000 metres and in lengths of up to 4-500 kilometres."

For longer distances where fibre optic cables are needed, typically for ocean crossings, a different type of cable system must be used that amplifies the optic signal. Approximately every 100 kilometres the signal is amplified by having an amplifier in line on the cable. Repeated Optical Cables (ROC-2) contain a vault cable core and a conductor for a 10kV repeater power supply. With various armouring packages this cable can be installed in depths down to 8000 metres. This type of cable is commonly used for trans-Atlantic or trans-Pacific cables. "We signed our first contract for the product in February 2014 and we are currently equipping the factory to industrialise this product for delivery in the first quarter of 2015. Although at the moment the product is not directly related to the oil and gas industry, as the market continues to evolve we expect demand for more sophisticated cable technology to grow," concludes Ragnvald. O&G

> Wherever people are in the world, there is now an expectation of full coverage and access to data transmission capacity, both offshore and in areas that previously lacked broadband connections

Nexans Norway
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Services
Power, umbilical and telecommunication cables

Commitment to excellence

Above
The lower ROV control panel on an Intervention System

Below
STL's Electric Line Pressure Control Head enters the SLIC connector at the top of a Riserless Well Intervention System

Formed by managing director Drummond Lawson and technical director Dave McKay in January 2010, Subsea Technologies Ltd (STL) provides subsea engineering solutions to blue-chip oil majors and service organisations requiring well control, well intervention and subsea control system applications.

Based in Aberdeen, UK, STL specialises in the design and manufacture of world-class subsea pressure control equipment, which is tailored to meet the specific demands of each client. STL prides itself in developing solutions that not only meet its clients' technical requirements, but their operational needs too. The STL team is committed to the design and manufacture of high quality, innovative, well intervention, well control and subsea control systems, often (but not always) including STL's proprietary application-specific connectors. Developing products for this technically challenging business segment means that STL has built a team capable of delivering engineering design, finite element analysis, 3D graphical visualisation, systems integration engineering, project management, QA, and assembly, test and maintenance.

In its first year, STL secured a contract through Halliburton to develop and deliver the first of its Stackable Lightweight Intervention Connectors (SLIC) to Shell in Nigeria. This provided a huge boost of confidence to the young company, as the SLIC was at that point simply a detailed concept, and both Halliburton and Shell believed in it sufficiently to commit to STL developing and delivering the first one to them. Since those early days, STL has sold five SLICs in a variety of configurations and is seeing continuing growth in the number of enquiries coming through for the product.

STL has a continuous R&D investment programme, and has developed a number of new patent applications since formation, though some IP within STL pre-dates the existing business. Three months after its establishment, STL acquired the intellectual property and assets of a previous business, founded by Drummond in 2005 and acquired 100 per cent by a Norwegian entity in 2008. The Norwegian parent company got into financial difficulties during the economic crisis and ultimately went into liquidation in late 2009. "STL's technical director Dave McKay and I believed in the business and the technology, so we created STL, re-employed a number of the former staff, gathered support from the previous clients and suppliers and ultimately managed to acquire the intellectual property that we had initially developed. I think that our demonstration of our commitment to both our clients and suppliers, and some of the technology foundations laid prior to founding STL can be acknowledged as contributors towards the reason why STL has developed at such an impressive rate," explains Drummond.

He continues: "2013 was a successful year for us. We won a significant contract through Interwell with Shell in the North Sea and we built a simplified well intervention system for a project which is actually just about to go offshore in the next few weeks."

Not long after winning the Interwell contract, STL began work with Malaysian firm Bumi Armada Berhad; recently delivering a FEED study for the design of a complete subsea well intervention system. STL received positive recognition for its work as Bumi Armada progresses towards the construction phase of its project. "The Bumi Armada project stands out as the first time that a client has asked us to design, develop and supply a full specification subsea well intervention system. It is a significant step forward in terms of the company's progress and assuming that it moves from the FEED study stage to the main construction and build phase, which we will find out later this year, it is going to lead to a substantial growth period for the

business," explains Drummond.

"We have grown fairly rapidly in both position and in recognition within the subsea well intervention industry as a whole over the last few years. In fact, we were told by Bumi Armada that an industry survey it carried out identified us as the recognised source for subsea well intervention systems, hence the company came to us," he adds.

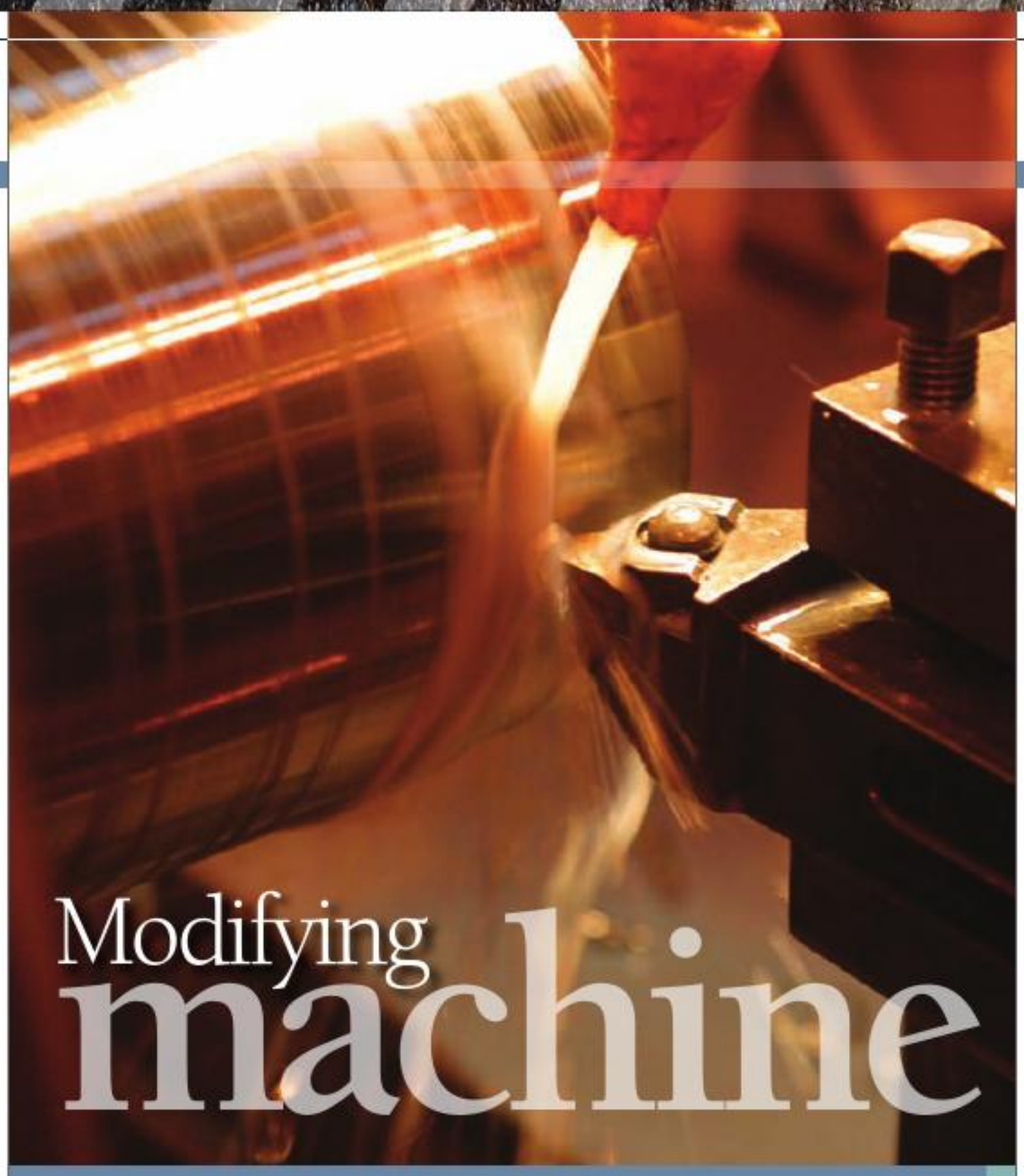
Having worked with service companies such as Helix Energy Solutions Group and Halliburton in the UK, and Weatherford and Wild Well Control in the US, as well as major oil firms such as Shell and Statoil, the company is renowned for providing high quality solutions to technically challenging requirements through innovative engineering. Indeed, a major factor for the company's success is its focus on providing bespoke solutions and industry-leading products that maximise its customers' uptime subsea and at surface in any weather.

STL has developed class leading connector technology, including the previously mentioned multi-functional SLIC Connector. The SLIC comprises of a family of products, which provide the user with a riser connector, a subsea lifting tool or a wireline pressure control head through the installation of different cartridges. Drummond explains: "Designed specifically for the well intervention market, the SLIC Connector is made to be constantly connected and disconnected, unlike previous connectors used in this market, which were originally designed for a different, much less onerous purpose and so were not ideally suited to this application. The SLIC connector's interface is extremely robust and can be used even in marginable weather conditions." Patented worldwide, the SLIC Connector features built-in redundancy and was designed for maximum ease of maintenance offshore.

Another notable product is STL's Xtreme Release (XR) Connector; highly regarded within the subsea industry, it removes the entire concept of Maximum Riser Disconnect Angle, as Drummond highlights: "The XR Connector is designed for occasional use in an emergency; for example, if you have a vessel connected to the seabed by a riser and the vessel drifts off, you need to be able to disconnect from the subsea infrastructure quickly and reliably. Patented worldwide, the XR Connector is able to release in situations where previously existing connectors could not release." Significantly improving vessel safety and reducing environmental risk, the XR Connector also lowers costs through vastly increased vessel operability.

Hailed as the winner of both the 'New Enterprise' award at the Subsea 2013 Awards and Grampian Award for Innovation at the 2013 Enterprise North East Trust Awards, STL has this year been shortlisted for the Best SME Award at the Institution of Mechanical Engineers' Manufacturing Excellence Awards. The company is certain to flourish over the coming years as it continues to develop its product range and meet the demands of its customers across the globe. "We have a strong position within the well intervention market and anticipate ongoing growth. To ensure this I think a next step for us will be opening an office in the US and continuing to consolidate our position on the other side of the Atlantic. We also want to build on our solid foundation of engineering skills and, where possible, expand our capabilities and technologies into other markets with similar technology applications, such as the drilling and well abandonment markets," Drummond concludes. O&G

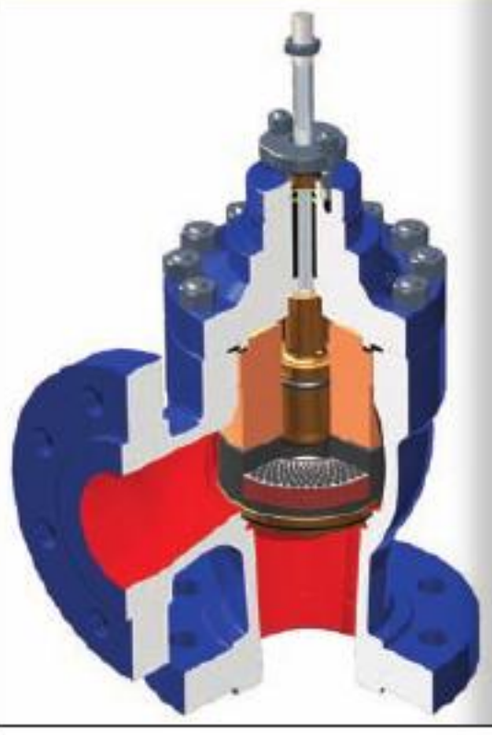
Below
STL's senior management team (from left to right) Dave McKay (technical director), Mark Vorenkamp (chairman) and Drummond Lawson (managing director)



Modifying machine

CASTINGS TECHNOLOGY INTERNATIONAL (CTI)

Cti's unique impeller and diffuser manufacturing process was developed to solve many of the challenges faced when making these difficult to produce components. Precision ceramic moulds are used to achieve high integrity, net-shape castings from 0.5 to 850kg, with class-leading dimensional accuracy and surface finish. Weir Oil & Gas have benefited from the process due to its greater repeatability, reduced machining and balancing, and proven ability to uplift pump performance by up to five per cent.



Weir Engineering Services is a constituent company of the Weir Oil and Gas Division part of The Weir Group PLC, which employs ~15,000 people worldwide across three divisions. The oil and gas division delivers end-to-end solutions for customers around the globe, from capital projects to long-term asset management contracts for continuing operations, both on and offshore. Its comprehensive portfolio of high performance pumps and superior safety critical equipment is designed and manufactured to meet the highest specifications, for robust and reliable operation in some of the world's most challenging environments.

The heart of the oil and gas division lies in Aberdeen, where the local service centre is recognised as the 'Centre of Excellence' facility with near to 150 years of heritage. As a business which both manufactures and sells the units, the oil and gas division has a particular engineering specialism that allows it to service pumps and valves, undertaking upgrades and re-rating to suit clients specific needs. "From chartered to site engineers, our team of specialists have the skill and experience that enables them to assess the operating conditions of any pump and re-design the internal workings to suit the requirements of the customer," says Ian Spiller, General Manager.

"It is not necessarily the case that there is anything wrong with the pumps that are already installed, but as a well operation matures, the conditions change. We are able to look after those units and adapt them to suit the changing environment in which they operate," explains Ian, continuing: "The manufacturer makes a standard range of pumps, and the customer selects the best fit he can at that time and installs it. Throughout production, wells reduce in terms of pressure, and the amount of oil decreases over time, with a greater amount of water or hydrogen sulphide coming through. It is at this point that we would adapt the design, creating a custom bespoke unit."

Working in this innovative style, the business recognises the importance of securing the correct workforce, and as such operates a standard apprenticeship scheme, where talented individuals are given the opportunity to learn vital trade skills, and continue to develop throughout their career. "We also have a graduate scheme, and each year we put individuals through a rotating scheme across all departments as they work towards career goals," adds Ian.

The innovative approach within the business plays a very important role, forming part of the core mission statement on values and behaviours, in what is referred to in the company as the Weir way, as Ian explains: "We are completely committed to exploring ideas and possibilities

that will actually deliver innovative solutions. It is not just more of the same. We stand back and ask the question; what does the customer actually need here, and it might be that the traditional approach just needs a minor adjustment, or it may be a completely new concept.

"We have recently done some work with Conoco Philips in Alaska, where the traditional method did not work so we came up with a completely different approach, which has been so successful that they are going to upgrade their entire fleet of one type of pump to our

new design." With a reputation of delivering excellence, consistently, the business has built up a healthy client base with ongoing renewal of contracts. "We wouldn't claim to be the cheapest or the fastest, but when we do deliver something, it works and does what we say it is going to do. Integrity is of key value within our company."

In January 2014, the Weir Group PLC announced that it had signed a contract with LUKOIL Oil Company to provide general maintenance services for the West Qurna-2 oilfield in Southern Iraq. The agreement, which is for two years and is estimated to be worth a total of $98m, will see Weir engineers deliver mechanical, electrical, maintenance and pipeline services for the related production facilities, including the Mishrif Central Processing Plant. "This is one of the biggest milestones in recent years for the business and signifies the global standing that we hold," says Ian.

Weir has invested over $8m in establishing its service centre in Basra, Iraq and it is the first in-country location to offer fully comprehensive maintenance services for all kinds of rotating equipment, valves and wellheads. The facility is also the first in Iraq to obtain API and ISO licences. Furthermore, in spring 2014 the UK Aberdeen business was awarded a fire pump contract from Talisman Sinopec Energy, with two additional contracts closely following. With an initial agreement of five years, and options to extend, the future for the business on the continental shelf looks set to continue.

Having recently introduced facilities into Aberdeen to offer solutions to the Weir OEM valve units, the market benefits for the first time with a manufacturer carrying out a service, normally conducted by a third party. As he looks towards the future, Ian concludes: "Opportunities ahead are significant. Despite the year on year decline in North Sea oil production, our market share has actually increased significantly with 20 per cent growth. We are an acquisition hungry company and our strategic growth plan works towards doubling the size of the division over the next five years." O&G

> Opportunities ahead are significant. Despite the year on year decline in North Sea oil production, our market share has actually increased significantly with 20 per cent growth

Weir Oil and Gas
weiroilandgas.com

Services
Products and service solutions for upstream, production and refining

EPSCO

Epsco is Europe's leading specialist in fresh water services for offshore supply and support vessels. Working collaboratively with Dales Marine Services for more than ten years has ensured vessels are fully cleaned and disinfected during dry-docking periods, with services satisfying MCA and representing industry best practice. Through flexible teams of water hygiene specialists EPSCO and Dales Marine Services have proven that fresh water systems can be safely and effectively maintained, with short turnaround times during busy docking periods.

With 27 years of experience and expertise behind it, Dales Marine Services has become a highly-regarded company renowned for its fast turnaround of precision engineering to extremely tight deadlines, along with a high quality of work.

It provides services to the oil and gas, shipping, chemical, power generation and civil engineering industries and has built up a client base which includes major oil companies, international sub-sea contractors, civil engineering and power generation companies. Major oil and gas clients include Subsea7, Technip, Saipem and Fugro.

Dales Marine Services Ltd has considerable experience and expertise in fabricating structural steelworks and pipe spools for topside applications. In addition, it also engineers and fabricates highly-specialised structures and equipment in carbon steel, stainless steel and non-ferrous materials, such as subsea clamps, topsides pipework, supports and subsea installation aids.

It recently completed a hyperbaric lifeboat system replacement for Technip UK which involved removing the old hyperbaric lifeboat davit system and foundations. The project also involved fabricating a new davit foundation, HPU support platform, walkways and the extension of existing deck area where required for the new system. The installation involved fitting a new dive bell escape trunk, davit foundations and support framework, the davit and hydraulic systems. All the work was completed under class. Another significant job was also for Technip UK, and involved fabricating six 34 tonne clump weights. Dales Marine ordered 204 tonnes of steel plate direct from the steel mill to meet fabrication requirements, assembled the individual plates to 34 tonne in its Aberdeen workshop, then tested and painted the structure before it was rolled out and loaded onto transport for delivery to client as scheduled.

One of the company's major projects was re-installing the Ampelmann Gangway onto Olympic Orion for BP. The workscope involved lifting the 100 tonne gangway off the cargo vessel, road transported to specific quayside, completing the re-installation of support frame work onto the Olympic Orion before lifting the 100 tonne gangway on, securing and commissioning.

Having undertaken a large array of projects, the company has built up a significant amount of experience in operations in sea-going modes together with dry-docking at selected public locations. Ventures further afield have taken the marine teams worldwide to areas as far away as Russia, the Canaries, Ascension Island and the Falkland Islands. O&G

Dales Marine Services also has the advantage of location for its clients. Along with its base and dry dock in Aberdeen, two sites and dry docks at Leith and another base in Montrose, it has acquired Forth Group, which offers an additional three companies and four dry docks ideally located all around Scotland at Grangemouth, Greenock, Troon and the Forth Estuary at Leith. This means oil and gas clients all around UK and Norwegian waters can get the same high level of service and fast turnaround as that at the Dales Marine headquarters in Aberdeen, as well as being situated near to the facilities. It also means work can be shifted around the different bases to ensure deadlines are met, and the harbour locations deliver swift shipment of fabrications for clients.

The business is one of a few in the UK which can dock vessels more than 100m in length in five of its dry docks. The Aberdeen dry dock is 112m x 21m x 6m (tidal), Imperial at Leith is 168m x 21m x 7.4m (non tidal), Forth Estuary at Leith is 70m x 12m x 4.5m (non tidal), Grangemouth is 105m x 16m x 4.5m (non tidal), Greenock is 200m x 21m x 4.5m (tidal), and Troon is 120m x 17m x 4.5m (tidal).

The acquisition further complements the experience held within Dales Marine Services Ltd, with an extensive team of well-trained professionals who can undertake maintenance, construction and call-off work onshore.

The loyal and long-serving staff have built an enviable amount of expertise and the company is building on this foundation with new appointments in HS, QA, QC, and HR to ensure all employees have the latest information affecting their job and the industry. Health and safety is a top priority for Dales Marine Services which is reflected in these new specialised appointments.

Dales Marine Services is also well regarded in the supply of plant, labour, and materials for vessel mobilisations and demobilisations, which are carried out not only in Aberdeen but also in most of the deepwater ports in Scotland and Northern England. The premises, adjoining the dry-dock and quayside, afford ease of access for vessel repair, fully supported by the facilities that include four workshops with overhead cranes, forklifts and a full range of machinery spread over the three locations of Aberdeen, Montrose and Leith.

The full scope of service includes ship repair and dry docking, mechanical engineering/ diesel engine overhauls, fabrication, welding and steel renewals, repairs and refurbishment, conversions, life-extensions and refits, structural steelwork and pipework, blasting and painting, vessel mobilisations, mobile all-terrain cranes and afloat repairs at various ports.

Additionally to the extensive list, available at all locations, the business offers mechanical engineering and diesel engine overhauls. Its engineers are renowned for a high quality of workmanship and professional attitude towards all aspects of ship repair and service, and as such they are often called upon to provide assistance for specialist service in the shipyards workshop facilities and on vessels to carry out all types of engine repairs.

Confident in its future, the business extended its lease on three of its UK-based locations in 2014 for a further 20 years to 2034. Continuously striving for success, the company's strategy includes adding and maintaining facilities that open up new markets, providing sizeable solutions for the industry, and viable alternatives to work being undertaken overseas. O&G

“The business is one of a few in the UK which can dock vessels more than 100m in length in five of its dry docks

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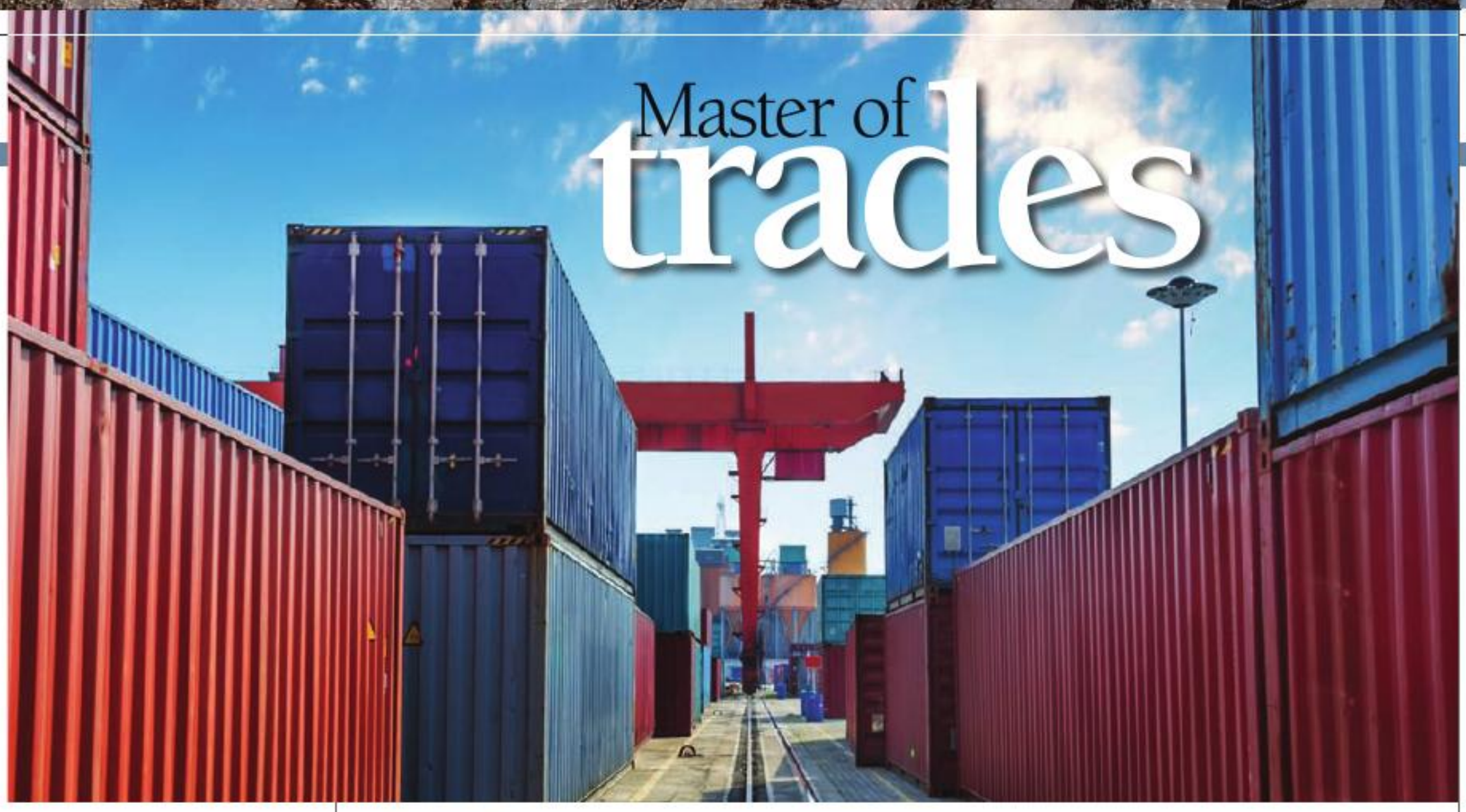


> The Port of Fujairah will remain foremost in the minds of crude oil, container and bulk operators well into the future

SCAMP MIDDLE EAST

For nearly 25 years, Scamp Middle East has been supporting the Port Of Fujairah's commercial diving needs, offering the full range of underwater ships husbandry services.

With the newly implemented local diving regulations, Scamp Middle East is now a fully audited member of The Association of Diving Contractors International (ADCI). In line with these regulations all of its diving operations are carried out using surface supplied air and hard wire communications.

The company's Fuel and Speed efficiency programme enables ship owners, managers and charterers to optimise a vessel's performance.

Located approximately 70 nautical miles from the Straits of Hormuz the Port of Fujairah is the only multi-purpose port on the Eastern seaboard of the United Arab Emirates (UAE). In conjunction with the economic growth of the UAE the initial construction of the port started in 1978, before full port operations officially commenced in 1983. The port is strategically located on the Gulf of Oman, close to international shipping lanes and today it is the gateway port to the Arabian Gulf and a hub for the Indian Ocean connecting both north/south and east/west trade lanes.

Since the port was established it has engaged in an ongoing process of enhancement and development of its facilities and services. For example, between 1982 and 2010 the Port of Fujairah has increased its total berthing space from 370 metres to 5230 metres, which includes a 1.4 kilometre long main quay with additional berths added in 1985 and 2003; a floating jetty; oil terminals one and two and a further five berths situated at the port's south break water.

In terms of the services that the port provides, Fujairah is one of the largest anchorages in world and is able to handle general and project cargo, container shipping, bulk cargo and oil. Furthermore in addition to operating as a strategically placed base for commercial and industrial shipping, the Port of Fujairah is also a popular destination for cruise ships, further exemplifying its position as a multi-role facility. Although the port today continues to deliver its multi-role services, the way in which it operates has continued to develop alongside the ever-changing needs and fortunes of the global market place. For example, within the container market Fujairah originally acted as a container transhipment port catering for transhipment to the inner Gulf and the Subcontinent. However as the facilities at these destinations gradually improved the need for transhipping became reduced, which prompted the Port of Fujairah to find a more cost-effective model for its container facilities. Today these are successfully franchised to DPW that with its strong worldwide network is well positioned to develop Fujairah as a vital link in the global supply chain. Presently the container terminal covers 200,000 sqm and offers significant excess capacity and a favourable position outside the Straits of Hormuz.

Within the bulk market the port has developed a strong business in the export of aggregate products and exported as much as 15,907,457 tonnes of aggregate during 2013. The amount of aggregates handled by the port has continued to grow steadily and although the port saw a dip in the export of aggregates between 2009 and 2011 that was brought on by the fall in construction projects caused by the global economic crisis, between 2012 and the present day the levels of aggregate exported by the port has matched and greatly surpassed those of 2008. The sustained and growing demand for aggregates was the basis for the planning, commissioning and construction of the port's two bulk loaders that share a combined loading potential of 6000 tonnes per hour. Shiploader 01 and Shiploader 02 allow the port to export aggregates from the Emirate to the Inner Gulf and beyond for an increasing number of building projects. Shiploader 01 has a loading capacity of 2000 t/h (max. 2200 t/h), giving it a yearly loading capacity of eight million to

ROTORK AND THE PORT OF FUJAIRAH

Rotork, a major flow control equipment supplier in the region, supports the Port of Fujairah from the Rotork Middle East Service Centre in Jebel Ali.

Many of the Rotork contracts involve automation projects using IQ intelligent electric valve actuators, which represent the predominant valve control technology for tank farms, terminals and pipelines in the region.

Rotork Middle East provides stockholding, retrofitting and asset management services for electric and fluid power actuators. Driven by the demand for reduced downtimes, Rotork's planned maintenance contracts are attractive for Middle East operators.

ten million tonnes; a maximum ship air draft of 17 metres and a distance of travel of 283 metres. Shiploader 2 is the larger of the two installations with a loading capacity of 4000 t/h (max. 4400 t/h) and a yearly capacity of around 20 million tonnes per year; a maximum ship air draft of 18 metres and a distance of travel of 488 metres. Each of the bulk loaders can load limestone and other aggregate materials into ships ranging from 15,000 DWT to 100,000 DWT and traverse using a 20-metre track gauge.

The port has also recently completed the UAE Grain Reserve, which in its first phase contains 250,000 tonnes of grain silo storage, conveyors and load and discharge arms. Plans are already in place to mobilise a second phase of development that will see this capacity increase to 750,000 tonnes. The purpose of the project is to provide sufficient grain reserves for the UAE and to provide an import grain transfer hub for other countries in the Arabian Gulf.

The port is also an important partner to the oil and gas market with Oil Terminals 1 and 2 (OT1/2), the recently completed Abu Dhabi Crude Oil Pipeline (ADCOP), private tank storage, all part of the expansion of the Fujairah refinery. As part of the on-going development of the port and its facilities, OT1 was commissioned in January 2006 and today has a throughput capacity of 15 million tonnes per year. Accommodating tankers of up 110,000 DWT, OT1 has three berths, a draft of 15 metres and eight 16-inch MLA loading arms. The Port of Fujairah's second oil terminal was commissioned on June 2010 and is the larger of the two facilities. OT2 is currently home to four berths with a draft of 18 metres and is able to accommodate tankers of up to 180,000 DWT loaded, including very large crude carriers (VLCC). The terminal has a yearly throughput of 25 million tonnes, which is handled with a total of 32 loading arms comprised of four 16-inch MLA and four 12-inch MLA loading arms that are situated at each of its four berths.

As the Port of Fujairah continues to evolve it has incorporated its own initiatives with further investments from external entities to drive the growth and development of the port and its facilities. The recently completed ADCOP for example, is a strategically important project that will allow Abu Dhabi to export crude oil directly from Fujairah. Further benefits of the new pipeline are that it will reduce the reliance on Arabian Gulf oil terminals and ease shipping congestion through the Straits of Hormuz, cutting sailing times by as much as three days. The pipeline itself is 370 km long and 48 inches in diameter, starting at Habshan – the current collection point for Abu Dhabi's onshore crude oil production – and runs through the emirates of Sharjah and Ras Al Khimah to the port of Fujairah. The pipeline will carry between one million and 1.5 million b/d per day and feed into an expandable storage facility before moving onto export through three subsea pipelines and three single point mooring buoys for deep water loading.

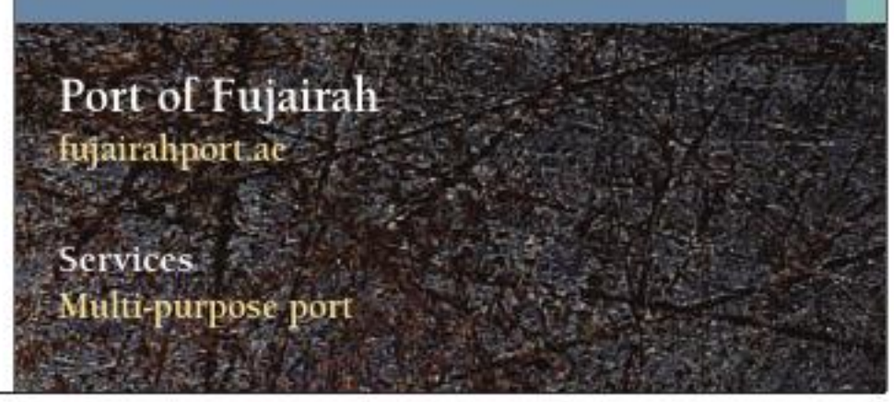
The installation of the pipeline also incorporated the construction of supporting infrastructure including pumping stations, a main oil terminal with a storage capacity of eight million barrels (expandable to 12 million barrels) and offshore loading facilities at Fujairah. The project also included a dedicated approach to fire-fighting and prevention with some of the equipment present on ADCOP representing the most up-to-date fire fighting equipment in the world, being deployed for the first time on this pipeline.

The crude oil traversing the ADCOP pipeline is mainly intended for shipment overseas, however it will also be able to re-direct the flow of product to the adjacent Fujairah refinery once

the facility is fully constructed in 2016. The Fujairah refinery project is a UAE government initiative, also in association with IPIC, to construct, operate and maintain a grassroots refinery complex that will be close to ADCOP and the port's deep-water export terminals. The refinery will be designed to process a mixture of UAE products such as Murban, Upper Zakum and Dubai as well as other regional and opportunity products. The terminal will have a processing capacity of around 200,000 barrels per day and feature its own power-generation capability to meet its own power requirements as well as supplying energy to the power grid of the Northern Emirates.

As the Port of Fujairah's crude oil capabilities continue to expand it is anticipated that private tank storage will increase as companies seek to cater for trading and bunkering activities. Fujairah had a capacity of 4.07 million cubic metres of oil storage capacity at the end of 2012, which rose by two million cubic metres to over six million cubic metres during 2013. It is anticipated that by 2010 oil storage capacity will reach over nine million cubic metres. Furthermore VOPAK Crude is anticipated to increase its storage capacity near the port by 860,400cbm during 2015, while Eurex Crude Terminal Fuj. is expected to raise its storage capacity by 279,600 in 2015 and 326,200 in 2017.

These developments are set to make the Port of Fujairah one of the world's largest tank storage facilities in the world by 2015 and continued expansion is planned well into 2017, making Fujairah a vital hub globally rather than regionally. Likewise as a truly multi-purpose port, the facilities at Fujairah appeal to a host of industries making the port a key component in the growth of the UAE economy, which is something that will serve to accelerate the growth of the port over the years to come. Although the crude oil market has seen significant investment it is important to observe that non-oil based facilities within the port have seen equal investment, to ensure that Fujairah remains able to deliver an exceptionally high level of service in all areas. With this consideration in mind it is safe to assume that the Port of Fujairah will remain foremost in the minds of crude oil, container and bulk operators well into the future. O&G



The next generation

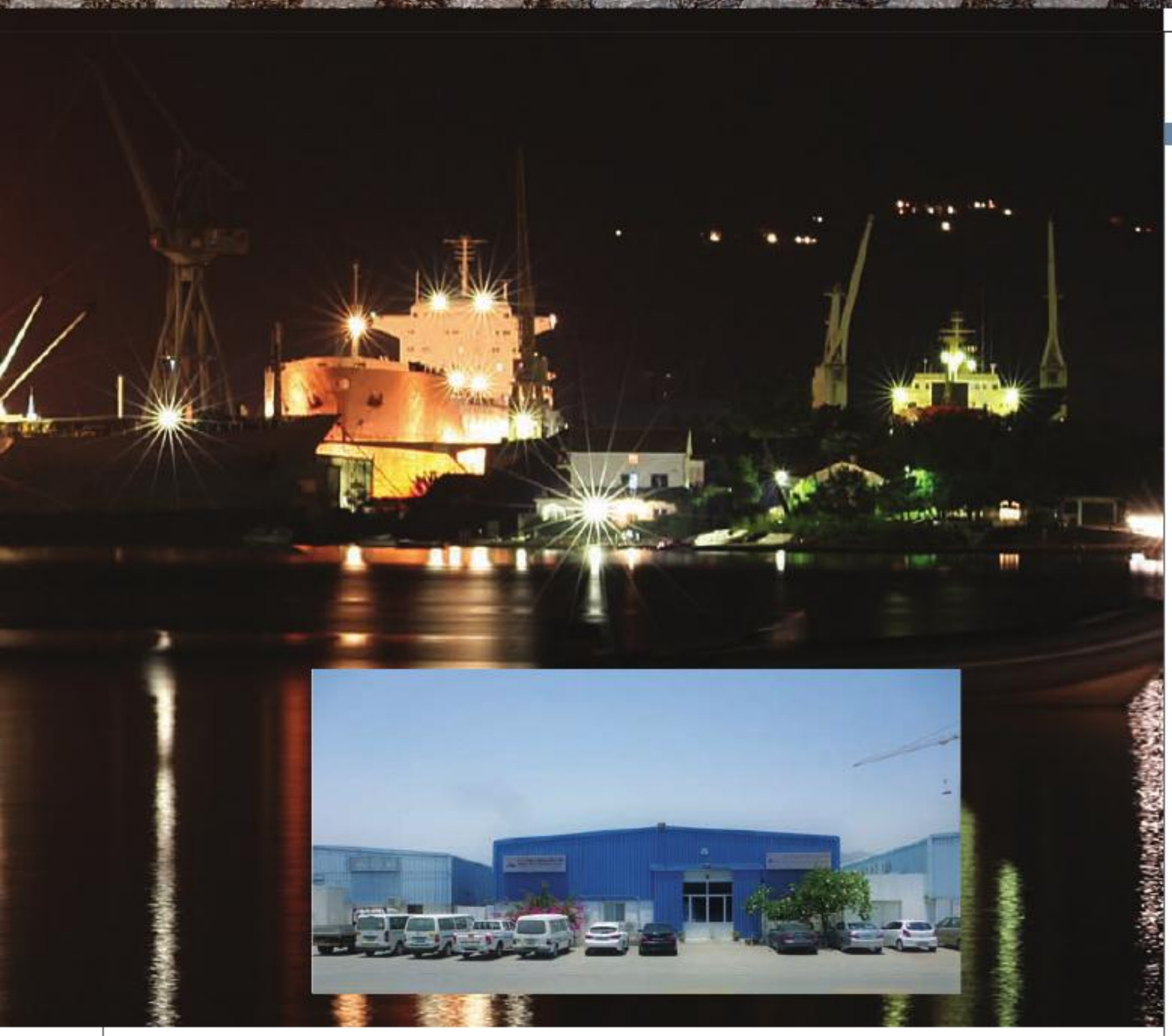
George Manetas, CEO at Ionian Ship Management has long been an established figure in the shipping industry. With a working history as an electrical engineer and recognised as a master tradesman, he has been working in the industry for a number of decades. With a successful past George felt compelled to take a step into ship management, establishing a group of businesses, working out of the hub of Fujairah in the UAE.

"Our group consists of a handful of companies," begins George. "Through our marine workshop we specialise in marine calibration, mechanical engineering and conducting refurbishment and surveying work. A second company manages three LPG vessels, an area in which we have a lot of experience and our third operation provides shipping management for 12 vessels, and has for two years undertaken full management on behalf of the owners, such as Vitol, chartering Aframax vessels."

Ionian Ship Management, Ionian Shipping Agency and Marine Safety Services collectively employ in the region of 160 personnel, each a specialist division operating both in the UAE and globally. Through its team of mechanical and electronic engineers it is able to provide calibration, inspection services and certification for safety equipment on vessels. Headquartered in the commanding trade centre overlooking the Arabian Sea, manual activities are undertaken at its premises in the port, a centre for the shipping community in the Middle East.

Over the last 12 months, industry demand has been varied, as George explains: "Our interests in vessel management and the chartering of fuel oil vessels has remained steady, but repair services has slowed down somewhat. However, this is a trend that I have witnessed before, and it will improve in time. We are very busy and I do not foresee any problems for the future." As he works towards retirement, George has appointed his two sons to eventually take full control of the business. "Having been in the industry for my entire career there have been many changes, and significantly over the last decade I have seen a growing demand from ship owners for a fast response time to service. We have consistently reacted to this, offering a 24-hour service. Benefitting from our location and facilities our clients recognise the advantages of using Ionian, and this has helped the business continue its growth," he adds.

All the vessels under its management have Lloyd's classification, and upgrading in line with this classification is a demanding operation. With a continued and growing interest in marine safety services, work on such a modern fleet



can occasionally prove a challenge, particularly due to the many safety considerations "There is always a lot going on, be it on the ships or in the office. We are active all the time, ensuring any defect list is addressed in its entirety. This aspect of the business exists to improve the safety of the ship, and our team is focused on maintaining this, and as such we have become known in the market for our clear approach.

"My background in shipping, before starting the management company, has ensured I hold a clear understanding of the fundamental requirements on board vessels, and importantly how to treat the crew," says George. Recognised for its honesty, experience, background and quality service, its customers are from regions as far spread as the UK, the US, Greece and Singapore and have been returning for over 20 years. Such customers include New Shipping, Holland Bros, AMPTC, Benelux Overseas Inc, Capitol Shipping and Logistics, and Hellespont Group, all of which Ionian has been working together with for many years.

With the fresh management structure set to take full control of the business in the coming years the company begins to look towards further expansion. Commenting on the future plans, George points out: "We have employed two newly graduated personnel already as we work in line with our ISO accreditation and we are actively looking for another six young people, with new ideas to bring into the company. We expect to have realised this ambition before the end of the year." Operating today in a strong financial position, the success of the company has been consistent since its inception, providing marine safety services from its workshop. However, despite its strength, it is faced with logistical challenges as its team travels globally to carry out works installing a range of equipment, but through regular training and focus on its operations the business continues to strive forward.

"Over the next ten months we are looking to acquire contracts on another six to seven vessels and we have already been in discussions with those owners who have requested our management services. Business volume is set to increase and this is one of the main drivers behind recruiting more personnel, and there are also a greater number of local companies in the region looking to utilise our services. Not only is there an increase in shipping management demand but also an increase in the business of marine safety, and demand for our engineers and the fully equipped, modern technology which we have. Over the next four years I see the volume increasing by at least 25 per cent," concludes George.

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Strong foundations

The history of FoundOcean

dates back to 1966 with the establishment of Wimpey Laboratories, which later became Wimpey Geotech. The company was the first in the world to develop the process of offshore grouting, which is now used worldwide on subsea installations. In 1993, the successful offshore company SeaMark Systems acquired the offshore division of Wimpey Geotech, rebranding itself as FoundOcean.

With over half a century of grouting experience, successfully completing over 1000 offshore projects, the company holds firmly its position as the world's largest dedicated offshore construction grouting company. The primary focus of the business is within securing structures to the seabed by foundation grouting, be it a single oil and gas platform or multiple installations for offshore wind turbines. "We specialise in providing grouting services for construction of sub-sea structures, mixing the cement into the foundations of the subsea structures of oil and gas platforms and wind turbines, or for subsea pipeline support and protection, and repair of damaged or ageing assets," begins managing director Jim Bell, continuing: "If a platform is suffering from corrosion or damage, or needs to take additional load then we have a solution."

With a presence in South East Asia, the Middle East, the Gulf of Mexico and Australia, a large share of its business is conducted in the North Sea, serving the oil and gas and windfarm industries. In the region of 70 per cent of the structures in the North Sea are sitting on foundations for which the business provided grouting services. Recognised as an industry leader, FoundOcean was involved in the first offshore windfarm in Europe when construction began in 2003. The business was equally responsible for installing the first pipeline supports for Exxon in California, deployed by ROV in 300 metres of water. In recent years the business has gone significantly deeper, installing pipeline supports at a depth of 1244m in West Africa in 2012. "We are also well known for our involvement in the Costa Concordia salvage project, which is currently sitting on a foundation that we constructed.

"We are a technically led, innovative business with operational directors from an engineering background. Strategy is formed from a technical

perspective, focusing on the clients' needs, allowing us to be innovative in challenging environments. There are always issues that arise offshore so it helps having a workforce that can adapt, so training is a key element in the company. Solving problems has become routine," explains Jim. With successful apprenticeship, graduate and trainee schemes, the company shows its commitment, not only to its own success but also to the achievement of its employees providing continued full support. In an industry where there is a push to drive down the installed cost, success also comes from the ability to reduce installation time. "In the last four years we have built bigger and faster equipment, increasing productivity from four tonnes of cement per hour to 15 tonnes. This represents a greater efficiency offshore with less vessel time," he adds.

"We work with a huge range of cements from the ordinary Portland product used frequently in oil and gas platforms, to ultra-high strength materials that have more than double the strength of standard cement, used on offshore wind turbines which are subject to much higher stresses and forces," points out Jim. The business also works closely with the large chemical company BSAF developing these high strength cements.

With bases in Scotland, Singapore, Mumbai and Houston, FoundOcean expanded its interests in 2013 opening a new office in Dubai. "We decided it was viable to establish a fulltime presence in the region and we are currently involved in the first offshore contract there, won through the local operation and not through long-term relationships with existing customers," says Jim. Working with contractors such as Heerema, Saipem, McDermott and RWE the business has enjoyed an active 12 months, following a four-year period of significantly less construction in the North Sea.

As the industry looks to extend the life of platforms the company has expanded into design services, establishing the new division SMR. Commenting on the expansion, Jim highlights: "We have a heavy involvement in structural repair for offshore installation, providing grouting services for repair clamps installed around damaged joints. Designing these repairs has been a natural progression from customer demand. There are few people in the world with the knowledge of 'off-design' codes but we have been fortunate enough to recruit one, who now heads the SMR division. We have already executed our first contract and we are seeing a high level of interest with enquiries."

Concluding Jim explains that the windfarm industry is moving into a consolidation phase, with work being completed installing turbines and cabling: "The next 12 months are set to be strong in the North Sea. We are also expecting South East Asia, the US and the Gulf of Mexico to become stronger markets. We aim to fully globalise our business, consolidating positions outside of Europe in the Middle East and the Gulf of Mexico, Australia and West Africa markets, supporting our already established position in Asia and India."

Masters of the forge

The origins of today's George Dyke Forgemasters can be traced back to its namesake - the late Mr. George Dyke, who was born in Birmingham in 1826 and later moved to live in Willenhall where he worked as a bolt maker.

He would be very proud to see what the company that bears his name has become today, over 180 years after his birth. Now regarded as a market leader in forged products, the company is able to meet all types of forging requirements, having the in-house capability to be able to produce drop, press and upset forgings. As an associate company of the Dowdeswell Engineering Group, George Dyke is also able to support this core business with a range of hot metal pressings, cold pressings and finishing processes. Furthermore, forgings can be offered in a wide range of materials, including all grades of carbon and alloy steels, stainless steels, non ferrous (aluminium) and micro-alloyed steels.

Added to these services are a range of finishing processes, such as turning, milling and threading, and an in-house heat treatment facility, which is able to meet the latest requirements of the petrochemical standard API6A and features normalising, annealing, sub critical annealing, hardening and tempering, and carburising.

The company also offers variety of testing capabilities - non-destructive testing (NDT) and mechanical testing to the current and latest British and American ASTM standards including ultrasonics, magnetic particle inspection and dye penetration (stainless parts).

All of these services are united under George Dyke's commitment to 100 per cent customer satisfaction. Its BSI and ISO 9001:2008 accreditations are testaments to this but the goal is to go beyond what the average customer would expect from a company holding such attainments.

Part of this approach embraces offering clients detailed assistance with identifying the most appropriate materials and finishes for their forgings, and George Dyke welcomes dialogue at the quotation stage to improve the possibility of finding a 'best case' scenario to applying forging techniques to customers' products. The organisation can also assist with sampling to enable customers to trial forgings ideas prior to full-scale production.

In order to ensure that it is able to meet the needs of an increasingly diverse and sophisticated customer base, George Dyke is committed to continually investing in new plant and equipment, as this enables the business to expand its range of forging applications and

provide greater scope for customers to source components and parts with greater durability and greater variety.

However, it doesn't neglect the conventional systems either – and as a result its in-house die and tool manufacture capability ranges from state-of-the-art CAD/CAM high-speed precision machining to traditional methods. Many of the newest pieces of equipment are less than two years old and include two new CNC machining centres (one purchased in 2014), power hammers, clipping press, band saw and high speed machining centre. Through this on-going investment in new equipment, George Dyke is able to support the most demanding of industry needs, and it has been able to expand its market from the UK to include the European Union, US and Canada.

Essentially all of these customers require a metal component of some sort, and typically these are required for hardwearing, heavy-duty applications (although the company does also manufacture and supply a range of security devices through its branded 'KEEP IT' range such as hitch locks for trailers and wheel clamps for caravans.)

In the early days of the business agriculture made up a large percentage of George Dyke's client base, but this changed as the company diversified over the years, expanding into other markets including petrochemicals, commercial vehicles, construction, mining and utilities. The petrochemicals side of the business especially has seen recent growth, and as highlighted the last time Geoge Dyke featured in *European Oil and Gas*, Gary Smith, managing director, noted this area is one to watch: "Looking a little further ahead over the next three to five years I would like to see George Dyke progress to become well-established in the North American petrochemical markets," he stated.

Nevertheless, the company is always keen to show even more potential new clients exactly what it can provide, and to do so often has a presence at major industry exhibitions – last year it exhibited at the Subsea Technology event in Oslo, and Subcon in the UK, and in 2014 it is attending ONS in Norway, one of the world's major meeting places for players in the oil and energy industry.

Now almost two centuries since it was established, George Dyke has become a major name, working at the forefront of the metal forgings industry. The company is the embodiment of a dedication to combining high quality products, good service and delivery, with a realistic market price. Its success is reflected in the recent need to move to a bigger facility and take on more staff to meet an ever-growing order book. By being able to identify modern requirements for forgings and respond accordingly, it has been able to grow into one of the biggest remaining forgemasters in the United Kingdom, and hold a place on the world stage as a premier supplier of metal forgings. O&G

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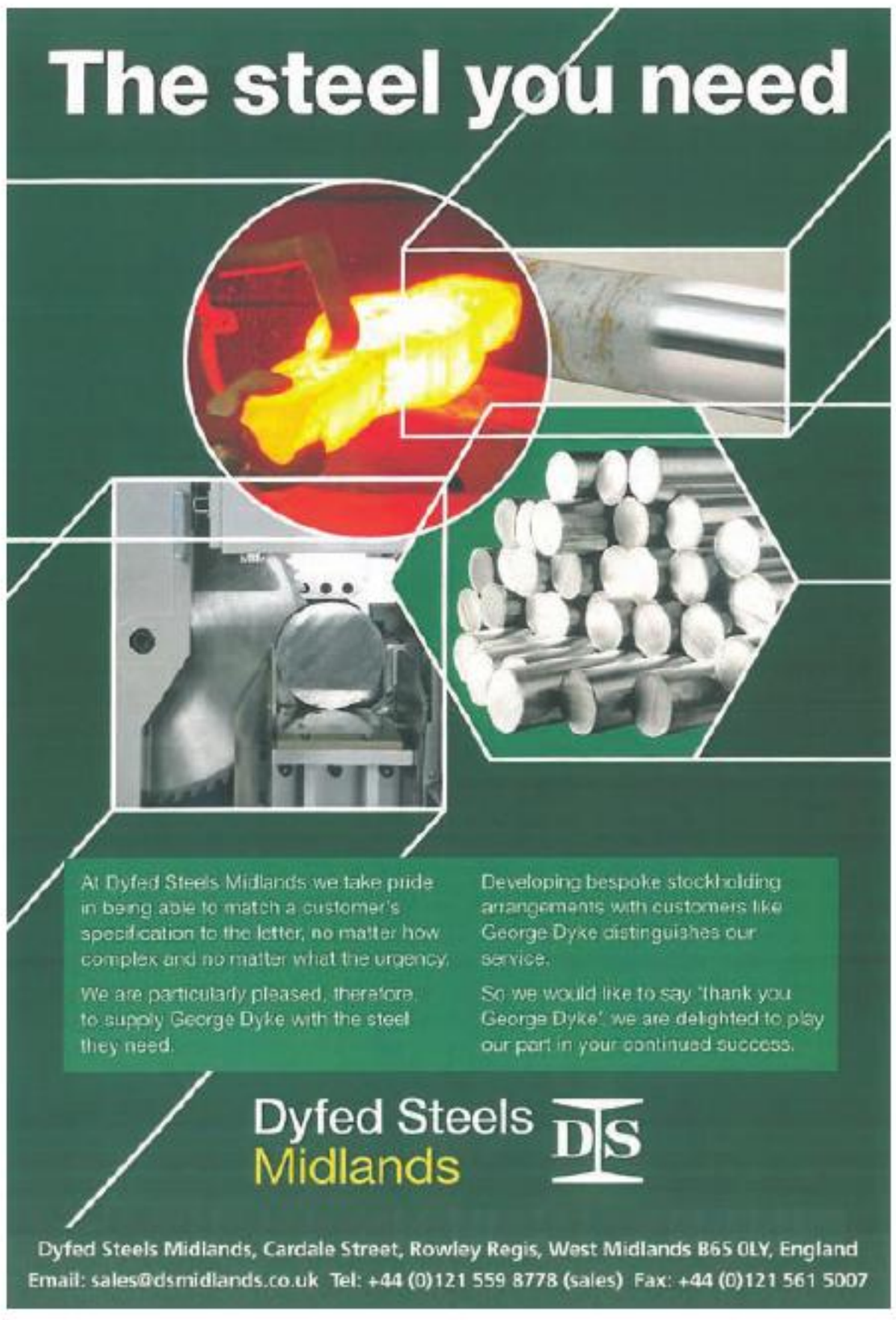

In demand

VIRO

VIRO is an international engineering firm. For many years, it has enjoyed a successful partnership with Veolia MPP Systems, for whom it has performed a wide range of multidisciplinary engineering and project management activities. The partnership is characterised by trust and communication. Over a career spanning more than 50 years, VIRO has participated in a wide variety of projects for leading international clients. It has worked in many fields where smooth co-operation is required between multiple disciplines, such as the chemical and petrochemical industry. Consequently, VIRO's strength lies in delivering total solutions through a decisive and integrated approach.

MPP Systems were first installed by Dutch firm AkzoNobel in 1994. Macro Porous Polymers (MPP) were originally developed as a highly promising, innovative product for medical applications in the 1970's. However, when the company couldn't find a use for macro porous polymer, the product was shelved until 20 years later when AkzoNobel's research department filed an application for utilising MPP to remove hydrocarbons from water in the Macro Porous Polymer Extraction (MPPE) process. This MPPE

process is based on liquid-liquid extraction (E). Following a pilot test and enhancements of the materials, the improved product came out onto the market; after a decade of further system developments, AkzoNobel evaluated its portfolio in 2005 and made the strategic decision to sell this part of the business to Veolia Water Solutions & Technologies (VWS) in December 2006.

Following the acquisition by Veolia, the largest water treatment firm in the world, the company has witnessed ongoing growth and increased demand in a diverse range of markets, as managing director of VWS MPP Systems B.V. Erik Middelhoek highlights: "I think we are a perfect fit with this company, an opinion that has been proven since 2006 with our increased market share and increased amount of business activity. We are still operating the same way, selling MPPE systems to remove hydrocarbons that have dissolved and dispersed from water to lots of markets, but oil and gas is certainly one of the most important industries for us. In addition to MPPE we also sell TIPSS (Tilted Plate Separation Systems), which use plate sets to increase the separation surface of contaminants. This is an interesting market that we have expanded over the last few years."

Previously featured in *European Oil & Gas magazine* in January 2014, the globally operating subsidiary has continued to witness demand for its MPP technology for extraction (MPPE) purposes. A highly effective, wholly automated, remote controlled method for the removal of dissolved and dispersed hydrocarbons from water, MPPE technology's extremely high efficiency rate guarantees customer satisfaction, as Erik discussed: "It doesn't matter where that water comes from, whether it is ground water, wastewater or produced water from oil and gas; we can reduce hydrocarbon levels down by 99.9999 per cent if required, which is beneficial to oil and gas companies who have to meet stringent legislation. They are looking for proven

> It doesn't matter where that water comes from, whether it is ground water, wastewater or produced water from oil and gas; we can reduce hydrocarbon levels down by 99.9999 per cent if required, which is beneficial to oil and gas companies who have to meet stringent legislation

technologies that can remove dispersed but also dissolved hydrocarbons at these separation levels. MPPE is the clear solution for these challenges. It is robust, low in maintenance and is one of the best available options suitable for this market."

Listed by OSPAR as Best Available Technology and selected as the best option among 55 technologies in a Government and Oil & Gas industry study, MPPE systems have been gaining the attention of oil and gas companies and governments looking to remove toxic hydrocarbons and meet legislation focusing on Zero Harmful Discharge (ZHD). Not only does MPPE reduce the Environmental Impact Factor (EIF) of offshore produced water by up to 95-99 per cent, it can remove dissolved and dispersed toxic hydrocarbons such as aliphatics, aromatic hydrocarbons, polyaromatic hydrocarbons and NPD virtually pure for reuse.

Aware that today's market operators require equipment to be not only be adaptable to changing projects, but also last between 25 to 40 years, VWS MPP Systems has worked hard to successfully meet these demands in the most critical areas in the North East Atlantic such as the Norwegian and Dutch shelves. More recently, it has focused attention on Australia, as a large amount of gas fields are in the process of being discovered and developed, as Erik highlights: "With ten years of experience supplying to the oil & gas industry, we are able to meet the different requirements and specifications of the major players in this industry around the world. We can handle this level of demand for quality and flexibility because we don't just offer a standard system to the client."

Having provided Shell with a MPPE unit for the first floating LNG plant in the world, VWS MPP Systems B.V. is currently working on the manufacture of an MPPE unit for Japanese company Inpex's Ichthys LNG project; as the largest discovery of hydrocarbon liquids in Australia in 40 years, Inpex Ichthys will cement Australia's place as the world's first or second LNG exporting country by 2020, while MPPE will help ensure it achieves the most stringent environmental conditions ever set. "This is an incredible project, by both size and difficulty, and is also the first major oil & gas construction project for Inpex," explains Erik. "We are supplying MPPE on the company's FPSO and also supplying a TIPSS installation for its onshore application in Australia. This is the second time we have been able to provide both systems to one client; the first time being the Woodside Pluto project in Australia."

Looking ahead, the company will continue to enhance its products to meet the needs of new and evolving markets, as Erik concludes: "We are of course looking into potentially interesting markets additional to oil and gas like lower flow wastewater streams (pharma etc.) that can be entered by our new micro MPPE unit concept. Next to the removal of hydrocarbons, we see possibilities to get involved in the removal of heavy metals from water or even using our MPP based materials in the cleaning and purification of hydrocarbons in gas streams. There will be quite a few interesting projects coming up over the next two to five years, I think there is a good place in the market for MPP based products and TIPSS." O&G

The natural step

"Trading since 2004, we are the transmission system operator for Denmark's gas and electricity networks," begins Torben Brabo, senior vice president of Energinet.dk. Two years ago the Danish government set out in its ambitious environmental and energy policy that by 2050 it will provide a 100 per cent carbon-neutral gas supply, as he reveals: "We are undertaking analysis of how the overall energy system and gas systems should develop so that over the next 35 years we can convert the existing mainly fossil based natural gas system to be progressively more green based."

The state-owned business maintains a well-established infrastructure for transmission, and now focuses – together with the distribution companies - on intensifying the conversion of oil and coal fired consumption into gas, achieving immediate CO_2 reduction, and at the same time significantly developing the production of a greater quantity of biogas. Biogas production has been in Denmark for the past 15 years, being used locally in smaller heat and power plants, but as Torben indicates: "A greater number of these projects are increasing in size and we expect up to 40-50 future biogas production sites, either connected to the distribution or transmission networks with an annual production capability of 5-15 million cubic metres per site."

With rising imports of gas through Germany from the north European markets, Energinet.dk has recently completed a new 94-kilometre gas pipeline project in Southern Jutland, implementing further investment in the pipeline through the installation of four compression units in the main intersection of the Danish system in Egtved. The infrastructure has been prepared so that it can pressurise gas at different levels for transit in each direction, enabling multiple usages from the investment. "We have also upgraded the SCADA and system operation tools to be able to get full value from the new import option. Historically, 100 per cent of gas in the system was supplied from the offshore fields in the Danish sector, so upgrading to two main sources is a big step," says Torben.

Having drawn to a conclusion a very successful project, Torben mentions a few of the mishaps along the way: "In constructing the compressor station, we were keen to make it as aesthetically pleasing as possible, and as such reduced costs on installing sound reduction. However, when the four compressor units run simultaneously it produces a very high pitched sound, that is undetectable to the human ear but not, it would appear, to dogs." Concerned for its neighbours, man or beast, Energinet.dk has already started the upgrade of the building fabric to eliminate the sound disturbance.

Eight years ago the business established an exchange to develop a transparent market price in the Danish and Swedish gas market. Through a partnership change, an opportunity opened to incorporate a new player with the knowledge to develop the exchange and its markets. In 2014 Energinet.dk teamed up with EEX, the German gas and power exchange and is currently focusing on development of the Danish/Swedish natural gas market and its alignment with continental European standards. "It could also open up opportunities for the distribution of some niche products, such as regional green gas products, or products based on gas from offshore fields in the North Sea," points out Torben.

Through steady and analytical progression Energinet.dk is always aware of what challenges or opportunities lay ahead and as such takes a step-by-step approach to adaptations in infrastructure, systems, personnel or their competences. However, the business has been heavily developing the resources, shown with regard to ie. gas quality. Following a period of heavy analysis on the co-ordination and mixture of gas quality to support free trade of gas across the borders, it was highlighted that Denmark utilises the widest range of the EU gas specification. "Essentially we allow a full combination of gases throughout our entire network, whereas other countries' systems are geographically split uses various sub-standards in the sub-systems. We conducted a review of all consumption aspects, establishing contact with all producers of appliances (household boilers as well as large turbines, etc.). The natural step has been to move forward in that direction. Complementing the move to a broader range of gases, all operatives in the supporting service sector and at the distribution companies have attended educational programmes to update their skills," says Torben.

Energinet.dk participates and supports research projects based on electrolysis process, as part of its company strategy - working towards a future where the primary power production comes from wind and solar. "We need to be able to convert the power to an energy form that can be transported, stored and used in the wider

SCHWIER

For the Compressor station Egtved of energinet - Schwier performed the HVAC work. It was a successful cooperation between Schwier and energinet from the beginning of the project to the completion of the station.
Schwier developed numerous solutions for the HVAC discipline, especially for hazardous areas and as well for IT. The Compressor-buildings are equipped with ventilation-units, which are operated via the central HVAC control-panel under the aspect of security, redundancy and energy efficiency.
In the station-building decentralised ventilation-systems were installed. Furthermore the station-building have a heating-system and a cooling-system that were selected in consideration of latest technologies for saving energy-costs and climate-protection.
The cooling-system works with a natural refrigerant. Heating- and cooling-system are also operated from the central HVAC control-panel. The installed HVAC plants from now on is maintained by Schwier by a multi-year maintenance contract. For more projects of energinet dk Schwier is in standby to support for the planning and execution.

M. J. ERIKSSON A/S

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The Civil Work Company M.J. Eriksson A / S was founded in 1920 and employs currently more than 470 employees, including 150 engineers, within infrastructure works and related tasks.

- Roads and Railway works
- Ports and Harbors
- Earthworks and Drainage
- Foundation
- Dewatering
- Pipelines

Frøslev - Egtved II, Denmark.

Earth works at the establishment of a 94 km long gas pipeline in South Jutland for Energinet.dk in Denmark.

M.J. Eriksson A/S - the largest earth construction company in Denmark - performed all excavation and restoration work within the project for the Dutch company Visser & Smith Hanab.

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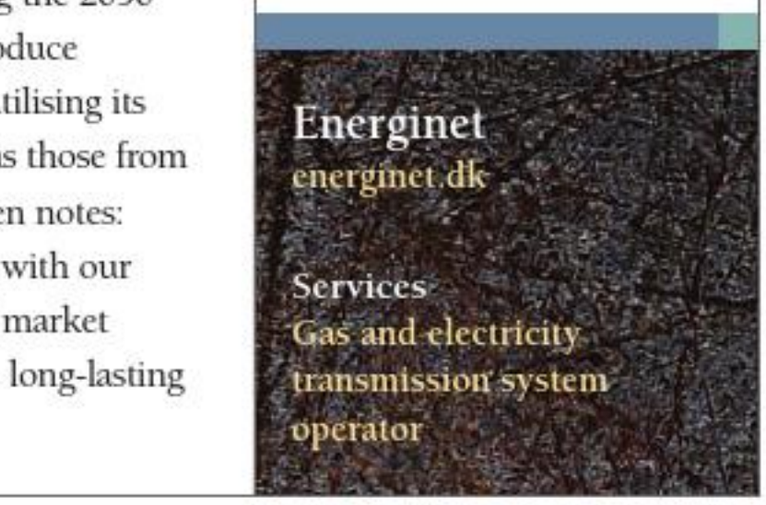
energy sector," adds Torben. Actively supporting two electrolysis projects, electricity from wind power and water is converted into hydrogen, which is used for upgrading biogas before it is injected into the natural gas grid. Biogas also contains CO_2, and therefore it cannot be sent to the Danish gas customers through the natural gas grid. However, a new biological process, where microorganisms and hydrogen convert CO_2 to methane, is upgrading the biogas. At the same time, the sister project is testing a new technology for chemical upgrading of biogas. "We test both hydrogen and methane products in our own transmission system in a 100-metre section of redundant transmission pipeline and connected M/R station. We need to test how large a percentage of hydrogen can be handled safely within the system, an area in which very few studies have been undertaken," he explains.

Following the record setting year for Danish wind power in 2013, the business is preparing for the construction of a traditional power grid connection system, connecting new offshore wind farms to the main electricity grid. "We have several new wind farms in the area with the newest, Anholt, producing around 400MW and the next two major wind farms, signifying the sixth and seventh," Torben highlights. A joint venture with Germany will see both nations developing wind farms in the sea between Denmark and Germany. Power connections between the wind farms and the two countries, will provide both social-economic benefit as well as business opportunity. "We have just signed a co-operation agreement with the Netherlands, and another with the UK for new electricity interconnectors between the countries. We have also developed our national operating system, taking more and more renewable energy from local production sites, helping to strengthen the system," he announces.

With the political aim of achieving the 2050 goal, Energinet.dk continues to introduce innovative thinking to the market, utilising its own assets and capabilities, as well as those from outside sources. Summarising, Torben notes: "Small steps and working in unison with our neighbours, producing regional and market based solutions is the key factor to a long-lasting greener future." O&G

PER AARSLEFF

The ASB Joint Venture with AARSLEFF and the partners STREICHER/BUNTE has established the new compressor station in Egtved, Denmark. The working relationship with the client Energinet was ideal, and there was a great commitment from Energinet to implement the complex project. Energinet also set up a competent project organisation, and its operating organisation was a constructive partner, says Peter Nordheim, project manager of Per Aarsleff A/S and board member of the joint venture.



Subsea investment

During 2008 diving company Anglian Marine Services and the marine construction management company Haven Ports merged to form Red7Marine Offshore Ltd. Since that time the company has striven to establish a strong market presence and has quickly become recognised as a leading provider of offshore, maritime and inland subsea engineering and marine construction services. This is hardly surprising when taking into account that both of Red7Marine's founding companies had each operated in their own right for over a decade within the oil and gas and maritime markets, meaning that the company was formed with several years of experience and industry knowhow.

Presently Red7Marine works with a varied client base within the offshore oil and gas, marine renewables, framework, public and private sectors. The company's activities are guided from its head office located in Wrabness, Essex and supported by strategic bases around the UK in Great Yarmouth, Ipswich, London, Exeter and most recently Aberdeen. The Aberdeen office was opened in the spring of 2012 in response to the continued growth and expansion of the company. Located within the Arnhill Business Park, the office has a central location to clients in the region, where Red7Marine has moved further into oil, gas and renewable markets following a high degree of interest in the company's subsea and surface products and services. The result has been the establishment of a permanent presence for Red7Marine in the Aberdeen region and the positioning of highly experienced managers and engineers with many years of technical knowledge close to clients and their operations in this highly important sector.

The merger between Anglian Marine services and Haven Ports was instrumental in defining and enhancing the service offering provided by Red7Marine, however the company continues to retain its core businesses of inshore and coastal commercial diving as well as marine construction activities within coastal and fluvial areas. Since the company was last featured in *European Oil and Gas magazine* during August 2011, Red7Marine has continued to grow in strength in all areas and with its growth within the civil diving industry and ROV activities it today represents the largest combined inshore and offshore diving firm in the UK.

Additionally Red7Marine has continued to strengthen its marine plant hire division inline with the overall growth of the business. Through a series of investments and acquisitions Red7Marine is today the UK's leading provider of classed self-elevating platforms and coastal flat top barges. Presently its equipment portfolio comprises four Haven Seariser modular jack up-barges; a monohull jack up-barge; four Haven Seajack modular jack-up barges; six multi-purpose flat top barges and a fleet of tugs; barges and interconnecting, road transportable pontoons; dredges and floats.

The latest additions to the Red7Marine fleet, Seariser 3 and Seariser 4, were delivered during 2013 and 2014 respectively. Both vessels were built by the Dutch shipyard and construction company Ravestein and are part of a total order of four Seariser jack-up barges delivered to Red7Marine as part of the company's on-going investment. The Haven Seariser 4 is a standard RCP-250 type jack-up that measures 29.3 metres length, a width of 17.10 metres and a deck load capacity of 250 tonnes. The barges are constructed using a modular design, built out of 15 units, four jacking units and four connectable spud legs. The modular construction of the barges makes them suitable to be broken

down for road transportation but the delivery of Seariser 4 was undertaken by MTS Victory, which towed the barge from Rotterdam.

In tandem to the expansion of its operating fleet Red7Marine continually develops its range of integrated subsea equipment, including its industry-leading SeaVex range of controlled flow seabed excavation systems. SeaVex was developed in response to operators need to utilise non-intrusive cable and pipeline burial systems and provides additional versatility in that it is able to undertake a variety of alternative tasks that can be executed as separate contracts in a single deployment. SeaVex provides solutions in pipeline, cable and umbilical trenching/reburial and decommissioning applications and is based on a hybrid subsea excavation system that is extremely adaptable, compact and controllable. The SeaVex design incorporates a large single cast impellor with direct drive and torque restrictor driven by hydraulic motor. Furthermore it is fitted with adjustable outlet nozzles at the base of the tool that allow for enhanced kPa cutting across a broad range of seabed materials. Each system is fitted with either 2D or 3D sonar survey packages that provide pre and post work surveys and feeds for live operational monitoring.

Operationally the SeaVex system features ancillary agitation lances that are fitted as standard and remove materials in excess of 180 kPa shear strength while variable exit nozzle diameters match seabed materials being excavated and set trench profile. The system is capable of producing narrower trenches for product burial and can operate in water depths of 1.2m to 300m.

With a firmly established history and turnkey industry knowledge, Red7Marine is set to further define itself as a significant market player within the oil and gas industry. Its aggressive and highly targeted investment in assets and new technology marks the company as an organisation at the heart of the industry and fully in tune with the needs of its clients. O&G

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Red7Marine Offshore Ltd
red7marine.co.uk

Services
Subsea engineering and marine construction

Eastern promise

In a history that dates back

to 1968, MODEC, Inc. of Mitsui Group has a portfolio of successful contracts that has allowed it to build a strong and enviable reputation in offshore construction projects. Initial growth for the business came from the design and construction of offshore construction vessels before later moving into the construction of jack-up drilling rigs mid way through the 1970's. As a Japanese business, its headquarters remain in Tokyo but it maintains a worldwide presence through offices in Houston, Singapore and Brazil, supported by regional offices in Angola, Australia, China, Cote d'Ivoire, Ghana, Malaysia and Vietnam. As MODEC does business around the globe thought and effort goes into developing the communities near its operations, employing over 3,000 personnel with natives of more than 25 different countries.

With a strong sense of commitment to honesty and integrity, and a hard work ethic, the business has retained a good reputation in the industry. As a general contractor, it specialises in engineering, procurement, construction and installation of floating production systems including Floating Production Storage and Offloading (FPSO) vessels, Floating Storage and Offloading (FSO) vessels, Tension Leg Platforms (TLPs), Production Semi-Submersibles, Mobile Offshore Production Units (MOPUs) and other new technologies that will meet the challenges of various types of gas production floaters.

Over the last six decades, offshore production has increased tremendously to a level where currently, approximately 30 per cent of world oil and gas production comes from offshore and it is expected to continue to increase in the future. Fixed platforms were initially used for the offshore development, but as the fields have gone deeper, floating production facilities

Strong Synergy. Proven Track Record.

Jurong Shipyard is proud to be part of MODEC's global success for over 20 years.

FSO TA'KUNTAH
Year Completed: 1998

FPSO OSX 3
Year Completed: 2013

FPSO FLUMINENSE
Year Completed: 2003

FSO CIDADE DE MACAE MV15
Year Completed: 2007

FPSO CIDADE DO RIO DE JANEIRO MV14
Year Completed: 2006

FPSO PSVM
Year Completed: 2011

FPSO KWAME NKRUMAH MV21
Year Completed: 2010

FPSO BAOBAB IVOIRIEN MV10
Year Completed: 2004

FSO MADIELA
Year Completed: 1997

FSO KOME-KRIBI 1
Year Completed: 2003

FPSO NAN HAI SHENG LI
Year Completed: 1995

FPSO MODEC VENTURE 11
Year Completed: 2004
Upgraded: 2013

FPSO BUFFALO VENTURE
Year Completed: 1999

FPSO MODEC VENTURE 1
Year Completed: 1998
Upgraded: 2008

FPSO STYBARROW VENTURE MV16
Year Completed: 2007
Upgraded: 2010

FPSO MV8 LANGSA VENTURE
Year Completed: 2001

FPSO JASMINE VENTURE MV7
Upgraded: 2005

sembcorp marine

Subsidiary:

JSL
JURONG SHIPYARD

29 Tanjong Kling Road Singapore 628054 • Tel: (65) 6265 1766 • Fax: (65) 6261 0738 / 6265 0201 • Website: www.sembmarine.com • Company Reg. No: 196300098Z

JURONG SHIPYARD

A long-standing partner of MODEC for over 20 years, Sembcorp Marine's subsidiary Jurong Shipyard has successfully delivered more than 21 offshore projects to MODEC since the yard's first major turnkey conversion of the FPSO Nan Hai Sheng Li in 1995.

Notable conversions completed by Jurong Shipyard for MODEC in recent years include: the FPSO OSX 3 (ex-Tar II) – which has a storage capacity of 1.3 million bbls and a production capacity of 100,000 bopd – for deployment offshore Brazil in 2013 as well as FPSO PSVM (ex-Bourgogne) – equipped with one of the biggest external turrets in the industry capable of two million bbls of oil storage, 157,000 bopd of oil production and 245 mmscfd of gas compression – for operations offshore Angola in 2011.

Jurong Shipyard is currently converting the Tullow T.E.N. MV25 FPSO from the VLCC Centennial J for MODEC. To be deployed to the T.E.N (Tweneboa, Enyenra, Ntomme) Field and moored in water depths averaging 1500m, the FPSO will be capable of handling 80,000 bopd of oil production, 170 mmscfd of gas production and 1.7 million bbls of oil storage.

With delivery planned in 2016, the FPSO will be installed in the T.E.N field and is designed to remain operational in the field for up to 20 years. This is the second vessel to be converted by Jurong Shipyard under MODEC for operations in Ghana following the successful conversion and delivery of FPSO Kwame Nkrumah MV21 (ex-Tohdoh) for the Jubilee Field development in 2010.

have become the main solution for the offshore production. With four main types of floating production facilities; FPSO, TLPs, Spars and Production Semi-Submersibles, MODEC has interests in all areas of the market.

Currently approximately 160 FPSOs, 20 TLPs, 20 Spars, 40 Production Semi-Submersibles and 100 FSO vessels are in operation worldwide. Orders for floating production facilities have increased dramatically over the last decade. That trend is expected to continue as the world's energy consumption continues to grow and advancements in technology provides the capability to extract more hydrocarbons in challenging environments. The business received its first contract for a FPSO vessel in 1985, and began operating the unit in 1986. Since this first contract MODEC has been awarded more than 35 additional FPSO / FSO EPCI projects and provides operation and maintenance services around the world. FPSO and FSO systems today have become the primary method for many offshore oil and gas producing regions around the world, utilising the ability to receive fluids such as crude oil and water from a subsea reservoir. Most FPSOs are ship-shaped and are anchored by a turret. Depending on the environment a range of mooring types may be used, including spread mooring in calmer waters and disconnectable turret mooring systems for use in environments where cyclones or hurricanes occur.

A number of the company's contracts have been undertaken at the Jurong Shipyard in Singapore, a subsidiary of SembCorp Marine, itself a well respected business in not only the Asia Pacific region, but also the offshore and marine industry globally. Such builds include the FPSO Fluminense with a production capacity of 81 thousand barrels per day, used for oil and gas production, stockpiling and transfer of Salema and Bijupira fields. Furthermore, in 2007 it undertook the construction of FSO Cidade de Macae MV15, set to be one of the most sophisticated distribution offshore oil facilities in the world. Receiving and exporting production of five platforms off the coast of Brazil, the FSO is capable of receiving up to 818 thousand barrels of oil per day.

Fast becoming the common name when discussing the FPSO market, MODEC was previously featured in *European Oil and Gas Magazine* at the beginning of 2014 with a review of the new projects; FPSO Cidade de Mangaratiba MV24, due for completion at the 3rd quarter of 2014, and the construction of its eighth FPSO/FSO for Petrobras, FPSO Cidade de Itaguai MV26. That contract involved the

conversion of a Very Large Crude oil Carrier (VLCC), to be deployed to the Iracema Norte area of the BM-S-11 block off the coast of Brazil in 2015. The area is part of a deepwater oil field located approximately 300 kilometres south of Rio de Janeiro, Brazil. The oil is contained in the pre-salt layer approximately 5,000 meters beneath the seabed.

Detailed in a press release in November 2013, MODEC revealed that through Petrobras it had been awarded a contract for the supply, charter and operations of an FPSO for Carioca field of the BM-S-9 block in the giant pre-salt region of the Santos Basin, with water depths of 2,100 meters. The BM-S-9 block is under a consortium formed by Petrobas, BG Group and Repsol Sinopec Brasil S.A.. MODEC is responsible, with the Schahin Group, for the engineering, procurement, construction, mobilisation, installation and operation of the FPSO, including topsides processing equipment as well as hull and marine systems employing its subsidiary SOFEC, acquired in 2006 for the design and supply of the spread mooring system.

FPSO Cidade de Caraguatatuba MV27 will be capable of processing 100,000 barrels of crude oil per day and has storage of 1.6 million barrels of crude oil. The delivery of the FPSO is expected by June 2016. This is the 11th FPSO/FSO vessel which MODEC will provide in Brazil and represent the 9th FPSO for the pre-salt discoveries, being MODEC's 5th in the pre-salt. "We are committed to carry out the project along with Schahin Group in order to contribute to the foundation for the development of heavy industry in Brazil," Toshiro Miyazaki, president and CEO of MODEC is reported to have said.

On the other side of the Atlantic Ocean lays another market, West Africa, which has seen several significant discoveries of offshore oil fields in recent years, which have given rise to expectations to demand for additional FPSO's in the region. Construction of the FPSO through conversion of a VLCC is planned to be completed and deployed in 2016 for the development of the Tweneboa, Enyenra, Ntomme (TEN) oil fields offshore Ghana, owned by a consortium of five companies, at water depths of about 1,500 meters.

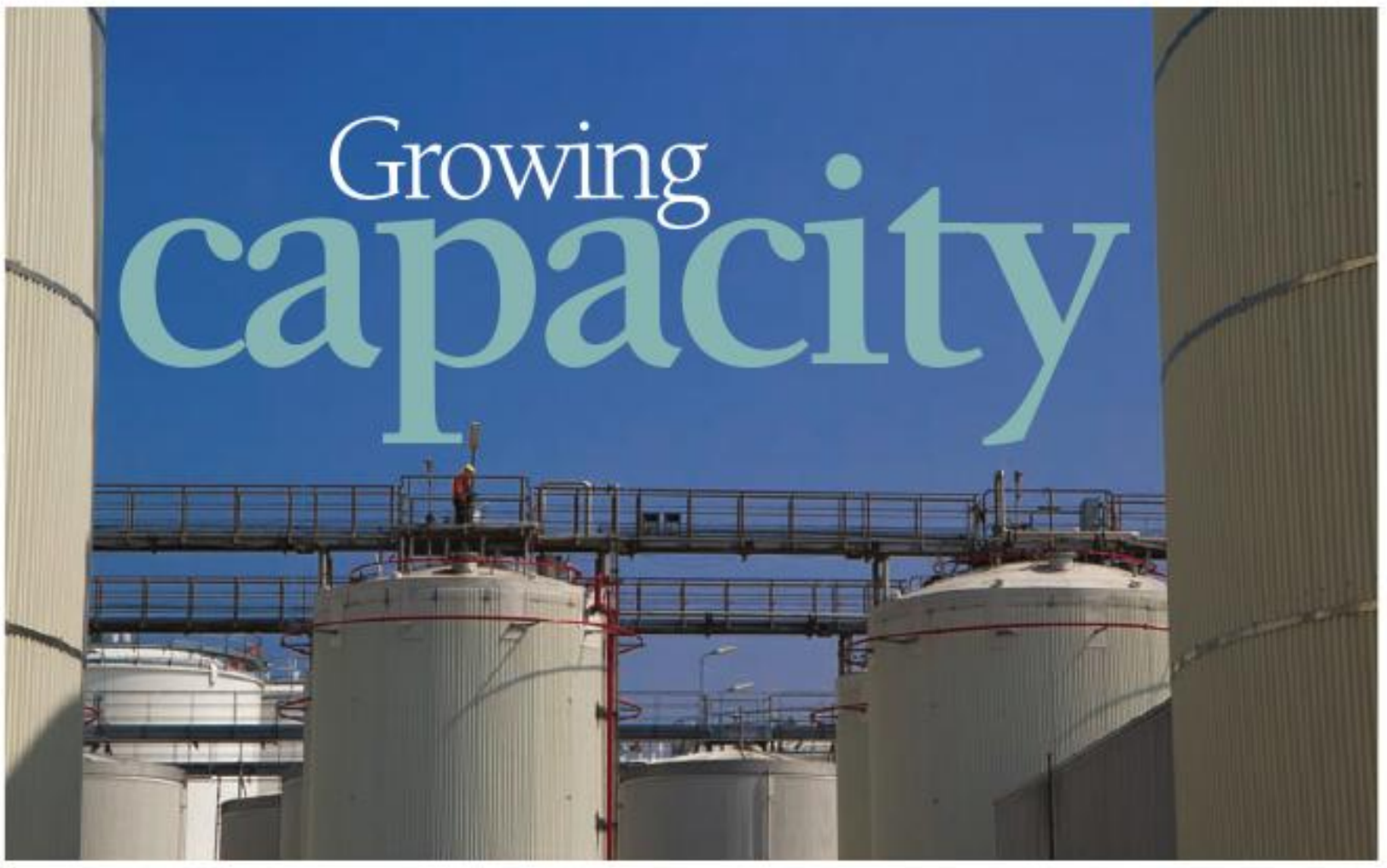
In September 2013 MODEC announced a long-term charter business project for providing the FPSO for use in the TEN oil fields. The contract, held with the operator Tullow Ghana, will run initially for ten years, with options for extension up to an additional ten years. MODEC will engage in FPSO leasing, operations and maintenance of the vessel, installed in approximately 1,500 meters water depth. This is the second vessel MODEC will provide and operate in Ghana following the FPSO Kwame Nkrumah MV21 for the Jubilee Field development, which was awarded in 2008. MODEC is currently operating the FPSO Kwame Nkrumah MV21 for Tullow as Operator of the Jubilee Field.

Recognising that success in the industry

comes from a proactive approach, MODEC has been working under an alliance with Velocys and Toyo Engineering to develop and implement a Gas to Liquids (GTL) technology. This innovative solution will allow the offshore oil and gas industry to capture and monetise associated natural gas that is currently flared or re-injected into the reservoir. The GTL technology creates the potential to access over 3,000 trillion cubic feet of natural gas that is currently stranded. Present at OTC 2014, the business worked on actively promoting its developments, services and solutions to the industry in preparation for the future years.

It is the strengths of the company that have achieved consistent delivery and operation of high-quality, innovative floating production solutions for the offshore oil and gas industry. Striving to meet customers' requirements it continually cultivates its talented team focusing on integrity, communicating openly and serving the community whilst protecting the environment. With so much previous experience to hand, MODEC promotes a confident approach to the new contracts it undertakes, and with a forecast of many new and strong projects, the company's vision of becoming the global leader in delivering and operating innovative and reliable floating production systems is being realised. O&G

> Over the last six decades, offshore production has increased tremendously to a level where currently, approximately 30 per cent of world oil and gas production comes from offshore and it is expected to continue to increase in the future



Growing capacity

Stolthaven Moerdijk BV is a strategically located storage terminal facility located between Antwerp and Rotterdam that offers tank storage for bulk liquid, drumming and services such as an IBC filling station, jetty, repacking, tolling, blending, heating and cooling (bulk liquids). The facility, which presents an attractive and popular option for many of Europe's leading bulk operators is situated in a congestion-free and lock-free port that is accessible via sea, inland waterways, highways and rail.

The facility, which benefits from high levels of experience and skill throughout its organisation and a deep understanding of the bulk liquid sector, is part of Stolt-Nielsen's Stolthaven Terminals division, which is a distinct advantage for the business. For example, Stolt-Nielsen is a global business that operates six divisions that cover a broad range of services and industries. Currently this group consists of Stolt Tankers, Stolthaven Terminals, Stolt Tank Containers, Stolt-Nielsen Gas, Stolt Bitumen Services, and Stolt Sea Farm. Being a part of this diverse range of business activities gives Stolthaven Moerdijk access to a wealth of knowledge across a global spectrum, while the overall strength of Stolt-Nielsen means that the facility has solid and dependable support in terms of continued expansion and investment.

The facility in Moerdijk was acquired by Stolthaven Terminals in 2012, so it is a relatively new enterprise, but it has quickly become an important aspect of the terminals division's business by providing additional support to its intra-European coastal tanker and inland barging service. The terminal, which is managed by Marco Dalmeijer, currently consists of 37 tanks which equates to a total of 31,720 CBM of storage space, with tank sizes of 340 CBM, 500 CBM, 900 CBM, and 2000 CBM. This provides storage for (hazardous) bulk goods and there is also warehousing capacity for the storage and handling of dangerous goods for approximately 13,000 pallet places, with an additional 1600m2 warehouse space for non-hazardous chemicals. The site can be accessed via jetty, which is suitable for loading and unloading barges and sea-going vessels with a maximum length of 175 metres. There is a pigging system for all jetty lines and vapour return and nitrogen blanketing are also available.

Considering the products passing through Stolthaven Moerdijk, the storage tanks themselves are naturally of the highest quality. For example, all tanks are made of stainless steel 316 L and Mild steel, with each tank having dedicated pumps and lines to exclude contamination. Furthermore, most of the tanks at Stolthaven Moerdijk have capabilities for nitrogen blanketing and a vapour return system and can be heated through the employment of electrical tracing circuits. As well as storage Stolthaven Moerdijk also provides a drumming service, from a sheltered filling station with two filling lines. Both of these lines are suitable for filling steel or PE drums up to 250 litres and one filling line for filling IBC's up to 2500 litres. The facility also has full unloading/loading capabilities for containers, trucks and vessels.

Stolthaven Moerdijk is of course just one link in the Stolthaven Terminals global chain. The division has a network of 20 owned and joint-venture bulk-liquid terminals around the world in Australia, Brazil, China, Europe, Malaysia, New Zealand, Singapore, South Korea, and the US, with a total storage capacity of 3.8 million CBM. Stolthaven Moerdijk is one of six fully

PENTAIR

One of Stolthaven's requirements on the expansion project was to apply a reliable, flexible and intelligent electrical heat trace system on 4pcs 2100m^3 tanks and pipelines. Pentair engineered and installed a tank farm specific heat tracing system controlled by Pentair's next generation controller, the NGC40, which is connected to Stolthaven's DCS system in the control room. Minimised maintenance, load balancing possibilities, easy setting, control and monitoring on batch loading and energy needs registration - all Stolthaven requirements have been fulfilled.

owned terminals, the rest being in New Orleans and Houston (US), Santos (Brazil), Singapore, and Dagenham (UK). The Dagenham facility was acquired in 2012 having been formerly owned by a French business, and it was an important foothold into the UK market for Stolt-Nielsen. Situated just 15 miles from London, the facility provides storage for petroleum products, CPP solvents, base oil and vegetable oils and has an overall capacity of 134,232 CBM.

The Stolthaven Terminals network is vast, providing high quality storage solutions for customers worldwide and building strong, lasting relationships with individual clients in order to establish integrated transportation and storage solutions that reduce costs and increase overall operating efficiencies.

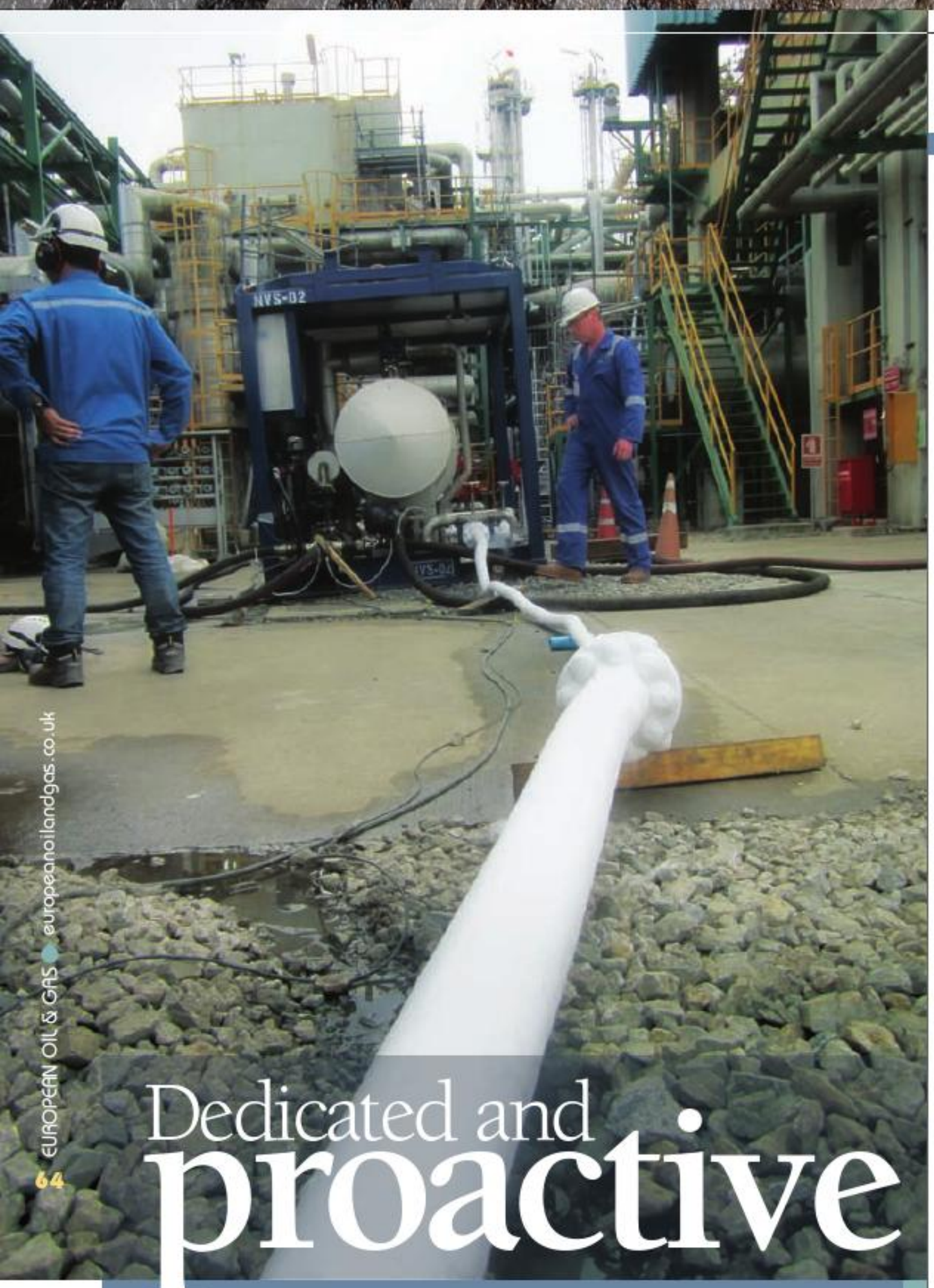
Stolthaven Moerdijk plays an essential role in this network, and moving forward the business has firm expansion plans that involve increasing its capabilities and adding new services to its portfolio. All of this is firmly in line with Stolt-Nielsen's main strategy of enhancing berth efficiency. The business is planning to expand its storage capacity in the near future by adding a total of 16,000 CBM of stainless steel tank capacity, which will ensure increased business opportunities in the market.

Furthermore, it is also currently in the process of building a major new depot for cleaning both its own and third parties' tank containers. This is taking place on a large plot of undeveloped land near to the Moerdijk site, which will ultimately become a Stolt Tankcontainers Depot. Lastly, there are also plans in the pipeline for the construction of a new drumming installation, which will consist of two drumming lines – a fully automated and a semi-automated line capable of filling a wide variety of drums and IBCs, which is due for completion in 2015. Ultimately the terminal is ideally located to take advantage of ongoing market growth, and with the backing of Stolt-Nielsen it means that there is the drive and support to make this development happen, taking Stolthaven Moerdijk successfully into the future. OEG

“The Stolthaven Terminals network is vast, providing high quality storage solutions for customers worldwide and building strong, lasting relationships with individual clients

Stolthaven Moerdijk BV
stolt.com

Services
Storage terminal



Dedicated and proactive

OILFIELD HIRE AND SERVICES (OHS)

OHS Ltd is a UK-based company specialising in the lease and sale of cryogenic tanks and associated equipment (including nitrogen pumps through sister company Horizon Speciality Leasing). Used for the transportation and storage of liquid gases, one of the primary applications of cryogenic tanks is their use in offshore service operations, including well stimulation and pipeline systems testing. An eight-year relationship with PNS has witnessed the supply of OHS tanks and pumps to locations throughout the world. Close collaborations have resulted in important safety improvements including the adoption of 'staggered' ISO-connected 2000USG tanks, allowing an operating platform on stacked units.

Formed following Dutch company Pipeline Nitrogen Services' (PNS) acquisition of the Singapore-based Duplex Energy in 2009, PNS Asia Pacific has enabled its parent company to strengthen its presence in the booming South East Asia region. Not only taking advantage of the existing organisational synergies between the two organisations to ensure growth, PNS Asia Pacific has also taken on the values of both Duplex Energy and PNS; PNS Asia Pacific provides a close-knit, open environment to its competent, dedicated and proactive workforce. Taking these values forward, the company has been involved in pipeline and flange management projects for some of the most renowned upstream operators in the region.

Discussing the development of PNS Asia Pacific over the last four years, general manager Jan Frieling begins: "Although PNS has been involved in Singapore since 2009, we acquired a company called Duplex Energy in 2007, so really we have had a presence here since then. To continue our growth strategy we established a joint venture in Jakarta, Indonesia, in 2012 to target to growing Indonesian market. The joint venture was registered in 2012 and the first contract was signed in 2013. Project wise, we completed our first pipeline job in Singapore in 2012 and our first operation in Thailand in 2013. Over the last year or so we have been trying to diversify our business and to bring pipeline and LNG services into the Asia Pacific region. Work has proven fruitful over the last six months and conditions look positive for the future."

Committed to expanding its services to support clients in the best possible way, parent company PNS has developed alongside the evolving oil and gas industry to ensure customer satisfaction and long-term relationships that thus cement the company's future. Merging with Coil Services BV in 2009, the company today is part of the Well Services Group BV, which complements its strong capabilities in providing a broad portfolio of services such as process-pipeline services, bolt-working and LNG services. Digging deeper, this includes pigging, chemical cleaning, pipeline hydrostatic and strength testing as well as a growing number of other services in line with the required demands of customers.

For example, in 2013 the company established a new joint venture for Mercury Solve solution, which it anticipates will be in huge demand over the coming years. "As a company that focuses on developing new services that meet market needs, Mercury removal is certainly something we want to begin providing to the South East Asia region," says Jan. "It is our objective to introduce the Mercury Solve solution to the Asia Pacific Region in 2014."

Present in many of the world's natural gas fields, the concentration of mercury has increased massively in many gas reservoirs; particularly susceptible to mercury caused liquid-metal embrittlement (LME) are the brazed aluminium heat exchangers that are typically found in LNG plants and pipelines. As the oil and gas industry increases its attentions on the production of LNG, the effective removal of mercury from streams during the production of the gas is becoming an increasing issue. "PNS is constantly focused on new services to support our clients in the best possible way, which has resulted in a new joint venture for Mercury Solve solution. The objective is that in 2014 the

first Mercury projects will be performed and we expect a huge demand for these services in the future," says Jan.

A recent major development for PNS has been remedial flow line services with coil tubing, which has been made possible through the representation of a US company. This agreement thus enables the business to offer its clients special patented tools that can pull coil tubing and slick line distances up to and beyond ten miles thanks to hydraulic force thrusters. The equipment can be used in applications such as washing out paraffin and debris, with heated fluids, from subsea pipelines, the retrieval of stuck pigs from subsea flow lines, and jet cleaning the walls of subsea flow lines.

Of course, being part of a major company that focuses on enhancing its services has its benefits, as Jan highlights: "We get the best support to ensure we grow; this is through engineering support, the accumulated experience and expertise of managers and the ability to use the same systems as PNS. We are not in this business to be the cheapest, but to be the best at providing high quality services that are driven by focusing on exactly what our clients want."

Looking ahead, there is a great deal of opportunity for PNS as it looks to develop a wider footprint in the Asia Pacific market through the potential expansion of offices, as Jan concludes: "PNS Asia Pacific currently has a regional office in Singapore and a support base in Batam, which is managed by the Singapore office. Over the coming years we want to increase market growth in Thailand and Malaysia and perhaps look to areas such as Brunei and the Philippines in the future. Depending on market demand, we will look to open a few more bases in the region." O&G

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PNS
Asia Pacific Pte Ltd
pns-services.com

Services
Process, pipeline, LNG and bolting services

Riding the waves

With a mission to provide advanced offshore vessels and high quality management services to the oil and gas industry, NSS strives to lead the way in vessel innovation, technology, HSEQ and customer satisfaction. Owned by the Klepsik and Okland family, the company was founded on the principles of a family business in 1984, which has thus resulted in a highly experienced organisation with a tradition for delivering competence, flexibility, consistency, loyalty and openness between staff and customers; values that have ensured excellent safety records, reliable operations and long-term clients.

"We are a small company with the ability to adapt to meet our clients needs. We are also leaders towards innovation and new thinking and are always searching for new solution that makes us better than our competitors. We have a very high focus on delivering quality so even if we are a small company with a small fleet we have three state-of-the-art vessel that are among the best vessel in their class when it comes to capability, reliability, redundancy and capacity," begins Sveinung Okland, operations manager at NSS.

Providing a wide range of services based around vessel ownership and the operations of its fleet, as well as the management of the vessels of other owners, NSS operates all vessels according to the modern ISM code, with a focus on experience and quality seamanship. All operations the shipping firm is involved in are in accordance with the Total Safety Management Concept. This applies a variety of quality controls, in which its quality assurance system run in UNISEA marine software (based on ISO 9001/14001) has a central role.

Since it was previously featured in *European Oil & Gas magazine* in September 2013, the Austevoll headquartered firm continues to have two vessels in operation and one vessel under construction. "Over the last ten months our core developments have been on the contract side of the business; we have extended the contract with ElectroMagnetic GeoServices (EMGS) for Atlantic Guardian with three years firm and the option for four x one years. We have also extended the contract for North Sea Giant and she is now on firm contract with Technip Norway until mid 2018 with Options till 2021," says Sveinung. "Meanwhile, the North Sea Atlantic is on a seven year firm contract with Technip, which will start once the vessel has been delivered."

Due for delivery in August 2014, when it will begin its seven-year contract with Technip, the North Sea Atlantic is a state-of-the-art offshore construction vessel that has been customised to meet both the client's and market's needs. "The North Sea Atlantic is equipped with an 550 tonne active heave compensated Offshore crane, carousel under deck, heavy gantry ROV LARS system, and the deck is reinforced to be able to hold an carousel on deck + and big vertical lay

tower + reels on deck. The vessel is very high tech standard where all solutions are of the newest and best technology that is on the market today," highlights Sveinung.

Designed by Skipsteknisk, the 141 x 27 metre multipurpose offshore construction vessel will be outfitted and prepared for pipe laying/cable laying projects from carousels with VLS through moonpool or over stern as well as subsea installation works through moonpool and over shipside, ROV operations such as pipeline/route survey and crane operations. Specially designed to operate under extreme weather conditions, the Ice-Class North Sea Atlantic can reach a maximum speed of 15 knots at six metre draft and boasts high manoeuvrability thanks to its diesel electric propulsion plant and two azimuth propellers, with an output of 4.5 megawatts each. Furthermore, with a dynamic positioning system that includes a dual redundant dynamic positioning system, two acoustic pos units, a HAIN system with heading outputs, and the seapath 3000, the vessel has superior station keeping capabilities.

Equipment on board the deck include one 400 tonne/13 metre boxboom crane with 3000 m wire, one 50 tonne/15 metre AHC offshore crane, one aux crane, stb 6 tonne/15 metre four capstans, each five tonne, two cranes for provision handling, each at two tonne/16 metre and one 21 metre under deck carousel, with 2000 tonne capacity. "Throughout 2014 we will focus on getting the North Sea Atlantic delivered and up running 100 per cent for our client and to continue to deliver top quality on all our vessels. We will also have focus on increase the efficiency of operating our vessels. We will also have a focus on our strategy of growing further," says Sveinung.

Indeed, operating in an evolving industry has always had its challenges for NSS, which has used its ongoing tradition for innovation to continue turning these issues into opportunities, as Sveinung notes: "Yes, the market is always challenging, but we have had some good years where we have got contract on North Sea Giant and contract on the new build North Sea Atlantic. There will still be a need for specialised vessels in the market, but it will be more challenging to get long firm contracts with reasonable day rates. This is because the key players in the market such as Statoil are now looking at every possible opportunity to save cost; this influences everybody in the market, but we view this as a positive development because it forces us to think differently to our competitors and to improve our product."

One way the company aims to improve its fleet is through investment, with the Atlantic Guardian due for upgrades to dramatically enhance fuel efficiency and station keeping abilities. However, with Atlantic Guardian now involved in new projects in the Gulf of Mexico, these modifications have been postponed until October 2014. "The yard stay is now scheduled to be 5th October and it will take place at Westcon in Florø. Yard stay is estimated for 40 days. She will return to the Barent Sea after her stay in the yard," says Sveinung.

Well-established as a forward-thinking, technologically-savvy shipping firm, NSS has developed an impressive fleet that will ensure it continues to lead the way in delivering innovation and first-class construction services, as Sveinung concludes: "We will continue to deliver top-class quality services to our clients through adaptability to the changes in the market and innovative solutions." O&G

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Engineering expansion

Whessoe is a market leader in designing and building low temperature and cryogenic storage and handling facilities. In March 2013 the business officially became a subsidiary of the Korean based Samsung C&T, one of the 34 companies under the Samsung umbrella. Based on over 40 years experience in the hydrocarbon and petrochemical industries, Whessoe brought to the group a track-record in world-class engineering, completing the full offering of EPC services on LNG and gas technology projects, an element previously understated in the company.

"LNG storage and design is now a fully comprehensive offering from the business. In the past we brought in an external entity to cover the engineering portion and the running of the project. We now offer full LNG and cryogenics solutions to our customers," says CEO Steve Kim, adding: "Since the acquisition we have been putting large sums of investment into IT and engineering infrastructure; the fundamental tools required to build world-class engineering."

Samsung wants to invest millions of pounds to revive the fortunes of the company, which makes massive storage tanks for the oil and gas industry. In the 15 months following the initial agreement, the business has already tripled its engineering workforce. Utilising the global positioning of the Asian parent in the heart of the petrochemical and oil and gas industry, Steve points out: "We have been able to attract a number of talented engineers with a strong training background. Once aboard we have provided further training to specialise their cryogenic knowledge."

Furthermore, the company is focused on maturing talent through internship and apprenticeship programmes. As a socially responsible business, much of its promotion is completed locally, aimed to grow and develop design engineers in the local area, eventually promoting students through to graduate level. Just a few months ago, the average age of the industry workforce was relatively high and this enthusiasm to develop has proved necessary for both the business and the community.

"LNG and ethane demand is expanding worldwide, and particularly so in India as the economy continues to grow. There is a lot of infrastructure both planned and established that requires fuels such as oil and gas to fire it, and storage solutions offer a reliable solution that ensures supply. Additionally the manufacture of materials such as polyethylene and

polypropylene are reliant on the petrochemical industry. By increasing our involvement in the movement we are backing that growth but also fulfilling our own ambitions of being part of a solution to the economic growth in that area," says Steve.

The company has also expressed interests in growing within the African market, with countries such as Mozambique recently discovering oil and looking to develop a solution to export gas to the external market on an international level. Moving forward on an international platform, Steve highlights: "We are also establishing projects in Malaysia and Singapore, as well as pursuing projects in the European market where there are operating entities seeking more active involvement in the market. As a dynamic company with a strong pedigree and the reputation of Samsung we are in a good position to enter new markets."

As a well-established, vastly experienced and

> Whessoe combines proven technology, quality and safety with global capabilities to deliver comprehensive and value-engineered solutions to clients in the hydrocarbon, petrochemical and energy industries

multi-disciplined contractor, Whessoe combines proven technology, quality and safety with global capabilities to deliver comprehensive and value-engineered solutions to clients in the hydrocarbon, petrochemical and energy industries. Commenting on the direction Steve says: "Our core engineering team specialises in cryogenic tank design and terminals and as we move forward we essentially continue to develop our LNG tank design, continually looking for other ways to find better and easier way methods of construction, and achieving greater efficiency, particularly with respect to installation of insulation."

With the aim of becoming the most innovative and successful company in the cryogenic gas sector by hiring more of the best engineering talent over the next few years, the main challenge for the business is how to bring in those experienced engineers, and do so in line with the anticipated growth expected within the global market for LNG and ethane. Steve explains: "We are essentially trying to promote specialist engineering within the market place, attract both people with direct experience, and those that are involved in engineering professions of other fields, such as refinery. Although it is a different type of speciality we can offer the training and skills to adapted to the cryogenic requirements, and of course promoting this exciting career to university students.

"The main focus over the next six months is on the contracts and projects that are coming to fruition and ensuring that as a business we have the appropriate work force. As CEO, my vision is to make the company the core engineering standard to Samsung C&T, to be the first and main contact for anything related

to LNG, cryogenic services and gas technology, eliminating the requirement for any engineering works to be outsourced to subcontractors." Looking further to the future, ambitions for the business continue to move forward with targeted and aggressive growth, as he concludes: "We are expanding our product line from purely LNG tanks into the entire chain of gas production, treating, liquefaction, re-gasification and supply, expanding and developing our focus from one single entity." O&G

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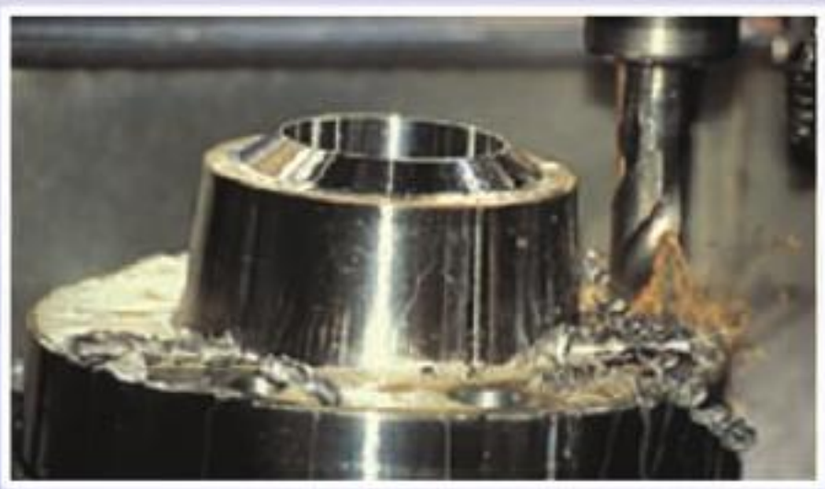

Best in class

E-BLAST

E-Blast Ltd's strategy for expansion in the UK by building on the positive relationships with existing oil and gas clients is evident in its relationship with Caledonian Petroleum Services. The 24/7 facility provides round the clock service to CPS and ensures all requirements are successfully met. The company meets key objectives of its growth strategy by substantial investment in state-of-the-art equipment and ongoing training and development of staff, allowing full support of current and future demands and fast tracking of work without compromising on quality. Substantial investment allows further expansion into a new workshop within the current site, which will increase capability.

Celebrating its 25th year in operation during 2014, Caledonian Petroleum Services (CPS) has developed a highly trusted reputation as a leading supplier of support services relating to fabrication, project management and manpower services for the offshore industry. The company has performed strongly since its inception and was acquired and became part of the Global Energy Group (GEG) during 2010. The CPS brand was retained and has continued to strengthen its fabrication service with the acquisition of A&B Welding in 2012, and its most recent acquisition of S&D Fabrication as of 2014. Today CPS is able to offer full turnkey solutions in structural fabrication, pipework, site services, offshore services, dimensional control, 3D laser scanning, and design services from three facilities in Aberdeen and a further base in Dunfermline, which specialises in vessel design and fabrication.

Integrity service

CPS differentiates itself from other companies in that it has developed a niche service that targets, support and delivers service operations for older, mature assets. As discussed in Sir Ian Wood's report under the Asset Stewardship Strategy, asset integrity is a primary objective. "The biggest challenge in the UK is in supplying a service in a mature market at a lower cost," explains CPS's Raff Celentano. "We can not keep doing the same thing over and over again and expecting different results."

Trying to apply the usual tools is not cost-effective on mature assets so this becomes the challenge, how you provide support to mature, and lower production assets? "This is where we fit in, we provide a level of support appropriate for that asset. We provide practical solutions to the mature asset market, which has been recognised by Apache. We have worked with them since 2005 and in 2012 we were awarded a contract for a further three years delivered to the company."

By focusing its efforts on meeting the needs of clients managing mature assets that require a 'lighter touch' and a more specialised approach to maintain, CPS has positioned itself as a vital part of the support network within the offshore industry. Raff likens the company's role to that of a mechanic in the automotive industry, saying: "CPS are the mechanics supporting our clients' MOT rather than designing and building the car from scratch, which the larger engineering companies perform excellently. It's about doing what you need to do to maintain integrity."

Through a combination of steady, organic growth and expertise added by its recent acquisitions, CPS is uniquely placed to provide an 'Integrity Service' to ensure that these mature assets remain productive and profitable. For example, during 2012 Global Energy Group amalgamated its specialist survey company, Global Dimensional Controls Ltd (GDC) with CPS, optimising its existing design capability by bringing outstanding dimensional control and 3D laser scanning services under the same umbrella as the company's already comprehensive service portfolio. This was an important development for CPS as it brought several services vital to maintaining mature asset integrity into the company, significantly bolstering its ability to deliver a fully turnkey service.

Dimensional control for example is predominantly used in spool replacement and routing of new piping systems, where an extremely reliable feed of data, coupled with the development of CPS' own software, provides precise lengths for piping as well as flange deviations and bolt hole rotations. For the client dimensional control delivers a host of benefits including accurate tie point information to guarantee first time fit, clash free routing of new piping and structural systems, the elimination of 'hot work, the ability to be carried out while the plant is live and the prefabrication of replacement parts greatly reducing shutdown times. Furthermore, the 3D laser scanning technology brought into CPS by GDC Z+F HD Scanners, can survey 50.5 million points, with a range of up to 80m, in less than seven minutes. Scans can be co-ordinated and stitched together to form a 360° master cloud point database

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that can be used alongside existing software to provide comparison between design and as-built, making the technology useful in both design and diagnostic roles. It can also be integrated with AutoCAD to facilitate modeling alongside the scan information.

Building the skills

At the core of the business is a strong belief in the investment in the technical skill of its staff, both for today and of tomorrow. "As we have grown we have always made a strong point of ensuring that we have the right resources," says Raff. "We have always had a very strong fabrication apprenticeship scheme and take on around six fabrication apprentices each year in what is a very robust programme. Additionally, we have a strong relationship with the Prince's Trust and became heavily involved in its 'Get into Oil and Gas' programme. We first became involved around a year and a half ago in helping disadvantaged people through the programme and a number of them are now going through our apprenticeship scheme."

In an industry first, CPS in partnership with Scottish Credit and Qualification Framework (SCQF) has also established the CPS Academy, which is notable in that it is the first and currently only organisation to have a training programme accredited by a university as a third-party partner. "We have recently looked into one of the key elements of integrity, which is survey," Raff elaborates. "With the support of SCQF we have developed a qualification for offshore oil and gas survey sector, which has been accredited by the Robert Gordon University in Aberdeen. This is the first time they have accredited a third party course and we are very proud of that."

As CPS moves forward into the future it will continue to develop the academy and its services and ensure that it has the right skill-sets to carry the business well into the future. The company's progressive attitude towards training and career development has earned it a retention rate of 92 per cent amongst its staff, and the CPS Academy is an industry defining first that is sure to influence the direction of offshore training in the future. With such a forward thinking philosophy engrained into the business, it is unsurprising to think that CPS has a very bright future indeed. OEG

> Through a combination of steady, organic growth and expertise added by its recent acquisitions, CPS is uniquely placed to provide an 'Integrity Service' to ensure that these mature assets remain productive and profitable

Caledonian Petroleum Services
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Services
Survey, design, engineering, fabrication, installation and site services

The big lift

LCS Cable Cranes, an innovative Austrian company, specialises in providing environmentally sound cable crane transport solutions to move heavy construction materials over inaccessible and difficult terrains. It began at the end of the 80s when LCS, led by founder and managing director Christoph Ludescher operated in the Austrian timber-industry, using mobile ropeways as transport system for logging in steep areas. The activities of LCS quickly became more diverse, for example, the company utilised cable cranes on Alpine construction projects such as the erection of ski lifts and power stations.

In 1996 the business for the first time utilised new cable crane technologies in pipeline construction, proving itself on the Yadana gas pipeline from Myanmar to Thailand. "We used our experience of working with several construction companies in the high mountains, and it really benefitted the contract in Myanmar. From that year on we have been working continuously all over the world," says Christoph Ludescher, managing director. Working with customers that include many pipeline construction companies, the business is active across Asia in Thailand, Indonesia, and Myanmar, South America with pipelines crossing the Andes, and also now in Canada across the Rocky Mountains and Europe. "Our services are called upon by construction companies that require special solutions as they reach difficult areas such as steep mountains, narrow rights of way (ROW) or rocky areas."

As the most challenging obstacles can be overcome with solutions provided by LCS, pipelines can be constructed in difficult areas via direct routes. The cableway system, where a crane-unit is pulled by a haul winch to move loads exceeding 20 tons, is installed straight above the determined ROW. This allows loading and unloading of pipes, equipment, machinery and construction materials at any point of the track, which can reach lengths of more than 3000m. "The solutions that we provide are completely unique. We are able to transport pipes across very demanding terrain, which is inaccessible to heavy machinery," explains Christoph. By utilising cable cranes, pipelines can be laid in steep slopes with over 70 degrees, as LCS did in India, for the East West Gas Pipeline constructed by Punj Lloyd.

With all equipment designed and built in-house, innovation plays an extremely important role. The company continuously seeks to develop new machines and systems using for example powerful electro-hydraulic engines with close consideration of the environmental requirements of the area in which it is employed. During the last 20 years, LCS has persistently worked on improvements, which in 2009 gained it the runners up innovation award of the IPLOCA sponsored by BP. LCS' cable crane systems are distinguished by their great versatility which is fully exploited for pipeline constructions. Separately controlled lifting systems of the crane unit not only allows pipes to be transported, but also to lay them in inclined positions, fit them in the greatest possible position to do the welding, sand-blasting and coating, and subsequently transport and unload sandbags and padding material easily with a special container.

"We developed a double-track curve system that is able to precisely follow the ROW and which is more efficient in varying conditions," adds Klemens Seyr, marketing and communication manager. "We have an ongoing contract in Mexico for GDI SICIM, where we have provided a cable crane to transport the pipes for the construction of a gas pipeline, as well as transport machinery and padding material over a very inclined and rocky section," informs Klemens. With challenging climatic conditions during construction and installation, the cable crane hauls the heavy loads over 750m steep (70 degrees) terrain, including a horizontal bend halfway up.

In 2001 LCS started a project in Ecuador for Techint Argentina, establishing 11 cable cranes in a row across a very narrow right of way. The construction site was 11 km long in the middle of the cloud forest in Ecuador, where the climatic conditions were not favorable. LCS'

mobile ropeways are unaffected by climatic influences, says Christoph. "Our systems permit an extension of the working period – since we are transporting pending loads in mid-air, we can perform in winter or in rainy season in the tropics. The project in Ecuador posed challenging environmental issues such as working in a protected area of the country where the noise limit was extremely low. "We are able to install pipelines within just six to eight metres right of way as opposed to 30 metres for traditional methods. Furthermore, extensive constructions of roads to access demanding terrain can be avoided. Consequently it is a very environmentally friendly way of working." Facts that in addition to the ecological characteristics contribute to saving expenses – having less road construction and lower re-instatement costs.

Thanks to the special transport solutions the safety standards of the projects are augmented. "As heavy plants do not have to enter steep areas, operators and machinery are less exposed to dangerous situations," adds Christoph. At the moment the company is in the preparation stages of a large gas pipeline project in British Colombia, Canada. Prior to this contract, in 2012 the business completed the installation of a permanent cableway, including limited manpower transportation, in British Colombia, Canada, in an area where safety and environmental standards were of especially high importance. Even if the cable cranes are quickly available and simple to handle, an accurate project management is indispensable for the analysis, planning, installation, implementations and the operation of the systems.

In 2012-2013 LCS realised a large-scale project in Myanmar, in relation to a 5km section of the Zawtika pipeline project in the approach to the border of Thailand, faced with challenging slopes of up to 50 degrees over a very narrow right of way. In addition to the installation and operation of cable cranes, the scope of works included the complete construction of the pipeline at this special point including trenching with special equipment, transport of pipes and fitting them into welding position, welding, transport of sandbags, blasting and coating, padding, backfilling and re-instatement works.

With most pipe laying activities in flat areas already complete, construction companies are often operating across more difficult terrain in search of oil and gas, in areas such as Northern Canada and Alaska, as Klemens points out: "We see a great future in our system and we are regularly receiving new enquiries from customers, especially from the US market, where working within narrow passages is deemed to be of high interest. We are able to demonstrate that our systems can assist their projects by entering significantly less space for constructions than traditional methods, and that is very interesting for the client."

Through a global presence with offices in Austria, Canada, India, Argentina and Indonesia the company is able to successfully penetrate new markets, as Klemens concludes: "We are continuously searching for new markets and contracts as several large projects come to fruition in South America, adding to the numerous enquiries for pipeline projects within Canada, and we have an ongoing focus on the growing Asian market. The ability to move pipes, construction materials and equipment to its designated point without any damage to natural habitats over normally inaccessible terrain is beneficial for both the contractor and the environment." OGE

New territories

METOOL

Present in the oil and gas market since the early 1970s KABELSCHLEPP Metool is one of the worlds leading manufacturers of drag chains (cable carriers) in the oil and gas industry.
Our customers benefit from our extensive industry, product and engineering knowhow to develop bespoke solutions for all project requirements. We manufacture and deliver fully assembled packages ready for installation, or modules for convenient handling and installation on site.
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SPEN BEARINGS

Spen Bearings is a leading independent authorised distributor of M.R.O. products for many of the worlds' leading brands. Established for nearly 50 years, its core focus in today's climate is meeting the standards required by its customers for both quality of supply and commercial awareness. A strong commitment to high quality products and excellent stockholding, along with continuous product and service improvements in conjunction with its customers, maintains its position as a key supplier to the industry.

TSC Offshore FZE was established in 2010 as part of the TSC Group Holdings Ltd, focusing solely on the Middle East market. The TSC Group is a global product and service provider, serving both onshore and offshore drilling industries worldwide. Offering a comprehensive product line that includes drilling equipment, mechanical handling equipment, solids control equipment, power control and drives, tensioning and compensation systems for semi-submersible rigs and drillships, it is also able to design, build and sell complete rig packages for jack-up rigs, semi-submersible rigs and platform modular rigs, as well as offshore deck cranes for both drilling rigs and production platforms.

Setting its sights upon the Middle East market TSC Offshore FZE is actively involved in the sales and marketing of its range of product lines, additionally providing service related offerings to clients in the UAE, Oman, Bahrain, Saudi Arabia and Kuwait. The company's client base consists of businesses such as Shelf Drilling, Sino Tharwa, Arabian Shipbuilding and Repair Yard, Lamprell, Petrofac, Saipem, McDermott's, Chinese Oilfield Services Ltd, Dry-docks World and other drilling contractors in the Middle East. The specific focus of the business in the area further complements the broad global offering of the group to markets in China, the US, Brazil, Mexico, the UK, Singapore, Hong Kong and Russia.

With a strong reputation as a designer and manufacturer of a complete range of products for the offshore industry, Sarabjeet Marwah, sales representative – Middle East explains: "We manufacture all major oilfield equipment like SCR's, VFD's, jacking systems, CTU's, pipe handling equipment, mud pumps, iron roughnecks and rotary tables. All of our products are of high quality and have an excellent track record." The turnkey products and services provided by TSC include comprehensive product lines in both onshore and offshore rig equipment, expendables and packages that encompass design, manufacture and system integration. As part of a large group, TSC Offshore FZE is able to access the broad and highly technical equipment portfolio provided by its sister companies.

The business deploys an innovative process to provide a complete offshore rig package, whether it is for a jack-up rig, semi-submersible rig, platform modular rig, or a drill ship. Through its turnkey approach, TSC Offshore FZE provides a complete cantilever and drill floor

package, which includes the main structure, drilling equipment, solids control system, power package, rig control and drive package, BOP stack and handling, and pipe handling system. With the system pre-tested at its purpose-built facility, it can then be shipped to any location

for installation and commissioning, benefitting its many customers. This innovative method of construction is further implemented in blocks for the semi-submersible rigs with the installation of drilling equipment accomplished on the ground before final integration.

Engineering is at the heart of the business with its skilled team able to customise the design of a specific platform modular rig, whether the requirement is for a large modular drilling rig package or a smaller work-over package. The modularised packages, such as drilling package, solid control package, power package and living quarters can be tailored to accommodate a customers' well drilling and work-over operations. As a transferrable unit, the complete packages can be easily lifted and re-located to another platform as required.

The development of its business interests in the Middle East has not been without challenge. There is enormous competition in the region from established vendors in operation such as NOV, Aker and other Chinese manufacturers. However, to continue to grow its market position, TSC Offshore FZE has built up a strong sales workforce, and established a good source and storage of essential products to supply to its customers. "In our warehouse we house mud pump expendables, shakers, screens and valves amongst numerous others," highlights Sarabjeet. As a manufacturer and distributer of mud pump fluid end expendables and spares it can supply for almost all popular pump models used around world, including Emsco, Garden Dever, National Oilwell, Wirth, OPI, Wilson, and IDECO.

"Very soon, we will be well placed to provide servicing jobs directly from the Middle East office. We are already regarded as having good quality products offering effective lead times on all our equipment," explains Sarabjeet. As well as operating as a trusted equipment supplier, TSC Offshore FZE provides an extensive range of engineering, maintenance and support services that present clients with greater value-added service and ensures that whatever the problem, TSC Offshore FZE has the solution. "We are a solutions provider to our client's needs," says Sarabjeet, adding: "We are dedicated to utilising leading edge technology to create high product performance, distinguishing ourselves from other companies with a reliable and flexible product line."

As an international company with over 1000 employees worldwide, the TSC Group is committed to the role it has naturally adopted as a good corporate citizen in the global communities it operates in, treating the environment and society with respect and dignity, whilst regarding the focus on the balance of social responsibility, environmental protection, safety and a sustainable economy as key factors in ensuring business continuity and success. Clearly demonstrating its beliefs in the values that it represents – tolerance, openness, reliability and co-operativeness, Sarabjeet points out: "We have also introduced efficient tools to ensure the comprehensive implementation of social, safety and environmental considerations within the organisation, involving our employees, business associates, supply chain partners as well as individual societies and cultures around the globe."

In line with the entire group's focus for the coming years, TSC Offshore FZE is confident that is has the right foundation to continue to grow well into the future, anticipating that the demand for rig solutions and equipment will continue to grow due to a sustained oil price and increasing demand. Growth of the group as a whole has been strong over the past year and the increased efficiency and productivity has generated its highest ever return on assets. The future business strategy for TSC revolves around opportunities arising from industry dynamics. Having already seen significant increase in demand over the last 24 months for offshore equipment sales Sarabjeet concludes on the future vision for the business: "We aim to expand the clientele base in the Middle Eastern region, effectively becoming one of the top vendors in the Middle East region." O&G

> The modularised packages, such as drilling package, solid control package, power package and living quarters can be tailored to accommodate a customers' well drilling and work-over operations.

Full of energy

DONG Energy was established in 2006 by the merger of six Danish energy companies: DONG, Elsam, Energi E2, Nesa, Københavns Energi and Frederiksberg Forsyning. In 1972 the Danish state founded Dansk Naturgas A/S, later becoming DONG. Initially created as a vehicle to develop Danish energy activities, the company has expanded significantly through organic growth and acquisitions both in Denmark and across Europe.

The merger brought together a wide range of experience, resources and activities that include oil and natural gas exploration and production, electricity generation at power stations and renewable energy facilities, natural gas and electricity distribution, sales and energy advice. The business has been exploring for and producing oil and natural gas since 1984 with the bulk of activities focused in the waters around Denmark, Norway, and the West Shetland area of the UK, the Faroe Islands and Greenland.

DONG Energy's gas distribution can be traced as far back as 1857, when Københavns Energi started using gas for street lighting in West and South Zealand and South Jutland, although today its range of use is more broad. When DONG started up production in the North Sea in 1984, natural gas was introduced in Denmark as a cleaner alternative to coal gas. Today, DONG Energy distributes natural gas across Denmark, South Sweden and the Netherlands. Based on its extensive knowledge, the business is able to offer customers advice on energy savings, natural gas and service agreements and safety.

With more than 50 years of experience in electricity and heat generation at central power stations in Denmark, DONG Energy has converted its generation processes and facilities from solely oil-based to more diverse sources of energy. This has been achieved through introducing some of the world's most efficient coal-fired processes, recycling residual products from these processes, international cutting-edge expertise in wind energy and developing energy resources from waste and straw. Today, most electricity and heat is generated at central coal-fired, gas-fired and biomass-fired CHP plants in Denmark and at new gas-fired power stations in Norway, the Netherlands and the UK.

Committed to moving the energy industry forward, the business faces the challenge of O&G

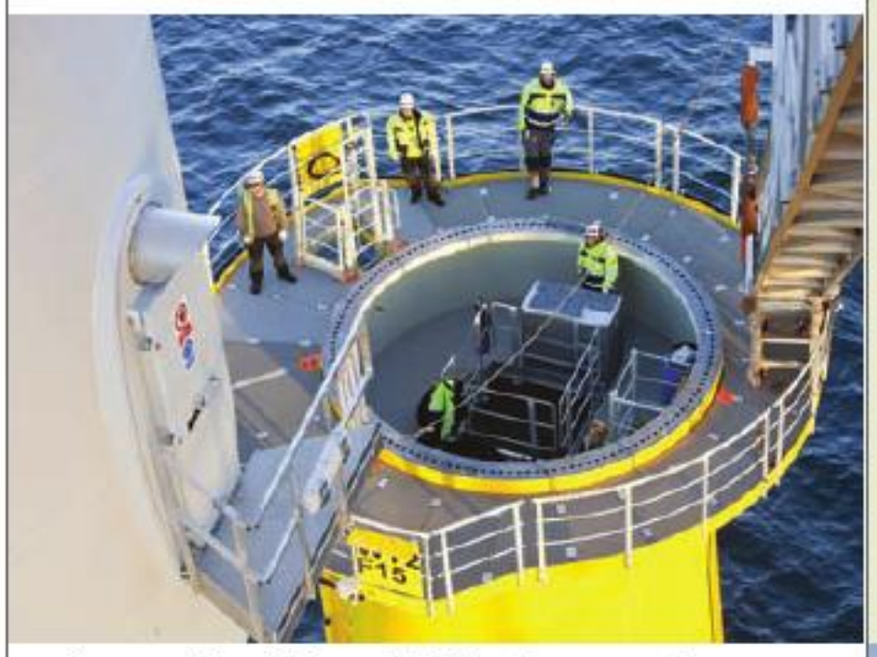
reducing CO_2 emissions from traditional energy production. At the same time, energy is a precondition for modern society, and global demand is on the increase. To target this, DONG Energy is focusing on providing more energy and converting the energy system to more renewable and sustainable production, focusing on providing the energy necessary by increasing the production of oil and natural gas from both the North Sea and other North European fields.

In order to maintain the reserves and production, the company participates in licensing rounds in the areas where it operates. In 2013, the business produced around 87,000 BOE per day, and through strategic acquisitions it has been able to gain access to additional reserves and production. Its target for 2020 is to increase production to 150,000 BOE per day. One of the largest projects to help reach this target is the Danish Hejre field, which will go into production in 2016. Due to its aggressive growth strategy, the business is increasing the number of highly specialised employees to be able to achieve future targets.

For many years to come, fossil fuels will be essential to keep the wheels turning in modern society, but eventually resources will run low. Recognised as being among the best in Europe at using biomass in electricity and heat production, the company has set itself an ambitious target of reducing the CO_2 emission per produced kWh by 60 per cent in 2020 compared to figures of 2006. DONG Energy's power stations are the cornerstone of the Danish electricity and heating supply, producing electricity when the market demands it. By combining the production of electricity and heating, the power stations increase the utilisation of the fuel. In order to utilise CO_2-neutral biomass and waste as a replacement for fossil fuels to fire these power stations, the company looks to developing new technologies, and has already developed three unique technologies that utilise biomass, waste and other residues for energy production.

With a customer base that extends across the North European energy markets the business has access to long-term energy supplies and infrastructure in Denmark and internationally the business can ensure a convenient and flexible supply of energy. Danish society, in which DONG Energy is rooted, requires a highly reliable energy supply. Essentially this demands that the business is accountable to the inhabitants of this planet, the environment, and the markets in which it operates, forming the fundamental core values of the result-oriented, responsible and responsive business.

DONG Energy has over two decades of experience of offshore wind farm development, which has ultimately positioned it as the current market leader in offshore wind power. DONG Energy's offshore wind farms are predominantly based in North West Europe, notably constructing more offshore wind farms than any other company in the world. Having achieved this strong market position it has proved its ability to operate its portfolio of wind



farms with a high availability for generating power. With more wind farms on the way, such as West of Duddon Sands and Borkum Riffgrund 1, its market dominance is set to grow. The offshore wind industry is facing the challenge of making wind power competitive with other energy resources, focusing on bringing down the cost of electricity. As such, some of the elements DONG Energy is looking to improve on include larger turbines, optimisation of operations and maintenance concepts, reduction of foundation and cable installation costs.

A focused growth strategy towards 2020 indicates that DONG Energy will change the way energy is produced, creating growth and value for both the company and the surrounding society. As it moves towards 2020 doubling the production of oil and natural gas, it will quadruple the installed capacity within offshore wind power, double the share of biomass in the electricity and heat production at Danish power stations and develop value-adding energy solutions for customers, quadrupling energy savings amongst Danish customers. Although the business cannot single-handedly ensure that the world's energy systems will go through the necessary conversion towards more renewable and sustainable energy in the years to come, it certainly is leading the way. As a company that knows where it wants to go, it operates in line with its strategy, moving energy forward. OSG

AQUATERRA ENERGY

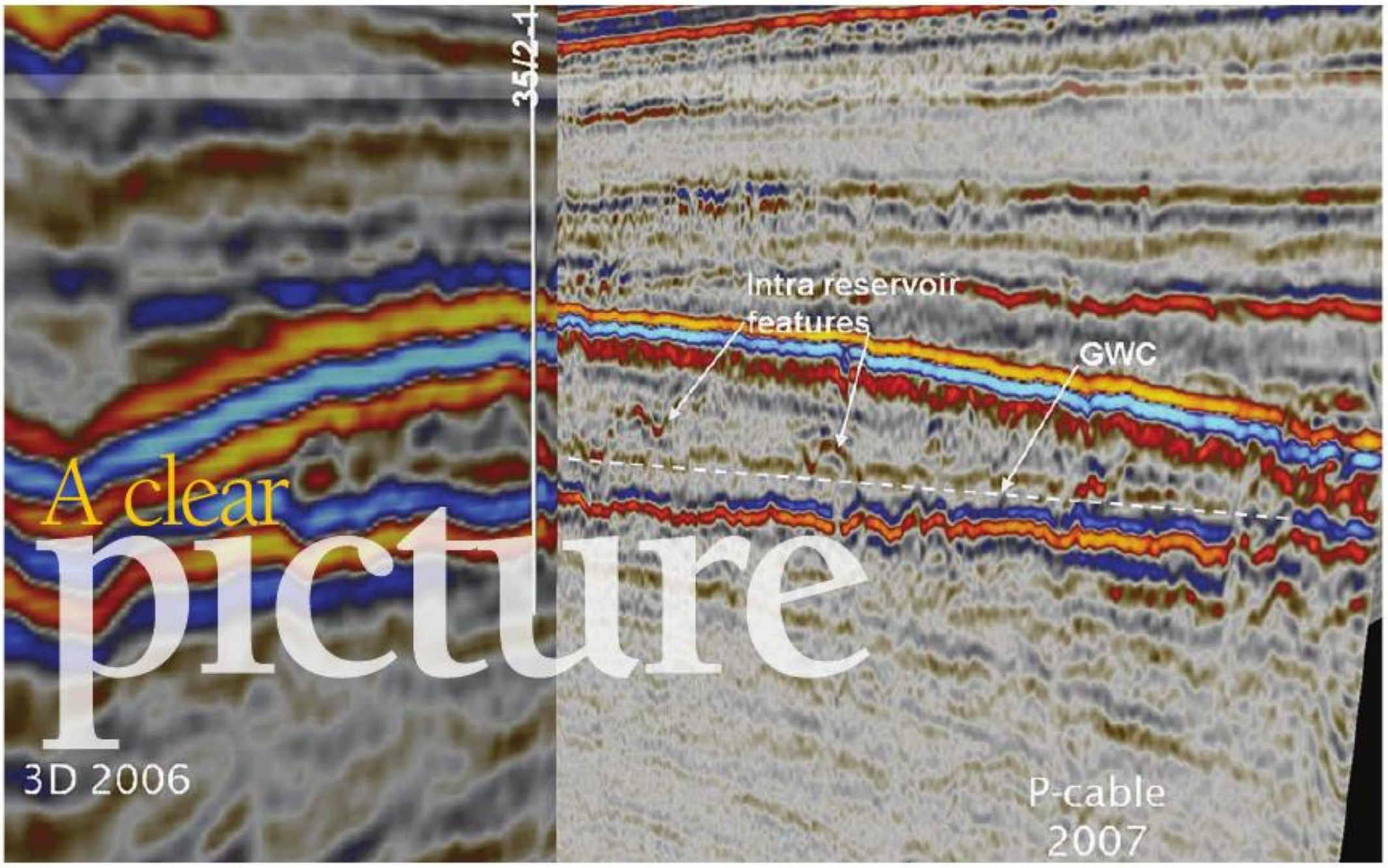
Aquaterra Energy provides complete offshore engineering solutions, from conceptual design and engineering analysis to construction, installation, service and maintenance. The company is renowned for its full-service approach in minimum facilities platforms, riser engineering and specialist riser analysis that has earned it a place in the top rankings of the world's offshore oil and gas engineering providers Aquaterra Energy has been awarded a four-year frame agreement with DONG Energy to provide Drilling Installation Support Services including centralisers, cutting and tensioning equipment and cement top-up systems. The contract was awarded based on Aquaterra Energy's reputation for delivering innovative, robust and reliable engineering solutions and its track record for maintaining long-term productive client relationships.

DNV GL

Verification provides the required assurance towards DONG Energy, stakeholders and regulatory authorities. DNV GL provides DONG Energy with the ability to focus verification effort where the contribution is cost effective by employing a risk based verification approach. DNV GL's independent and competent appraisals of DONG Energy's field developments and in-service activities provide the required assurance that they are designed, constructed, installed, and operated in accordance with project objectives and legislative requirement, i.e. at the same time providing optimum business performance of DONG Energy.

DONG Energy
dongenergy.com

Services
Energy production and distribution



A clear picture

With over 20 years of operational and management experience WGP Group is a market leading provider of unique, state-of-the-art seismic acquisition services. The company prides itself in its innovative attitude, striving in frontier locations, pushing technology and innovation to the limit to meet the most demanding requirements of the industry, with a dedicated focus on developing solutions for the future.

Founded in 1991, WGP has built its reputation around its highly regarded marine geophysical services, which are offered from inception to completion, and its dedication to working closely with clients to deliver operational proficiency to the oil and gas industry from exploration through to production, enabling its customers to greatly increase the value and output of their existing assets. To this day the business stays true to its mission statement: "Exploration and Beyond," which gives an insight into the type of service customers can expect.

As highlighted the business provides a very wide range of services, including pioneering 4D life of field and specialised seismic services, ocean bottom seismic, portable seismic source, 3D Hi-Res/P Cable, project management, lake seismic acquisition, marine 2D data acquisition, and magnetic and gravity.

The newest and most exciting technology is the versatile P-Cable™ 3D Seismic System, which benefits operations in mature as well as frontier regions, providing proven Hi-Res 3D data for exploration and field development.

Through their partners they also provide post-processing services with de-multiple removal for selected targets. The benefits of P-Cable's new technology includes the ability to produce low cost high-resolution 3D seismic data with rapid deployment and retrieval from small vessels, as well as high production rates and the ability to acquire data in shallow waters. WGP is currently acquiring a set of multi client data in the Barents sea in conjunction with TGS.

In the area of 4D life of field services WGP is providing long-term seismic acquisition for a number of key clients for permanent reservoir monitoring, or PRM. This has been a key focus of the business in more recent years, whereby the company has been working to develop and offer containerised seismic source solutions to offer true life of field seismic (LoFS) capabilities.

WGP has been working on a number of pioneering projects in this field, including with Statoil, providing PRM services for its Snorre and Grane fields in the Norwegian North Sea. This contract, which was finalised in April 2013 related to the provision of long-term seismic acquisition services for permanent monitoring of both fields, as well as the supply of a bespoke dual portable modular source system (D-PMSS). As of June 2014 the company has completed mobilisation for the first PRM survey over the Snorre field, with the first good shot point having been achieved and production underway. Furthermore, the D-PMSS has been mobilised

on the M/V Siem Sailor PSV and the first survey over the Grane Field is due to commence before 1st September 2014.

In a similar vein WGP has had an extended working relationship with BP in the North Sea, providing ongoing services at Valhall. The company was initially contracted to develop a self containerised source system to be used above the world's first at-scale permanent ocean bottom cable installation at Valhall. Since 2003 the business has carried out a total of 15 LoFS surveys, enabling BP to acquire survey data of the highest technical standards with the repeatability required to maintain and extend upon the quality of the Valhall LoFS 4D database.

For the Valhall project WGP is using its Portable Modular Source System (PMSS), which offers both adaptability as well as portability. WGP Group currently operates two PMSS', which are designed to be transportable on land and sea in order to provide rapid mobilisation worldwide and can be quickly and efficiently installed temporarily on a 'vessel of opportunity', such as a PSV or other. Through the deployment of PMSS WGP can provide a range of services, including reservoir monitoring/4D survey, wide/azimuth survey, undershoot operations, 3D VSPs, and pilot studies. Important for clients, PMSS demonstrates that data acquisition for the next generation of energy supplies can be both cost-effective and easily adaptable to the most demanding of needs.

While its solutions offer customers the latest technology and state-of-the-art seismic capabilities, WGP recognises the importance of sharing its vast knowledge and expertise in the field. Accordingly the company offers geophysical project management services, through which its team of experts works closely with clients to deliver unique solutions and turn their ideas into a safe and effective operation, as Mark Burnett, WGP CEO explains on the company's website: "Our personnel have the technical and commercial expertise to handle every phase of a project from inception through to the final handover of the working system to the client". The team has completed a broad range of successful projects, from design, procurement, installation and commissioning of survey vessel refurbishment and upgrade, and design and testing of seismic airguns to reduce high frequency noise output, through to being engaged by an oceanographic institute to develop a source handling system to reduce manual handling of airguns.

The range of WGP's expertise makes it an indispensible attribute to the marine and oil and gas industries. For more than 20 years the business has built an excellent reputation through the deployment of state-of-the-art technology that is strongly backed by vast experience and technical know-how in the industry. In line with its dedication to continuous development, and with a strong order book for the foreseeable future, there is little doubt that the business will continue to be a leading player for many years to come. OGC

WGP Group
wgp-group.com

Services
Provider of marine geophysical services

Looking ahead

Above
Nordic Energy

Below
Mokul Nordic

Founded in 1999 Nordic Maritime Pte Ltd has spent the past one and a half decades building a trusted reputation as a leading supplier of seismic and offshore services. Based in Singapore, the company today operates primarily in Southeast Asia, West Africa, the Middle East, India, Australasia and Russia with a fleet currently comprising of six vessels. This is made up of two 2D/3D seismic survey vessels (SSV) and four offshore utility vessels (OFV) that allow Nordic to deliver a broad range of offshore and survey services.

The services delivered by Nordic are divided into four main areas of expertise made up of ship management and agency; marine seismic acquisition; offshore subsea and ROV/IMR operation, conversion and yard supervision. Since the company first began it has offered the highest quality management services that it tailors to meet the individual shipping requirements of its clients. Nordic's management system addresses all areas of technical management, marine operations and HSSEQ and provides procedures, instructions and documentation of all vessel activities, which are presented in a clear, systematic and well-structured fashion. The management system provided by Nordic is easily adaptable by the ship's crew and office management, making it a vital bespoke solution for ship owners looking for targeted and highly professional handling of operational and technical matters. Furthermore the company is able to provide ship agency services comprising port clearance and pilot arrangements; off port limit services, crew change arrangements (for example immigration, visa, transport and hotel accommodation); purchasing services and others.

Within the marine and seismic acquisition side of its business Nordic Maritime offers a complete range of high quality conventional marine seismic services. All of the company's SSVs are equipped with onboard processing systems that allow its clients access to real time information regarding the potential of offshore fields. The newest addition to the Nordic survey fleet is the S.V. Nordic Bahari, which was originally built in Canada during 1983. The vessel was fully converted for 3D survey in 2006 and upgraded and acquired by Nordic in 2013.

Most recently, Nordic successfully took delivery of an IMR/ROV vessel in March 2014, which installed a 100T AHC crane and went straight on charter in the North Sea for N-Sea. Furthermore, it is now about to sign a five year charter in the Mediterranean for an oil operator, which represents a great achievement for Nordic. At the same time it has a sister vessel of Mokul Nordic under construction at Tebma Shipyard, which will be delivered Q2 2015 and will also have the same 100T AHC crane installed. Nordic has a strong belief in the medium segment IMR/ROV market and plans to increase its fleet with medium sized IMR/ROV vessels.

The company is also proud to offer its proprietary fleet of chase boats and supply vessels in support of seismic survey operations, allowing Nordic to focus on increasing its clients' profitability by operating at peak efficiency and adhering to the highest safety standards. Having worked with most of the National Oil companies in South East Asia, Nordic Maritime is able to draw on a well of experience that guarantees its clients a professional approach at every stage of an operation.

Nordic Maritime is also able to support its clients and their vessels at the yard level, where it is able to integrate its operational experiences into new building and conversion projects. This strength is derived from a long history of experience in in-house engineering and design; project management for new builds, conversions and repair; general vessel inspections and audits; preparation of repair and dry-docking specifications, and supervision

and ship yard review selection for large projects. Through a combination of these services and the application of its growing fleet, Nordic Maritime can be considered a total solution provider in the field of seismic and offshore services.

In conjunction with its expanding fleet, Nordic Maritime has continued to enjoy sustained growth and a steady flow of contracts. On December 26, 2013 Nordic Maritime, with its Registered Office P.T. Bahari Lines Indonesia, was awarded the provision of marine seismic data acquisition and processing services for the East Muriah Block offshore East Java, Indonesia by Kris Energy (East Muriah) Ltd. Work commenced on January 29 and called for the S/V Nordic Bahari to execute the acquisition of approximately 1300 line km, which was completed by the end of February 2014. Following next was a 400km sq 3D contract for Husky Energy also in Indonesia.

A key project for Nordic Maritime was the award of a $23.5 million contract to provide 3D marine seismic data acquisition and processing services off the coast of Andhra Pradesh, India on behalf of Cairn India Limited. The project started in March 2014 and involved collaboration between Nordic Maritime and the Russian firm SCF Geo and its seismic survey vessel Vyacheslav Tikhonov. In all, 1023 sq km were surveyed during the project, which also called for the acquisition of gravity and magnetic data alongside the seismic data near Nizamapatnam Bay. Commenting on the project, Nordic Maritime CEO Kjell Gauksheim said: "This award from Cairn Energy for work offshore India is naturally exciting for Nordic and our partners. We are pleased to be entrusted with it and we will perform as always to our established high standards. We believe there are more opportunities like this in the region and we are open to more contracts of the sort in the future."

With further contracts awarded throughout 2014 and a long list of clients including Total, ExxonMobil, Fugro, Saudi Aramco, Petrovietnam PTSC and many others; Nordic Maritime is set to remain a vital player in the oil and gas market within the Middle East and beyond for many years to come. O&G

> Nordic Maritime is also able to support its clients and their vessels at the yard level, where it is able to integrate its operational experiences into new building and conversion projects

Nordic Maritime
nordic.com

Services
Seismic and offshore services

Full steam ahead

Founded over 80 years ago

in the US, Clayton Industries has a worldwide reputation as a leading manufacturer of equipment for industrial process steam generation, offering fired steam generators and water to steam heat exchangers in over 18 sizes. After the Second World War a new factory was established in Belgium to supply to the developing European market. Entering a market that has a varying culture and language every few thousand kilometres encouraged the business to become a lot more flexible in both its way of thinking and working.

"From the basic provision of multi-lingual manuals to more innovative solutions and services we are able to provide to our customer requests. Over the last 20 years we have been working towards extending the network out of Benelux into a wider European coverage. With each country operating under different requirements there are numerous challenges that we have to overcome. As we try to increase our output capacity to a larger market, incorporating a greater number of customers, we do so on a step-by-step basis and although it is not a very fast process, it is a continuous process. It is important that whilst helping customers achieve their goals, we maintain a firm footing," explains Stefaan Janssens, export sales manager.

In recent months the business has witnessed a significant increase in interest for its services and products with an upturn in the quantity of enquiries following the improvement in economic activity. "One of the main drivers behind the increase in activity is that customers are looking towards energy savings, particularly as the price of energy increases. More specifically within the oil and gas market, we have seen an upturn in activity surrounding heat and power generation and the increase in demands from different African countries as well as exploration businesses within the European and Middle East countries as they look towards enhanced oil recovery (EOR)," says Stefaan. Faced with the question of how to save money, Clayton continuously looks to develop solutions that are not available on the market place. "Whilst many of our competitors are not flexible, we ensure that we fully understand our customers' requirements. Our focus is totally customer dedicated, not only in service, but also in our products," he adds.

Working with major European upstream oil companies, the business developed solutions to support the injection of high-pressured steam underground in order to increase output of the existing and old oil wells. Through the injection of steam, the crude oil is heated increasing its fluidity so that it may be pumped more easily. Clayton is able to provide this technology in both fixed installations as well as mobile installation, a solution popular with many customers, increasing the ability to move between one well and the next and eliminating the expense of the fixed installation cost.

In a contract with Petrom it supplies such mobile solutions, which will allow the customer to go from one site to another. In countries such as Kuwait, Oman and Yemen, the average quality of the oil well is less impressive than those in neighbouring Saudi Arabia. "Thanks to this technology, such countries can increase their oil

production and output capacity. We target our focus on technological developments through our R&D department in Belgium, which communicates closely with our factory," points out Stefaan.

From the earliest stages the equipment is designed in such a way that meets the customers' demands, overseeing the installation until the system is fully installed and operational. From day one, the Clayton steam boiler was very special in its design, with specific aspects of the product. Compared to alternative solutions on the market, the required footprint is 30 to 40 per cent less, and is also an explosion free design. "Our product overcomes many of the disadvantages displayed in existing technology. Over the last five to ten years we have taken recent innovate steps to address the need to provide bigger capacities, generally increasing the total solution of our products. Today we are also able to supply the auxiliary equipment that is needed around the boiler to make steam. Innovation is still ongoing and efficiency remains the key consideration. Our competitors continue to deliver new products on a daily basis so we are driven to improve our products, particularly with less energy input whilst generating the same level of steam output," says Stefaan.

The products on offer serve today's and the future needs of the market, providing the most efficient boiler as the environmental topic continues to be a driving factor. The day-to-day challenge as the business increases is ensuring its products and services continue to stand at the forefront of the industry as Stefaan concludes: "Our strategy as we move forward with a new product offering is to highlight to existing customers and markets the advantages of our products. With many new products coming onto the market with higher capacities, we are driven to demonstrate the flexibility of our products. Not only can our technologies be used on smaller projects, but they offer huge cost savings for larger projects, and as we expand both the business and product range into new markets this will become increasingly important." O&G

SPIRAX SARCO

Spirax Sarco is a leading, international business-to-business company for the management and optimisation of steam systems. Steam is a major energy carrier in the industry. With over 100 years of experience Spirax Sarco has the expertise to guide customers in achieving a safe, reliable and energy-efficient steam system, also achieving reduction of operating costs and CO2 emissions.
As world leader Spirax Sarco is the partner of choice for all boiler manufacturers such as Clayton. In addition to high quality products Spirax Sarco delivers high value adding services through steam plant audits, steam quality testing, testing and management of steam traps, project support and training.

Clayton of Belgium
clayton.be

Services
Manufacturer of auxiliary water tube steam boilers

Reputation for excellence

With a strong reputation

throughout the industry, Overseas AST LLC is one of the longest established construction companies in the UAE, with a head office in Dubai, other offices in Abu Dhabi and Sharjah, and operations in the UAE and other Gulf countries. The company, which has participated in many of the largest and most prestigious projects in the UAE distinguishes itself from its competition through a focus on customer services and a dedication to providing comprehensive, single source solutions that meet even the most demanding of requirements.

AST itself is a European business that was founded in Austria in 1898 by engineer Eduard Wilhelm Ast and has since become one of the largest contractors in Europe. Overseas AST commenced operations in Dubai in 1959, quickly becoming renowned in the region for its high levels of service and the close relationships it developed with its clients. Initially the company completed various contracting works, such as the Dubai Harbour improvement and extension work it completed in 1959, and later, the construction of the Maktoum Bridge in 1962 to 1963 – a landmark project that helped change the face of the region.

As the oil and gas industry developed in the UAE the company contributed to a number of key operations including working on underwater oil storage vessels (Khazzans) in the late 1960s, continued work on the extension and improvement of Dubai's harbour facilities, the establishment of the Dubai Water Supply Network between 1962 and 1964, and various other important constructions works.

Today the business carries out its work in a number of areas, predominantly based around civil/marine work, mechanical operations and special services. For the former Overseas AST has unrivalled experience as a marine

works contractor in the UAE, with its work encompassing ports and shipyards, jetties, pontoons and marinas, quay walls, harbours and sea defences, piling, and bridges. The company maintains and operates its own fleet of vessels, including five tugs, 15 barges, and support vessels and cranes, and throughout its history has played an important role in re-shaping and enhancing the coastline in the region.

For example, the company was a leading contractor in the construction of the yard at Abu Dhabi Ship Building, working on the installation of quay walls, piers, associated buildings and a 2000 tonne syncrolift. Similarly, the business has been involved in numerous projects on Dubai Creek throughout its history, carrying out various operations like marine piling, the fabrication of pontoons and the construction of quay walls, and the building of a private marina that involved seabed pile driving and the fabrication of various pontoons and jetties.

When it comes to working with subsea pipelines Overseas AST's Mechanical Division has considerable experience and knowledge gained from participating in major projects

throughout the Emirates. The company has been involved in numerous pipeline projects over the last 40 years, working with pipelines for the oil, gas and water sectors. In this field the business has a large stock of roller stations and floats that are deployed when installing subsea pipelines, while it uses its experience to meet the various technical demands of pipeline installation such as re-routing and expansion of existing services, hot tap welding, hot tapping and bypassing on oil, gas, jet fuel, and water pipeline systems.

Of course, Overseas AST is a business that prides itself on working closely with its clients. Accordingly, alongside its more traditional construction and contracting works the company provides a range of more specialised services such as engineering services, specialised equipment supply and fabrication operations.

When providing engineering services Overseas AST approaches a project with the aim of bringing added value to its client's operations. This can encompass any number of different offerings that can be carried out through a project's life cycle, such as project development, conceptualising, visualisation and 3D modelling of project elements, option analysis and early stage planning, temporary and permanent works design, and method assessment and selection. Through provision of these services Overseas AST can minimise risk and maximise opportunity for a client by ensuring the most suitable cost and time efficient methods are selected, and that full risk management brings a smooth and effective project start up.

For the UAE region Overseas AST provides the complete package of contracting and construction work, as well as specialised associated services. The company's reputation makes it the first choice for its clients, and it repays this by its strong emphasis on client relationships and a long tradition of quality. With industry in the UAE continuing to grow for the foreseeable future there is little doubt that Overseas AST will continue to play a key role in shaping the region for many years to come. OSG

> The company's reputation makes it the first choice for its clients, and it repays this by its strong emphasis on client relationships and a long tradition of quality

Infinite steel solutions

Established in 1981, Dylan Group is a stockist and distributor of steel piping materials for the petro-chem, oil and gas, and power generation industries providing pipe, fittings, flanges and valves across all sizes and grades. In addition to the large variety of low temp carbon steel, high yield carbon steel, stainless steel grades and duplex stainless steel in accordance with ASTM and EN standards, the business also trades in special grades such as super duplex, nickel alloys and ancillary materials such as stud bolts, gaskets and strainers.

From its head office in Holland, Dylan Group operates sales offices in Belgium, Germany, UK, Spain, Abu Dhabi and Singapore. Holding numerous MRO contracts (Maintenance, Repair and Operations), Dylan works for major oil companies, refineries and petrochemical companies that require materials to be supplied from stock at very short notice. As Peter Staat, the group's business development director, explains: "Our MRO contracts depict the need for our business to have stock close to our many customers' sites. Initially founded as a company supplying specialist materials for projects, as we grew over the years, we began to stock more standard materials, and also established in-house machining facilities."

Commenting on the current trading conditions and demand, Peter points out: "The market has recently been quite flat, following a brief upturn at the beginning of 2013. However, we are still particularly busy with day-to-day sales across Holland and Belgium where we have a decent market share, from EPC's and construction companies as well as projects with power generation contractors. We are not dependant on just one market, and this diversification has allowed us to be successful despite the difficult market."

As a specialist supplier the business has a strong knowledge of both the industries to which it supplies and the value added products that it can offer. There is a drive in the business to live up to its motto of 'infinite steel solutions', as Peter highlights: "We always try to find a solution for every request, using materials of all possible grades or origins. We always fulfil customers' requirements and our knowledge and experience across a very wide range of products is important. In comparison with many of our competitors, we have a very proactive, 24/7, nothing is impossible mentality."

By sourcing the appropriate forgings for its in-house machine shop, Dylan is able to machine fully to customers' drawings and specifications, in any grade or size common to the piping industry. Through its global presence, Dylan Group is able to achieve worldwide fulfilment, supplying from stock or directly from mills anywhere in the world. Under a contract with SBM Offshore, Dylan Group has supplied materials for several FPSO contracts, most recently on a project simultaneously providing the materials for two vessels to be leased to Petrobras in Brazil. There is an increased demand for more FPSOs in order to exploit the oil reserves quicker, which has ultimately led to the increase in supply demand for complete packages with faster and more intense delivery schedules.

Holding maintenance contracts with companies such as DOW Chemical, BP, Total, Neste, and Exxon, Peter explains: "For many years we have had continuous orders through ongoing contracts, with growth supported by

the decision of such customers to consolidate all the European MRO interests under one contract. For day-to-day business it is of course important to have stock to supply to customers within a very quick time, but for MRO it is essential to have this material available and according to the right specification, from the right origins and in the right sizes, and shapes, so there is a lot of pressure on having the correct material available."

As Peter looks towards the future, faced with an ever growing market place he speculates: "The power generation market, handled mainly by our Belgian office, working with companies such as Siemens, Alstom, NEM and the associated construction companies, has started to improve. The offshore market too is growing, but the process and refineries markets are slowing somewhat in the European market. However, although difficult to enter, the Middle East market is certainly driving forward.

"In the European petro-chem industry there is generally over-capacity, and there are little or no new-builds. However, the significant amount of maintenance requirements which we cater for keeps the business very busy." Operating across a number of geographical regions, the company has to remain flexible to ensure its efficiency. "We maintain a focus of concentration on European possibilities but further ahead we expect to grow our offices in the Middle East and the Far East, increasing our market share in those regions. To achieve this, it is important that we hire and train the right people. Beyond this we look towards Brazil, which is a booming market. Growing through our current agents in India, and our office in Singapore, we are hopeful to increase our market share in Asia and possibly Australia too," he adds.

Companies are often looking for materials that are used for standard applications but because of their specific processes they require adaptation. "We closely follow the market to ensure that we have the right material available for such projects. It is important that we solve any problem for our customers," Peter concludes.

Unstoppable force

TME Hydraulics was founded in 1995 based in Ryton, Tyne & Wear. The company's unique mix of technical expertise and resources allows it to design, manufacture, test, install and maintain its customers' hydraulic systems from the design concept through to spare parts and life time extension. Today the business is focused on providing complete hydraulic services for customers in the offshore, marine and process industries. As an engineer led enterprise it undertakes bespoke design challenges in addition to regular service provision and system assembly.

Accredited to ISO 9001, TME holds a strong market position, recognised both for its quality and its strong health and safety policy and record. As part of the MKW Group the business has access to the facilities of its parent and sister companies, which enables TME to further extend its provision to include machining, fabrication and precision engineering. The MKW Group was established in 1976 and has maintained an across-the-board engineering capability that includes design, manufacture, testing, installation and maintenance, and project management.

In May 2014 the business became the UK authorised installer for the TM 37º Flare and retaining ring piping technologies from Tube-Mac. The contract is reflective of the growth of TME's hydraulic installation capacity and brings a proven pipe coupling technology to the UK market, increasing the options for equipment builders, vessel owners and facility operators looking for secure, clean and cost effective pipe coupling systems. The benefits of non-welded technologies are significant, including the reduction in hot-work, weld procedure approvals and NDT costs. For hydraulic installations internal pipe cleanliness is of paramount importance and flushing of welded pipe to the desired ISO cleanliness level can be costly and time consuming. Using TM 37º-flared pipe with SAE flanges is a proven method of achieving clean secure connections with both time and cost benefits. Tube-Mac fittings are readily available in carbon steel and 316 stainless steel in metric and imperial sizes, and are suitable for use offshore with full material traceability.

The company recently made a large investment in a range of new equipment to support the growing hydraulic installation business. The recent purchases include a Parker EO2 Form F3 Work Station and programmable hydraulic pipe bending equipment, allowing TME to accurately form pipes up to 2" on-site. Managing director Jerome Dardillac reported in July: "In purchasing new equipment the main consideration has been the ease at which equipment can be transported to site and set-up to be operationally ready at sites around the UK. With hydraulic pipe installation work scheduled in Aberdeen, Blyth and Darlington we need to deploy multiple teams fully equipped to each site. In addition to the equipment investment the business also organised training for technicians in Parker A-Lok products as part of our technician development programme."

Specialising in 3D design and hydraulic calculations the company can manufacture modular and bespoke hydraulic power units, bespoke hydraulic test equipment, providing advanced manifold design, electrical control system design and ATEX certification. Systems can be assembled with a power range of 7.5kW to 500kW, with full testing at its facility. Utilising the skill base of its in-house design team, TME is able to successfully accommodate bespoke requirements and work with limited space envelopes. Each hydraulic system is assembled and tested within TME's premises from where it maintains strict quality standards working within the constraints of project timelines.

The company's workforce consists of

experienced and skilled engineers specialising in bespoke manifold design with the ability to consolidate multiple valve stacks into a compact leak free manifold. Manifolds are designed using 3D CAD programmes, allowing interface connections to be easily checked and aligned, ensuring rapid and effective transfer from design to manufacture. TME sees the intelligent use of manifolds as a way to progress system designs and allow for further improvements in functionality within restricted space envelopes.

Not only does the business ensure that its own workforce remains at the forefront of the industry, hiring talented individuals additionally supported by continuous training, but furthermore it provides training for its customer base, working with in situ to provide detailed technical training in industrial hydraulics, which is delivered in a convenient manner via web casts and online learning to suit the compressed timetables of hydraulic professionals. Trainers are selected from an international pool of hydraulic engineers to ensure that teaching is relevant and specific to the subject and experience level of the trainees.

TME has carried out many industry high-profile projects including the installation and upgrade of the hydraulic control console for a ROV Launch and Recovery System in Rotterdam. The upgrade was to increase the functionality of the hydraulic control console using a console unit that was manufactured at TME's Ryton workshop. This end-to-end project covered the scoping, installation, flushing and commissioning of the system and was completed safely and proficiently, on time.

Targeting expansion in Norway and subsea markets, TME attended the Underwater Technology Conference 2014 in Bergen, recognising the opportunity to reinforce contacts and discuss engineering capabilities for subsea applications. As a business with heavy involvement in the subsea sector from the design stage through to the service and refurbishment of established equipment it continues to seek new contracts to utilise its assembly capacity. O&G

> TME sees the intelligent use of manifolds as a way to progress system designs and allow for further improvements in functionality within restricted space envelopes

TME Hydraulics
tmehydraulics.co.uk

Services
Complete hydraulic services for offshore, marine and process industries

A contained solution

Founded in 1998, Conserve Oilfield Services Ltd has developed a market-leading reputation as a supplier of containers, cargo carrying units and chemical tanks as well as associated equipment and services for clients operating within the offshore oil and gas sector. The business is currently part of the SCF Partners group of companies after being purchased by the group during 2012.

As such Conserve has the backing of a parent company with a reputation for investing in companies that display high long-term growth potential and a team of executive directors with more than 60 years of experience within the oil and gas industry. The company's primary business concern is focused on the rental of offshore containers, cargo baskets and offshore chemical tanks – a market in which it excels. Conserve has had a strong presence in the North Sea working with operators based in the UK for over a decade, however the company has also supplied cargo carrying units for clients operating in as diverse regions as Alaska to Australia, and from Africa to Azerbaijan. Further to this Conserve is able to offer additional support services to clients including maintenance and re-certification of their own container or tank fleets, adding greater value added service to the Conserve portfolio.

Both Conserve's service portfolio and global reach were recently expanded by the acquisition of Rentair Offshore by the SCF Group, which saw the bringing together of highly complimentary companies underneath the SCF umbrella. Headquartered in Aberdeen, Rentair Offshore is the trading name for the registered company Rentair Ltd, a well-established specialist offshore rental company with a history dating back over two decades in offshore, and today the firm continues to deliver an extensive range of Air Compressors and associated products and support services to clients throughout the world, with facilities in Aberdeen, Great Yarmouth, the Netherlands and Singapore. Co-operation between the two brands will see Conserve containers and tanks combined with Rentair specialist products into turnkey solutions packages that, with the added value provided by each company's individual expertise, will result in an incredibly robust service for new and existing clients. The first client to benefit from the partnership will be Venko Offshore, which was recently awarded a major offshore contract for rig fabric

maintenance on the West Sole Bravo for Perenco UK Limited.

Andy Waite co president at SCF said: "SCF is excited to acquire RentAir Offshore and to have the opportunity to work with the company's talented management team and employees. We believe this will be an excellent platform for both organic and acquisition based growth opportunities. We also believe there may be excellent synergies to be realised with other companies in the SCF portfolio."

Conserve has itself been the focus of significant investment in terms of its hire fleet and general facilities in recent years, which have likewise added to the company's strength in providing a premier service to its clients. Just prior to the company's acquisition by SCF, Conserve announced that it had moved to a larger headquarters in Aberdeen during December 2011. 'Hillview House' is a large modern facility that houses the Conserve management team, operations, HSEQ, sales, IT and finance departments under one roof. Additionally the facility is located next to the Conserve 'Hillview Base,' which provides options to develop the eight-acre site over the coming years.

Responsible and efficient operation are the corner stone of the way in which Conserve does business. During 2014 the company was successfully recertified in internationally recognised OHSAS 18001 Health and Safety, ISO 14001 Environmental and ISO 9001 Quality management standards with zero non-conformances. Additionally, following a three-yearly audit the business and its employees were praised for their contribution to HSEQ achievement and performance. BSI commended Conserve for a traffic management plan implemented at its eight-acre site, which regularly transits 40 plus lorries through the facility in one day.

Presently Conserve Oilfield Services manages a sizeable fleet and is set to extend its service offering and engage with its parent and sister companies to expand into new markets. "We've recently purchased additional land next to our Aberdeen facility in order to extend our yard and storage area for additional container fleet," concludes Chris MacPhee, managing director. "Achieving high HSEQ standards is paramount to our successful growth and I'm delighted with our recent successful recertification audit, the results of which pay testament to the efforts of our entire team in implementing and practising the highest levels of safety each and every day. We continue to explore new technologies and innovations that will deliver safer operations, equipment and solutions for our growing client base." O&G

Conserve Oilfield Services Ltd
conserveplc.com

Services
Rental of offshore containers, cargo carrying units and IMO chemical tanks

EUROPEAN OIL & GAS

FROM EXPLORATION TO END USER

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