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Editor's note

BAHRAIN AND ITS state oil company BAPCO are the focus of this issue. As our interview with Yahya Al Ansari, the NOC's manager of Exploration shows (p12), BAPCO is pursing some groundbreaking exploration initiatives. Bahrain may have limited resources compared with some of its neighbours, but it more than makes up for this in its bold and innovative approach. Other strategic projects are making progress too. We also report on MEOS 2017 (p20), which received a lively flow of visitors and where the sentiment could perhaps best be described as cautiously optimistic.

With the focus on gas development and the prevalence of sour gas reserves in the region, we look at gas treating and processing in advance of SOGAT 2017, the leading show for sour hydrocarbon developments (p22), while our technology and IT sections cover areas ranging from the latest compressor developments to corrosion protection and reservoir characterisation.

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Cover image: Nikolai Zaburdaev / Shutterstock

➔ Executives' Calendar 2017

MARCH			
26-30	**SOGAT 2017**	ABU DHABI	www.sogat.org
APRIL			
4-6	**Oman Downstream**	MUSCAT	www.downstream-oman.com
4-7	**Gastech**	TOKYO	www.gastechevent.com
11-12	**Middle East Heavy Oil Congress (MEHOC)**	MANAMA	www.meheavyoil.com
21	**Oil & Gas Bash**	DUBAI	www.expatbloke.com/events
26-27	**StocExpo Middle East Africa**	DUBAI	www.stocexpomiddleeastafrica.com
MAY			
3-5	**23rd International Energy & Environment Fair**	ISTANBUL	www.icci.com.tr/en
5-8	**Offshore Technology Conference (OTC)**	HOUSTON	www.otcnet.org
6-7	**Iran Oil Conference**	TEHRAN	www.iranoilconference.com
6-9	**International Oil, Gas, Refining & Petrochems Exhibition**	TEHRAN	www.iran-oilshow.ir
9-10	**Offshore Arabia**	DUBAI	www.offshorearabia.ae
22-23	**Iraq Petroleum**	LONDON	www.cwciraqpetroleum.com
23	**EIC Connect Oil & Gas UAE 2017**	ABU DHABI	www.the-eic.com/EICConnect
31-1 June	**Caspian Oil & Gas**	BAKU	www.caspianoilgas.az
JUNE			
12-15	**EAGE Conference & Exhibition**	PARIS	www.eage.org

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

Oman downstream event to boost the growing refining and petrochemical sector

VENDORS OF PRODUCTS and services for Oman's burgeoning downstream sector will be descending on Muscat for the Oman Downstream Exhibition and Conference. Scheduled for 4-6 April at the Oman Convention and Exhibition Center, manufacturers, distributors, suppliers and service providers will be exhibiting, while the conference will offer discussions and knowledge-sharing platforms focused on the market trends, developments, projects, technology and innovations in the fields of refining and petrochemicals.

Oman has become an important Middle Eastern hub for the downstream sector with multiple projects worth billions of dollars now underway. The US$6bn Duqm Refinery and Petrochemical Complex, a major greenfield refinery, is one such example. It is expected to have a capacity of producing about 230,000 bpd from a variety of crude mixtures, with the aim being to produce middle distillates like clean diesel, jet fuel, naptha and LPG.

Salalah, meanwhile, will be home to an ambitious LPG extraction project involving propane, butane and condensate from the region's natural gas pipeline. With a planned lifespan of 25 years, production is slated to start in 2019.

The Oman Convention and Exhibition Center

The Fahud NGL Plant project, worth US$3.6bn, will produce feedstock for Liwa Plastics Industrial Complex. Located at the port in Sohar's industrial area, the liquids will be transported through a 200km pipeline and serve as a petrochmicals facility with a production capacity of 900,000 tons per year of polyethlylene and 300,000 tons per year of polypropylene.

As well as these new projects, the news that the Oman Oil Company is planning to invest US$1bn this year, a planned upgrade to a Sohar refinery to boost output by 70 per cent, and the Khazzan tight gas project to go into production by Q4 2017, it is clear that the Oman Downstream Exhibition and Conference is well-timed.

Leading speakers will be on hand for the conference, including Luc Geerts from Schneider Electric, Dr Zahid Qamar from Sultan Qaboos University, and Sayyif Mohamed bin Ali Al-Said from IBD Group and VEC.

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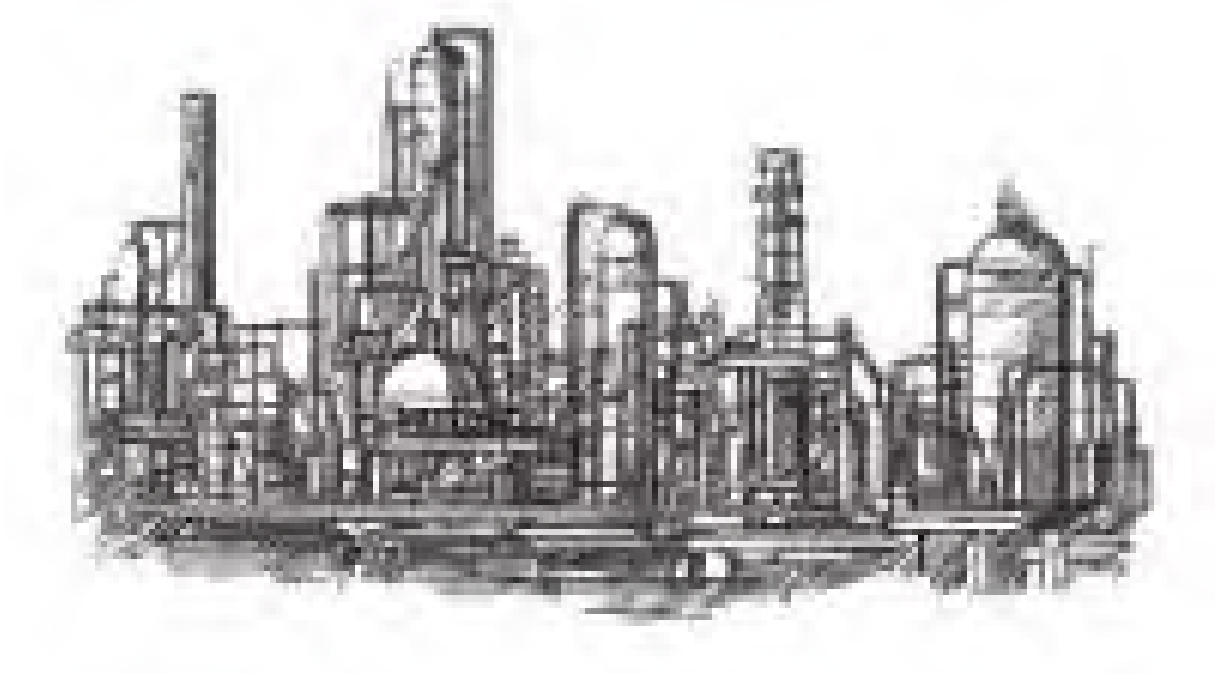

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Exhibitions to showcase Iraq's oil and gas potential

IRAQ HAS IMMENSE oil and gas reserves and production potential. Expotim & Pyramids Group and M&T Iraq initiated Iraq Oil & Gas – Basra Show (previously named Basra Oil & Gas) in 2010. The 2017 edition takes place from 5 – 7 December 2017 in Basrah, Iraq. Iraq Oil & Gas – Basra, which has been supported by Iraq's Ministry of Oil, has presented a wide variety of opportunities for international investors over its six consecutive years of operation, with previous participants including Shell, Rumaila Organization, Exxon Mobil, Eni, Honeywell, Halliburton, Schlumberger, FMC Technologies, Mitsubishi, Kuwait Energy, Scania-Volvo, Schneider Electric, Trade Bank of Iraq, Weatherford, Emerson, Aggreko, Endress & Hauser, Punj Lloyd, China Petroleum, Petrofac, Petronas, KBR, Taqa and Samsung.

Erbil Oil & Gas first launched in 2011 and returns for the sixth time in 2017 to serve Northern Iraq's oil industry, taking place from September 27-30, 2017 at the Erbil International Fair Ground. The show has likewise welcomed industrial giants such as Oilserv, Schlumberger, CAT, Scania and Hoerbiger as exhibitors and sponsors.The Kurdistan Region's autonomous state and ability to make its own decisions relevant to industrial development, along with its relatively liberal investment environment, continue to appeal to international companies.

Participating in Iraq Oil & Gas Show – Basra and Erbil Oil & Gas will allow participants to make contact with the leading local and international industry members in Iraq, learn about the latest developments in the country's oil and gas industry and engage with Iraqi officials.

Please contact info@iraqoilgas.com for further details, and see the websites at www.basraoilgas.com and www.erbiloilgas.com.

Major oil, gas and petrochemicals exhibition to take place in Tehran

THE 22ND IRAN International Oil, Gas, Refining & Petrochemicals Exhibition will be held from 6-9 May 2017 at the Tehran International Fairground, organised by the National Iranian Oil Company (NIOC).

Over 100,000 trade visitors from some 40 countries are expected to attend the show. 2,000 participating companies from 35 nations are expected to be there. Seven country group pavilions from Germany, France, China, Republic of Korea, Italy, Russia and Turkey are planned.

The presence of leading foreign companies, as well as domestic producers and industrialists, will provide a good opportunity to explore avenues for mutual cooperation.

Iran Oil Show is a show for the regional market and major players such as Shell, BP, TOTAL, and Eni will be present, as well as prominent officials from Ministry of Petroleum, NIOC, NIGC, NIPC and NIORDC.

A major conference will take place alongside the exhibition, with keynote speakers including HE Bijan Namdar Zanganeh, Minister of Petroleum; HE Dr Amir Hossein Zamaninia, Deputy Minister of Trade & International Affairs; and HE Ali Kardor, Deputy Minister of Petroleum and CEO of NIOC. With a strong focus on the upstream sector, the conference will discuss how Iranian companies and international counterparts can form dynamic partnerships to unlock opportunities, create in-country value and develop sound local content and knowledge transfer policies.

Iranian and international participants attending the conference will obtain updates on industry developments and government priorities in Iran's oil and gas industry.

For further information see www.iran-oilshow.com and www.iranoilconference.com.

Iran holds around 11 per cent of global oil and 18 per cent of global gas reserves. (Photo: takawildcats/Fotolia)

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Saudi Aramco and Shell finalise Motiva assets deal

SAUDI ARAMCO HAS finalised the execution of definitive agreements to separate and transfer the assets, liabilities and businesses of the Motiva Enterprises LLC joint venture with Royal Dutch Shell plc.

"Our longstanding investment in the United States is continuing to evolve and strengthen. We view this transaction as a positive outcome of the strong and historic business of Saudi Aramco in the US, and see next steps to support Motiva in its ongoing role as a major refiner and a top provider of refined products and derivatives in the US," said Amin H Nasser, president and CEO at Saudi Aramco.

Under terms of the agreements, the assets retained by Saudi Aramco's Saudi Refining, Inc subsidiary include the Motiva Enterprises LLC name and legal entity, which will be used in continuing its operations as a Texas-based refiner, distributor and marketer of gasoline, diesel and other petroleum products; the 600,000 bpd refinery at Port Arthur, Texas. This complex also includes a 40,000 bpd base oil manufacturing plant; a network of 24 distribution terminals with a total storage capacity of 11.1mn barrels. These facilities support product delivery to approximately 5,300 Shell-branded service stations and unbranded wholesalers, as well as product storage for third-party customers; Motiva will have the right to exclusively sell Shell-branded gasoline and diesel in Georgia, North Carolina, South Carolina, Virginia, Maryland and Washington DC, as well as the majority of Florida and the eastern half of Texas.

Amec Foster Wheeler wins Al-Zour Kuwait contract

AMEC FOSTER WHEELER has won a contract with Petrochemical Industries Company KSC (PIC), a subsidiary of the Kuwait Petroleum Company (KPC), for the integration project between its Olefins III, Aromatics II and ZOR Refinery in the State of Kuwait. The contract covers front-end engineering design (FEED) leading to project management consultancy (PMC) for the project.

The six-year contract builds on Amec Foster Wheelers' significant expertise in petrochemicals and refinery integration, alongside the impressive track record of delivering PMC services to KPC companies in Kuwait.

The new petrochemical facility will be integrated with the new Al-Zour 615,000 bpd refinery, which will be one of the largest refineries in the region.

Amec Foster Wheeler president, oil, gas & chemicals John Pearson said, "This award reflects our expertise, as well as our successful track record in large, complex FEEDs, and project management. It is directly aligned to our strategy of extending from FEED into later phase scopes in downstream and to building on our existing strength in chemicals. I'm also delighted that this adds to our existing portfolio of work we are delivering for KPC."

Saudi Aramco, McDermott sign MoU for construction of offshore platforms

SAUDI ARAMCO HAS signed an MOU with McDermott International (MDR) for the integrated engineering procurement construction and installation of offshore platforms for McDermott's growing Middle East and other regional oil and gas development markets at the King Salman International Complex for Maritime Industries and Services.

This project is expected to contribute to Saudi Aramco's plan to expand its local supply chain. (Photo: Oil and Gas Photographer/Shutterstock)

This project is part of Saudi Aramco's plan to expand its local supply chain, which will improve the company's agility while driving additional economic and human capital development, as well new employment opportunities in the Kingdom of Saudi Arabia in support of the goals of "Vision 2030."

MDR is a leading provider of integrated engineering, procurement, construction and installation (EPCI) services for offshore developments worldwide, with more than 55 years of experience in the region and in working for Saudi Aramco. The selection of MDR was the result of a rigorous evaluation process which followed extensive negotiations with several world-class players in the offshore EPCI services field.

The project aims to create a world-class provider of offshore EPCI services throughout the Middle East and regional markets. It will build on the existing relationship between Saudi Aramco and MDR to localise this part of the supply chain, which would improve efficiency while increasing local content, export of energy goods and services, and further development of the Kingdom's economy.

Oil and gas recruitment sees renewed confidence

A REVIEW OF the employment environment in the energy sector by Petroplan has revealed that global oil prices are now around the level where demand for talent looks set to pick up again, despite a major contraction in the value of the energy employment market over the past two years.

The review conducted a survey among thirty-five organisations from across the major global oil and gas hubs, which aimed to gain insight from the industry's employers on the prospects for recovery, and how this would impact on hiring.

The review predicts that contract staff are likely to be in the vanguard of any recovery, with over two-thirds of respondents expecting greater use of contractors, bringing with them the flexibility and cost control which are critical in the current business environment. However, the use of Western expat contractors – long seen as a mainstay of the oil and gas industry – looks set to decline as lower-cost local talent upskills and nationalisation targets take effect.

Activity is expected to pick up on onshore rigs first (in the US, then Middle East, Asia and Africa), followed by shallow water projects. According to the review, experienced technical talent, as well as those with a combination of technical and financial skills, will be most in demand in any recovery. Mechanical and chemical engineers, project managers and IT experts were among the shortage roles cited.

If anything, the oil price downturn since mid-2014 has increased the demographic challenge the industry faces, with experienced middle managers laid off and put off entering the industry. While two thirds of respondents recognise the challenge as a major obstacle to growth, there was a feeling that multi-skilling and up-skilling the existing workforce will help to address it.

"After a very challenging couple of years, our review reflects a cautious optimism for the future among energy employers. This is feeding through into hiring strategies that are focussed to a greater degree on cost efficiency and flexibility – but not at the expense of quality. Something that came across very strongly from the review is that, whilst employers want to fill roles quickly, they also want to find the right candidate in terms of technical and business culture fit. Reconciling these two is where specialist recruiters such as Petroplan play a key role, even more so with the reduction of internal recruitment teams in many organisations," Petroplan CEO Rory Ferguson said.

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IEA predicts global oil supply could lag demand after 2020

THE LATEST FIVE-YEAR oil market forecast from the International Energy Agency Global predicts that oil supply could struggle to keep pace with demand after 2020, risking a sharp increase in prices, unless new projects are approved soon.

The global picture appears comfortable for the next three years but supply growth slows considerably after that, according to Oil 2017, the IEA's market analysis and forecast report previously known as the Medium-Term Oil Market Report. The demand and supply trends point to a tight global oil market, with spare production capacity in 2022 falling to a 14-year low.

The report predicts that while oil supply is growing in the United States, Canada, Brazil and elsewhere, this growth could stall by 2020 if the record two-year investment slump of 2015 and 2016 is not reversed. While investments in the US shale play are picking up strongly, early indications of global spending for 2017 are not encouraging.

Oil demand will rise in the next five years, passing the symbolic 100 mb/d threshold in 2019 and reaching about 104 mb/d by 2022.

Developing countries account for all of the growth and Asia dominates, with about seven out of every 10 extra barrels consumed globally. India's oil demand growth will outpace China by then. While electric vehicles are an important factor for oil demand, the IEA estimates they will displace only limited amounts of transportation fuel by 2022. "We are witnessing the start of a second wave of US supply growth, and its size will depend on where prices go," said IEA executive director Dr Fatih Birol. "But this is no time for complacency. We don't see a peak in oil demand any time soon. And unless investments globally rebound sharply, a new period of price volatility looms on the horizon."

The largest contribution to new supplies will come from the United States. The IEA expects US light tight oil (LTO) production to make a strong comeback and grow by 1.4 mb/d by 2022 if prices remain around USD 60/bbl. Expectations for US LTO are higher than last year's forecast thanks to impressive productivity gains.

The United States responds more rapidly to price signals than other producers. If prices climb to USD 80/bbl, US LTO production could grow by 3 mb/d in five years. Alternatively, if prices are at USD 50/bbl, it could decline from the early 2020s.

Within OPEC, the bulk of new supplies will come from major low-cost Middle Eastern producers, namely Iraq, Iran, and the United Arab Emirates. Others like Nigeria, Algeria and Venezuela will decline. For its part, production from Russia is forecast to remain stable over the next five years.

The report also highlights changes in international oil-trade flows and investments in storage infrastructure. Asia will need to look beyond the Middle East to meet its growing import requirements. With OPEC countries focused on boosting domestic refining capacity to meet local demand and ramp-up exports of refined products, additional crude oil exports from Brazil and Canada will be higher than those from the Middle East.

The International Energy Agency is a global energy authority founded in 1974 to help its member countries co-ordinate a collective response to major oil supply disruptions and expand energy cooperation and dialogue around the world.

Lukoil plans Middle East expansion

RUSSIAN OIL GIANT Lukoil is seeking new projects in the UAE, Iran, Oman and Kuwait as it plans to expand its operations in the Middle East, the company's vice president in the region Gati Al Jebouri said.

The company is currently involved in two projects in Iraq including West Qurna-2 oilfield where the daily oil production is 400,000 barrels and in the exploration of Block 10 in Southern Iraq. Apart from this, the company has projects in Egypt where the daily production in Lukoil's share is about 6,000 bpd.

"Our desire and wish is to grow the business significantly in the Middle East, part of that growth comes from Iraq because we recently announced a successful discovery on the Block 10 and we will be carrying out further appraisal wells during 2017. We are investing in further drilling and in the future will be developing the field which will bring significant production," Jebouri said.

"In other parts of the Middle East, we are in active discussion with National Iranian Oil Company (NIOC) to develop two oilfields, Ab-Teymur and Mansuri, in Western Iran. We have proposed detailed plans of how we would develop those fields and are expecting to be awarded a contract. We are also looking at opportunities in Kuwait, Oman and the UAE."

Iran, which has been seeking to increase its oil output and attract foreign investment since the lifting of international sanctions last year, named 29 companies including Lukoil that will be allowed to bid for oil and gas projects using the IPC model.

Al-Jebouri also expressed optimism about signing the agreement with Iran once the terms of the contract are finalised. "The final version of Iran Petroleum Contract (IPC) is yet to be approved. Once that it is done, we believe that the contract signing will commence which is expected to be in second half of this year or early 2018. We are very much hoping to reach an agreement that would enable us to sign contracts."

He also added that in Abu Dhabi, the current licence extension on the onshore projects shows a clear wish by the authorities to invite a variety of international oil companies and that the company looks forward to being able to participate in offshore license extension that will happen in 2018.

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Small nation, **big ambition**

Oil Review hears from Yahya Al Ansari, manager of Exploration at BAPCO, about the NOC's groundbreaking exploration initiatives.

BAHRAIN'S OIL AND gas industry may be modest in comparison to many of its neighbours. But what it lacks in resources, it more than makes up for in the bold and innovative approach of its national oil company, BAPCO. Indeed, BAPCO's plans for the exploitation of unconventional oil deposits offshore could make it something of a pioneer for the whole region.

"BAPCO is going to be the first to target unconventional oil offshore, and I am proud that BAPCO and NOGA (National Oil & Gas Authority) have the courage to take such a step," says Al Ansari. "We are confident that we'll be successful in terms of discovery, and we have done everything possible to bring the project to the operational level – we've done all the studies and analysis utilising the acquired data. And as of today we have platforms in the location. The project includes drilling and fracking – which is uncommon offshore – so it's a big challenge. It's a very exciting new project for us so we are looking forward to seeing it up and running and to getting the results."

> "BAPCO is going to be the first to target unconventional oil offshore."

Other ongoing projects include an onshore drilling campaign for exploration targeting the flanks of the mature Awali (Bahrain) field, going as far as some of the islands around Bahrain island. The Awali field, the Kingdom's major producing field, reached peak production of 79,000 bpd in 1970, declining to around 32,000 bpd by 2009, although BAPCO has been taking active steps in recent years to add to the reserves.

"Another big project is the Pre-Khuff gas project," says Al Ansari. "A lot of work was done on this some time ago, and more recently a deep well was drilled by OXY under an Exploration and Production Sharing Agreement (EPSA)to target the Pre-Khuff potential. We have seen great potential for gas in that section, so we are proceeding with more work to appraise what we have seen from the deep well. The interesting part of the project is that we have different zones in that section, some of which are ready for development, and others have high potential that need appraisal work – we know there is gas there, we just need to appraise that resource. In addition, there's a huge section still there waiting to be explored.

"We are currently evaluating the options for undertaking this project, whether under EPSA agreements with IOCs, or under service agreements with service companies, or by ourselves."

BAPCO's exploration strategy, Al Ansari explains, has a two-fold approach. "We look at the technical risk versus reward, and where it is a challenging project, we look to invite another party to share the risk with us, as for example under EPSA agreements, which we have used recently with Occidental and companies like Petronas and Chevron in the past, where the IOCs share the cost and the risk with us. This is one part of the strategy. The other part of the strategy is to undertake projects in-house, wherever BAPCO as the national oil company can take the risk. In between, we work on adding value on all the prospective areas, which helps us with both arms of the strategy, whether promoting for IOCs or for development in-house. This in general is our approach in exploration. There are various other types of risk sharing or investment sharing, such as development and production sharing agreements (DPSAs), which we also used recently with Occidental. Here we are not sharing risk, because it is a well known field, but we are looking for technology transfer and experience

Yahya Al Ansari, manager of Exploration at BAPCO

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Yahya Al Ansari, manager of Exploration at BAPCO (centre), with Jean Wessels, Airborne Surveys project manager, CGG, left, and Lachlan Enright, survey pilot, right. (Photo courtesy of BAPCO)

exchange, as well as investment sharing.

"The objective is the same for all these approaches – to increase Bahrain's hydrocarbon reserves, whether oil or gas, on the one hand, and to enhance and develop whatever we have in terms of production."

BAPCO is also inviting international participation in an 'innovative' Joint Study Agreement focusing on four offshore areas covering all of the country's offshore acreage as well as a Technical Evaluation Agreement focusing on the onshore Pre-Khuff section, in the highly prospective Widman-North Arabian Gulf Sedimentary Basin; one of these includes the area considered the 'unconventional sweetspot' of offshore Bahrain.

> "It's part of our tradition in BAPCO that we are open to new technologies and new ideas."

After successful completion of the study, participants will be invited to negotiate exploration agreements for one or more of the contract areas offshore Bahrain – an under-explored area with just 19 offshore wells drilled between 1960 and the present day.

Supporting projects

BAPCO is adopting an equally innovative approach in its initiatives to support exploration projects, which focuses on data acquisition or data reprocessing and re-evaluation.

"We have just finished the acquisition part of an airborne gravity and magnetics survey, using state-of-the-art technology, namely Falcon Plus – the first time it has been used in the industry," says Al Ansari.

"The aeroplane has covered around 95 per cent of the onshore and offshore areas belonging to the Kingdom of Bahrain. Right now we are working on processing and interpreting the acquired data which is at an advanced stage, so soon we should receive the final results and interpretations. I can't highlight enough the added value of such data in evaluating prospectivity onshore and offshore." All the parties involved in the big projects, as well as participants in joint study agreements, will highly benefit from the results of the airborne surveys, he comments.

Al Ansari adds that BAPCO will soon be initiating a huge seismic reprocessing project with Largeo, to enhance data quality and imaging especially for the deeper sections, which will also contribute much to the understanding of the prospectivity of the area.

"It's part of our tradition in BAPCO exploration that we are open to new technologies and new ideas; that's why we picked the latest in airborne acquisition, the latest in seismic reprocessing and seismic acquisition, and the best and newest techniques when it comes to geochemical and geomechanical analysis."

In the current environment cost efficiency is key, with innovation and technology playing a part in this, he adds.

BAPCO faces similar recruitment and retention challenges to other operators globally, such as the shortage of students entering the oil and gas industry, especially in geoscience and petroleum engineering disciplines, and the gap between the numbers of those retiring and those entering the industry, with the resultant loss of expertise. BAPCO has adopted a number of measures to address these challenges, such as promoting within schools the disciplines needed in the industry; adopting a hand-on approach to training, which enables new hires to get up to speed very quickly; and establishing effective systems to monitor and guide newcomers through their development, with an emphasis on one-to-one coaching and mentoring.

"The exploration team in BAPCO is young, energetic and full of ideas and plans," says Al-Ansari. "They are the driving force behind executing all these big projects." ■

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Opening up possibilities for explor tion

CGG has completed the acquisition and processing of the first ever airborne gravity gradiometry (AGG) survey of the Kingdom of Bahrain, as Rao Yalamanchili, CGG, reports.

CONDUCTED ON BEHALF of the Bahrain Petroleum Company (BAPCO), this was the first commercial survey to be acquired worldwide using Falcon® Plus, the newest release in CGG's highly successful suite of Falcon AGG systems and the lowest-noise AGG system available today.

A data set of around 18,000 km of high-resolution, low-noise airborne gravity gradiometer and magnetic data is now available over approximately 7,700 sq km of open exploration acreage across the Kingdom's offshore licensing blocks. The data set and integrated interpretation products will help BAPCO and future license holders better evaluate their hydrocarbon potential and identify priority areas for exploration in advance of future licensing rounds.

CGG is working with BAPCO to deliver a comprehensive integrated study that will combine the AGG data with existing seismic, well and other geological information to help improve the seismic imaging and interpretation of existing seismic vintages over the area and also improve prospectivity.

The study will also help to develop improved velocity models for the mitigation of near-surface effects. This will enhance industry understanding of the region's challenging Pre-Khuff section, as well as help image salt thickness and the edges of salt flanks to identify potential prospects and leads created by salt bodies.

Yahya Al Ansari, BAPCO's exploration manager, said, "The Kingdom of Bahrain will benefit from the additional, geological insight brought by the higher sensitivity of the CGG Falcon Plus data and its subsequent integration with our existing information. The integrated study is expected to provide a valuable platform for BAPCO and our future partners to target and develop new petroleum resources in the Kingdom."

Pascal Rouiller, CGG's COO said, "CGG has a long history of conducting successful geophysical survey projects in the Middle East, and notably Bahrain, where we are delighted to have another opportunity to work with BAPCO. Falcon Plus builds on the success of our Falcon AGG system to deliver uncompromised gravity data to the petroleum exploration industry. Its deployment in this prolific petroleum province will give BAPCO, and future license operators, access to the highest-quality data to inform their geological decisions."

The interpretation is being performed by CGG's recently strengthened Multi-Physics Imaging group, combining CGG's expertise in depth modeling and interpretation of potential fields and electromagnetics data. This diverse and global team works on marine, land and airborne non-seismic data, using dedicated software and algorithms developed and continuously updated in-house.

The interpretation includes 2D and 3D depth modelling using the AGG and magnetic data, seismic data, seismic interpretation, well data and geological information. The resulting structural interpretation should yield both basement and intra-sedimentary structures, integrating and validating features interpreted on the existing seismic data. Depressions and sub-basins that may be present are being targeted. Faulting could be related to vertical basement shifts and lithological changes and can be imaged by 2D and 3D modelling.

The extent of the BAPCO Falcon Plus survey area. (Map courtesy of BAPCO)

CGG Multi-Physics' experience of acquiring airborne surveys to map the near-surface, combined with advanced 3D depth inversion modelling tools, led to the development of geologically reliable 3D workflows to derive the updated velocity field from density and resistivity. The densely acquired AGG data are expected to help reduce seismic statics issues by improving the characterisation of the near-surface earth model. ■

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Bahrain mega projects come into focus

Despite some uncertainty over timelines, Bahrain is making headway on a number of strategic projects that will redefine the nation's oil and gas sector, says Martin Clark.

WITH THE US$5BN plan to expand the Sitra refinery making progress, and the new oil pipeline with Saudi Arabia shaping up, Bahrain is attracting a lot of interest from big industry players chasing big contracts.

Indeed, Bahrain hosting the annual meeting of the World Petroleum Council at the end of last year was perhaps indicative of the country's slow rise to prominence. Bahrain's nogaholding, an investment vehicle which holds the government's oil and gas assets, expects to invest more than US$7bn across several separate ventures over the next few years, including the oil pipeline and refinery upgrade.

Refinery upgrade

At the end of last year, state oil company Bahrain Petroleum Company (BAPCO) received bids for its giant refinery project from a collection of the world's best-known engineering firms, highlighting the scale and significance of the job.

Bahrain wants to boost the processing capacity at its oil refinery to 360,000 barrels per day (bpd) from 267,000 bpd at present.

The bulk of the additional crude required to feed the capacity increase will come from the new pipeline link to Saudi Arabia's vast oil fields.

The next step forward for the refinery is the award of the contract to lead the project, although bidding has overrun original timelines due to the complexity of the scheme, among other factors.

Four major consortia are competing for the work, according to reports. They include Japan's JGC Corp with South Korea's GS; Technip, Tecnicas Reunidas and Samsung Engineering; Fluor, Hyundai Engineering and Construction with Daewoo Engineering and Construction; and CB&I, Petrofac with Japan's Mitsui and Co.

> "The next step forward for the refinery is the award of the contract to lead the project."

A contract was expected to be awarded early this year, although officials have plenty of variables to ponder before finally signing on the dotted line. Above all, these include a subdued international oil price which has already dented enthusiasm for many big ticket energy projects around the world

What is certain is that such vastly complicated projects take time to mature, even with the greatest will to proceed.

Bahrain's Oil Minister HE Shaikh Mohammed bin Khalifa Al Khalifa said in March that the final execution phase of the refinery upgrade – and the start of actual construction work – is expected to commence next year with the commissioning likely to follow in 2021.

Bahrain is looking to boost processing capacity at its oil refinery. (Photo: BAPCO)

With the front-end engineering and design (FEED) work complete, and now with bids on the table, officials are nearing decision time, although it seems certain that this is something that will not be rushed, given the significance – and cost – of the venture.

Officials hope that the BAPCO Modernisation Programme (or BMP as the project is known), will ensure the refinery remains competitive under a wide range of product prices and market scenarios over the long term.

A-B Pipeline

It is a similar story for the new 350,000 bpd oil import pipeline link – the so-called A-B Pipeline – although this project is more advanced, with construction underway on the Saudi side. Eventually the new pipeline's capacity could be increased to 400,000 bpd. The two sides have previously suggested the link could become operational by the end of 2018, although this would now be three years ahead of the proposed refinery start-up schedule. The new pipeline has been long talked about, however, with officials originally estimating completion during 2016.

Its importance is not disputed, however. Bahrain currently relies on output from the Abu Safa oil field that it shares with Saudi Arabia for the vast majority of its oil.

The new pipeline will replace the ageing 230,000 bpd link and enable BAPCO to expand its processing capabilities at the Sitra refinery. Under the plans, Arabian Light crude oil will flow from Saudi Aramco's Abqaiq plant via the 115 km pipeline, which will include both onshore and offshore portions running under the Gulf.

Agreements to build the pipeline on the Saudi side were signed two years ago with the kingdom's Al Robaya Holding Company and National Petroleum Construction Company of the UAE. ■

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Transforming the oil and gas industry

More than 8,000 oil and gas professionals came together at MEOS 2017, the twentieth edition of the leading oil and gas technical conference and exhibition, which took place at the Bahrain International Exhibition and Convention Centre from 6-9 March with the theme of 'Transforming the industry through innovation and operational excellence'.

THE CONFERENCE OPENING ceremony on 6 March highlighted the growth in stature of MEOS over the forty years since its inception, and its role as a respected platform for the sharing of knowledge and technical expertise. Addressed by HE Shaikh Mohammed bin Khalifa Al Khalifa, Bahrain's Minister of Oil, Nabeel I AlAfaleg, MEOS 2017 co-chairman and chief petroleum engineer, Saudi Aramco, Dacry Spady, 2018 SPE president and Amin H Nasser, president and CEO of Saudi Aramco, the opening ceremony and ministerial dialogue set the stage for the conference, organised as in previous years by the Society of Petroleum Engineers (SPE).

The need to embrace the digital transformation, collaboration and standardisation, environmental considerations and attracting new entrants to the workforce were just some of the issues and challenges raised. Amin H Nasser pointed out that despite the growth in renewables and alternative energy sources, oil and gas will play an important role in the energy mix for the foreseeable future, with major investment and capital needed today to meet future growth in demand.

MEOS 2017 attracted a record number of visitors, according to the organisers.

> "A strong theme was the push for localisation."

The exhibition was opened on 7 March by Deputy Premier HH Sheikh Ali bin Khalifa Al Khalifa, who noted the critical role of the oil sector in driving economic growth and the importance attached by Bahrain's government to employing cutting edge technology to generate maximum returns.

Featuring exhibitors ranging from Saudi Aramco and other regional NOCs to international service companies and niche technology providers, the exhibition received record levels of visitors over the three days, according to the organisers, with many exhibiting companies expressing satisfaction with the levels of attendance and the quality of contacts made.

MEOS has always provided a forum to launch and showcase the latest groundbreaking technologies, and this year was no exception. Innovations on display ranged from GE's predictive corrosion management system (PCM), showcased at MEOS for the first time outside the USA, to Saudi Aramco's augmented reality wellhead, used at its Upstream Professional Development Center to help students understand the mechanics of wellheads.

A strong theme was the push for localisation, as exemplified in Saudi Aramco's IKTVA initiative, and this is clearly now being taken on board by companies looking to develop their business with the market. Baker Hughes for example proudly exhibited its manufactured in Saudi Arabia drill bits which are designed, engineered and manufactured in the Kingdom from tungsten carbide powder and exported to 37 countries; 50 per cent of the engineering and sales workforce are Saudi.

The mood could perhaps best be described as cautiously optimistic; while some commented that the market was still depressed, many expressed cautious optimism that the industry had turned a corner following the prolonged downturn, and were expecting business to pick up this year. Certainly the Middle East, and Saudi Arabia in particular, is seen to provide good opportunities compared with other parts of the world.

As one exhibitor commented, "The future for us is the Middle East." ■

Technology and innovation key to exploitation of heavy oil

Technology and innovation will play an instrumental role in securing heavy oil's valuable position in the global energy mix, according to the region's industry experts.

Speaking ahead of the upcoming Middle East Heavy Oil Congress (MEHOC), the largest gathering of heavy oil professionals in the region, Dr Peter Bartlett, chief executive of the Bahrain Petroleum Company (Bapco), said overcoming the challenges associated with leveraging this complex – but invaluable – energy resource will depend on the industry's ability to develop commercially viable recovery solutions.

"Fossil fuels will continue to account for the majority of the world's primary energy needs for the next few decades, and heavy oil will feature in that mix. In order to compete, though, heavy oil producers will have to overcome cost challenges versus commercially competitive alternatives. They will innovate in order to do so. At Bapco, we consider heavy oil in the mix of feedstocks we purchase for our refinery," Dr Bartlett said.

"Our participation in the Middle East Heavy Oil Congress is part of our strategy in monitoring important developments in the heavy oil marketplace. The event offers key industry stakeholders a platform to network, explore the latest technologies, and share knowledge and best practice across the value chain, enabling us to ensure that heavy oil continues to be a valuable contributor to the evolving global energy mix."

Dr Peter Bartlett, chief executive of Bapco

According to a recent study by international management consultancy Arthur D. Little, heavy oil accounts for 21 per cent of the world's crude oil reserves. Nearly 30 per cent of this is in the Middle East, at 971bn bbl of heavy crude oil.

Despite the global abundance of this valuable resource, its commercial viability and sustainable production continues to be a challenge for the world's producers, especially amid a challenging economic landscape. Because of its highly viscous composition, heavy oil requires a different – and often more technologically advanced – refining process than that which is used for conventional oil.

Hosted under the patronage of His Excellency Shaikh Mohammed bin Khalifa Al Khalifa, Minister of Oil for the Kingdom of Bahrain, supported by the National Oil and Gas Authority (NOGA), and organised by the Global Energy division of dmg events, MEHOC 2017, to take place from 11-12 April at the Gulf Hotel Manama, will offer two days of unparalleled networking and knowledge exchange opportunities for heavy oil professionals from across the globe through a dedicated conference and an international exhibition, where industry leaders, including national oil companies, international oil companies and service providers will showcase the latest technologies and developments in heavy oil recovery and production.

Key participating companies this year include BAPCO, the Kuwait Oil Company, Lukoil Engineering, Occidental Petroleum Oman, Schlumberger, Tatweer Petroleum, and Total S.A.

Leading in gas treating solutions

In advance of SOGAT 2017, Adriano Gentilucci, commercial director – IMEA for Dow Oil, Gas & Mining, discusses how Dow is contributing to tackling the region's gas treating challenges.

What is Dow's history and pedigree in gas treating solutions?

For more than 65 years, Dow has led the way in gas treating. Today we offer one of the broadest and most in-depth portfolios of gas treatment products, services and technologies for natural gas applications in the world. Our UCARSOL™ solvents, specialty amines and specialised technologies – together with unsurpassed industry expertise – bring you the most advanced solutions available for gas treatment.

Dow's core expertise in gas treating also lies in providing engineering consultancy services and simulation capabilities to engineering companies and oil and gas operators backed by over 1,000 references worldwide, dealing with a wide ranges of gas compositions and process conditions.

What is Dow's gas treating "footprint" in the Middle East?

The Middle East has some of the world's most sour gas reserves. Gas treating here is primarily about removing sulfur, and Dow is an expert in this area. Dow has more than 50 gas treating references in the Middle East, including plants in Kuwait, Qatar, Oman, Saudi Arabia, and the UAE. Our Middle East references include the use of Dow UCARSOL™ and SELEXOL™ solvents in five world-scale LNG plants in Ras Laffan, Qatar.

It is estimated that Dow solvents are used to treat the majority of the region's liquid natural gas. Dow solvents are also used for the removal of H_2S and CO_2 in the Acid Gas Removal Unit (AGRU) and selective separation of CO_2 and H_2S in the Acid Gas Enrichment Unit (AGEU). Dow has a regional headquarters in Dubai and has significantly increased its investment in customer-facing local technical engineers throughout the region.

> "Recent advances in technology have rendered highly sulfurous fields both safe and economically feasible for development."

How has gas processing in the region evolved?

Abu Dhabi is actively investing in developing new gas fields, due to come on-stream in the next few years. These fields contain some of the most sour (high sulfur content) gas in the world, meaning significant levels of H_2S – a contaminant that must be removed from the gas before it goes to market. Dow is an expert in this area and we continue to work with leading engineering companies to design best-in-class facilities to treat this gas.

Incidentally, as a result of the high sulfur content recovered from the region's natural gas, Abu Dhabi is fast becoming one of the world's biggest markets for sulfur, especially as production from the Al Hosn sour gas project ramps up. This is significant given the high demand for sulfur as a raw material for the production of phosphate fertilizers for agricultural use.

Adriano Gentilucci, commercial director - IMEA for Dow Oil, Gas & Mining

We therefore anticipate continued increases in the sulfur content of the natural gas coming out of the ground in the region, as well as tightening environmental regulations. This adds to the complexity of gas processing, and the demand for more customised solutions to better treat sour gas. However, the recent advances in technology have rendered highly sulfurous fields both safe and economically feasible for development.

What are the biggest challenges in sour gas treatment in the region?

We are seeing a significant increase in the concentration of sulfur in natural gas and refinery gas, along with an increase in efforts to improve air quality through reductions in sulfur dioxide emissions. More sulfur in feed gas is driving a need to upgrade existing plants and

design new plants to accommodate greater levels of H_2S removal while optimising throughput and cost efficiency. Moreover, we're also seeing interest in generating more concentrated sulfur streams from acid gas enrichment units. Collectively, these factors are increasing the potential complexity and cost of sulfur removal.

One of the other main challenges facing sour gas processors in the Middle East today is that of efficient amine management. Amines, a chemical compound used to treat sour gas by removing harmful hydrogen sulphide (H_2S) from the useable gas, works best in cool conditions, which means the added costs of thin fan coolers or chillers to the sweetening process. Dow's amine technology works by allowing the amines to operate efficiently for H_2S removal even at relatively high temperatures. This eliminates the cost for cooling the amines.

A relatively recent phenomenon we are witnessing is that a large number of mature gas plants require upgrades in order to fulfill evolving feed gas and gas treating specification objectives. Dow has the engineering capabilities to help in the retrofitting of these plants to match new specifications at minimum capex. This is achieved by deploying our process simulation tool to evaluate the extent of upgrade required and providing the optimal UCARSOL™ solvent needed.

Efficient amine management is one of the challenges facing sour gas processors. (Photo: Dow)

Why are companies moving towards hybrid solvents in place of physical and chemical solvents?

An important trend in the Middle East is the tightening of regulations for controlling emissions that are in line with international standards. As a result, it is no longer sufficient to just remove H_2S from natural gas to meet regulation, but the removal of other exotic contaminants for e.g. mercaptans. The removal of these requires a different approach and more specialised amine technology. To address this need, Dow introduced hybrid solvents, a combination of chemical and physical solvents which are capable of removing organic sulfur compounds from natural gas streams, with reduced hydrocarbon uptake compared to physical solvents, while still reaching the customer's stringent gas specifications on acid gas removal. These hybrid solvents can be applied at natural gas plants and refineries, and also be extended to other potential applications in the oil and gas industry.

Over the last few years, Dow has invested in further R&D efforts to develop an accurate simulator tool for hybrid solvents.

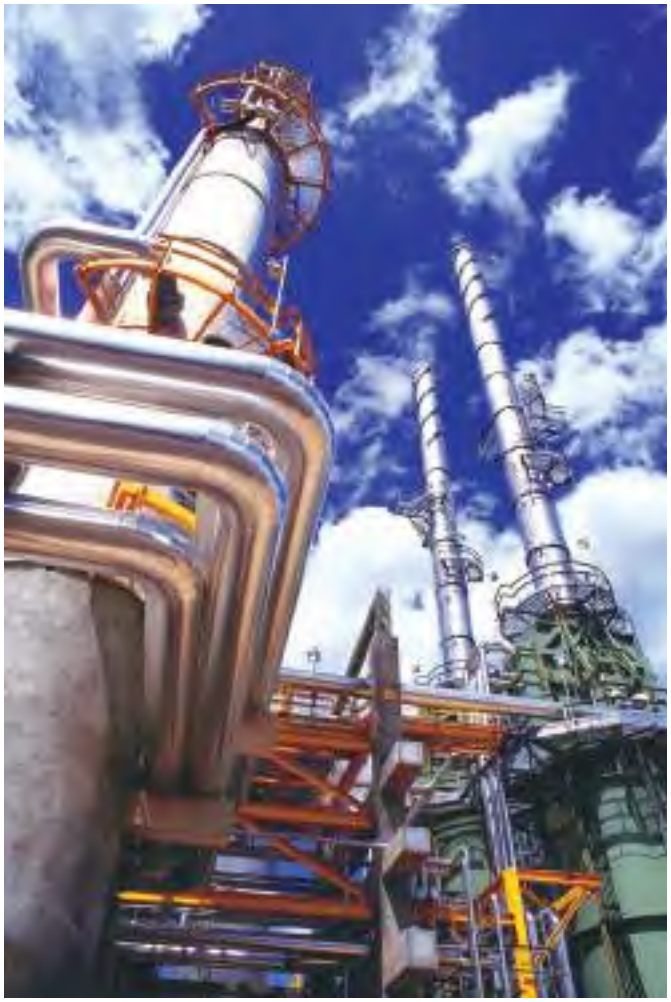
> "We are seeing a significant increase in the concentration of sulfur in natural gas and refinery gas."

How does the Dow AMINE MANAGEMENT℠ Program work?

The Dow AMINE MANAGEMENT℠ Program is a comprehensive gas sweetening service programme that targets the gas treating amine systems to achieve environmental compliance while improving reliability, reducing energy costs and preserving the integrity of assets. Dow AMP is tailored to each customer's performance objectives, of process optimisation, energy efficiency and asset integrity, ultimately helping them optimise total system costs. The service programme uses Dow's proprietary state-of-the-art simulation software, which offers customers best-in-class performance prediction technology.

All Dow's UCARSOL™ customers have access to this programme.

Our key customers usually have a dedicated technical resource onsite working closely with the facility's operational team to help ensure that the gas plant is operating at optimal performance.



The Middle East holds some of the world's most sour gas reserves, creating a demand for gas treating solutions. (Photo: Dow)

What encourages you to participate in SOGAT every year, and what are you presenting this year?

Since its foundation in 2004, SOGAT has consistently gathered the leading sour gas technology leaders together and has evolved into the region's leading sour gas conference. Dow has been at the forefront of gas treating technology for more than seven decades, with over 50 project references in the Middle East and more than 1,000 worldwide. SOGAT provides us with an opportunity to feature some of our technical experience and knowhow, as well as to engage with our customers and understand how the local industry is evolving and the trends driving industry.

This year, in addition to sponsoring SOGAT, Dow will present a technical paper about a newly formulated series of specialty solvents, UCARSOL™ TGT that we have developed and successfully demonstrated with a unique molecule which improves H_2S removal performance. When compared to commodity MDEA, this newly developed series offers economically competitive alternatives for reduction in sulfur emissions in high temperature environments and in plants where one would like to mitigate daily or seasonal temperature influences on sulfur emissions. By introducing this technology to the UAE market, we aim to address the challenge of the removal of residual hydrogen sulfide from low pressure sulfur plant tail gas at elevated lean amine or ambient temperatures. This will in turn help in improvement of air quality through reduction of sulfur emissions from industrial facilities.

In addition, Dow will host a technical workshop for the region's gas treating experts on 27 March as part of SOGAT's annual workshop series. The workshop aims to facilitate an in-depth discussion on various types of amines available in the market and their characteristics, chemistries & reactivities for gas treating applications. This will include an overview of Amine Unit Processes, schemes, equipment design and various factors influencing amine solvent selection with a focus on the evolution of gas treating solvents and new technologies.

> "Dow has been at the forefront of gas treating technology for more than seven decades."

In your opinion, where is the industry heading and how can Dow contribute to addressing regional needs?

During this year's World Future Energy Summit (WFES), the Abu Dhabi National Oil Company (ADNOC) announced that it plans to introduce measures that will increase energy efficiencies by 10 per cent by 2020. The energy efficiency strategy will reduce ADNOC's gas consumption by 156mn cubic feet per day, saving a total of US$1 billion by 2020. Dow continuously works towards developing solutions which help with such optimisation.

For instance, Dow offers operators a lower-cost, value-added option, particularly for small-scale gas treatment - UCARSORB™ Natural Gas Liquid (NGL) Adsorbents. This highly selective system is designed to allow water, CO_2 and NGLs of lesser value to slip through the bed, removing and capturing only targeted NGLs. Previously, if the goal was to generate a separate NGL stream or simply exclude NGLs from contaminating a process, a large scale, high-cost cryogenic, refrigeration or other low-temperature unit was required to separate out NGLs. The UCARSORB™ system is a selective and effective means to remove and recover NGLs, reducing emissions without sacrificing combustion engine power and efficiency.

Another good example is the aforementioned mentioned AMINE MANAGEMENT℠ Program that has as its goals, process and cost optimisation as well as improving energy efficiencies. ■

SOGAT 2017

Since its inception in 2004, SOGAT has grown to be recognised as the premier event in the international oil and gas calendar focusing on sour hydrocarbon developments in the Middle East.

Taking place at the Beach Rotana Hotel, Abu Dhabi from 26-30 March, SOGAT 2017 is sponsored by Saudi Aramco and the ADNOC Group as well as leading international operators and contractors.

Sour field development plans are ongoing throughout the Middle East given the gas demand, and the technologies involved in sour field management and production are constantly evolving. The latest developments across the whole management spectrum will be covered in the SOGAT 2017 conference programme, including energy efficiency, increasing processing capacity, HSE reliability management, SRU operational enhancement, improving amine treatment and CO_2 management, capture and usage, particularly in EOR, with case studies and presentations primarily from operators.

An integral part of the event are workshops on topical issues which will be presented in the first two days covering sour oil and gas process optimisation; GASCO and Al Reyadah carbon capture utilisation and storage awareness; improving SRU cost efficiencies and associated KPIs; and benefits of hybrid solvents for mercaptan in natural gas.

The associated SOGAT Exhibition will feature the world's leading contractors, vendors and suppliers.

For further information see www.sogat.org.

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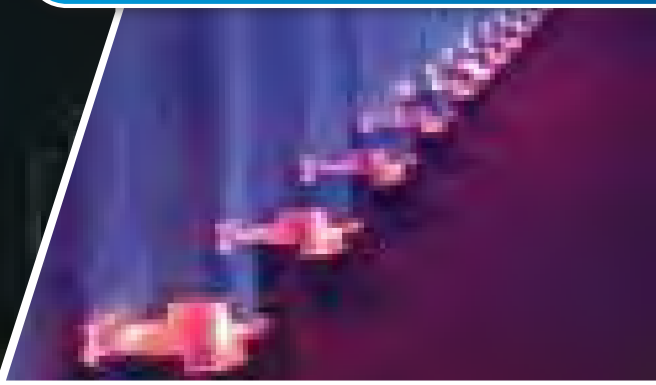

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Saving ageing assets

Emma Perfect, CEO of oil and gas asset integrity and corrosion management firm, LUX Assure, discusses how the company is helping to address corrosion challenges.

What are the main corrosion challenges faced by companies operating in the oil and gas sector?

One of the major challenges facing the GCC oil and gas industry today is ensuring the safe operation of maturing assets. At a time where budgets are under pressure and restructuring is widespread, putting solutions in place which prolong the lifetime of assets is extremely valuable to operators.

One area of growing concern is internal corrosion. As water production increases, so does the risk of internal corrosion, and effectively mitigating this can be complex due to the number of contributing factors, each of which requires careful consideration.

An important component of internal corrosion management, and one that is commonly used in the upstream oil and gas industry, is the use of chemical corrosion inhibitors. These inhibitors form a protective barrier on corrosion susceptible surfaces and protect infrastructure from corrosive attack. However, without effective monitoring of the corrosion inhibitor, it is extremely difficult to determine when the optimum amount of inhibitor is being used in the system. This is important, as overdosing can lead to production upsets and increased costs due to excess chemical being applied, whilst underdosing leaves the system at risk of corrosion failures. Therefore, the demand for reliable, in-field, at site corrosion inhibitor detection methods is high.

LUX Assure's CoMic™ technology provides information on optimal dosage of corrosion inhibitors

How does LUX Assure's CoMic™ technology work and what are its main benefits?

Our CoMic™ technology is uniquely placed to give additional assurance to operators and service companies regarding effective management of internal corrosion. The technology does this by providing information on optimal dosage of corrosion inhibitors. As well as improving long-term asset integrity management, there are positive cost implications to managing corrosion inhibitor dosage, from reduced chemical spend and fewer production upsets. CoMic's combined technology and service offering provides critical data analysis allowing for effective and informed management.

The basis of the CoMic™ technology is the detection of corrosion inhibitor micelles; these are nanoscale clusters of corrosion inhibitor floating around in fluid, which form when every surface in the pipe structure has been coated, and the chemicals start to group together. The ideal functional dose of corrosion inhibitors is the point where micelles begin to form in a system, but before there are too many which can upset the system – this point is the critical micelle concentration (CMC). CoMic™ is the only readily available technology for accurately measuring CMC in the field.

The CoMic™ technology offers an onsite, accurate and non-intrusive measurement of corrosion inhibitor, resulting in significant time and cost savings through chemical usage efficiency and ultimately increased asset integrity assurance.

Can you give any examples of applications in the oil and gas sector?

LUX Assure conducted a project for a major oil and gas company based in the Middle East. The company operates a major carbon steel seawater pipeline, 48km long and 914mm in diameter. As the pipeline carries seawater from the Gulf to a number of injection wells, it is at risk from corrosive attack, and corrosion inhibitor is therefore injected to protect the system.

CoMic™ was deployed to detect micelles in the seawater stream and verified that an optimal dosage level of corrosion inhibitor was present throughout the length of the pipeline. The results showed that the system was running as efficiently as possible, significantly reducing the risk of corrosion and providing assurance to the company that they were avoiding unnecessary spend on overdosing corrosion inhibitor.

In other applications, evidence of underdosing has been demonstrated, allowing assets to optimise dosage and better protect their systems.

How do you view the Middle East as a market for your technology and are you finding an increased focus on prolonging the life of assets in the current environment?

EP: The Middle Eastern market is our key focus for LUX Assure as part of our ambitious global growth strategy. We have a network of agents in the region and are committed to providing high quality, valuable services to our clients. Those operating in the Middle East understand that new, innovative technologies are vital to the long-term sustainability of the oil and gas market, not only for asset integrity and life extension, but for training and upskilling of personnel. It's important that the industry understands the need for, and is able to implement, critical technologies such as CoMic™. ■

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The need for effective reservoir characterisation

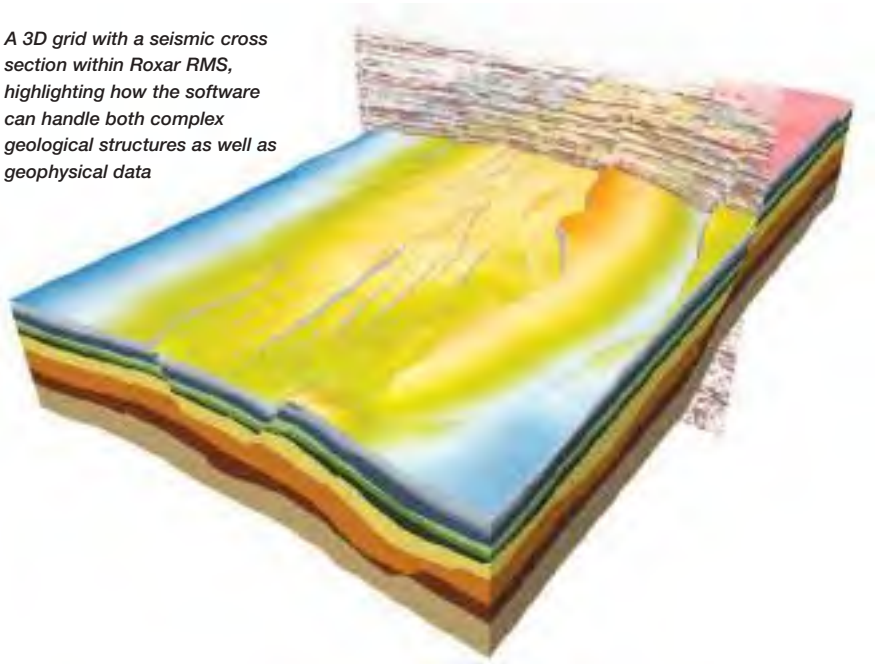
Effective reservoir characterisation is essential for good decision making at this time of tight budgets, say Ali Ramady and Samir Walia, Emerson Automation Solutions.

FOR ALL THE technological developments in the Middle East oil and gas sector over the past decade, recovery rates – as in the rest of the world – remain low. Recent low oil prices and the need for more reliable reservoir management decisions within shorter timeframes and tighter budgets have also helped focus operators' minds.

Where should I drill? What production strategies should I embrace? How can I plan for productive wells, accelerate field development planning and maximise oil and gas recovery? Middle East operators must address these questions and more as they look to developing realistic representations of their reservoirs, accurately map out fluid paths and volumes, build flow simulation models and engage in optimised well and production planning.

Technology is one strategic lever to deliver measurable, predictable results, with reservoir characterisation a key tool in answering the questions above. Yet, as with any technology, there is always room for improvement and a continuing need for innovation.

> "Any reservoir that oversimplifies the geological complexities is not going to deliver the vital information needed today."



A 3D grid with a seismic cross section within Roxar RMS, highlighting how the software can handle both complex geological structures as well as geophysical data

The need for a full seismic to simulation workflow

Any reservoir model that oversimplifies geological complexities in the reservoir is not going to deliver the vital information Middle Eastern operators require today.

That's why an integrated reservoir characterisation workflow that incorporates 3D seismic and geological risk quantification early in the process and that takes the user from seismic interpretation right through to reservoir simulation, is so important.

With this in mind, Emerson's reservoir characterisation and modeling software, Roxar RMS™, includes model-driven interpretation capabilities where uncertainty is captured during the interpretation process. The process can handle multiple models, capture the limitations of the data, and quantify geologic risk with direct correlations to the seismic.

The latest version of the software, RMS 10, which was launched only late last year, has taken the process a step further forward, with a variety of new workflow improvements. Seismic interpretation, for example, is made stronger with a new Trace Viewer that leads to improved accuracy in picking up seismic traces and assists with interpretation.

There are also further improvements to the snap to seismic algorithm – a feature that allows interpreters to get the detail they need from their seismic data without labour-intensive clicking or extensive QC afterwards. At a click of a button, the model is conditioned to the seismic data via a waveform similarity metric that gives users the ability to track characteristics of a seismic event across the domain of interest – even across faults (both normal and reverse), complex geometries, or variability in data quality.

RMS 10 also comes with improvements to both structural and property modeling with a more flexible stratigraphic framework, improved horizon modeling algorithms and a better isochore quality framework – all contributing to a more accurate and complete reservoir model and understanding of the subsurface.

The need for an integrated workflow

Too often in the past, reservoir characterisation has tended to be a fragmented and proprietary-dominated process with a lack of flexibility and interoperability. Vital data was often overlooked if it did not fit comfortably within the existing workflow.

Similarly, there was a tendency for domain-specific working practices to take precedence

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over the common goals of the reservoir characterisation and modeling project. Uncertainties tended to be sustained within each of the domains, instead of a collective understanding of which parameters and input matters to achieve the project's end goals. This led to a lack of agility on the part of the asset team with a difficulty in adapting and responding to new data or correcting errors in existing data.

Recent innovations – the Big Loop solution

Emerson's answer to these challenges can be seen in two recent innovations – its Big Loop™ solution and the Roxar API (Application Programming Interface). Both innovations are complementary to the Roxar RMS reservoir characterisation and modeling software.

Based on automated workflows – from depth conversion to flow simulation – and on up-to-date reservoir information, Big Loop tightly integrates static and dynamic domains, ensuring reservoir uncertainties are captured and used as input parameters to the reservoir simulator. This leads to a better understanding of the reservoir model, more reliable estimations of reserves, and better-informed decisions for future development scenarios.

Once the workflow has been set up, Big Loop can be run automatically to produce as many realisations and simulation runs as needed. The outcomes from these processes can then be used to understand the sensitivity and interplay of the many parameters involved. Hence, uncertainties can be added in the domain where they belong (for example, static), and propagated to where they matter (for example, production).

RMS 10 also provides greater workflow integration to support the Big Loop solution. This includes improved support for the building of complete flow simulation models; automated, repeatable and traceable well modeling to keep models up to date; and the automated creation of well targets.

Expanding existing software capabilities

In addition to the Big Loop solution, the recent launch of the Roxar API (Application Programming Interface) takes the process of greater integration and flexibility a step further. Roxar API can be used in an open environment to expand the capabilities of existing software or used within the RMS environment to create unique solutions.

Using Python – a powerful but simple to use programming language that is used by such well-known organisations as NASA, Google and YouTube – the Roxar API enables operators to integrate their own intellectual property into reservoir characterisation and modeling workflows. Applications can also be written or extended to access RMS project data. This increased interoperability facilitates communication and information exchange between different software packages, ensuring maximum flexibility and an expansion of end user capabilities.

> "The result is an opening up of new possibilities for sub-surface workflows."

The Roxar API can also be used to build customised, standalone programs called Roxar Apps. An App can be developed and customised to achieve specific goals, with the Roxar API acting as a software platform on which operators can develop proprietary, commercial, or open solutions.

The result is an opening up of new possibilities for sub-surface workflows, enabling users to build innovative geoscience, reservoir engineering and oilfield technology applications, adding company-specific goals to generic workflows, and unleashing new creativity in how we interpret our reservoir models.

A Middle East application

So how are new reservoir characterisation solutions being adopted in the Middle East?

One example is Kuwait Oil Company (KOC), with whom Emerson Automation Solutions signed a deal in late 2016 to supply further licenses of Roxar RMS. The new order expands KOC's wide adoption of previously purchased Roxar RMS software, which has provided crucial input to KOC in well placing and determining the wellbore trajectory in the most potentially productive parts of the reservoir as well as reducing the geosteering risk for sidetracked wells.

According to Abdullah Al-Awadi, senior geologist at KOC: "The structural model, the advanced geostatistical evaluation in terms of gridding and others analyses generated highly accurate results especially on facies and property models. We are now starting to integrate the seismic data with the static model and are finding a lot of flexibility in the workflows and the ability to load any kind of data."

It is examples such as this that show the importance of an integrated and seismic to simulation workflow for operators.

Handling all reservoirs

From accurate volumetric estimations through to building flow simulation models, optimising well planning and gaining accurate representations of the reservoir within short timeframes and tighter budgets, effective reservoir characterisation is vital for Middle East operators today.

It's encouraging therefore to see that recent technology developments are rising to the challenge, increasing integration, improving efficiencies and raising performance throughout the reservoir characterisation and modeling process. ■

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Good air filter, better power output

Sound gas turbine performance helps maintain the designed electricity output, thereby reducing fuel consumption, emissions and the number of outages.

GAS TURBINES ARE used extensively in power generation where high availability and reliability are increasingly demanded. The success of gas turbine engines in power generation placed more emphasis on enhancing their performance while complying by environmental regulations.

The continuous demand of high availability and reliability has highlighted the critical role of air filter performance in providing enhanced air quality. In addition to being challenged with different environments – tropical, coastal and extreme, gas turbines confront wide array of atmospheric contaminants with various concentrations and particle size distributions that would lead to performance degradation and components deterioration.

Therefore, the combined role of compressor washing and filtration techniques are of a paramount importance since a fouled compressor can reduce power output and availability of the gas turbine to over 70 per cent throughout operation.

Air filtration emerges as a critical (separation and retention) process to the gas turbine operation. Different filtration techniques are employed to protect the compressor assembly from suspended contaminants in air stream so that large masses of clean air reach the compressor. Therefore, accurate filter performance prediction facilitates their appropriate selection in order to minimise the economic impact of outages. Further research and development are required to assess the filter performance in different environments around the globe to engineer filter design for optimum operational results.

Compressor washing is another maintenance measure where an engineered injection of demineralised water droplets and cleaning fluids is delivered to the compressor assembly. Compressor washing is widely used to bring compressor blades to their design point and allow the compressor assembly to realise its fullest potential. The three methods of compressor washing are: online, offline, and/or hand-wash.

They can be used at different times and are usually implemented alongside various filtration techniques to achieve optimum results.

How a gas turbine works

The essence of the gas turbine operation lies in accelerating a gas to high velocities by increasing the specific enthalpy of the gas and converting it to kinetic energy. This can be achieved by virtue of increasing the pressure and temperature to increase the specific volume and internal energy respectively.

The working principles of a gas turbine start with the thermodynamic principles of the Brayton cycle. The atmospheric air is drawn through a filter house installed at an elevated level and then passed through the filtration stages prior to entering the compressor via the bell mouth. Filtered air is compressed to a high pressure and temperature to enter the combustion chamber where fuel is injected and combusted at constant pressure. The gases that leave the combustor are very hot and contain large amounts of energy. Energy is then extracted from the hot pressurised gas, thus reducing pressure and temperature. The energy is converted to work in the turbine, 50 to 60 per cent of which drives the compressor and the rest drive the generator to produce power, or mechanical equipment (gas compressors and pumps).

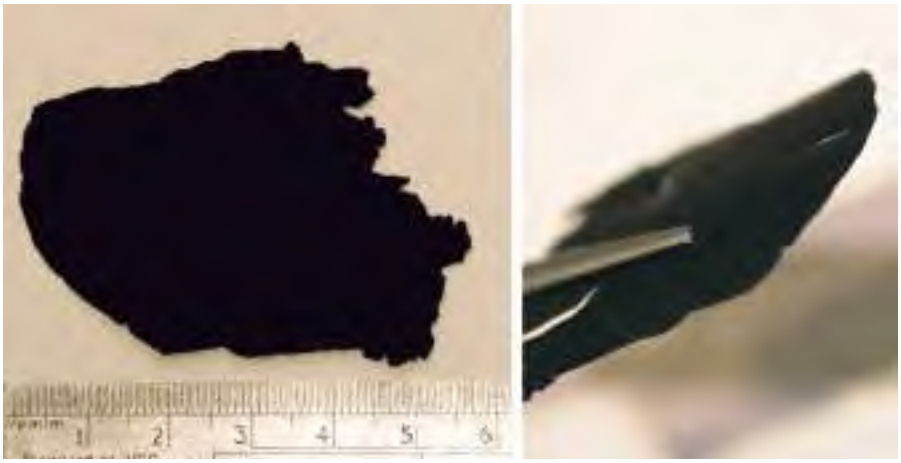
Different examples of fouling on compressor assembly. (Image source: R-MC Power Recovery Ltd)

Performance degradation of gas turbines

A standing challenge of gas turbine engines is compressor fouling, erosion, corrosion, abrasion, and foreign object damage. Fine airborne particles, smoke, oil vapour, carbon, sand and sea salt could cause fouling.

Fouling can be responsible for 70 per cent of gas turbine performance degradation. It is regarded as the adherence process of airborne contaminants such as dust particles, unburned hydrocarbon, fine sand, air intake and their deposition on the airfoils and annulus surfaces at the inlet of the gas turbine, particularly the compressor section.

Erosion occurs as a result of impaction of particles of around (10-20 µm) in diameter or greater. A key factor affecting the erosion rate is the impact velocity of particles in addition to the shape, size distribution, density, and/or material. Erosion can inflict multiple challenges starting with altering surface roughness to reducing the



Deposits of various contaminants removed from a compressor blade

throat area between consecutive blades promoting aerodynamic performance fluctuation. In addition to the damage that erosion can induce to the compressor blades, it can also change the airfoil shape, the incidence angle of the following airfoils in the compressor, reduce the efficiency and the mechanical strength of the blades. Other consequences include blade tip clearances variation, which would jeopardise air mass and foster rotational unbalanced forces due to the change of natural frequencies of the blades.

Reduced inlet mass flow lead to reduction in efficiency, pressure ratio and surge margin of the compressor, leading to a reduced power at a fixed firing temperature. Additionally, material losses lead to complex vibrational issues contributing further to the overall gas turbine performance degradation.

When gas turbine performance degradation is addressed, lower power output hover in our minds and an immediate action is sought to sustain power output. Therefore, more fuel ought to be burnt which in turn increases the firing temperature and heat rate. Consequently, high thermal stresses are produced in addition to the higher mechanical stresses due to centrifugal force, vibratory and flexural stresses. Ultimately, exposing gas turbines to such operating conditions shortens lifetime of its assembly.

Abrasion, is another challenge faces the compressor blades. It occurs when material losses are experienced due to the rubbing as a result of moving or particularly rotating element and stationary surface. Further, objects damage, which can be foreign and/or domestic, invade the engine entrance and confront the flow path components.

Corrosion

Corrosion is a non-reversible degradation mechanism that commonly caused by salts (sodium and potassium based) as well as lead and vanadium. Corrosion also intrude into cracks or other material defects and accelerate crack propagation. Further, corrosion rate can be accelerated due to the contaminants and impurities in the air. Therefore, physical and chemical characterisation of atmospheric air is essential toward a scientific approach to appropriate filter selection and compressor washing techniques. It is also important to highlight that atmospheric air quality is location sensitive as it differs relative to gas turbine geographic location and can have a pronounced influence on the filter selection and the number of stages needed to clean the air.

Hot corrosion, on the other hand, represents material losses due to chemical reaction between the components and airborne contaminants. Such contaminants may include aggressive gases such as hydrogen and chlorine, mineral acids and salts. Furthermore, corrosion can be the result of both inlet air contaminant and the contaminants from fuel combustion. The chemical composition of the deposited agglomerate can be corrosive not to mention their fouling capability. Corroded components require replacement in order to regain performance losses and achieve optimal operation.

Improving efficiency

An efficiency gain as low as one per cent is significant to gas turbine operators. Sustained gas turbine performance translates into maintaining the designed power output, reducing fuel consumption, emission and number of outages. Therefore, employing effective maintenance measures such as qualified filtration and compressor washing techniques are in demand. Operational implications must also be considered in comprehending the underlying issues caused by the inability of air filters to remove all suspended contaminants with various phases, concentrations, size distribution and/or chemical composition. Clearly, compressor washing techniques are credible candidates in bringing the compressor assembly back to its design point. However, as mentioned earlier, this requires a balanced approach with air filtration performance. ■

By Dr Iyad Al-Attar, an expert on air filtration and clean air technologies for HVAC and gas turbine applications.

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To address the potential and current HSE hazards faced in construction, infrastructure and oil and gas, *Health, Safety & Security Review Middle East* is organising the **Qatar HSE & Fire Safety Conference 2017**. Taking place in Doha on 17th-18th May 2017, the event will provide a platform for knowledge sharing, networking with specialists in HSE, procurement, project management and fire safety and key government ministers. Participants will gain a better understanding of international standards and how to enforce and comply with local Qatari fire safety codes, resulting in improving occupational health and safety for a sound working environment.

Speakers will cover a broad range of relevant topics from evacuation planning for cities to smart safety innovations and latest fire protection technology that will achieve on-time project delivery while maintaining a well-planned health and safety strategy.

BENEFITS OF ATTENDING

- Improve occupational health and safety for a sound working environment
- Establish roles the Qatar Labour Law plays on workers' health and safety
- Identify reasons behind construction project delays
- Understand better the safety standards and fire safety codes
- Evaluate your fire safety and property protection goals
- Discover various aspects of fire detection, suppression and mitigation
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- Gain product knowledge and latest developments on fire protection and life safety products

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- **Abdellatif Benyahia,** Corporate HSE Department Enforcement and Regulation Directorate, **Qatar Petroleum**
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- **Samir Hasan,** HSE Manager, **Qatar Fertiliser Company (QAFCO)**
- **Waleed Ghanem,** Head of Health and Safety, **Arab Engineering Bureau**
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Engage in a Mock Court Trial based on a real-life scenario

In this is simulated court hearing, volunteers role play a mock case in front of a jury and judge. In their roles as attorneys and witnesses, they will provide testimonies, defend and cross examine. The mock court trial segment in the Qatar HSE & Fire Safety Conference will help the attendees to better understand Qatari laws, regulations and current market practices. The trial also aims to give delegates a brief overview of the key safety codes regulating workplace injury in Qatar.

Join us in Doha this May to discuss industry issues and gain solutions from industry thought leaders.

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High performance screw technology for blower air

KAESER KOMPRESSOREN, THE Coburg-based compressed air specialist, showcased its new screw and high efficiency portable compressors at Wasser Berlin International, the international water and wastewater show.

The new Kaeser DBS screw blowers from 15 kW for low rates from eight to 22 m³/min are significantly more efficient than conventional rotary blowers and also provide substantial energy savings compared with many competing rotary and turbo blowers, thanks to the proven Sigma rotor technology used in the rotary screw compressor sector. Another key factor is the innovative non-slip direct drive with speed transmission integrated into the air-end.

The new Kaeser DBS screw blower

These screw blowers are especially well suited to municipal and industrial water treatment applications. Two different versions are available to meet the needs of water treatment plants requiring pressures of 400 or 650 mbar. The new blowers are exceptionally quiet, with sound levels in primary applications not exceeding 72 dB, which is equivalent to a modern vacuum cleaner.

They are designed for use over long duty cycles, including continuous operation, require little maintenance, and can be installed side by side, or even next to a wall. Upon request they can be delivered with an integrated frequency converter or a star-delta starter.

Also showcased were Kaeser's new road-going portable compressors. With its wide range of innovative and trusted compressors, including the M13, M20 PE, M27 PE and M31 PE, Kaeser has the right compressor for any application. For instance, the M13 reliably drives compressed air hammers, drills, saws, screwdrivers and soil displacement hammers at a flow rate of 1.2 m³ of compressed air per minute at seven bar pressure.

There are also 10, 12 and 13 bar versions for jobs requiring higher pressures.

BAUER introduces new VERTICUS compressor range

BAUER HAS INTRODUCED the all-new VERTICUS and MINI-VERTICUS series of stationery compressors, developed as an all-new platform, and offering unlimited interfaces for applications in the future.

The new series combines the quality and reliability of the preceding stationary compressor series with an all-new design, smartphone connectivity through the BAUER APP, online air quality monitoring and outstanding ergonomic features. Its identical housing now conceals more advanced engineering: the highest-end model now incorporates a more powerful compressor block, boosting its maximum free air delivery by over 20 per cent to 320 l/min. In addition, numerous accessory models from the larger VERTICUS series, such as the B-CONTROL II control unit, are now also available. It is also significantly quieter to run. The system supports remote-control operation and control using the BAUER APP.

The new MINI-VERTICUS SILENT with filling hoses

The new BAUER APP1 communicates with the compressor system using WiFi, providing simple, direct remote access to functions of the high-performance B-CONTROL MICRO compressor control unit. The app transforms your smartphone into an at-a-glance monitoring device for the main system levels, including air quality and final pressure, as well as providing important maintenance information. The integrated calculation tool enables operators to convert units, calculate filter service life with and without B-KOOL and determine filling time and condensate volumes. The app includes a direct link to BAUER's YouTube channel with videos providing practical advice and assistance on a range of servicing topics including replacing filter cartridges or changing oil. It can be downloaded free of charge from the iTunes Store (for iOS) and from Google Play (for Android).

The system features a high-precision smart online gas measurement system B-DETECTION PLUS which continuously monitors the quality of the breathing air produced in compliance with DIN EN 12021:2014 Breathing Air Standard using professional high-performance sensor systems and sophisticated self-check functions. When limit values are exceeded, the unit displays a visual warning and shuts down the system before contaminated air can pass into the cylinders being filled. In cases where limit values are briefly exceeded, an automatic flush valve (optional) discharges contaminated air to the outside without interrupting operation of the system. It is available in two versions – the PLUS i, which is fully integrated into the compressor system, and the standalone PLUS s for wall mounting.

Saving money with **smarter contracts**

Olga Labai, director, Oil and Gas Consultants, discusses how to avoid common pitfalls in drafting contracts.

THE OIL AND gas industry is in something of a quandary. One the one hand, it requires the highest level of technical and intellectual skill, but on the other its demonstrates a surprisingly "forgiving" attitude to poorly drafted contracts.

The oil and gas industry is driven by contracts, from procurement and purchase agreements, to turnkey arrangements across all sectors of the industry. Contract negotiations frequently require the input of a number of functions, most notably commercial, technical, operational, financial, credit and legal teams, each bringing with them a specific set of skills and knowledge. Often however, these teams are disjointed, and this is reflected in the contracting process and resultant contracts.

As a consequence, contracts are drafted with undesirable practical implications, particularly where standard "one size fits all" approaches are adopted – for instance, a Master Service Agreement, which was drafted for a particular type of product supply that is then subsequently used for the supply of services, without any adaptation of the contract, which in turn can give rise to significant legal and commercial consequences that could have been managed had thought been given in respect of how the contractual terms fit in around a new scenario.

In addition to the problems associated with adopting a "one size fits all" contractual approach, there are a number of other poor contracting practices that are often seen across the industry. These include:

> "Often oil and gas contract teams are disjointed, and this is reflected in the contracting process and resultant contracts."

Olga Labai is the director, Oil and Gas Consultants

- Disconnects between quotes, orders and terms and conditions leading to discrepancies in the contract, poorly defined terms (very often demonstrated by inconsistent use of defined terms) and legal uncertainty;
- Issues surrounding a "Battle of the Forms" scenario where each party (particularly in the purchase of goods or services) attempts to impose their terms and conditions on the other, with the last "shot" typically being successfully incorporated, without the same being explicitly rejected, which can cause far reaching consequences for the party whose terms are not incorporated, particularly where there is a misconception that they have been;
- Adopting "standard" terms without consideration of context. A common example here will be the choice of law and jurisdiction. Does it make sense (for instance) to have a contract where all parties (and their assets) are in the UAE to adopt the jurisdiction of the English courts?

Given these problems, it is vitally important that contracts are subject to review (legal, commercial and technical) at the time at which they are entered to ensure that the same are fit for the purpose for which they are entered. As important is ensuring that all stakeholders (not just the legal team) are acutely aware of the issues surrounding contracts and that there is a joined up approach between them all. For instance, it is of no use having a well drafted legal contract and process if the surrounding implementation is poor, or if as part of commercial negotiations important protections are simply given away or amended without legal input. A joined up way of thinking and knowledge sharing among all stakeholders in the contract process will ultimately alleviate many of the problems noted in this article, leading to smarter contracting and the financial benefits that the same brings. ■

Oil & Gas Consultants are holding a training session on 'Understanding Contractual Terms and Conditions' on 1-2 May at JW Marquis Marriott in Dubai. For further information, visit www.ogc.works.

Latest advances in satellite technology

It's all happening up there…but will it affect oil and gas? Vaughan O'Grady looks at recent and planned growth in satellite communications.

BOTH SATELLITES AND the technology that uses them, on the ground, in the air and at sea, are changing fast. For many oil rigs, the option is now not only Ku and C-band communications, but the very promising Ka-band, a relatively plentiful and powerful source of bandwidth that is making inroads worldwide, although sensitivity to extreme weather conditions means that it is not always ideal for offshore communications.

The distance satellites transmit from is changing too. A few geostationary satellites can cover the globe from around 36,000 km above the earth. However, a transmission round trip of many tens of thousands of kilometres brings frustrating delays during voice and data calls. The arrival of medium earth orbit (MEO) and low earth orbit (LEO) satellites will change that.

LEO satellites, at an altitude of as little as 160 to 2,000 km, do not come cheap; you need a lot of them for good coverage. But that is what a number of initiatives are planning to offer.

OneWeb plans 648 LEO satellites, LeoSat Enterprises plans 108 and SpaceX plans thousands, all offering a variety of high-speed communications services for everything from airline communications and disaster relief to consumer broadband.

> "Equally relevant to oil and gas is the transformation in ground equipment infrastructure."

These may still be in the future but here and now there is O3b, a MEO (about 8,000 kilometres from the earth) constellation of, initially, 12 satellites. O3b is targeting energy among its customers, although its big win so far is the supply of fast Internet for ships in the Royal Caribbean Line cruise fleet.

Martin Coleman, director of the Satellite Interference Reduction Group, an industry association that, as its name implies, aims to keep interference under tight control, suggests that, if successful, some LEO services could be the equivalent of "fibre in the sky". But, he adds, "It will be interesting to see how the business cases evolve, as this is in its infancy."

Benefits for oil and gas

For oil and gas at least, much of this innovation may be too costly or require new equipment. That said, oil and gas companies will benefit from another revolution. High throughput satellites (HTS) are the much-discussed new breed of high-performance broadband satellites that often use Ka but in some cases also Ku and C-band frequencies and will provide more new bandwidth capacity that will deliver higher speeds at a lower cost.

Oil and gas companies could benefit from the plethora of satellite technology innovation. (Photo: Johan Swanepoel/Shutterstock)

An example is Inmarsat's upgrade to its global service – Global Xpress – which is now available through three Ka-band, high-speed and mobile broadband communications satellites.

Equally relevant to oil and gas is the transformation in ground equipment infrastructure. The possibility of a teleport in the cloud, built-in interference mitigation and ever-increasing processing power are the hallmarks of many modern satellite modems and VSAT systems. Add to that mix new antenna technology and the development of flat panel versions, and you can clearly see the extent and speed of the product development cycle.

Coleman cites Newtec's Dialog, a multiservice satellite communication platform that supports multiple satellites, multiple frequency bands and both regular and spot beam satellite coverage, and includes Carrier ID and interference mitigation. Or the VT iDirect product portfolio, which includes hub and network management systems and IP-based satellite communications systems. Comtech, offering satellite bandwidth and link optimisation and Harris CapRock One, a communications service with a multi-band antenna, are some of a large number of innovations helping end users to make the most of their satellite connectivity.

Ironically, oil and gas now has the much more prosaic problem of slow data connections. Much of the slow performance associated with satellite Internet is because IP has overhead, thus slowing the transmission of raw data.

Coleman says, "Obviously on the rig and back at HQ, you have fast network infrastructure already. But to get data back in a hurry it's still IP: lots of packets, lot of overheads. The bit cost is always the problem – the cost of getting that data through." Which is why ways of sending out raw compressed data, but securing it at the start and endpoints are now being seriously discussed.

HTS notwithstanding, oil and gas is not necessarily going to be at the cutting edge of new satellite developments. But, as Coleman puts it, "They still need data. Rigs still run. I think oil and gas companies will pick up the benefits of the ever-growing plethora of technology innovation. ■

Ashtead supplies new inspection technology

ASHTEAD TECHNOLOGY HAS expanded its equipment rental pool following a significant investment in the latest Pulsed Eddy Current (PEC) technology to deliver faster, more accurate asset integrity inspections.

Ashtead will now supply the Eddyfi Lyft™, an inspection tool for identifying corrosion under insulation (CUI), a major asset integrity issue for the oil and gas, and petrochemical sectors. CUI is a type of corrosion that occurs as a result of a moisture build-up on the external surface of insulated equipment. The corrosion is most commonly galvanic, chloride, acidic or alkaline, and if undetected, the consequences can lead to the shutdown of a process unit or an entire facility.

Lyft™ can be used to accurately measure corrosion and wall thickness on insulated pipes without the need to remove insulation, significantly reducing time and costs. It is suitable for use on a number of materials including metal, aluminium, stainless steel and galvanised steel weather jackets, to provide real-time C-scan imaging, wall thickness measurements and fast data acquisition (up to 15 readings per second).

The Eddyfi Lyft™ is an inspection tool for identifying corrosion under insulation (CUI)

Allan Pirie, chief executive of Ashtead Technology said, "This investment underlines our commitment to the subsea and non-destructive testing markets, by offering the latest, cost-effective technologies ensuring our customers are getting the most efficient, reliable solution available.

"CUI is one of the most difficult processes to prevent. No matter the precautions taken, water invariably seeps into the insulation and corrosion occurs.

"With traditional methods it was near on impossible to identify and measure the severity of corrosion without physically removing the insulation; however Eddyfi Lyft™ provides a fast, reliable and flexible solution."

Weatherford develops cement retainer and bridge plug technology

WEATHERFORD HAVE DEVELOPED a high-performance cement retainer and bridge plug technology, which is certified to API V3 Standards.

Weatherford International plc announced on 6 March the development and deployment of a high-performance cement retainer and bridge plug for use in wells in Sakhalin Island, Russia.

According to the internationally renowned company, after identifying a need for a higher-performance cement retainer and bridge plug to provide isolation in Sakhalin wells, a major operator in Sakhalin Island contacted Weatherford to develop a technology that reliably meets new, more stringent industry standards.

Weatherford's engineering team went on to enhance an existing, proven proprietary design, and then conducted extensive testing of the new retainer and bridge plug according to American Petroleum Institute (API) Specification 11D1. This new design has achieved the desired V3 rating.

The resulting downhole tool is one of few on the market qualified for use in Sakhalin wells, meaning that it has been tested at the pressures, temperatures and geometries expected throughout the service life of the tool.

After successfully pressure testing the tool, Weatherford performed further surface qualification testing to demonstrate that the cement retainer could be easily and reliably drilled with a milled-tooth rock bit.

All testing was completed at the Weatherford Research & Development, Engineering, Technology and Training Center in Houston, Texas.

The high-performance cement retainer and bridge plug is among several Weatherford completion technologies fully qualified for deployment in Sakhalin wells.

"We are pleased to once again deliver a technology solution tailored to meet our client's needs," said Nicole Carpenter, vice president and global account manager at Weatherford.

The high-performer cement retainer and the latest bridge plug technology are the latest innovations in Weatherford's support of the sustainable development and production of oil and gas resources.

This is to ensure that the world's current and future energy needs can be met safely, efficiently and economically.

Weatherford specialise in innovative formation evaluation techniques, products and services that ensure well integrity and drilling reliability, thus, securing energy demands for today and tomorrow. Weatherford develops and applies its specific technology, understanding and expertise to help its customers efficiently develop new resources and maximize recovery from producing reservoirs.

The company operates in over 90 countries and has a network of approximately 900 locations, including manufacturing, service, research and development, and training facilities and employs approximately 30,000 people.

The path ahead for Middle East's oil and gas industry

The role of the Middle East in the global oil market, and impact of OPEC production cuts, will be at the heart of conference discussions at this year's StocExpo Middle East Africa, taking place at the Dubai World Trade Centre on 26 and 27 April 2017.

WITH GLOBAL OIL prices hovering around US$50-55 per barrel, a significant amount of US shale production has come back on stream, blunting the impact of coordinated production cuts agreed by OPEC members in November last year. A number of expert speakers at this year's event will be considering where oil prices are heading, and what impact this will have on the role of the Middle East in global oil supplies – particularly the continued status of Saudi Arabia as a swing producer.

The conference programme will include a keynote presentation by Christof Rühl, global head of research at Abu Dhabi Investment Authority (ADIA), who will be exploring global oil supply and demand, the role of OPEC and the Middle East. Edward Bell, commodity analyst at Emirates NBD Bank, will be examining the impact of oil prices on future supply with further analysis of oil price trends. Alan Banniser, Asia and Middle East regional director for Oil Content at Platts will also be looking into the development of the region as a pricing hub.

Oil storage capacity has grown significantly in recent years, with Fujairah Free Zone now the second largest bunkering hub in the world and Vopak Horizon Fujairah soon to add almost half a million cubic metres of capacity, thanks to Project Black Pearl. Attendees will get a regional perspective with presentations on the growth opportunities in the Middle East by Kamel Al-Harami, independent oil analyst and former president of Kuwait Petroleum International, and on the supply and demand outlook for tank terminals in the Middle East and Africa by Patrick Kulsen, managing director of PJK International. They will also get the local perspective from H.E. Sharief Habib Al Awadhi, director general of the Fujairah Free Zone Authority, as well as Captain Tamer Masoud, harbour master at the Port of Fujairah, both of whom will be looking at the development of Fujairah as a global storage and trading hub.

Bulk liquid storage is an industry with an inherent degree of risk, with incidents such as the Tianjin disaster a reminder that safety remains a key focus area in many emerging markets. Dr. Waddah Ghanem Al Hashmi, executive director for EHSSQ and Corporate Affairs at ENOC will be presenting a case study on the work that ENOC and Horizon Terminals have been doing in order to improve resilience in terminals.

Nick Powell, divisional director, StocExpo Middle East Africa, commented, "It will be interesting to see what the experts say about the future state of the Middle East market. We have already had an overwhelming response to this year's conference line up, with delegates quick to book their seats in the conference theatre. We urge anyone looking to attend the conference to book soon so as not to miss out." ■

To view a full list of panel speakers, please see the StocExpo Middle East Africa conference programme at www.stocexpomiddleeastafrica.com.

The event is supported by the UAE Ministry of Energy, alongside many oil majors, ports, terminals and institutions including ENOC, Fujairah Oil Terminal, GPS Chemoil, Gulf Refining Co., Gulf Petrochem, Horizon Terminals, Siddco, Socar Aurora, Star Energy OilTanking and Hamriyah Free Zone Authority.

For more information about StocExpo Middle East Africa, and to register, please go to: www.stocexpomiddleeastafrica.com.

Hi-Force celebrates 25 year milestone in the Middle East

The specialist high pressure hydraulic tools manufacturer has been serving the region since 1992.

ON 1 FEBRUARY 2017 UK hydraulic tools manufacturer, Hi-Force, celebrated the 25th year anniversary of its Middle East business, located in Jebel Ali Free Zone, Dubai. From humble beginnings of just one employee (Kevin Brown) working from a lease office building in LOB3, Hi-Force growth in the UAE and Middle East region has been unprecedented for a specialist high pressure hydraulic tools manufacturer.

The Hi-Force success story started in May 1991, when UK sales director Kevin Brown flew out to Dubai to participate in a "Rebuild Kuwait Exhibition" at the Dubai World Trade Centre, from 22-25 May 1991. Brown recalls those challenging and pioneering days as the catalyst for the hugely successful global business Hi-Force is today: "Having left a UK market that was in the middle of its worse recession for decades, I had to remain positive and give this opportunity, for Hi-Force, everything I had. The exhibition itself was a huge success, with all my literature being taken within the first two days and over 75 per cent of the stock being sold, directly off the Hi-Force exhibition stand!"

After further successful visits by Brown that year to follow up on the many sales leads from the exhibition and orders received following each visit, the decision was made and Hi-Force was established, within the Jebel Ali Free Zone, under licence number 704, on 5 February 1992. At that time 704 signified that Hi-Force was the 704th company registered by JAFZA, which when you consider that today there are over 7,000 companies registered in JAFZA, with Hi-Force as the first hydraulic tools company, it certainly was a historic decision for Hi-Force, as pioneers in their industry.

Reflecting on those early days, Brown recalls the excitement and challenges of literally being a "one man band operation" although the appointment, of his first employee, as an office based secretary and PA, greatly assisted Brown, by allowing him to move around in the local and regional market. Over the course of the year, sales of Hi-Force products had gone so well, it became vitally important to establish a service and repair facility, to support those customers who had purchased Hi-Force products.

With the establishment of a Service and Repair Centre in the UAE, came a growth in personnel and one of the very first employees, T.N.S. Kumar, joined Hi-Force direct from India in June 1993 and is still with Hi-Force Middle East, as training manager, today. Further expansion in 1996 saw Hi-Force open an office in Abu Dhabi, with a Service & Repair Centre established, within a year of operation. Both the Dubai & Abu Dhabi facilities also established safe product use and repair training facilities. Additionally considerable growth was achieved regionally with trained and authorised Hi-Force distributors appointed throughout the MENA region and several other strategically located countries.

In 2006 Kevin Brown relocated, back to the UK, as group managing director, a new and challenging role, given the continued worldwide growth Hi-Force had seen, and was ably succeeded by his son Craig, who took over as the Middle East regional director, at the relatively young age of 28. Craig's youngest sister, Laura Thompson, soon joined him in 2010 as a marketing executive, and is now the group marketing director. Kevin's elder daughter, Kelly Graham, joined the business in 2013, and is now also a group director, based out of the Dubai office.

(From left to right) Adel Bin Turkeya, chief resources officer, JAFZA; Omar Ibrahim BinHendi, VP – customer relations and development, JAFZA; Craig Brown, Hi-Force group sales director; Kelly Graham, Hi-Force sales director; Kevin Brown, Hi-Force group managing director; Mohammed Al Muallem, SVP and managing director of DP WORLD UAE, CEO – JAFZA; and Laura Thompson, Hi-Force group marketing director. (Photo: Hi-Force)

In 2012, Hi-Force global business came under the full ownership and control of the Brown family. As Brown explains: "The growth within Hi-Force worldwide and the huge investment, made in the UK facilities, would not have been possible without the tremendous growth of business achieved within our Middle East operations. As a family owned business, we will always be grateful to the visionary leadership of the UAE Government and the people of the UAE that welcomed us way back in 1992. We look forward with pride and optimism at what the UAE has achieved and what is still to come, believing, in our own small way, that Hi-Force has played its part, helping to build a world class country."

Today Hi-Force is a financially strong, well-managed business, driven and managed by hardworking shareholders and directors, alongside a fantastic global workforce of over 200 employees, all of whom retain the same passion for Hi-Force as Kevin Brown did all those years ago. Future plans include the opening of a new Hi-Force business in Saudi Arabia, further expansion of our Holland and recently acquired Italy businesses, as well as further expansion of manufacturing capabilities in the UK. Clearly the Hi-Force success story will continue for many years to come.

The Hi-Force Middle East 25 year anniversary celebrations were held at the JW Marriot Marquis Hotel in Dubai, attended by all of the Brown family shareholders, regional directors, customers past and present, business partners and colleagues from across the Middle East region. In his short address Kevin thanked everyone for their attendance and reiterated that Hi-Force is only as good as its people and its partners in business, all of whom should take equal recognition for helping Hi-Force to be where it is today. ■

QATAR HSE & FIRE SAFETY CONFERENCE 2017

17th & 18th May 2017 - DOHA, QATAR

www.hse-forum.com/qatar/home

Please contact us for more information:

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Qatar's investment on infrastructure and urban development is expected to hit US$160bn over the next few years driving towards Qatar National Vision 2030 goal.

To address the potential and current HSE hazards faced, *Health, Safety & Security Review Middle East* is organising the Qatar HSE & Fire Safety Conference 2017. This event provides a platform for knowledge sharing across a broad range of relevant topics from evacuation planning for cities and digital surveillance to smart safety innovation that will accelerate on-time project delivery.

KEY TOPICS OF INTEREST

- How to prepare for the implementation of Qatar's new fire safety legislation
- Innovation in heat stress and smoke protection
- Implementing evacuation systems in commercial, residential and public buildings
- Digital surveillance for crowd safety
- Insights into directing onsite security and emergency assistance
- Updates on smart safety and security for critical infrastructure

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Hytera launches the world's first ia explosion-proof TETRA radio

WHETHER ON AN oil rig, in a coal mine, a gas station or any other potentially explosive environment, safe and reliable communications are a must. Hytera Communications, a world leading solution provider of Professional Mobile Radio (PMR) communications, understands the challenges for users in hazardous and harsh environments.

In order to meet the increasing requirements for intrinsically safe and reliable communications, Hytera has launched PT790 Ex, the first ia explosion-proof TETRA radio in the world. This device has passed ATEX, FM, IECEX certifications and complies with IP67 rating as well as MILSTD 810 C/D/E.

The two-way TETRA radio is operable in places that contain explosive gases, including mine methane, such as coalmines, gas stations, oil platforms, chemical plants, airports and other inflammable or explosive conditions. It can also be used in Zone 0/1/2 and complies with M1.

The rugged device features an antistatic shell made of light metal to avoid mechanical spark and reduce the possibility of static discharge. The 4.6 cm LCD screen is also crack-proof and provides a clear display even under bright sunlight. Separated by the antenna, the radio's channel knob and volume knob stand apart from each other, while large textured keys provide good tactile feeling. These features combined are designed to offer ease of use and accuracy when users wear gloves or operate the device in dark environments.

The product supports GNSS positioning, man down and lone worker functions for worker safety. It also provides a 1800/2400 mAh large capacity Li-ion battery, which lasts over 20 hours under 5-5-90 duty cycle. A strict over-charge and over-discharge protection design protects the battery against instability caused by overheating.

Founded in 1993 in Shenzhen, China, Hytera Communications Corporation Limited offers complete and customised communication solutions to government, public security, utilities, transportation and businesses, with a large customer base in more than 120 countries and regions across the world.

The new TETRA radio is operable in environments containing explosive gases. (Photo: Hytera)

KELLER unplugged - the Series 21 D RFID and 21 C RFID pressure transponders

IN RECOGNITION OF the potential offered by combining near-field communication with industrial pressure transmitters, KELLER AG für Druckmesstechnik has launched two new series: the 21 D RFID and the 21 DC RFID.

The passive pressure transponders in the Series 21 D RFID are autonomous in terms of their energy requirements, allowing them to be used indefinitely without maintenance, while the main attraction of the Series 21 DC RFID is its integrated data logger, which runs on a special long-life battery. With both products, the energy required to transmit measurements is provided wirelessly via the RFID interface.

The pressure transponders in the Series 21 D(C) RFID are based on KELLER's Series 7 LD pressure transmitters, which are extremely sturdy with excellent long-term stability. A moulded RFID transponder made from impact-resistant plastic replaces the usual plug for electrical connections, with stainless steel being used for all parts that come into contact with media. The pressure transponders in the Series 21 D(C) are thus immune to environmental influences and vandalism. An RFID reader allows measurements to be read off quickly and easily and transferred straight to a laptop via USB.

The energy required to transmit measurements is provided wirelessly via the RFID interface.

Alternatively, a battery-operated pocket reader can be used, which displays measurements, stores them to its memory and makes them available as an .xml file for transfer via USB.

As well as the benefits of the Series 21 D, the pressure transponders in the Series 21 DC (DataCollector) also come with an integrated data logger, while a special integrated battery with a life of up to ten years guarantees a reliable power supply. The data logger records pressure and temperature values at intervals of between 10 seconds and 255 minutes. Depending on how it is configured, the measurement function will either stop when the memory is full, overwrite existing data or go into sleep mode. As with the pressure transponder, measurements are configured and read off using RFID.

KELLER's RFID pressure trasnsponders are ideal for use wherever vibrations, moisture, dirt or icy conditions make mechanical pressure gauges unsuitable. Reading errors can be avoided thanks to wireless transmission and freely configurable measure points. RFID pressure transponders are particularly advantageous when it comes to monitoring large-scale pressurised facilities such as chemical plants, chillers or large building complexes. Closely related applications include the occasional monitoring of pressure vessels and the inspection of pressure-resistant components. The sturdy, compact and inconspicuous design of the two Series 21 D(C) RFID lets hydraulic pressure be monitored on excavator shovels and clamping chucks.

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Faccin's machines for the production of pipes

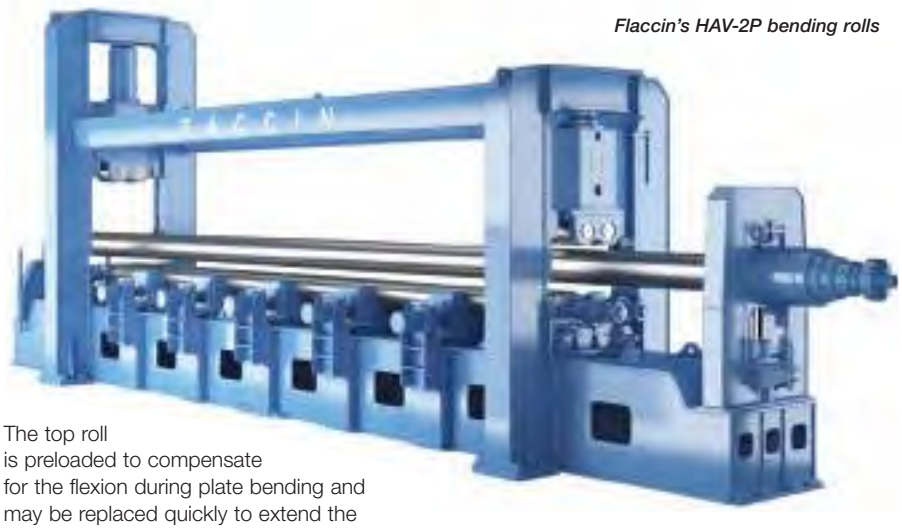
PIPES PRODUCTION TECHNOLOGY is a complex area requiring high levels of experience and technological expertise to deliver machines suitable for the most challenging projects.

Faccin SpA, with a 60,000 sq m facility in Visano, Italy, has many years of experience in the design and manufacturing of special machines, standard and customised, for the production of pipes.

Using the latest technology, the company is involved at every stage of the machine construction process, from receipt of the order to design by the in-house engineering department, from construction of electro-welded structures to machining of structures and forged rolls up to assembly, shipping, installation and training.

In order to meet specific industry production requirements, the company offers the HAV-2P, a series of NC-controlled high-performance pipe mill bending rolls able to support the production of pipes delivering productivity, repeatability and automation of the entire process. These pipe production bending rolls are constructed with extremely sturdy electro-welded structures and are fitted with three rolls in thermally treated steel alloys.

The rolls of the special HAV-2P bending rolls are moved independently – the top roll moves vertically, the lower rolls move horizontally – and allow the power of the machine to be fully exploited, depending on the various thicknesses to be rolled. To offer high performance in the production of long pipes with relatively small diameters, the lower rolls of the HAV-2P bending rolls are supported by backups for their entire length.



Flaccin's HAV-2P bending rolls

The top roll is preloaded to compensate for the flexion during plate bending and may be replaced quickly to extend the range of diameters and thicknesses that can be obtained by rolling.

HAV-2P long bending rolls are designed for rolling plates up to 45 mm thick, ideal for producing pipes up to over 18 metres long, complying with certain technical specifications and roundness tolerances and offering a high quality finished product complying with API standards.

For further increase production speed and automation, Faccin proposes in addition to the HAV-2P pipe mill bending roll, an accurate post-bending machine that prepares the pipe for welding and a series of outboard motorised guide rollers that control the movement of the pipe from the HAV-2P to the post-bending machine and successive working stations.

For specific customer projects, Faccin's professional engineering and R&D department designs and produces customised solutions to the requirements of the most demanding pipes producers.

Faccin has more than 50 years' experience in the design, manufacturing and commercialisation of plate bending rolls, profile bending machines, dished head machinery and special machines including ship frame bending rolls and presses, plate straightening machines.

With technologically advanced production and certified ISO 9001: 2008, Faccin has the largest production facility in the world of bending systems and plate bending machines. Through an extensive network of subsidiaries, Faccin provides thorough sales and after-sales service worldwide.

New partnership to increase efficiency of storing oil and gas project data

QUANTUM CORP. AND Interica have announced a joint solution which enables oil and gas organisations to add cloud archive storage to their exploration workflows.

Interica has certified Quantum Lattus® private cloud object storage for use as an S3 storage target with Project Archive and Retrieval System (PARS®), Interica's advanced project data management solution. The combined solution lowers costs, improves data access and streamlines storage to achieve greater operational efficiency, helping companies confront data growth and tight budgets.

The combined solution lowers costs, improves data access and streamlines storage to achieve greater operational efficiency. (Photo: Singkham/Shutterstock)

Effective exploration for oil and gas generates vast pools of extremely valuable data which must be managed properly. Exploration and production projects incorporate data characterised by a rich variety of sources, locations and file types. Preserving this data requires that it is organised, available, accurate, and enduring across time and technology changes.

Quantum's Lattus private cloud object storage is a self-protecting, self-healing solution that uses 10TB low-power HDDs and cost-effectively scales from 100TB to hundreds of petabytes to deliver cost-efficient capacity, data protection and resiliency with a simple-to-operate, simple-to-scale private cloud architecture. Trusted by the oil and gas exploration industry for over 15 years, PARS® enables companies to manage complex digital content for long-term knowledge retention, compliance, and storage.

The combination of Lattus and PARS® enables users to leverage the benefits of cloud technology to preserve this data without the uncertainty and vulnerability of public cloud services.

PARS® Version 4.4 adds support for public and private S3 destinations such as Lattus to its existing support for tape and disk storage systems, which includes Quantum's high-density Scalar® tape libraries and QXS™ disk storage. When paired with a Scalar tape library, PARS® combines the newest, most operationally efficient tape automation with Lattus for more accessible long-term storage. Data already archived in Lattus may also be copied to tape to protect against online threats such as ransomware, or to provide offline storage or sharing with business partners, while containing storage costs.

Project Databank

Compiled by Data Media Systems

OIL, GAS AND PETROCHEMICAL PROJECTS - BAHRAIN

Project	City	Facility	Budget	Status
BAC - NOGA - Bahrain International Airport Modernization Program - New Aviation Fuel Farm & Fuel Hydrant	Muharraq	Oil Storage Tanks	200,000,000	EPC ITB
Bahrain LNG - Liquefied Natural Gas Receiving and Regasification Terminal	Hidd	Liquefied Natural Gas (LNG)	660,000,000	Construction
Banagas - Central Gas Plant Expansion	Sitra	Gas Treatment Plant	600,000,000	Construction
Banagas - Fuel Pipelines And Storage Facilities Expansion	Sitra	Gas Storage Tanks	80,000,000	Engineering & Procurement
Bapco - A-B Pipeline	Abqaiq - Sitra	Pipeline	350,000,000	Construction
Bapco - Bapco Modernization Program (BMP)	Sitra	Petroleum Oil Refinery	6,000,000,000	EPC ITB
Bapco - Bapco Modernization Program (BMP) - Residue Conversion Unit	Sitra	Petroleum Oil Refinery	800,000,000	EPC ITB
Bapco - Offshore Blocks	Various	Exploration	80,000,000	EPC ITB
NOGA - Gazprom - Liquefied Natural Gas (LNG) Distribution Centre	Various	Liquefied Natural Gas (LNG)	600,000,000	Feasibility Study
PIC - NOGA - Aromatics Complex	Manama	Aromatics	1,000,000,000	FEED
Tatweer Petroleum - Central Gas Dehydration Facilities	Awali	Gas Processing	100,000,000	Construction

Project Databank

Compiled by Data Media Systems

Project Focus

Compiled by Data Media Systems

Project Summary

Project Name	Bahrain LNG - Liquefied Natural Gas Receiving and Regasification Terminal, Hidd
Name of Client	Bahrain LNG
Revised Budget (US$)	741,000,000
Facility Type	Liquefied Natural Gas (LNG)
Status	Construction
Project Start	Q2-2008
End Date	Q4-2018
Main Contractor	AxeTeekay LNG Partners GS Engineering & Construction
Award Date	Q4-2015

Background

Bahrain's National Oil and Gas Authority (NOGA) is planning to build a Liquefied Natural Gas Receiving and Regasification Terminal which will be located in Hidd Industrial area. The terminal will have an initial capacity of 400 million standard cubic feet per day (mmscfd) which is expandable to 800 mmscfd. The project will be developed on a BOOT (Build-Own-Operate-Transfer) basis under a twenty-year agreement commencing on 15 July 2018. The terminal will help Bahrain meet the increasing demand for gas.

Project Status

Date	Status
Jan 2017	Construction works are underway with the project expected to be commissioned in Q4 2018.
Dec 2016	Bahrain LNG has secured a US$741 million syndicated loan for the construction of the project. Arab Petroleum Investments Corp (APICORP), and Korea Development Bank were the institutions leading the limited recourse project financing.
02 Dec 2015	National Oil & Gas Authority (NOGA) and The Oil and Gas Holding Company (Nogaholding) sign agreements for the development of the project with a consortium of Canada's Teekay LNG Partners, SK's Samsung C&T, and the Gulf Investment Cooperation (GIC).
02 Dec 2015	The winning consortium selects GS Engineering & Construction as the EPC contractor. The EPC contract has a total value of US$645 million. Teekay LNG will supply the FSU vessel for 20 years.
Nov 2008	NOGA has signed a MOU with Hess Corporation for the establishment of an LNG import terminal.

Project Scope

The project scheme includes:

- Floating storage unit (FSU)
- Subsea gas pipelines from the platform to shore
- Offshore LNG receiving jetty
- Onshore gas receiving facility
- Breakwater
- Regasification platform
- Onshore nitrogen production facility

Project Finance

The LNG terminal will be owned and operated by Bahrain LNG WLL, a new joint venture owned by NOGA (30 per cent) and a consortium of Teekay LNG, Samsung and the GIC (70 per cent). A syndicate of nine international and regional banks is participating in the 20-year loan for the first such project to be developed on a PPP basis in the Middle East.

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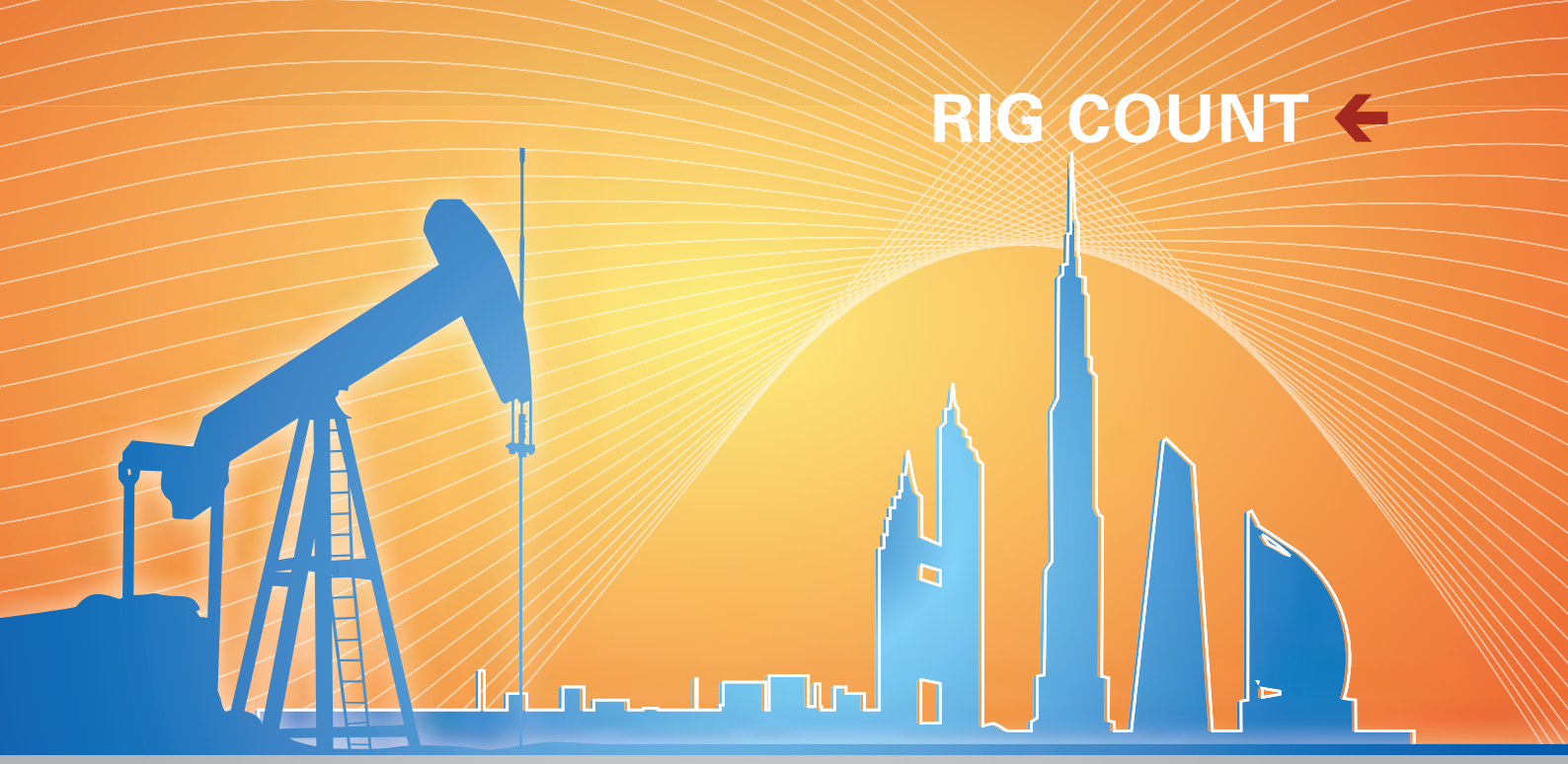

Middle East & North Africa

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

	THIS MONTH			VARIANCE	LAST MONTH			LAST YEAR		
Country	Land	OffShore	Total	From Last Month	Land	OffShore	Total	Land	OffShore	Total
Middle East										
ABU DHABI	33	14	47	-1	33	15	48	25	11	36
DUBAI	0	2	2	0	0	2	2	0	2	2
IRAQ	40	0	40	-1	41	0	41	61	0	61
JORDAN	0	0	0	0	0	0	0	0	0	0
KUWAIT	59	0	59	7	52	0	52	45	0	45
OMAN	56	1	57	0	57	0	57	57	0	57
PAKISTAN	21	0	21	0	21	0	21	19	0	19
QATAR	5	6	11	1	5	5	10	2	7	9
SAUDI ARABIA	103	17	120	-4	105	19	124	97	18	115
SUDAN	0	0	0	0	0	0	0	0	0	0
SYRIA	0	0	0	0	0	0	0	0	0	0
YEMEN	0	0	0	0	0	0	0	3	0	3
TOTAL	317	40	357	2	314	41	355	309	38	347
North Africa										
ALGERIA	50	0	50	-1	51	0	51	49	0	49
EGYPT	18	5	23	-2	19	6	25	46	16	52
LIBYA	0	1	1	0	0	1	1	4	3	7
TUNISIA	1	0	1	-1	1	1	2	0	3	3
TOTAL	69	6	75	-4	35	8	79	102	9	111

Source: Baker Hughes

المناطق فرصة حقيقية لتحسين كفاءة الأصول الحالية بضخ استثمارات قليلة نسبيا.

فهناك العديد من مجالات التنفيذ المرتبطة بإدارة الأصول، والتي اتبعتها الشركات على مدى السنوات القليلة الماضية، وقد حققت بعض النتائج الرائعة. ينطبق ذلك ـ بوجه خاص ـ على شركات التكرير التي تبنت منهجا شاملاً واستراتيجية كاملة لتحسين عمليات الشركة الأساسية في مجالات مثل؛ كفاءة الطاقة، والتوافر التشغيلي والميكانيكي، وتحسين الإنتاج ومجموعة المنتجات، وإيقاف النفقات غير المجدية، وأتمتة الإنتاج وجعله مبنيا على المعلومات.

واليوم تعتبر السلامة إحدى أكبر المخاوف التي تساور جميع أصحاب مصافي التكرير. فقد شهدنا العديد من الحوادث المفجعة التي وقعت في منطقة الشرق الأوسط وروسيا وأوروبا والولايات المتحدة خلال العام الماضي. ولهذا يجدر بالشركات إجراء إعادة النظر المستفيضة للأصول الحالية، بحيث تحتل السلامة ـ دوما ـ أولى الأولويات.

فالشركات يتعين عليها أن تكون على دراية بالقيود المتعلقة بالأجهزة والمعدات الرئيسية حتى تدرك كيفية إجراء عملياتها بأمان وبشكل أفضل، اليوم وفي المستقبل. ويتطلب ذلك إجراء فحوص شاملة لكل وحدة عاملة. وقد تُجرى عمليات التدقيق باستخدام موارد الشركة الخاصة أو بالاستعانة بشركة طرف ثالث للحصول على رأي مستقل بشأن الحالة الفعلية للأجهزة والمعدات إلى جانب تلقي التوصيات المتخصصة في المجالات التي تحتاج إلى التطوير، والمدى الممكن لرفع الكفاءة بوجه عام.

يمكن تطبيق المنهجيات المختلفة على إدارة الأصول (البيانات)، بالاستعانة بالموارد الداخلية والخاصة بأطراف ثالثة، وجدير بالذكر أن العديد من الشركات تستخدم كليهما. وبالإمكان أن يستغرق تطبيق البرنامج الكامل، لاستقدام الطرق والتقنيات الجديدة، على الأقل ثلاث سنوات. وهو يتم في الغالب على ثلاث مراحل:

- التصميم
- التطبيق
- الدعم والتطوير.

بعد استكمال مرحلة التصميم، يجب تطبيق أية تغييرات ضرورية خلال مرحلتي الإنشاء وبدء التشغيل، بما في ذلك الاختبار وإنهاء الإجراءات، والتحقق من المستندات والعناصر الأساسية، مثل حواجز ومستويات السلامة كالصمامات والعزل وإنذارات الطوارئ وما إلى ذلك.

أثناء التشغيل، يجب أن تخضع كافة عناصر نظام سلامة الأصول للصيانة من قبل المُشغلين ومديري الصحة والسلامة والبيئة. ويجب استكشاف الحدود التشغيلية الجديدة، وتطبيق ومراجعة إجراءات إدارة التغييرعند تغيير ظروف التشغيل. كما يجب وضع منهج استباقي يفرض تدابير وقائية للمحافظة على مستويات عالية من السلامة والكفاءة. ويجب أيضا توثيق، والإبلاغ عن، أي تغيير، فضلاً عن الحوادث أو التدخلات المهمة، من أجل مراقبة الأصول طوال دورة حياتها.

يجب على الشركات أن تدرس تشخيص الموقف الحالي، وإعداد خطة عمل واستراتيجية لتحسين أداء الأصول. وهناك بعض المجالات الحرجة التي تشمل إعادة الهيكلة لتقليل الأوقات المهدرة، وتقليل تكاليف الصيانة، وذلك عبر استخدام الأنظمة المتطورة والفعالة للتفتيش والمراقبة من أجل تقليل المخاطر، ومهام الصيانة غير المخطط لها.

ومن بين الطرق التقليدية المتبعة لضمان سلامة الأصول، إجراء تحليل الفجوة واختبار الأداء، وعمليات التفتيش والتدقيق، فضلا عن تقييم التآكل، والمراجعة والصيانة، وتكامل العمليات باستخدام الأدوات البرمجية. ولمضاعفة الإنتاجية، يمكن تطوير قائمة تضم مؤشرات الأداء الرئيسية، وتتضمن مؤشرات الصحة والسلامة والبيئة التي تنطبق على تقييم حالة سلامة الأصول.

وبإطالة عمر الأصول الحيوية، يمكن ترشيد تكاليف المستودعات، وتوفير الكثير من المال. ينضم ذلك إلى هوامش الربح المتزايدة، ويُعبّد الطريق إلى النجاح. ومن شأن خدمات إدارة الأصول تمكين الشركات من إدارة أصولها وأنظمتها بطريقة مستدامة، لأجل تحسين الأداء والإنفاق بأقل درجة ممكنة من المخاطر على مدار دورة حياة المنشأة بالكامل، ومضاعفة العائد على استثمارتها القائمة على الأصول.

وفيما يلي العناصر اللازمة لضمان إحراز النجاح بأفضل صورة ممكنة أثناء عملية التطبيق:

- فريق العمل والتواصل.
- أهداف ومهام S.M.A.R.T. (محددة، قابلة للقياس، يمكن تحقيقها، واقعية، في حينها).
- مراقبة وتحليل الأداء بشفافية.
- الانفتاح على الإبداع والمناقشة.

لا يجب النظر إلى العمل الدؤوب للمحافظة على سلامة الأصول وقدرتها على المنافسة فقط بوصفها مجرد تكاليف زائدة لحماية الأجهزة والمعدات من التدهور الذي لا مفر منه (بعض الشركات فضل في السابق شراء أجهزة ومعدات جديدة بدلاً من إنفاق المزيد من المال على الأصول التي تتطلب رأس المال الضخم خلال دورة حياتها). غير أنه بسبب الظروف الاقتصادية الحالية، يتوجه الملاك نحو اتخاذ قرارات استثمارية رشيدة.

يجري تطبيق المنهج الجديد، المُدرك للأصول، على كافة صناعات المعالجة، وقد أحدث بالفعل تغييرا جذريا في مجال النفط والغاز. وبتحسين الكفاءة نرتقي بالسلامة ونقلل مخاطر وقوع الحوادث الناجمة عن التسريبات، وتعطل الأجهزة وما إلى ذلك، علاوة على تقليل مخاطر وقوع الحوادث الكبيرة.

وعندما يتعلق الأمر بتحسين العمليات، يجب على شركات مصافي النفط التركيز على عدد من مجالات المشروعات الرئيسية، ومنها:

- **السلامة:** التدريب بالمحاكاة والتحكم عن بُعد، تحديد المخاطر وقابلية التشغيل، والتدريب على إدارة سلامة العمليات.
- **تكاليف الإنتاج:** تحسين المزج داخل الأنابيب، ووضع برامج تقليل الخسائر.
- **هامش الربح:** بلوغ الحد الأقصى من الإنتاجية، ومضاعفة الإيرادات.
- **هامش الربح:** وضع إستراتيجية صيانة استباقية – المساعدة في تقليل الأعطال غير المخطط لها.
- **هامش الربح:** الإدارة المُوحدة لسلسلة التوريدات. تحسين المواد الأولية وقائمة المنتجات لتلبية متطلبات السوق.

تبدو الاعتبارات الاقتصادية لهذه الأنواع من المشروعات، جذابة للغاية بوجه عام. فقد تطلبت مستويات الاستثمار نطاقا يتراوح بين ١٠ ملايين دولار أمريكي إلى ١٥ مليون دولار أمريكي لكل منشأة، وقُدِّرت فترة استرجاع رأس المال بين ستة أشهر و١٨ شهرا، بينما قُدِّرت الأرباح السنوية (شاملة المبالغ المُوفَّرة) بـ ١٠ إلى ١٥ مليون دولار أمريكي بحد أدنى.

وحتى يتسنى لمصانع التكرير خوض غمار المنافسة في ٢٠٢٠، يتعين عليها تطبيق معايير السلامة والتحلي بالكفاءة والنظافة والمرونة والذكاء.

بالإمكان تحسين كفاءة مصانع التكرير باستثمار أقل نسبيا

تحسين مستوى السلامة وهوامش الربح عبر إدارة الأصول بشكل أفضل

حتى يتسنى لمصانع التكرير خوض غمار المنافسة في ٢٠٢٠، يتعين عليها تطبيق معايير السلامة والتحلي بالكفـــاءة والنظافـــة والمرونة والذكاء. وفي هذا المقال، يناقـــش كلٌ من كولين تشابمان، رئيس شركة «يورو بتروليام كونسالتنتس» وإيكاترينا كالينيكو- مديرة المشاريع بالشركة، الإستراتيجيات التي تهدف إلى تحسين السلامة وهوامش الربح عبر إدارة الأصول بشكل أفضل.

شهد أداء الأصول الخاصة بمرافق التكرير وصناعات البتروكيماويات، على مدار السنوات السابقة، تدهوراً مطرداً. هذا علاوةعلى انكماش هوامش الربح التي تحققها. ويرجع ذلك إلى عدة عوامل، منها وقف التشغيل المتكرر وغير المخطط له، وفي بعض الحالات وقوع حوادث كبرى، إلى جانب الطاقة الإنتاجية الزائدة في العديد من المناطق، والتي تؤدي إلى احتدام المنافسة، وانخفاض الطلب.

وعلى الرغم من هذا التوجه، يتراءى لنا نشاطٌ متجددٌ في المشروعات الجديدة بمناطق معينة، لا سيما في أمريكا الشمالية، حيث تعكف شركات تكرير النفط على تجديد الأصول لاستيعاب المواد الأولية التي تشهد تغييرات. وعلى صعيد آخر، تعتبر منطقة الشرق الأوسط ضمن أكبر المستثمرين في القدرات الجديدة. فإيران ـ على سبيل المثال ـ تركز على المشروعات الاستثمارية الكبرى لجميع مصافي النفط الخاصة بها، إن أمكن توفير التمويل. وتحاول الدول الآسيوية ودول أمريكا الجنوبية تخصيص مواردها لتلبية الاحتياجات الداخلية المتزايدة، وفي نفس الوقت مواصلة التصدير للأسواق الخارجية. ولاشك أن ظروف اليوم، المفعمة بالتحديات، تدفع المستثمرين في مصافي النفط إلى تعظيم قدرتهم على المنافسة من أجل المحافظة على هوامش أرباحهم وزيادتها. هذا وتمتلك العديد من

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الشركة ستوفر الخدمات لمشروعات ضخمة في عمان

إس إن سي لافالين تفـــوز بعقـد في عمـان

أعلنت شركة إس إن سي لافالين عن توقيع شركة كينتز العالمية المملوكة لها اتفاقية لمدة خمس سنوات لتوفير خدمات الدعم وبدء أعمال التشغيل لمشاريع شركة تنمية نفط عمان. وبموجب الاتفاقية، ستتولى كينتز توفير مجموعة متنوعة من الأنظمة المتكاملة، وأنشطة الخدمات التشغيلية، والتكليف لمجموعة من مشروعات النفط والغاز العملاقة في عمان تشمل مشروع «رباب هرويل» المتكامل ومشروع «جبال خف». وقال مارتن إدلر، رئيس إدارة النفط والغاز بشركة إس إن سي لافالين: «يسرنا دعم شركة تنمية نفط عمان لهذه المخططات المتكاملة التي تعتبر محورا أساسيا لاستمرار خدمة عملائنا على المدى الطويل. وهذه الاتفاقية هي الأولى مع شركة تنمية نفط عمان وستساهم في توسيع أعمالنا في المنطقة. كما أنها تعزز سمعتنا الجيدة في تحسين عمليات تسليم المشروعات وضمان نجاح المشروعات الجديدة لعملائنا». علما بأن مدة الاتفاقية تستمر من ٢٠١٧ حتى ٢٠٢٢. وسوف يتعاون فريق خبراء إس إن سي لافالين مع فريق شركة إدارة تنمية نفط عمان لبدء أعمال التشغيل، وتشمل جميع الخدمات المتكاملة للأنظمة، والتكليف وإدارة بدء التشغيل، والتخطيط والاستشارات، والإشراف والتنفيذ، والإدارة لمختلف منشآت النفط والغاز التي يشملها المشروع. وبموجب هذا العقد، ستتولى شركة إس إن سي لافالين أيضا تطبيق برامج تدريب تقنية مخصصة. حيث يساهم ذلك في تدريب وتطوير مهارات العمانيين لإكمال المشروعات وبدء أنشطة التكليف والتشغيل بشكل مستقل، وذلك من خلال التعاون الوثيق مع البائعين المحليين المتخصصين لتحقيق أكبر قدر ممكن من إستراتيجية شركة تنمية نفط عمان في الدولة، والتي تهدف لتحقيق الفوائد التقنية والتجارية المستدامة للسلطنة.

أرامكو وبيكر هيوز تقدمان نظام المضخات الكهربائية الغاطسة المُوزَّعة عبر الكابلات

أعلنت أرامكو السعودية وبيكر هيوز عن تركيب أول نظام TransCoil للمضخات الكهربائية الغاطسة لا يحتاج إلى منصة حفر، والمصمم لمساعدة المُشغلين على زيادة سرعة الإنتاج في الآبار، وخفض التكاليف المرتبطة بتركيب واستبدال المضخات الكهربائية الغاطسة. ولهذا أصبح بإمكان المُشغلين الآن تقليل فترات تأجيل الإنتاج، وخفض تكاليف الرفع الكلية، مما يسمح بتحقيق أقصى فائدة اقتصادية من أصولهم، وذلك نظرا لقدرتهم على الاستغناء عن منصات الحفر في الحقول، حيث تكون هناك مخاوف من تواجد المنصات أو تكاليف التدخل العالية من خيارات الرفع الاصطناعي للنفط.

يضم نظام TransCoil، الذي تم تطويره بالتعاون مع أرامكو السعودية، نظام مضخات كهربائية غاطسة مُحوَّل يتصل فيه المحرك مباشرة بتكوين جديد ومخصص من كابلات الطاقة. وهو يغني عن الحاجة إلى توصيلات الطاقة من الكابلات إلى المحرك بنظام المضخات الكهربائية الغاطسة التقليدي، ويرفع من كفاءة النظام بوجه عام. وفيما يختلف عن أنظمة المضخات الكهربائية الغاطسة المُوزعة عبر الأسلاك، لا يضم نظام TransCoil القابل للاسترداد بالكامل «وصلة رطبة» داخل البئر تتطلب منصة حفر لسحبها واستبدالها في حالة تلفها. هذا ويرفع تصميم كابلات الطاقة المبتكر كفاءة سلسلة التوزيع، مقارنة بالمضخات الكهربائية الغاطسة الموزَّعة عبر الأنابيب الملتفة، والتي تسحب كابل الطاقة فقط عبرهذه الأنابيب. وقد أُجريت اختبارات الإجهاد الشاملة، وتحليل النمو الحراري في مركز بيكر هيوز للبحوث والتصميم الهندسي للأنابيب الملتفة، وذلك بهدف تحسين اختيار المواد وتصميم النظام. ويساعد تصميم كابلات نظام TransCoil أيضا في توسعة نطاق التشغيل، ليصل إلى ١٢ ألف قدم، مقارنة بأنظمة المضخات الكهربائية الغاطسة التقليدية الموزعة عبر الأنابيب الملتفة. وقد تم تركيب نظام TransCoil مؤخرا وبدأ تشغيله في حقل خريص الذي تتولى أرامكو السعودية تطويره.

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وكالة الطاقة الدولية تتـــوقع نقص العرض عقب 2020

إمدادات النفط قد تتعثر في مواجهة الطلب عقب ٢٠٢٠

طبقا لآخر توقعات وكالة الطاقة الدولية حول سوق النفط خلال الأعوام الخمسة الماضية، ربما تشهد إمدادات النفط العالمية انخفاضا ملحوظا لا يُمكّنها من مواكبة الطلب بعد العام ٢٠٢٠، مما ينذر بارتفاع حاد في الأسعار، ما لم يتم اعتماد مشروعات جديدة في القريب العاجل. فحسب تقرير تحليل وتوقعات حالة السوق، الصادر عن وكالة الطاقة الدولية «النفط ٢٠١٧»، تبدو الحالة العالمية مستقرة خلال السنوات الثلاث المقبلة، غير أن نمو العرض سيشهد تباطؤا ملحوظا عقب ذلك. فالعرض والطلب سيتجهان نحو الانكماش الحاد في سوق النفط العالمية، مع انخفاض الطاقة الإنتاجية الاحتياطية خلال ٢٠٢٢ إلى أدنى مستوى لها في ١٤ عاما. فالطلب على النفط من المتوقع أن يرتفع خلال السنوات الخمس المقبلة، متجاوزاً النطاق الشائع، فيبلغ ١٠٠ مليون برميل يوميا في ٢٠١٩ ليصل إلى حوالي ١٠٤ مليون برميل يوميا بحلول ٢٠٢٢. ويعود ذلك النمو في الطلب إلى الدول النامية تتصدرها الدول الآسيوية، والتي تستهلك ما يقرب من سبعة من كل عشرة براميل إضافية يتم استهلاكها على مستوى العالم. وسوف تتجاوز الهند الصين ـ حينئذ ـ في زيادة الطلب على النفط. وعلى الرغم من أن المركبات الكهربائية تلعب دورا مهما في الطلب على النفط، فإن وكالة الطاقة الدولية تتوقع أنها ستحل محل كميات محدودة من الوقود المستخدم في وسائل النقل بحلول ٢٠٢٢.

ومن بين دول أوبك، سوف تأتي أغلب الإمدادات الجديدة من كبرى الدول الشرق أوسطية المنتجة للنفط منخفض التكلفة، وهي العراق وإيران والإمارات العربية المتحدة. بينما من المتوقع أن يتراجع إنتاج دول أخرى مثل نيجيريا والجزائر وفنزويلا. ومن المتوقع أيضا ـ حسب التقرير ـ أن يظل إنتاج روسيا مستقرا خلال السنوات الخمس المقبلة.

كما يلقي هذا التقرير الضوء أيضا على التغييرات التي طرأت على تدفقات تجارة النفط الدولية، والاستثمارات في البنية الأساسية للتخزين. وعلى آسيا أن تبحث عن منتجين آخرين بخلاف منتجي الشرق الأوسط، لاستيفاء متطلباتها المتنامية من واردات النفط. ومع تركيز دول أوبك على تعزيز قدرات التكرير المحلية لسد الاحتياج المحلي وزيادة صادرات المنتجات المُكررة، من المتوقع أن ترتفع صادرات البرازيل وكندا لتتخطى منطقة الشرق الأوسط.

أدنــوك تضــع الخطـوط العريضـة لخطط التنميـة طويلـة الأجـل

تتطلع شركة بترول أبوظبي الوطنية «أدنوك» إلى عقد شراكات إستراتيجية جديدة تحقق قيمة إضافية وتدعم خطط النمو المستقبلية، وذلك فيما تواصل التزامها بتلبية الطلب العالمي المتزايد على الطاقة، والاستجابة لزيادة التنافسية في سوق الطاقة.

جاء ذلك في الكلمة التي ألقاها الدكتور سلطان أحمد الجابر، وزير الدولة والرئيس التنفيذي لمجموعة شركات أدنوك، ضمن فعاليات أسبوع «سيرا» الذي يعد أحد أهم منتديات الطاقة في العالم. وقد أكد الجابر حصر الشركة على إقامة الشراكات المبتكرة، بما يضمن الموازنة بين رفع الكفاءات التشغيلية وخفض التكاليف عبر تنفيذ إستراتيجية النمو الذكي التي من شأنها تعزيز القيمة في كافة جوانب الأعمال.

أدنوك دعمت شركاتها العاملة في حقول النفط البحرية

وقال الجابر: «نحن حريصون على التعاون مع شركاء إستراتيجيين قادرين على تقديم قيمة إضافية، والقيام بدور مُكمل لخبراتنا الحالية عبر توظيف التكنولوجيا المتطورة، وتوفير فرص جديدة في أسواق الطاقة وضخ الاستثمارات. كما أننا نتطلع إلى العمل مع شركاء لديهم استعدادٌ للالتزام بالاستثمار طويل الأجل، ومشاركة المخاطر والمزايا، على ألا تقتصر الشراكات فقط على أعمال التنقيب والإنتاج، وإنما تشمل سلسلة القيمة بالكامل، بما في ذلك شركات خدمات الموانئ والخدمات البحرية».وأشار الجابر إلى اتفاقيات الامتياز التي وقعتها أدنوك مؤخرا مع كلٍ من شركة «بي بي» وشركة بترول الصين الوطنية والشركة الصينية المحدودة للطاقة، كأمثلة على النهج الجديد لبناء نماذج مبتكرة للشراكات التي تحقق المنفعة المتبادلة، وإضافة الديناميكيات الجديدة للقطاع. فعلى مدى العام المنصرم، سعت أدنوك لدعم شركاتها العاملة في حقول النفط البحرية، وهي شركة أبوظبي العاملة في المناطق البحرية (أدما العاملة) وزادكو، ودمج شركاتها المتخصصة في مجال خدمات الموانئ والخدمات البحرية «إسناد» و«إرشاد» و«أدناتكو». وأوضح معالي الوزير قائلا: «ركزنا في أدنوك على استثمار القدرات التي تتيحها عمليات الدمج والتكامل، وتوحيد وتنسيق الإجراءات، وتعزيز كفاءة وفعالية العمليات، والتكاليف في جميع شركات المجموعة. وقد ساهمت هذه الجهود في تخفيض المصاريف التشغيلية لتكلفة إنتاج برميل النفط».

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