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Editor's note

DIGITAL TRANSFORMATION WILL be key for the oil and gas industry as it seeks to redefine itself in the face of climate change and economic pressures. This was a strong theme at the Baker Hughes Annual Meeting (see p30) and other leading industry events. In this issue we examine how AI and disruptive technologies are transforming operations in areas ranging from corrosion protection (p34), to pipeline operations (p33) and artificial lift (p28).

We also report on the Gulf Downstream Association (GDA) Virtual Conference, which explored the leadership qualities needed and ingredients required for delivering efficient capital projects, at a time when the COVID-19 pandemic has caused unprecedented disruption to business (p38).

Also in this issue we give an update on Bahrain's oil and gas developments (p12), look at Iraq's efforts to reduce flaring (p16), discuss the latest seismic acquisition trends (p22) and advise on process safety fundamentals (p36).

Contents

➔Executives' Calendar, 2021

APRIL			
6-7	**UAE HSE Forum 2021**	DUBAI	www.hse-forum.com
MAY			
24-27	**Middle East Oil & Gas Show (MEOS 2021)**	MANAMA	www.meos-expo.com
25-26	**OWI MENA**	DUBAI	www.offsnet.com/owi-mena
JUNE			
7-9 June	**EGYPS**	CAIRO	www.egyps.com
14-16	**Middle East Energy**	DUBAI	www.middleeast-energy.com
AUGUST			
16-19	**OTC**	HOUSTON	2021.otcnet.org
SEPTEMBER			
13-15	**Oman Petroleum & Energy Show**	MUSCAT	www.omanpetroleumandenergyshow.com
13-16	**Gastech**	SINGAPORE	www.gastechevent.com
28-30	**OMC**	RAVENNA	www.omc.it
OCTOBER			
4-7 October	**GEO**	MANAMA	www.geo-expo.com

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

OWI MENA comes to Dubai

The world's premier well intervention conference series is celebrating its sixth year in the Middle East and North Africa. OWI MENA will be coming to Dubai on 25-26 May, providing a forum to explore best practice processes and new technologies to optimise well intervention efficiency to suit the current environment.

The conference this year focuses on six key themes:

- Well Integrity: understand how operators are predicting future well integrity problems to ensure that the wells remain safe, secure, and compliant
- Plug & Abandonment: access exclusive P&A case-studies and see what P&A activity is ongoing across the MENA region
- Production Optimisation: access the latest opportunities and technologies that enhance oil production, including frac, re-frac and zonal isolation best practice
- Brownfield Management: hear unique insights into production enhancements from aging wells through the use of new technologies and strategic planning
- Transformative Technology: test new technologies that are transforming industry practises in the exclusive technology showcase hall
- Collaborate and Change: discuss the collaborative relationship between operators and contractors to deliver well intervention programmes in light of COVID-19 and a low oil price environment.

To explore these topics the conference will be hosting more than thirty speakers from companies including ADNOC, Saudi Aramco, Dragon Oil, Wintershall Dea, BAPETCO, Agiba Petroleum Company and the General Petroleum Company.

In addition to this, a technology hall will showcase the latest in well intervention innovations and allow you to get to grips with technologies that could help shape your company's future.

As a minimum, the conference organisers guarantee at least third of attendees will come from operating companies, and another third from well service companies.

For more information, visit https://www.offsnet.com/owi-mena/conference-brochure

The event will focus on best practice processes and new technologies to optimise well intervention efficiency.

Image Credit: Shutterstock

Bringing the health and safety community together with a shared purpose

PREPARATIONS ARE IN full swing for the eagerly anticipated Health, Safety & Environment UAE Forum, which is returning to Dubai for its sixth edition. More than 100 delegates are expected to take part in the event, which takes place from 6-7 April, 2021.

As the UAE's infrastructure industry continues to deliver multi-billion dollar projects, the health and safety regulations in the country are becoming increasingly stringent, and ambitious socioeconomic reform programmes, such as the UAE Vision 2021 continue to drive heavy investments in the sector. An investment of US$1.8bn is currently under implementation by Dubai Municipality for environment and sustainable projects in an effort to preserve environment and protect the health and safety of people in the UAE.

The HSE UAE Forum will offer a platform to navigate the latest UAE regulatory changes and explore global best practices for an optimised HSE function. On the agenda for this year's forum are six key sessions addressing the most business critical aspects of HSE in the UAE. These cover exclusive regulatory updates to optimise organisational HSE performance; best practices on HSE operations post COVID-19; sustainability to reduce carbon footprint for your business; digital transformation, the impact of disruptive technologies and high speed communication; working in hazardous environments; and transformative technologies that are having an impact on HSE projects.

Image Credit: Alan Charles Publishing

The event will bring together health and safety professionals, government regulators and solution providers.

The forum brings together health and safety professionals, government regulators, policymakers and solution vendors. Expert speakers from the industry include Eng. Raed Marzooqi, head of safety engineering and accidents investigation, Dubai Municipality UAE; Hafidh Masoud, head of aerodrome safety, Dubai Civil Aviation Authority, UAE; Dr. Maisoon Ali Al Shaali, head of environmental section, UAE Ministry of Health and Prevention; Dr. Mona Shawki, specialist, occupational medicine, UAE Ministry of Health and Prevention; Salem Salmeen Alnuaimi, head of safety, National Crisis & Disaster Management Authority, UAE and more.

The event will also feature a Technology Showcase demonstrating the latest innovations and products to enhance HSE performance.

"We have been participating in the HSE UAE Forum almost every year," said Eng Raed Marzooqi. "This platform helps us in communicating Dubai Municipality's health and safety vision and educating stakeholders in terms of new health and safety issues and related improvements. We look forward to this forum, to be very informative and to help the understanding of health and safety, and also to hear from various other stakeholders, which helps us to improve our governance in health and safety. This also ties in with our awareness-raising efforts overall."

For more information visit: www.hse-forum.com/dubai/conference brochure. All safety protocols required by the local authorities will be implemented at the event.

Low carbon oil to play central role in energy transition

LOW CARBON OIL will play a central role in the energy transition, according to Dr Sultan Ahmed Al Jaber, the UAE minister of industry and advanced technology and managing director and group CEO of the Abu Dhabi National Oil Company (ADNOC).

Speaking at CERAWeek alongside Vicki Hollub, CEO of Occidental, during a virtual panel session, Dr Al Jaber explained that the UAE is uniquely positioned to provide lower carbon oil and gas for as long as the world still relies on hydrocarbons.

Image credit: ADNOC

The ADNOC group CEO (right) at CERAWeek 2021.

"When it comes to low carbon oil and gas, the UAE has a dual advantage; a leadership that has always put environmental protection first, and a natural advantage, because our geology gives us some of the least carbon-intensive oil in the world," Dr Al Jaber said as he went on to explain that the UAE has been preparing for the energy transition for over 15 years.

"Rather than shy away from it, we have always seen the energy transition as an opportunity to diversify and develop our economy. As the founding CEO of Masdar, I was closely involved in growing the UAE's renewable investments, and today, the UAE has three of the largest and lowest-cost solar projects in the world with significant renewable energy projects in 30 countries globally."

Thameen-1 exploration well on Block 49 encounters hydrocarbons

THE EXPLORATION WELL Thameen-1 on Block 49 onshore Oman has drilled to its final total depth and wireline logging operations have been completed.

The well has encountered hydrocarbon shows in the primary target, the Hasirah Sandstone. The next step in evaluating the well is to commence a well testing programme in an attempt to flow hydrocarbons to surface. The result of the testing programme is expected within three weeks.

"We are very encouraged by the progress so far and it is great news for the overall prospectivity of the Block. Now we have to be patient for another three weeks as we await the test results," said Tethys Oil AB's managing director Magnus Nordin.

Tethys Oil AB, through its wholly owned subsidiary Tethys Oil Montasar Ltd, is the operator of the Block and holds a 50% working interest in the exploration and production sharing agreement covering the Block.

Total and Zahid Group to develop SAFEER

JEDDAH-HEADQUARTERED ZAHID GROUP, represented by 'Altaaqa Alternative Solutions,' and the French energy company Total, represented by 'Total Solar Distributed Generation,' have established a joint venture named SAFEER – Saudi French for Energy Efficiency and Renewables.

Image credit: Total

Julien Pouget is the senior vice-president renewables at Total.

In line with Zahid Group's and Total's commitment to the kingdom of Saudi Arabia Vision 2030, SAFEER's mission is to bring affordable and reliable solar energy solutions to commercial and industrial customers across the kingdom of Saudi Arabia,. This involves the development of the ecosystem for distributed generation through the delivery of state-of-the-art solutions, development of local content and talent while maintaining a second-to-none commitment to safety and quality.

Specialising in commercial and industrial solar installations on rooftops and carports, the joint venture will leverage Total's expertise across the entire solar value chain and Altaaqa's 18 years of leadership in delivering independent power and water utility solutions in the kingdom.

The Zahid Group and Total have a track record of successful investments in the kingdom's oil and gas and energy sectors, creating numerous career opportunities while also being catalysts in the elevation of industry standards and best practices.

GlobalData: 2021 to see a bump in final investment decisions across EMEA

WITH DELAYS AND COVID-19 restrictions hampering oil and gas project timelines in 2020, 2021 is forecast to see a bump in both field starts and final investment decisions across the Europe, Middle East and Africa (EMEA) region, according to GlobalData.

Daniel Rogers, senior oil and gas analyst at GlobalData, commented, "A strong start to 2021 has resulted in a number of project approvals across EMEA so far, including the giant US$30bn North Field East development in Qatar, which could well be the largest upstream project sanctioned globally this year. 2021 has provided a ray of optimism for the sector so far, as 2020 experienced multi-year lows for project starts and a slump in upstream investment, seeing a decline of approximately 30% in global upstream development and production capex."

The market turbulence in 2020 led to the majority of E&P companies opting to defer project investment decisions amid capital preservation measures. This year could see those projects reconsidered for investment as lockdown measures ease and oil prices return to pre-COVID-19 levels while economies commence recovery.

Rogers continued, "Some critical projects across Africa are poised for final approval, including Uganda's first major oil development – the Tilenga oil project led by Total. Furthermore, Morocco's first offshore gas development, Anchois, aims to play a pivotal role in the country's strategy of reducing gas imports from Algeria and transitioning to lower carbon energy."

Qatar Petroleum sanctioning the giant North Field East project earlier this month emphasises the long term viability and commerciality of mega LNG projects. However, it may also raise competition for targeting LNG buyers into the late 2020s, potentially creating challenges for upcoming LNG developments elsewhere in the USA, Canada and Mozambique. Other notable projects due for sanction are UAE-based gas developments including the multibillion-dollar Hail and Ghasha sour gas projects and development of the Umm Shaif gas cap.

Rogers concluded, "Despite continued trepidation going into 2021, the upstream sector will be optimistic with the price recovery and investment commitments already seen so far. Sustained prices above US$60 per barrel could well move forward developments that have been put on hold across EMEA throughout 2020."

3t Energy Group sees surge in demand for digital twins

3T ENERGY GROUP is seeing a surge in enquiries from global energy companies for digital twins, which create immersive and highly effective learning environments ideal for remote training. As well as replicating physical environments, digital twin technology enables companies to realistically reproduce work site procedures so workers can learn and practise before entering a live work environment.

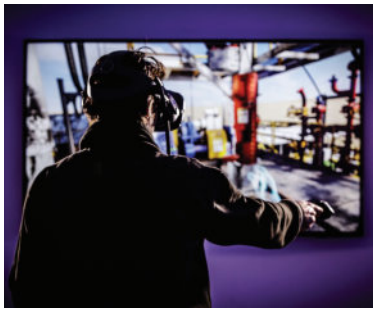

Image credit: 3T Energy Group

Digital twins create effective learning environments.

Challenges around COVID-19 and an industry-wide digital push are resulting in many companies looking towards digital twins as a viable training and competency assessment option.

3t Energy Group's technology company, 3t Transform, has been commissioned for a number of digital twin projects for clients such as SANAD, DNV GL and BP.

For BP, 3t Transform is developing a bespoke four-week training programme for the operational personnel on the Greater Tortue Ahmeyim development project, which includes creating a virtual reality digital twin of BP's facilities, to help deliver an immersive experience of the project. Using the digital twin, the operational personnel will be able to familiarise themselves with the layout of the facilities and learn operating systems and procedures.

Operational personnel will begin training this summer before joining the facilities during facility construction and commissioning. Up to 100 personnel will go through the training programme over the next 18 to 24 months.

Gavin Taylor, vice-president for the global sales and strategy for 3t Energy Group, said, "We specialise in creating realistic, immersive learning environments, which replicate real-world scenarios and procedures allowing workers to test skills and knowledge in a safe setting, and we are seeing an increase in the number of enquiries for this type of training and competency assessment."

Shell signs agreement for onshore upstream interests in Egypt

SHELL EGYPT AND one of its affiliates have signed an agreement with a consortium made up of subsidiaries of Cheiron Petroleum Corporation and Cairn Energy PLC to acquire Shell's upstream assets in Egypt's Western Desert for a base consideration of US$646mn and additional payments of up to US$280mn between 2021 and 2024.

The transaction is subject to government and regulatory approvals and is expected to complete in the second half of 2021.

The package of assets consists of Shell Egypt's interest in 13 onshore concessions and the company's share in Badr El-Din Petroleum Company (BAPETCO).

Wael Sawan, Shell's upstream director, said, "The deal will enable Shell to concentrate on its offshore exploration and integrated value chain in Egypt. It will help Egypt maximise the potential of its onshore assets through new investment, helping secure energy and revenue."

Image credit: Adobe Stock

The deal is expected to add more value to Shell and boost Egypt's energy diversification strategies.

MEA's oil and gas industry saw a rise of 6.45% in cross border deal activity

LED BY ENERGEAN'S US$405mn acquisition of Energean Israel, the Middle East and Africa's oil and gas industry saw a rise of 6.45% in cross border deal activity during Q4 2020, when compared to the last four-quarter average, according to GlobalData's deals database.

A total of 33 cross border deals worth US$1.69bn were announced for the region during the last quarter of 2020, against the last four-quarter average of 31 deals.

Of all the deal types, M&A saw most activity in Q4 2020 with 32, representing a 96.9% share for the region.

In second place was private equity with one deal capturing a 3.03% of the overall cross border deal activity for the quarter.

In terms of value of cross border deals, M&A was the leading category in Israel's oil and gas industry with US$1.44bn, followed by private equity deals totalling US$30mn.

The top five oil and gas cross border deals accounted for a 78.2% share of the overall value during Q4 2020. The combined value of the top five cross border deals stood at US$1.32bn, against the overall value of US$1.69bn recorded for the quarter.

Omega Well Intervention and Wellpro Group form strategic alliance in MENA

DOWNHOLE TECHNOLOGY DEVELOPER and manufacturer Omega Well Intervention and global well intervention company Wellpro Group have announced a strategic alliance to deliver downhole tools to the Middle East and North African (MENA) market.

The agreement will see Wellpro Group managing the deployment of Omega Well Intervention products through their extensive network across the region, a move which will go alongside significant investment in all MENA facilities.

Image credit: Omega Well Intervention

The agreement will see Wellpro Group managing the deployment of Omega Well Intervention products through their extensive network across the region.

Omega Well Intervention, which has over twenty three years of experience developing and manufacturing downhole tools, will provide access to an engineering design team as well as manufacturing capabilities and test facilities for product development.

Brian Garden, managing director of Omega Well Intervention, said, "As part of Omega growth strategy, collaboration with Wellpro Group within the Middle East enhances the ability of both companies to offer a more comprehensive product range within the well intervention business space. This collaboration will ensure that we deliver quality products alongside first-class service."

Jim Thomson, CEO of Wellpro Group, added, "This agreement which covers the Middle East and North Africa, gives us the opportunity to deliver a more complete well intervention package to the region."

Chariot Oil & Gas Ltd and Subsea Integration Alliance sign agreement in Morocco

AFRICA-FOCUSED TRANSITION energy company Chariot Oil & Gas Ltd has signed a collaboration agreement with Subsea Integration Alliance to work together to enable the front-end design, engineering, procurement, construction, installation and operation of the Anchois Gas Development project in Morocco.

Subsea Integration Alliance is a non-incorporated strategic global alliance between Subsea 7 and OneSubsea, the subsea technologies, production and processing systems division of Schlumberger.

Chariot and Subsea Integration Alliance will adopt a "One-team," integrated and collaborative approach to safely fast-track first gas to maximise the return on investment.

Image credit: Adobe Stock

According to Chariot, 2021 will be an exciting year for businesses.

Saudi Aramco awards EPCI contract to Lamprell

LAMPRELL HAS ANNOUNCED that it has been awarded an Engineering, Procurement, Construction and Installation (EPCI) contract by Saudi Aramco as part of their Long-Term Agreement Programme (LTA) with Lamprell.

Work on this large contract will consist of two offshore production deck modules and associated pipeline and subsea cables in Saudi Aramco's Marjan Field, which is located in the Arabian Gulf, off Saudi Arabia's east coast. It is one of the largest oil and gas fields in the region.

Christopher McDonald, CEO of Lamprell, commented, "We are delighted to have received our first LTA contract award since joining the programme in 2018. Our team has been working closely with Saudi Aramco over the past few months and we look forward to strengthening our partnership through this project."

Fluenta launches Fluenta FlarePhase ultrasonic transducer range

FLUENTA, A SPECIALIST in flare gas measurement technology, has launched the Fluenta FlarePhase transducer range. The new market leading transducer range sets the standard for flare gas measurement in highly challenging environments.

The range includes 350°C, a 250°C, and a cryogenic variant to suit different industries and the conditions they present.

The market leading FlarePhase 350 transducers can accurately measure flare gas flow at temperatures up to 350°C, a capability previously unmet in the industry. These are ideal for the petrochemical industry, or modern processes that typically see these extremely high temperatures.

The Fluenta FlarePhase 250 system is optimised to measure up to 250°C, making it the go-to measurement option for most high temperature installations.

Image credit: Adobe Stock

Capable of measuring flare gas flow in process temperatures between 350°C and -200°C.

For extremely low temperatures, the FlarePhase Cryo transducers provide highly accurate and repeatable measurement in temperatures as low as -200°C. With certified specialist materials, these transducers are the ideal solution for the LNG industry.

Stuart Tyres, group chief technology officer, said, "For years Fluenta has set the standard for the measurement of flare gas. This launch represents another pioneering achievement for the team, providing customers with an unrivalled combination of flexibility, reliability and accuracy in difficult flare gas installations."

Switching to refinery and petrochemical integration

INTEGRATED REFINERY AND petrochemical sites have significantly outperformed their fuels-only peers, according to Wood Mackenzie. The year 2020 was a difficult year for the world's refineries as the COVID-19 pandemic reduced refinery utilisation and OPEC+ supply restraint narrowed crude price differentials. One of the most highly integrated sites in China, Hengli, generated a net income of more than US$1.4bn during the Q1 to Q3 2020, at a time when most of the refining industry was incurring significant losses.

Image credit: Adobe Stock

The Middle East has invested in expert refining.

Alan Gelder, Wood Mackenzie's vice-president for refining, chemicals and oil markets, said, "Over the coming years, the energy transition and the associated electrification of the passenger car fleet will slow the pace of global gasoline demand growth and drive it into decline after 2030.

"Meanwhile, the versatility and durability of petrochemicals will see sustained demand growth, particularly in the developing economies of Asia, with global petrochemical feedstock demand growing by over 500,000 bpd each year over the next decade.

"This growth in petrochemical feedstocks will be tempered by an increase in global recycling rates as societies focus on reducing the environmental challenges of plastic waste.

"This switch in demand away from gasoline to petrochemicals promotes the adoption of refinery and petrochemical integration, particularly for new facilities in Asia and the Middle East.

"Currently, more than 30% of the world's refineries are now integrated with commodity petrochemicals. These sites benefit from both a diversified product slate, and the potential to unlock greater value through economies of scale and operational cost synergies."

Aramco SVP Downstream expresses optimism for post-COVID future

MOHAMMED AL-QAHTANI, SENIOR vice president, Downstream, Aramco expressed optimism about the future of the oil market at IP week in February, when he spoke on opportunities for transformation in a post-COVID world.

"The market is already responding positively to vaccine development, we're seeing a tighter supply/demand balance and shrinking inventories. Overall, I am very optimistic and expect markets to continue to improve," he said.

However he expressed concern about the declining levels of investment in the industry, particularly in exploration and development, which had been impacted by multiple factors, notably climate pressures and financial constraints. A significant share of current global E&P investment is in brownfield investments, short-term cycles and rapid payout investments, which in the ong-term could result in a supply gap, he added. Post-pandemic, reliable and affordable energy supplies and adequate infrastructure will be critical, otherwise the economic recovery could be threatened, causing more hardship.

Al-Qahtani said that while the energy transformation debate is intensifying post-pandemic, new energy faces many technical and economic challenges, with massive investments required.

"Alternatives still have some way to go to shoulder the significant hurdle of global energy demand. What is needed are practical energy policies with the aim of achieving a smooth transition. All types of energy will be needed as the energy transition unfolds."

Al-Qahtani pointed out that Aramco's oil production carbon intensity is already amongst the lowest in the world at around 10 kg CO2 per barrel oil equivalent, while methane intensity last year was just 0.06%, also one of the lowest in the industry. This is not just a result of the quality of its oil and gas fields, but as a result of a "meticulous strategy that looked at many areas in our operations and reservoir management, including methane leak detection, with a strong focus on energy efficiency and GHG management."

Commenting on the SABIC acquisition, Al-Qahtani said this is a major part of Aramco's strategy given the synergies between the two companies. "Together we are focusing on selective integration synergies in procurement, supply chain, manufacturing, marketing, sales, project management, IT and many other areas," he said. "We also have governance in place with a corporate collaboration and integration committee that will oversee the implementation and execution of these synergies and validate the benfits."

Looking ahead, Al-Qahtani foresaw a strong future for Aramco. "We will continue to have competitive advantage with a greater position in the oil market, and will continue to reduce our carbon footprint. We're also complementing our upstream operations with a fully integrated downstream business focused on profitability, integrity and synergies. The recent acquisition will add to the profitability of the company. We will be moving more into chemicals, and will convert with our own crude to chemicals technology, which will be a differentiator for us. In the future, Aramco will be looking into advanced non-metallics.

"We have to be cognisant of climate change and issues around it; we will be moving into the cleaner gas space, LNG and new energies such as blue hydrogen and blue ammonia, as well as looking to the Kingdom's Vision 2030 and how to make it a reality, with renewables and many other areas."

BP and SABIC to collaborate for advanced plastics recycling

OIL AND GAS multinational bp, and the global diversified chemicals company SABIC, have signed an agreement to work together to drive circular economy in the petrochemical activities, at the Gelsenkirchen (Germany) chemical complex in Germany.

Image Credit: bp

The Gelsenkirchen chemical complex in Germany.

Certified circular polymers, a part of SABIC'S TRUCIRCLE portfolio, are produced using advanced recycling to convert low quality mixed and used plastic, otherwise destined for incineration or landfill, into pyrolysis oil, used as alternative feedstock to traditional fossil materials. Polymer production using the alternative feedstock started at the site early this year, after successful trials.

"Advanced recycling has a crucial role to play in the current recycling mix as it can capture value from plastic waste streams that have traditionally been ignored or discarded," said Fahad Al Swailem, vice president, PE & Sales at SABIC.

"This is an important milestone in our vision of achieving up to 30% of our ethylene and propylene production from sustainable, recyclable raw materials by 2030," commented Wolfgang Stückle, vice president Refining and Specialities Solutions Europe & Africa at bp.

Wison Engineering wins Saudi Aramco EPC contract

WISON ENGINEERING, A diversified group focusing on energy and chemical services, was awarded an engineering, procurement, construction (EPC) contract by Saudi Aramco for the Shaybah Gas Processing Plant, located in the Rub' al-Khali desert of Saudi Arabia.

In the new project, Wison Engineering will build a brownfield 'Dew Point Control' unit at upstream of existing Acid Gas Removal Units (AGRU), to recover heavy hydrocarbons from raw gas, remove acid gas from heavy hydrocarbons, thereby enabling the control of foaming in AGRUs and expend gas processing capacity.

This is the first EPC project awarded to Wison Engineering by Saudi Aramco. The company operates across the globe, Including southeast Asia, the Middle East, the Americas, Africa and Europe, with branches in more than 20 countries and regions. It is involved in an array of sectors including petrochemicals, syngas chemicals, oil refining, natural gas, civil utilities, and fine chemicals. The company has established a good track record in project execution and modularisation in the Middle East. Wison Engineering is a leading provider of energy and chemical EPC services and technology integrated solutions in China.

Iran to start Khesht field production

IRANIAN CENTRAL OIL Fields Company (ICOFC) has announced plans to start crude oil production at Khesht oilfield in the first half of the next Iranian calendar year, starting in March 2021.

Image credit: NIOC

Crude oil production at Khesht oilfield will start in the first half of the next Iranian calendar year.

According to the company subsidiary, South Zagros Oil and Gas Production Company, Ramin Hatami, the CEO of ICOFC, during his visit to the Khesht oil field said, "Early production of this field will be operational by launching three wells in first half of next year and the produced oil will be sent to Nargesi Production Centre via a 10-inch pipeline which stretches 17 km."

He said the field would yield 20,000 bpd by the end of the next calendar year. The development of the field, expected to have a positive impact on the improvement of the adjacent urban areas, has so far made nearly 90% progress.

The field is located in the Southern part of Zagros Mountains in the Konar Takhteh city, between Kazeron and Borazjan, 190 km off Shiraz, on the border of Bushehr Province. Its development project has been defined to enhance the production capacity of Sarvestan and Saadat Abad oilfield and bring it to 30,000 bpd.

Established in 1999, ICOFC is one of the five major subsidiaries of the National Iranian Oil Company (NIOC). The company, at its establishment, was assigned to develop and to produce oil and gas from onshore fields through the utilisation of all available technology and know-how.

Saipem awarded contract by Qatargas

SAIPEM HAS WON a contract worth approximately US$ 1.7bn for the development of the North Field Production Sustainability Offshore Project, from Qatargas. The company is one of the leading companies in engineering, drilling and construction in the energy and infrastructure sectors.

The scope of work encompasses the engineering, procurement, construction and installation of various offshore facilities for the extraction and transportation of natural gas, including platforms, supporting and connecting structures, subsea cables and anticorrosion internally cladded pipelines. The project further encompasses the decommissioning of a pipeline and other significant modifications to existing offshore facilities.

Image credit: Adobe Stock

The scope of work encompasses the engineering, procurement, construction and installation of various offshore facilities.

The project aims at increasing the early gas field production capacity to 110mn tonnes per annum.

This new contract, which consolidates the group's position in Qatar, is the latest of a string of projects awarded to Saipem since its return to the country in 2018 with the Barzan project, nearing completion. Saipem is already executing the WHP12N Jacket project, awarded in July 2020, which is part of the North Field Production Sustainability Offshore Project development.

"This acquisition by Qatargas consolidates our position in the gas sector, confirms our strategic role in the energy transition and represents a token of confidence in Saipem's experience and proven ability to successfully execute and deliver challenging projects. Furthermore, it also confirms the relevance and effectiveness of the early engagement model adopted through our division XSIGHT, which recently concluded, ahead of time, the Front-End Engineering Design contract for the whole NFPS development programme," commented Stefano Porcari, Saipem E&C Offshore Division COO.

IOCs primed for record free cash flow

INTERNATIONAL OIL COMPANIES (IOCs) are primed for a V-shaped recovery in free cash flow, and may generate record figures this year should oil prices average US$55 a barrel, according to an analysis from global natural resources consultancy, Wood Mackenzie. Spot Brent is currently at US$67/bbl.

"Savage cost cuts imposed last year as the global economy contracted in the face of the COVID-19 pandemic saw average IOC corporate cash flow breakevens reduced from US$54/bbl pre-crisis to US$38/bbl," Tom Ellacott, senior vice president, corporate analysis, said.

"The record annual losses being announced in the Q4 earnings season serve as a stark reminder that 2020 was one of the toughest years in the industry's history. But IOCs emerged from the crisis far more resilient to lower prices. The scale of their financial reset has primed the sector for a V-shaped recovery in free cash flow."

Ellacott added, "Our IOC peer group of 40 companies generates more than US$115bn of surplus cash flow over the next three years after shareholder distributions, investment and interest at US$55/bbl prices. At US$70/bbl, cumulative surplus cash flow generation over the next three years would rocket to US$400bn."

However, capital allocation priorities will be very different to any previous up-cycle. Mending broken balance sheets will be at the top of the list. Average leverage – excluding operating leases – ballooned from 15% a decade ago to 35% by the end of 2019. The crisis of 2020 pushed it to 44% by Q3 2020, the highest this century.

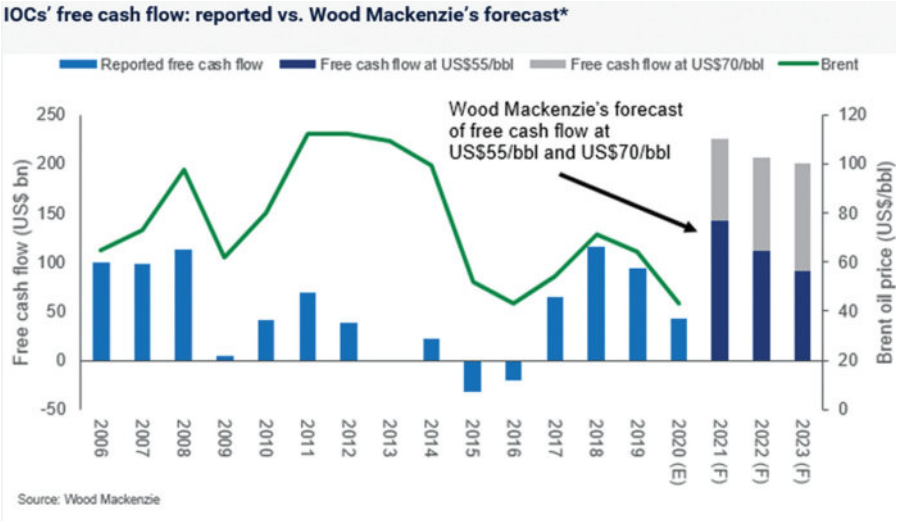

Image credit: Wood Mackenzie

Companies will aim to lower gearing to help weather future price volatility, either by cutting debt or growing equity – or both. Ellacott believes most players would prefer to deleverage towards the low end of historical gearing ranges, which is about 20%.

"We expect companies to continue to plan for the worst, prioritising net debt reduction in redeploying surplus cash flow," he said. "Some players will also look to speed up debt reduction by selling non-core assets."

Restoring investor confidence will be the second priority. Investment will recover only slowly even if confidence in higher prices grows. Strategic M&A will continue to favour paper over cash; share buybacks will be preferred over dividends for any surplus cash post-deleveraging.

"The sector is in ultra-capital-disciplined mode to win over investors," Ellacott said. "We think the industry will stick to its tight management of investment for some time."

New era of export oil operations in Kuwait for Petrofac

PETROFAC'S LOWER FARS heavy oil development project team has completed the integration of Kuwait Oil Company's new Crude Oil Control Centre. The company's expertise has been used to upgrade technology and equipment to improve the effectiveness of operations.

Extracting heavy oil can be more difficult than lighter crude because of its viscosity; however, the potential is huge. The centre is now set to make extracting heavy oil easier by utilising the latest state-of-the-art Orion operations and monitoring consoles. It also controls the blends of heavy oil from the Ratqa field in the north of the country with lighter crudes from the south, using a blending package provided by Petrofac, the company said in a statement. The teams worked to solve the challenges in linking the control centre with local control rooms, spread across southern Kuwait. Around 220km of fibre optic cable was laid, including roads passing through facilities.

ADNOC Logistics & Services expands fleet

ADNOC LOGISTICS & SERVICES (ADNOC L&S), the shipping and maritime logistics arm of Abu Dhabi National Oil Company (ADNOC), has announced the acquisition of six Very Large Crude Carriers (VLCCs). Two VLCCs have already been deployed into the company's fleet. ADNOC L&S has placed an order for three new build vessels with options, which will be delivered in 2022 and 2023, and purchased one additional existing vessel that will be joining its fleet shortly. These vessels are the first crude carriers to join the ADNOC L&S fleet, adding a total cargo capacity of 12 million barrels.

Very Large Crude Carrier.

Image credit: ADNOC L&S

ADNOC L&S, which is currently the largest integrated maritime logistics and shipping company in the GCC, and owner and operator of the largest shipping fleet in the UAE, is pursuing a major fleet expansion programme. This will enable the company to provide better service to its global customers, while also supporting ADNOC as it expands its production and refining capacity and grows its new trading operations. ADNOC has established two new trading companies: ADNOC Trading, which is focused on crude oil and started derivatives trading in September 2020; and ADNOC Global Trading (AGT), a joint venture with ENI and OMV that focuses on trading of refined products and began operations in December 2020.

Image Credit: Tatweer Petroleum

Bahrain is seeking to squeeze more value from its comparatively small acreage position.

Bahrain
bouncing back

It has been a tough year for all, but Bahrain's flagship refinery upgrade project is making good progress as the kingdom emerges from the shadows of 2020, says Martin Clark.

ALTHOUGH ONE OF the region's smaller producers, Bahrain is nonetheless significant in terms of the Gulf's rich oil and gas heritage.

It was the first Gulf state to discover oil, back in 1932, with an initial crude shipment to Japan despatched just two years later.

Almost 90 years on, and Bahrain's energy industry is still going strong, despite all the challenges of the past year with pandemics, lockdowns, and feeble oil pricing.

Oil production continues, while the success of the industry over many decades has fuelled development in other key areas, from banking and tourism to aluminium.

That includes the development of a thriving refineries sector, via Bahrain Petroleum Company (Bapco), the integrated state energy firm that oversees downstream activities. Its flagship Bapco Modernisation Programme (BMP) is now underway, a multi-billion dollar initiative that will expand refining capacity to 380,000 bpd.

Bapco currently owns a 267,000 bpd refinery, along with storage facilities for 14 million barrels as well as associated marine terminals for its portfolio of petroleum products, from naphtha and gasoline to ultra low sulphur diesel.

The BMP, Bapco's largest single capital investment in its 90-year history, has brought with it a swathe of work for external contractors. A consortium of TechnipFMC, Samsung Engineering and Tecnicas Reunidas was awarded a US$4.2bn contract from Bapco in 2017 for the main works at the Sitra refinery, which are now scheduled for completion in 2022.

> "The modernisation drive includes a host of other associated improvements."

The modernisation drive includes a host of other associated improvements as well, not just in fuels, but also in key infrastructure works. Most recently, the UK's Mabey Bridge announced that it had delivered two critical construction site access bridges in support of the project. The two twin-lane modular steel bridges are to facilitate easy access of construction vehicles and deliveries of specialist equipment to the work site, without any interference to the local road network.

Linxon, an SNC-Lavalin and Hitachi ABB Power Grids joint venture, has also just energised a new 220/66/11 kV Bulk Supply Point (BSP) sub-station on behalf of state power utility, Electricity and Water Authority, which will feed the expanded Sitra complex.

Upstream oil and gas

Upstream, Bahrain is seeking to squeeze more value from its comparatively small acreage position, both onshore and offshore, with the help of another state-owned firm, National Oil & Gas Authority (Noga).

One of its upstream operating units, Tatweer Petroleum, now manages the historic Bahrain Field, also known as the Awali field, the nation's primary oil-producing asset. It follows the 2016 departure of Occidental Petroleum and Mubadala Development, which formed Tatweer Petroleum and had managed Bahrain Field operations since 2009.

Tatweer Petroleum has been nurturing ties with the private sector since, notably Italian energy giant Eni, as it seeks to unlock potential new oil and gas deposits.

Eni has been present in Bahrain since 2019 and is the owner and operator of offshore exploration Block 1, an area of 2,800

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sq km, with water depths ranging from 10m to 70m.

Last September, Tatweer Petroleum also signed a study agreement with Eni for Block 2, covering 2,230 sq km, to assess this offshore area as well.

Noga is exploring new environmental initiatives as well. In November 2020, it signed an MoU with Air Products to assess the feasibility of developing a hydrogen economy, while in January, it signed an agreement with Eni Rewind, Eni's environmental company, to collaborate in areas, such as the recovery of soil, water and waste resources. The aim of the venture is to help Bahrain work towards implementing the United Nations' 2030 global goals for sustainable development.

Eni Rewind's CEO Paolo Grossi said the sustainable development alliance would help Bahrain "tackle the energy transition challenge" whilst "protecting the environment and regenerating natural resources".

As well as exploration, sustainability and and renewable energy, Eni is also active in Bahrain's nascent liquefied natural gas (LNG) industry.

At the Bahrain Field itself, Tatweer Petroleum last year awarded a contract to services group Petrofac for engineering work that includes well hook-ups, associated pipelines, and tie-ins for several new gas wells to be drilled. Petrofac has been in Bahrain since 2015, following the award of a contract to supply a new 500 MMscfd gas dehydration facility by Tatweer Petroleum, which was completed in 2018.

The Bahrain Field reached peak oil output in the early 1970s, from 20 proven hydrocarbon-bearing reservoirs, but is now producing at around 50,000 bpd. Bahrain also receives around 150,000 bpd from the shared Abu Safah field, via Saudi Arabia.

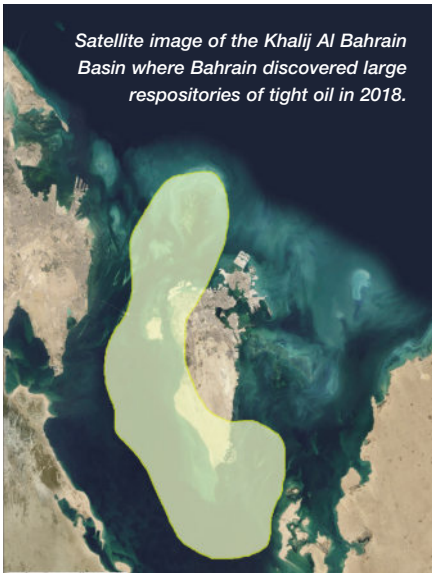
New horizons

Potentially, there could be a lot more to come after Bahrain announced in 2018 the discovery of around 80bn bbl of tight oil and up to 20 trillion cubic feet of deep gas when drilling off the west coast of the country. Although details on these finds remain scarce, officials said in April 2018 that Halliburton was to start work on two further wells in the area to further evaluate the reservoirs and their long-term potential.

> "Bahrain's own domestic energy needs are to be topped up by imported LNG supplies."

Oil Minister Sheikh Mohammed bin Khalifa al-Khalifa told a news conference in Manama at the time that he was not sure how much of the estimated 80bn bbl were recoverable, but privately there is excitement and optimism in the air.

Bahrain's National Communication Centre said in a 2018 statement that the newly discovered resource could be in production "within five years", although that would clearly hinge on successful testing efforts and follow-up work.



Satellite image of the Khalij Al Bahrain Basin where Bahrain discovered large respositories of tight oil in 2018.

Image Credit: Tatweer Petroleum

In the meantime, Bahrain's own domestic energy needs are to be topped up by imported LNG supplies, following the construction of a floating import terminal at the start of 2020. Bahrain LNG brings together various international parties, including Teekay LNG, Gulf Investment Corporation and Samsung C&T Corporation.

Last November, Noga signed an agreement with Chevron Middle East to conduct a joint study, assessing future demand for gas in the kingdom and identify potential sources of supply, state news agency BNA reported. The work is expected to support the kingdom's efforts to develop its LNG sector. ■

Bahrain is topping up its energy requirements with imported LNG.

Image Credit: Tatweer Petroleum

Facilitating net zero targets through digitisation

Newly-appointed president of oil and gas at Schneider Electric, Astrid Poupart-Lafarge, chatted with Oil Review Middle East to explain how the company is supporting energy producers and consumers to reduce carbon emissions through digitisation and new technologies.

POUPART-LAFARGE BEGAN by explaining that the fight against climate change was central to Schneider Electric's business model, with their continued relentless drive to reduce global emissions landing them the top spot in Corporate Knights' 'Global 100 most sustainable corporations in the world'. Poupart-Lafarge commented, "Schneider Electric is in the top spot because of our strong performance around the sustainability criteria. The company earns 70% of its revenue from sustainable solutions and 73% of our investment is directed to sustainable solutions. We also performed strongly in regards to racial and gender diversity and resource productivity and safety."

"We act for a climate positive world and we continuously invest and develop innovative solutions that deliver immediate and lasting decarbonisation. By 2025 we aim to achieve 80% green revenues, save and avoid 800mn tonnes of CO_2 emissions for customers (since 2018), and help reduce CO_2 emissions by 50% for our 1,000 top suppliers."

Reducing emissions upstream

Poupart-Lafarge continued by discussing Schneider Electric's 'Net Zero Upstream' facility study, which suggested that for a minimal total expenditure increase of 2%, the solution operational emissions of oil and gas operators could be reduced by a staggering 76%, with embedded carbon emissions dropping by a potential 17%. She said, "This study was result of collaboration to advance research and design of carbon neutral facilities for the upstream oil and natural gas market. It applies a number of decarbonisation measures to achieve carbon neutrality including power import and electrification; renewable microgrids; integration with hydrogen networks; integrating energy storage; reduction of fugitive emissions; removal of flare systems; facility de-manning and access method; facility monitoring and controls for remote operations; engineered offsetting methods, excluding what we call nature-based offsetting; and, last but not least, digital transformation in design and operations."

Image Credit: Schneider Electric

Astrid Poupart-Lafarge, the newly-appointed president of oil and gas at Schneider Electric.

Expanding on digitisation, Poupart-Lafarge added, "Over the last year the pandemic has definitely accelerated digitisation across industries. In oil and gas specifically there are opportunities for digitisation to drive benefits for sustainability and for the bottom line. The reality is that around 15% of total CO_2 emissions on a litre of gasoline used in our car is emitted during the manufacturing process itself. We wanted to change that and make energy-intensive manufacturing more sustainable."

The EcoStruxure platform

"Our goal is to provide tangible solutions that help companies reach their sustainability goals and also deliver profitability, and this is what we do with EcoStruxure Power and Process. Designed in collaboration with AVEVA for energy intensive industries, EcoStruxure connects power and process information across the whole life cycle of a plant, delivering up to 20% electrical instrumentation and control CapEx reduction,15% unplanned downtime reduction,10% process energy usage improvement, and 3% points profitability improvement," explained Poupart-Lafarge.

"An example is a medium to large oil refinery producing 450,000 bpd can expect to reduce its CO_2 output by almost 570,000 metric tonnes and save US$210mn a year. As you can see, there are clear sustainability and financial benefits."

Reflecting on the year 2020, Poupart-Lafarge commented, "After rising steadily for decades, global greenhouse emissions fell by 6.4% in 2020, according to new data on fossil fuel emissions. The decline is very significant, and in 10 years time one positive thing I think we will say is that it was in this year that the concept of net zero became a mainstream activity that reshaped the economy. The shift that has made this sustainable solution possible is the rapid acceleration of digital. When you consider that 80% of all carbon emissions are due to energy consumption and 60% of the way we manage energy is inefficient, the scale of the task of changing the way we create, manage and use energy to reach net zero is significant, but so are the potential benefits."

Finally, Poupart-Lafarge focused on her new position as president of oil and gas, and concluded, "My responsibility in this new role is to lead the business that Schneider Electric does in the oil and gas and petrochemical market. My goal is to bring together all of our capabilities from energy management, automation and all digital portfolio for efficiency and sustainability. I will focus largely on partnerships with our stakeholders in the oil and gas markets."

"At Schneider Electric our purpose is to empower all to make the most of energy and resources, bridging progress and sustainability for all, which we call 'Life is On'. My priority in this new role is to accelerate our support to the oil and gas and petrochemical companies in their digital transformation and towards the energy transition." ■

Iraq's flaring finally burning out?

A recent surge of government and private initiatives to increase gas production could see Iraq finally tackle its continued issues with flaring. Robert Daniels reports.

Flaring releases millions of tonnes of GHGs into the atmosphere each year.

Image Credit : Adobe Stock

A COUNTRY ENDOWED with reserves of around 145bn bbl of oil and 3,714bn cu m of natural gas (according to OPEC data) should be positioned as a dominant economic force in the Middle East capable of using its oil wealth not only as the foundation of its economy but even, as many other countries in the region have done, to expand into other energy markets. But for Iraq, years of political disruption has left its energy sector flagging far behind neighbouring polities with Iraqi citizens still frequently experiencing power shortages despite the abundance of their natural resources. No single issue more readily demonstrates this inadequacy than flaring.

Once an industry norm, the flaring of natural gas produced by oil extraction is now subject to strict regulation as the fight against climate change has gained momentum. The process annually releases millions of tonnes of CO_2 into the atmosphere alongside methane emissions and other greenhouse gases (GHG) such as nitrogen oxide. Additionally, with the advance of new technology, it represents an enormous commercial waste with Iraq spending billions to import natural gas from Iran to support its energy demand (it was given special consideration to continue doing this despite the Iranian trade embargo).

> "Years of political disruption has left the country's energy sector flagging."

In 2018 the IEA reported Iraq in the top four countries in the world for flaring (alongside Iran, Russia and Algeria) and, according to the Washington Institute for Near East Policy, the country burns off through flaring an estimated U$S2.5bn per year - an agonising statistic for a country relying on its neighbours for its gas. Restricted by years of disruption the state has not been able to implement the gas infrastructure needed to reduce flaring and fully take advantage of this

enormous potential source of revenue, but it appears the years of waste could finally be coming to an end.

Change in the air?

Perhaps prompted by the economic squeeze caused by the COVID-19 pandemic and the realisation that global customers are now seriously invested in reducing their carbon footprint, in October 2020 the Iraqi government formally adopted the White Paper for Economic Reform to develop a diversified and dynamic economy. As part of this, the government vowed to establish a natural gas national company, expand gas infrastructure, establish a regulated framework to encourage more international private investment and ultimately end its reliance on imported gas. The country is also a member of the World Bank's Zero Routine Flaring by 2030 initiative and the Oil Minister of Iraq, Ihsan Ismaeel speculated that gas flaring in the country could be ended in 2025.

While this is not the first time Iraq has come out with such ambitious ideas (the government has previously stated its intentions to reduce flaring in the past with nothing materialising, and Ismaeel's 2025 date was itself an extension of a target originally set for 2022) there does now seem to be some genuine movement in this field.

Baker Hughes has confirmed that it was awarded a major contract by the South Gas Company (SGC) of Iraq in Q4 2020 to design, manufacture, deliver, construct and commission an integrated facility for the processing and production of natural gas with a capacity of 200mn cu ft of natural gas per day. It will also reportedly use previously flared natural gas from the Nassiriya and Gharraf oilfields which will reduce emissions by an estimated 6mn t of $C0_2$ annually.

> "Only time will tell whether Iraq accomplishes its flaring objectives."

Meanwhile, in the Kurdistan Region of Iraq (KRI), DNO Norway launched its Peshkabir Gas Capture and Injection Project in its Tawke licence in mid-2020, which had already captured 1bn cu ft of gas injection by September and reduced flaring at the Peshkabir field by more than 75%. The company have just expanded their operations in the KRI with the acquisition of Baeshiqa licence which could herald in future gas capture projects, given the companies clear commitment to this cause.

Additionally, Dana Gas announced that at the end of 2020 it reached a new record of 430MMscf/d of production sales for Pearl Petroleum's Khor Mor Gas Plant in the KRI and reported that it has restarted the expansion plans in the region (including a 250MMscf/gas processing train expected in Q1 2023) following a pandemic-related suspension.

These ventures now rank alongside established projects such as the Basrah Gas Company, a joint venture between Iraq's South Gas Company, Shell, Mitsubishi Corporation, which claims to supply 70% of Iraq's LPG. This enterprise was established in 2013 and continues to develop the sufficient infrastructure (such as pipelines and compressor stations) required to tackle Iraq's flaring problem.

Only time will tell whether Iraq accomplishes its flaring objectives. But with the global community increasingly focusing on emissions reduction and the need to wean itself off Iranian gas more glaring than ever with the COVID-19 recession, there has never been a more urgent need to do so. ■

DNO increases stake in Kurdistan Region's Baeshiqa license

DNO ASA, THE Norwegian oil and gas operator, has announced the acquisition of ExxonMobil's 32% interest in the Baeshiqa license in the Kurdistan Region of Iraq, doubling DNO's operated stake to 64% (80% paying interest), pending government approval.

The company plans to continue an exploration and appraisal programme on the license while fast tracking early production from existing wells in 2021.

DNO has already demonstrated proof of concept of producing through temporary test facilities, having delivered 15,000 barrels of 40° API oil and 22° API oil for export from the Baeshiqa-2 and Zartik-1 wells, respectively.

In November 2019, DNO issued a notice of discovery on the Baeshiqa license after flowing hydrocarbons from several Jurassic and Triassic zones to surface in the 3,204m (2,549m TVDSS) Baeshiqa-2 exploration well. Following acid stimulation, the zone flowed variable rates of light oil and sour gas. Two zones flowed naturally at rates averaging over 3,000 bopd of light gravity oil each and another averaged over 1,000 bopd also of light gravity oil. Subsequent analyses on surface samples collected during testing confirm that the Triassic reservoirs contain saturated oil with a gas cap.

An exploration well was completed in 2020 on a second structure (Zartik), some 15km southeast of the Baeshiqa-2 discovery well. The 3,021m well tested hydrocarbons to surface from several Jurassic zones, with the uppermost zone flowing naturally at rates averaging over 2,000 bopd of medium gravity oil.

Subsequent analyses on surface samples collected during testing confirm that the Triassic reservoirs contain saturated oil with a gas cap.

Image Credit : Adobe Stock

"By increasing our stake in the Baeshiqa license now, we demonstrate our belief in its ultimate potential," said Bijan Mossavar-Rahmani, DNO's executive chairman. "Following the stabilisation of oil prices and export payments in Kurdistan, DNO is stepping up spending on new opportunities," he added.

DNO acquired its first 32% interest from ExxonMobil and assumed operatorship of the Baeshiqa license in 2018.

The 324 sq km license is situated 60 km west of Erbil and 20km east of Mosul. The license contains two large structures, Baeshiqa and Zartik, which have multiple independent stacked target reservoir systems, including in the Cretaceous, Jurassic and Triassic. The remaining partners in the license include TEC with a 20% paying (16% net) interest and the Kurdistan Regional Government with a 20% carried interest.

The potential of AI in motors and drives

Marek Lukaszczyk, European and Middle East marketing manager at motor and drive manufacturer WEG, says the potential of artificial intelligence (AI) in electric motor and drive applications could soon be unleashed.

AI, A TERM which was originally coined by American academic John McCarthy in 1956, involves creating algorithms and programmes that allow computers to follow hundreds of millions of instructions – thanks to significant improvements in data-processing power and the advent of big data.

In fact, AI is now a key component in today's manufacturing plants. Advanced machine learning has allowed computers to solve problems without needing to follow a comprehensive list of instructions. This allows powerful programmes, which are based on neural networks, to be trained to perform specific tasks, carrying huge potential for motor and drive applications.

Motion control

Design engineers want to introduce the power of AI to motors, for advanced motion control. For example, embedded algorithms could be used, based on information provided by intelligent sensors, to alleviate some common motor performance limitations.

Essentially, these systems compare a data-based model of motor performance with real time analytics to correct performance issues with voltage commands, generating torque when phase faults arise. The goal of these systems is to minimise the impact from phase faults, making them more manageable, especially in critical safety situations.

Additionally, these motors can boost motion control performance by improving efficiency, uptime and energy consumption. By using WEG's motor scan, the performance of electric motors can be monitored with sensors, which facilitates predictive maintenance. Once installed onto the motor, WEG's motor scan technology uses these sensors to send data to the cloud for analysis, alerting operators to suboptimal data trends.

What the future holds

In the past, technology was simply too expensive to measure the temperatures in an electric motor. Since then, however, sensors have developed and become much more accessible. For example, thermal protection is achieved by monitoring the temperature of the motor windings. By using Positive Temperature Coefficient (PTC) sensors, thermistors can be installed into the motor windings to protect the motor against locked-rotor conditions, continuous overload and high ambient temperature.

Going forward, scientists from the Department of Power Electronics and Electrical Drive Technology at the University of Paderborn aim to develop software capable of estimating the temperatures at certain points. As part of the project, funded by the German Research Foundation (DFG), researchers are using AI and machine learning to find new models for estimating the temperature in drives and other power engineering applications.

This involves training their software, with a software testing method that examines the functionality of an application without peering into its internal structures, and test-bench measurements, to obtain precise temperature readings.

Alan Turing's research proved that a digital computer could simulate the behaviour of any other digital machine, which has led to digital manufacturing as we know it. AI holds huge potential, especially for electric motor and drive applications, but research still has some way to go. ■

Image Credit: WEG

The performance of electric motors can be monitored with sensors, facilitating predictive maintenance.

> "Design engineers want to introduce the power of AI to motors, for advanced motion control."

ABB urges greater adoption of high-efficiency motors and drives

IN A NEW whitepaper, ABB reveals the potential for significant energy efficiency improvements in industry and infrastructure enabled by the latest and most high-efficiency motors and variable speed drives. ABB calls on governments and industry to accelerate adoption of the technology to help combat climate change.

Electric motors - and the variable speed drives which optimise their operation – power a vast range of applications from industrial pumps, fans and conveyors for manufacturing and propulsion systems for transportation to compressors for electrical appliances and heating, ventilation and air conditioning systems in buildings.

Motor and drive technologies have seen exceptionally rapid advancement in the past decade, with today's innovative designs delivering remarkable energy efficiencies. However, a significant number of industrial electric motor-driven systems in operation today – in the region of 300 million globally – are inefficient or consume much more power than required, resulting in monumental energy wastage.

Independent research estimates that if these systems were replaced with optimised, high-efficiency equipment, the gains to be realised could reduce global electricity consumption by up to 10%. In turn, this would account for more than 40% of the reduction in greenhouse gas emissions needed to meet the 2040 climate goals established by the Paris Agreement.

"Industrial energy efficiency, more than any other challenge, has the single greatest capacity for combatting the climate emergency. It is essentially the world's invisible climate solution," said Morten Wierod, president ABB Motion.

"The importance of transitioning industries and infrastructure to these highly energy efficient drives and motors to play their part in a more sustainable society cannot be overstated," continued Wierod. "With 45% of the world's electricity used to power electric motors in buildings and industrial applications, investment in upgrading them will yield outsized rewards in terms of efficiency."

By 2023, it is estimated that ABB motors and drives will enable customers globally to save an additional 78 terawatt-hours of electricity per year.

Regulatory policies are among the main drivers of industrial investment in energy efficiency around the globe. While the European Union will be implementing its Ecodesign Regulation (EU 2019/1781) this year, which sets out stringent new requirements for an expanding range of energy efficient motors, many countries have yet to take action.

To take advantage of the tremendous opportunities afforded by energy efficient drives and motors to reduce greenhouse gas emissions, ABB says all stakeholders have a critical role to play:

- Public decision makers and government regulators need to incentivise their rapid adoption,
- Businesses, cities, and countries need to be aware of both the cost savings and environmental advantages and be willing to make the investment, and
- Investors need to reallocate capital towards companies better prepared to address the climate risk.

"All stakeholders need to work together to bring about a holistic transformation in how we use energy. By acting and innovating together, we can keep critical services up and running while saving energy and combatting climate change,"concluded Wierod.

ABB's white paper "Achieving the Paris Agreement: The Vital Role of High-Efficiency Motors and Drives in Reducing Energy Consumption" can be downloaded at https://www.energyefficiencymovement.com/en/whitepaper/

TÜV SÜD data analytics service to minimise operating costs

TÜV SÜD NATIONAL Engineering Laboratory has launched a data analytics service to help oil and gas operators minimise flow meter downtime and maintenance, significantly lowering operating costs.

The total cost of calibrating an offshore flow meter is estimated to be in the region of US$50,000 or more, once all costs incurred are accounted for. Traditionally, irrespective of whether a flow meter is deviating from its required operating parameters it will be routinely scheduled for recalibration and operations stopped unnecessarily.

The new data analytics service will enable operators to move away from this time-based calibration approach to condition-based calibration, by using statistical modelling techniques to predict meter performance based on live and historical data. In addition, diagnostics information can be used to understand what may be negatively impacting a meter by analysing hidden patterns to identify specific fault conditions. This could include incorrect installation, instrument damage, particle deposition, the presence of an unexpected second fluid phase, and upstream or downstream flow disturbance.

Gordon Lindsay, head of digital services at TÜV SÜD National Engineering Laboratory, commented, "Thanks to advances in technology and increased connectivity through the Internet of Things, vast amounts of data exist but only a fraction of its potential benefit is realised. Our new data analytics service uses data in real-time to detect when a meter is not performing to specification and identify the cause of this failure. This means that end-users can avoid shutting down production to remove a device from the pipeline before a solution to a fault can be found.

"Recalibrations are both costly and labour intensive, so proactively determining the optimal calibration date delivers increased measurement confidence, reduced downtime and cost savings," Lindsay added.

Validation of models created by the data analytics service can be conducted in TÜV SÜD National Engineering Laboratory's accredited calibration facility. This increases end-user confidence in results by reducing any levels of error, assuring them that the problem-solving method suggested by the data analytics service will be effective in the real world.

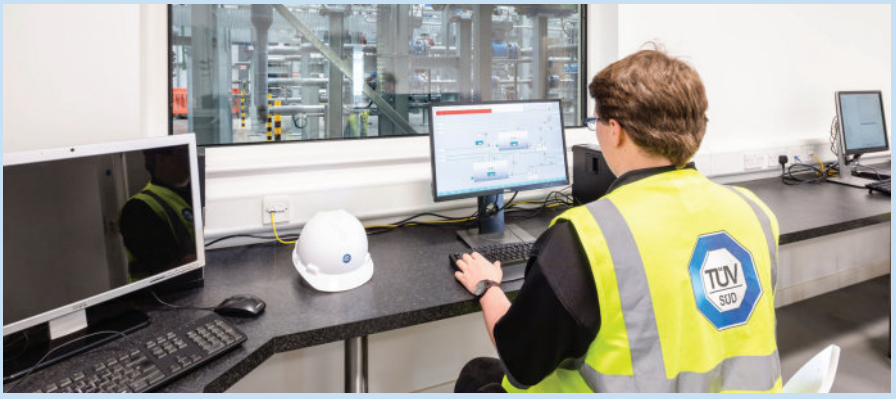


Image Credit: TÜV SÜD

The new service will help oil and gas operators move away from the traditional time-based calibration of flow meters.

The drive for sustainable power solutions

In the face of increasingly stringent environmental regulations and ESG considerations, power solutions providers are stepping up to help oil and gas operators meet emissions reduction targets and minimise their carbon footprint. Louise Waters and Robert Daniels report.

THE OFFSHORE OIL and gas industry presents huge power requirements, and an uninterrupted power supply is essential for smooth operations. With increased climate change pressures, there is a growing demand for sustainable power solutions which at the same time satisfy customer demand for reliability, improved efficiency and lower fuel costs.

Versatile approach

Caterpillar Oil & Gas argues that there is no one-size-fits-all solution to meeting environmental, social and governance (ESG) goals in oil and gas, highlighting its versatile approach and commitment to innovation.

"We're constantly seeking solutions that can help you achieve fuel savings, greater durability and higher productivity while meeting your environmental, social and governance (ESG) goals," the company states.

With this in mind, Caterpillar has recently added some innovative solutions and emerging technologies to its product line-up:

- Semi-modular power plants: This fully turnkey solution supports energy companies interested in self-generating electricity. Pre-fabricated modules house Cat generators and switchgear needed to connect to an electrical substation. Gas that otherwise would be flared is converted into usable electricity, reducing GHG emissions and operating costs.
- Land drilling energy storage system: This first-of-its-kind hybrid system pairs natural gas generator sets with a robust battery storage system. It enables land drilling rig engines to run entirely on natural gas, reducing site emissions and fuel costs.
- Dynamic Gas Blending Engines for Well Service: The award-winning 3512E U.S. EPA Tier 4 Final DGB Engine delivers the same power, performance and reliability as the diesel model but in a dual-fuel platform that can run on flare gas (as well as CNG, LNG or pipeline gas). The engine automatically maximises the amount of natural gas used to displace diesel up to a maximum diesel displacement rate of 85%, reducing an operation's overall GHG footprint and cutting fuel costs significantly.
- Dynamic Gas Blending generator sets for Land Drilling: Built on a traditional diesel-electric platform, DGB generator sets can operate on CNG, LNG, pipeline gas and field gas — all of which cost less than diesel.
- Engine idle reduction system: Available on its well service engines, this simple hardware technology automatically stops and restarts the engines on a frac rig between pumping stages, using batteries to provide auxiliary power to the trailer. That reduces fuel consumption, working hours and preventive maintenance — lowering operating costs and improving profitability.
- Electric motors: For gas compression applications, the company offers a full line of electric motors that produce zero emissions on location — ideal for highly regulated regions.

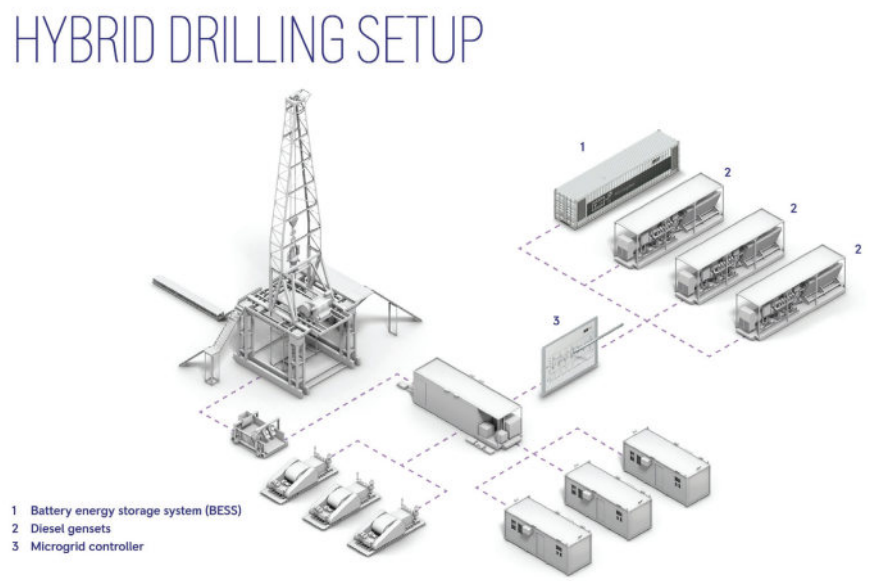


Image Credit : Rolls-Royce

The Rolls-Royce Hybrid Drilling Package (HDP).

> "The engine automatically maximises the amount of natural gas used to displace diesel."

Sustainable solutions

Rolls-Royce have outlined that their central focus is to develop and distribute sustainable solutions for their power generation plants and drive and propulsion systems. In pursuit of this, each year, the company commits two-thirds of their annual research and development investment budget into improving the environmental performance of their products. The fruits of this are clear to see with each offering providing benefits such as reduced fuel consumption and a reduction in emissions.

For instance, the company has noted that drilling contractors are increasingly concerned with saving money on fuel and maintenance expenses while at the same time requiring their electric drilling rigs to drill harder and faster than ever before. Rolls-Royce has released the mtu Hybrid Drilling Package (HDP) to address these challenges. This comprises of a combination of proven technologies in oil and gas power generation and energy storage, purpose-built for demanding operations. The HDP aims to deliver scalable solutions which can, compared against a non-hybrid solution, reduce fuel consumption by 15%; reduce emissions via fuel savings and efficiency improvements; reduce OPEX through genset operating hours (>40% reduction years); recapture energy; provide immediate power with ESS for transient responses for peak shaving and spinning power reserves; and double the TBO of gensets.

Rolls-Royce have also extended out their mtu Hybrid E-Frac Power System (HEFPS), a combination of critical natural gas powered gensets and intelligent battery energy storage systems, which can be easily integrated with virtually all types of frac setups and applications. This HEFPS facilitates a more efficient autonomous system that intelligently manages and optimises mission critical power supply assets and offers the chance to reduce emissions by up to 80% and power generations cost of ownership by 50% in comparison to the Tier 2 diesel system.

Committing to net zero

To ensure they are well on their way to achieving net zero by 2050, Aggreko have committed to three main goals which they hope to fulfil by the end of the decade; to offer customers cleaner technologies and fuels to reduce the amount of fossil diesel fuel used by customer solutions by at least 50%; to reduce local air quality emissions from their solutions by 50%; and to achieve net zero across all of their own business operations.

At the start of 2021 the company set out its intentions for the upcoming year to build towards these targets by investing in more clean energy alternatives, such as e-fuels and hydrogen engines; accelerate its offering of more efficient solutions such as temperature control and energy recovery; grow its portfolio of mobile and modular solar power and battery storage; and continue on its digitalisation journey with emphasis on remote monitoring and data analytics.

Aggreko has also taken up the challenge of reducing flaring through its flare gas to power projects. Applying their technical expertise to each separate situation, Aggreko provides operators with the ability to repurpose gas to provide power for operations, saving money on fuel costs and reducing their net carbon emissions. Across the globe, the company has now reached 1GW of installed power capacity through this, converting around 9.5mn cu ft per MW/h of associated petroleum gas (APG).

Image Credit : Visa SpA

Visa SpA's solutions are used in a variety of industrial sectors, including the oil and gas industry.

> “In the Middle East, Aggreko has pioneered two flare gas to power projects.”

In the Middle East, Aggreko has pioneered two flare gas to power projects with a combined installed capacity of 170MW. One of these projects, situated in Oman, posed a number of challenges such as extreme temperature, heavy fog and a remote location. These were all overcome through the implementation of a number of bespoke solutions, such as engineering a solution to treat, scrub and cool the gas so that it was usable and replacing the 5MW of decentralised diesel power generators located at each site with a centralised 4MW continuous gas power centre, which was made up of 10QSK60 gas generators along with a gas conditioning skid. With the successful delivery of the project, the operator now achieves savings of US$600,000 each year.

Environment protection

Visa SpA provides a wide range of solutions to ensure reliable and high-quality power. In more than 60 years of power generation, the Italian company has been developing sustainable solutions for many sectors across the globe, such as industry, data centres, healthcare, airports, military and civil protection, as well as independent power stations.

In 2018, the company started to plan the first steps of transition to adapt to the new regulation for off-road mobile applications, known as Stage V, to be ready to adopt the new engines as soon as possible.

Known for its responsibility towards protecting the environment, Visa SpA counts on a research and development team of engineers constantly engaged in studying the best possibilities to meet the client's needs while guaranteeing reliability and sustainability.

The reliability and versatility of its products are due to the use of the best components and latest technology, particularly focusing on green themes, to offer significant energy savings as well as a decreased operating cost.

All manufactured generating sets are designed to minimise environmental impact and maximise noise reduction. The machines destined for mobile use fully comply with the latest EU standards for noise and exhaust emissions and are equipped with specific accessories and protections.

As part of its continuous improvement process towards environmental protection, Visa SpA has introduced in its whole range of products high performance exhaust mufflers, best systems for the treatment of exhaust gases, with high noise reduction including a particulate filter.

As well as the gensets, Visa SpA's industry motor pumps, particularly suitable for many oil and gas applications, are equipped with Stage V engines, and the company is regularly assembling this kind of more sophisticated engine in its product ranges. ■

Seismic acquisition developments in the Middle East

Nicolas Tellier, chief geophysicist, Sercel, discusses seismic acquisition trends and technologies.

Sercel was recently awarded major contracts to equip seismic mega surveys in Saudi Arabia – what type of equipment was selected and why?

Yes, Sercel equipment has been selected for two 3D mega-crews recently awarded in Saudi Arabia, as well as for a smaller 2D survey project. These awards confirm the good reputation of our equipment and the confidence the major client and local contractors have in its capabilities: for each crew, we are talking about more than 60,000 channels of our 508^{XT} acquisition system, 540,000 SG-10 geophones, and more than 30 Nomad 65 *Neo* vibrators controlled by VE464 electronics. The fact that we've had Sercel systems running for years on other crews in Saudi Arabia and the wider region and they've consistently registered excellent performances, in terms of both data quality and productivity, most likely played a part in those awards.

From Sercel's perspective as a leading seismic equipment provider, what major seismic acquisition trends are you seeing worldwide and in the Middle East region in particular?

All operators want to acquire the best possible seismic data, to better identify and assess oil and gas reservoirs and de-risk costly field development. Gathering maximum information from the subsurface as cost-effectively as possible is a must, that demands an optimum performance from both the seismic sources and receivers. On the source side, productivity levels have increased sharply, as a result of the larger numbers of seismic vibrators being deployed, and the advanced shooting strategies now made possible by equipment advances.

On the receiver side, the solution that can seem obvious is to increase the volume of seismic channels acquiring data. This means that large-scale acquisition systems need to be very robust to meet the expected productivity levels and targeted project costs. Designed specifically for this purpose, the

Image Credit: Sercel

Sercel's robust 508^{XT} seismic acquisition system deployed for Saudi mega crew surveys.

> "Gathering maximum information from the subsurface as cost-effectively as possible is a must."

"cross-technology" architecture of our 508^{XT} system combines the advantages of cabled and nodal technologies: it enables continuous data recording even if there are multiple line cuts. This breakthrough technology has proven its capabilities on numerous mega-crews in the Middle East, with target production being reached only a few days after project start-up. The importance of broadband seismic should also not be forgotten, as the ability to generate and record lower frequencies has played an important role in achieving superior imaging, while paving the way for full-waveform inversion (FWI) subsurface modelling.

With technology moving very fast, what advances can we expect for seismic acquisition in the region?

We are seeing an uptake of single-sensor acquisition in the region: though not the standard yet, the discussions we have had with local players and the parameters of several recent tenders certainly indicate an increasing interest in this acquisition strategy. One that offers enhanced spatial and vertical resolution, and richer datasets that are easier to de-noise and interpret. Although nodal systems are now commonly used for single-sensor surveys in many parts of the world, due mainly to accessibility considerations, it is not the case in the Middle East. Despite some

industry testing, there has not yet been a conclusive demonstration of their operational efficiency in the open, large areas specific to the region. Regional operators and contractors instead favour advanced cabled systems. I guess this is due to the fact that it is still early days before nodal systems can compete with the performance of advanced cabled systems in terms of real-time management of operations or the automatic and reliable management of large volumes of seismic data. The success of these cabled systems is mainly due to their unrivalled productivity level, with production records regularly exceeding 20,000 shots a day. In fact, Saudi Arabia, Kuwait, Iraq and Egypt operate purely with cabled systems. Only Oman and UAE have started to introduce nodal systems, mainly to address congested areas.

In terms of data quality, we mainly see the clear potential of innovative seismic sensors, like our third generation of MEMS sensors, Quiet Seis, which is unique in terms of both broadband capability and fidelity of the signal acquired, that exhibits true amplitudes and phase and therefore highly valued for FWI and reservoir characterisation. When used as three-component sensors, they also enable verticality and vector fidelity far above industry standards, reducing the contamination of seismic records with unwanted signals and meanwhile making proper de-noising easier. Different field tests have demonstrated all these advantages of MEMS technology, and the feedback we have had from different oil and gas companies worldwide has so far been very encouraging.

The automation of seismic acquisition is also expected by many to improve productivity levels and reduce operational cost and HSE risk. We made a significant step in this direction with our Vibrator Auto-Guidance solution, and I am confident that within a decade seismic surveys will be automated in a way that is hard to imagine now. The digitalisation trend, that is revolutionising data analysis and interpretation, continues to advance.

What technology solutions are needed to overcome tomorrow's challenges in the Middle East and around the world?

For their capability to record broadband signal with true amplitudes and phase, and also true verticality when used in 3C, we definitely believe in our third, latest generation of QuietSeis MEMS sensors. So far, these cutting-edge sensors equip our 508^{XT} system, and two new nodal systems we recently released: our real-time QC-capable WiNG^{NT} system for onshore, and our GPR^{NT} system for ocean-bottom surveys. When combined with our SmartLF distortion reduction solution, the data acquired is second to none in terms of fidelity, especially in the low-frequency end of the spectrum that drives the success of full-wave inversions.

A large 100,000 DSU-508^{XT}, SmartLF-equipped mega-crew has just started up in North Africa, in a desert region similar to those in the Middle East. Preliminary geophysical results clearly exceed those of a geophone line deployed for test purposes: this is very encouraging, and we are confident that we will soon have an additional case study to further demonstrate the value of this technology to the seismic industry in the Middle East. ■

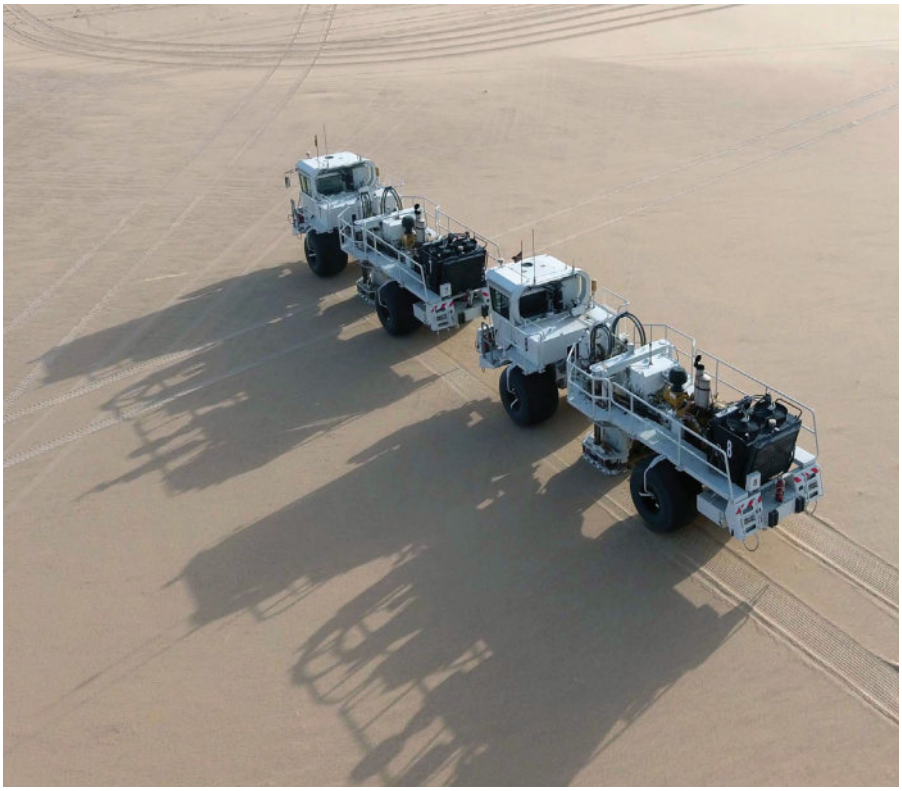


Image Credit: Sercel

Sercel Nomad 65 Neo broadband seismic vibrators deployed in desert region.

Using advanced technologies to maximise hydrocarbon resources and unlock greater value from reservoirs

THE ABU DHABI National Oil Company's (ADNOC) Thamama Center of Excellence (Thamama) has generated US$1.1bn in business value since its inception in 2017, according to an announcement made at ADNOC's Innovation Week, which took place virtually from 21-25 February.

Named after the reservoir formation most dominant in Abu Dhabi, the state-of-the-art hub, which is located in ADNOC's headquarters, brings together ADNOC's leading subsurface experts and leverages big data, cutting-edge digitalisation and smart analytics to help access hydrocarbon resources and unlock greater value from existing reservoirs. Additionally, Thamama drives innovation across ADNOC's upstream projects, optimises development costs and enhances value from all producing onshore and offshore fields in Abu Dhabi.

Yaser Saeed Al Mazrouei, ADNOC upstream executive director, said, "The value generated by Thamama since its start in 2017 highlights how ADNOC is harnessing advanced technologies, digitalisation and big data as well as deep engineering expertise to maintain ADNOC's position as a leading low cost and low carbon player in our industry. Thamama is also helping us to nurture the UAE's next generation of engineers and data scientists, as well as serving as a hub to harness AI solutions together with the recently established joint venture between ADNOC and G42, AIQ."

Through Thamama, ADNOC focuses on reducing exploration costs by hundreds of millions of dollars as it executes the world's largest three-dimensional (3D) seismic survey, which is providing 100 petabytes of high-resolution images of the subsurface across Abu Dhabi which are then turned into prospects by ADNOC's experts, ultimately enabling drilling and potential for oil and gas production.

Thamama is also enabling ADNOC to integrate AI, advanced analytics and cloud computing into its reservoir management and subsurface workflows to enhance oil recovery and improve production efficiency by more than 10%. Its integrated capacity model creates a digital twin of ADNOC's entire hydrocarbon value chain, potentially unlocking hundreds of millions of dollars in value every year.

EOR market expands in the face of industry retrenchment

The enhanced oil recovery (EOR) market continues to grow as companies seek to maximise yields from their existing assets in the face of a cost-constrained environment.

THE PRIMARY (NATURAL pressure combined with artificial lift techniques) and secondary (gas and oil injection) phases of oil recovery have been the industry's go-to method for oil extraction principally due to their ease of use. Whilst primary and secondary methods are more straightforward, their major drawback lies in the small percentage of oil in place actually recovered, with around 10% and 20-40% recovery rates for a reservoir respectively.

The tertiary phase, or EOR, sets itself apart with its distinguished recovery rate of 30-60% which is achieved, typically through three measures; chemical injection to increase the effectiveness of waterfloods or lower the surface tension that prevents oil droplets moving through a reservoir; injecting natural gas to expand in a reservoir to push out additional oil or dissolve into the oil and lower its viscosity; and thermal recovery whereby the stream is heated, through the injection of steam for example, to also lower the viscosity.

The advantages of EOR

EOR techniques traditionally have a relatively high cost (so that most EOR production globally relies on some form of government incentive) and unpredictability of effectiveness, which has restricted their usage. However, EOR is becoming increasingly utilised and according to a report by MarketsandMarkets the global EOR market is estimated to grow from US$43.3bn in 2020 to US$59.4bn in 2025, at a CAGR of 6.5%. This is due to a number of benefits being recognised such as its environmental advantages; EOR goes hand-in-hand with the rise of carbon capture storage (CCS) as green house gases, such as CO_2, can be injected as part of the oil extraction process. There is speculation that at COP26 there will be more intense discussion on carbon pricing which will raise the profile of methods lowering carbon intensity even more.

EOR proccesses have also benefitted from the decline in exploration activity. According to Wood Mackenzie, in 2014, global spending on exploration hit a peak at almost US$100bn but has been steadily declining ever since so the new normal annual figures reside at around US$17bn. As IOCs and governments lose their appetite for exploration, they are increasingly turning to EOR to squeeze as much revenue as they can from their existing assets.

Image Credit : Aubin

An Aubin chemist preparing for downhole tests in their dedicated lab in Aberdeen.

> "EOR goes hand-in-hand with the rise of carbon capture storage"

The use of EOR is also expanding due to the introduction of new technology which has made the phase more effective and accessible. One company pioneering this is Aubin, which has identified unwanted water production, leading to water management issues and oil production disruption, as one of the biggest and most costly challenges faced by the industry. In response to this, Aubin has developed an innovative technology, XMAX, which enables rapid water shut off downhole.

Ray Stirton, business director at Aubin, explained the value of this product, "Once deployed, XMAX precipitates an insoluble, non-reversible scale in the rock pore throats, permanently isolating the water production reservoir zone. It acts quickly and effectively by shutting down water production, allowing the production of crude oil to increase."

When introduced, the XMAX has the capacity to not only increase production but also significantly increase the life of a well. Aubin is currently planning to launch the technology in Malaysia in June this year to prove its viability, and hopes the technology will be picked up quickly in the Middle East. ■

The propagation pressure of pipelines

Elsevier Inc has published a new book in the area of pipeline engineering entitled the "Mechanics of Offshore Pipelines Volume 2." In the book, the authors Stelios Kyriakides, Research Center for Mechanics of Solids, Structures and Materials, The University of Texas at Austin, and Liang-Hai Lee Genesis Oil and Gas Consultants Ltd/Technip, USA, Inc, outline the technical details on the propagation pressure of offshore pipelines.

COLLAPSE UNDER EXTERNAL pressure is one of the main limit states governing the design of offshore pipelines. It leads to severe flattening of the pipe, rendering it unserviceable.

Consequently, a great deal of effort has been placed on developing dependable models for estimating the collapse pressures. The collapse pressure can be reduced if the pipeline experiences tension or bending simultaneously. Both types of combined loading are commonly encountered in offshore operations and consequently must be accounted for in the design of the pipeline also.

However, the damage caused by collapse under pressure or the combined loadings, although severe, is usually limited to a section a few pipe diameters long. In the case of offshore pipelines, unfortunately, such damage does not remain local.

Collapse continues its propagation until it either encounters an obstacle, such as a buckle arrestor, or until it reaches a water depth that is shallow enough so the pressure cannot sustain the propagation of collapse. The lowest pressure that can sustain the propagation of collapse is the propagation pressure, a characteristic pressure of the pipe. It is typically only a small fraction of the collapse pressure of a geometrically intact pipe (15-25%) and thus the potential of suffering a propagating buckle must be accounted for and designed against.

Image Credit: Adobe Stock

The collapse pressure can be reduced if the pipeline experiences tension or bending simultaneously.

A volume-controlled pressurisation procedure can be a solution

The propagation pressure of a pipeline is determined experimentally through a volume-controlled pressurisation procedure as follows. A section of pipe, usually more than 20 pipe diameters long, is sealed at both ends and placed in a stiff pressure vessel. To ensure that the internal pressure of the tube remains constant during the propagation of collapse, the tube is vented to the atmosphere through an umbilical. Venting to the atmosphere is particularly important when the test pipe is shorter, as is often the case in full-scale experiments on 20-inch or larger pipes. The vessel is completely filled with water, sealed and pressurised at a slow rate using a positive displacement hydraulic pump so that the propagation of collapse is quasi-static. (Note that the horizontally oriented vessel is at a small inclination to ensure complete venting of air from the vessel before the test commences.)

In the experiments conducted by Kyriakides and co-workers, collapse is typically initiated from a locally weakened location close to one end of the specimen. The local collapse pressure is reduced by mechanically introducing a dent approximately one diameter long either prior to or at the beginning of the test. During the experiment, the pressure in the vessel is monitored with an electrical transducer and its signal is recorded using a digital data acquisition system. The volume pumped into the vessel can also be monitored. ■

The communications revolution

New digital and satellite communications technology advances are benefiting Middle East offshore industries, says Martin Clark.

OFFSHORE COMMUNICATIONS PROVIDE a vital link between oil and gas facilities, from drilling rigs and platforms, to shuttles and tankers, connecting them to the world outside. In isolated offshore environments, perhaps many miles from the shoreline, good communications offer a reassuring link to a global pool of expertise in an instant, as well as having a positive impact on crew welfare by enabling personnel to stay in touch with friends and family. For the fleets of vessels that ply the seas everyday, carrying the Gulf's crude around the globe, it is also an inherent piece of the safety and navigational jigsaw.

And, like other sectors of society, it is an area that is experiencing a rapid, ongoing evolution driven by relentless technology advances.

The days of phone calls and fax machines have been overtaken by big data, digital technology and satellite connectivity – and things are moving faster than ever before.

It is now 30 years since the launch of the Global Maritime Distress and Safety System (GMDSS) service, via the Inmarsat C satellite service.

Inmarsat C delivers 99.9% reliability to seafarers, with Marlink currently responsible for almost half of the global traffic on Inmarsat C, which forms the basis of vital maritime safety and vessel tracking and positioning systems.

Infrastructure expansion

Meanwhile, the infrastructure to handle what is effectively a communications and data explosion is growing exponentially too.

Marlink is among those expanding its footprint in the Middle East in response to strong business demand for more bandwidth and new installations from energy sector and other customers at sea and on land.

It is expanding both in terms of number of activated terminals, satellite connectivity and managed network and IT solutions as well as onsite resources, such as sales or in-country field service teams.

Image Credit: Inmarsat

Inmarsat's GX5 satellite provides additional capacity to Europe and the Middle East on the Fleet Xpress (GX) Ka-band high-speed satellite broadband service designed for the maritime industry.

Prior to the COVID-19 pandemic, it reported significant year-on-year growth of 11% in the first half 2019 for the Middle East region. It said the increased demand and activity was coming from diverse customers, including national oil companies and oil majors as well as rig operators and companies providing exploration and production services.

> "Its customers have been looking for increasingly sophisticated hybrid connectivity and IT solutions."

Its customers have been looking for increasingly sophisticated hybrid connectivity and IT solutions for onshore and offshore operations in order to drive the digital transformation of oil rigs, drilling and offshore supply vessels, production platforms and FPSO vessels.

GX5 offshore boost

Satellite services have also gone through a transformation during the past 30 years. At the end of last year, Inmarsat announced that its most powerful satellite yet, GX5, had entered service, which will benefit users specifically across Europe and the Middle East. It provides enhanced, industry-leading Fleet Xpress capability (GX) Ka-band high-speed satellite broadband services designed for the maritime and offshore industries – delivering approximately double the combined capacity of the entire existing GX fleet (GX1-GX4).

Together with a significantly expanded ground station network and enhanced cloud-based processing, Inmarsat said that GX5 now supplements the global coverage of GX and supports the rapid growth in customer demand for GX services, particularly from maritime industries such as the leisure, merchant and offshore sectors.

A further seven satellite launches are planned by the company over the next four years to further upgrade its infrastructure, adding speed, capacity and resilience to offshore communications networks worldwide.

Tens of thousands of active users throughout aviation, maritime, offshore, enterprise, government and other areas already depend on GX daily.

Digital solutions

Many other digital products and solutions are coming onto the market to improve or accelerate communications in the offshore and maritime segment.

IEC Telecom and Thuraya launched a new digital game-changing solution for all vessel types at the virtual Seatrade Maritime Middle East expo in 2020. Orion Edge V ('V' for virtual) is a state-of-the-art satcom system that offers an affordable VSAT-like experience over compact hardware.

As technology advances at pace, the good news is that digitalisation – which was previously reserved for large vessels only – is now available for smaller crafts as well, typically used in a supporting role within the offshore oil and gas industry.

"Today we are experiencing a significantly higher demand for digital solutions, which has been escalated by the pandemic," commented Nabil Ben Soussia, chief executive for Asia, Middle East and CIS at IEC Telecom.

Initially launched for the UAE market, he said Orion Edge V has "highlighted the benefits of digitalisation that are now available even to small vessels via state-of-the-art virtual platforms." The UAE fleet includes numerous smaller vessels, particularly those supporting its growing offshore oil and gas sector.

> "A further seven satellite launches are planned over the next four years."

Some 60% of Middle Eastern companies report that they are now actively investing in digital technologies. Digitalised vessels have a competitive advantage when it comes to adapting to challenges and optimising business opportunities.

Incorporating IEC Telecom's OneGate system into the pre-existing Orion Edge solution allows ICT managers to monitor and control their network across all fleet vessels remotely via a user-friendly set of dashboards.

New services, including telemedicine, videoconferencing, and remote maintenance, can also be added on demand.

Internet of Things

These high-tech advances are having a material impact right where it matters.

Speedcast recently launched a next-generation Internet of Things (IoT) platform to simplify connectivity, provisioning, and device management through a single console. It means offshore users can manage all industrial IoT needs via the new service.

Customers can choose from cellular, satellite and low-power wireless options, managing everything from a single interface. Once devices are deployed, the Speedcast IoT Centre – deployed on Amazon Web Services to increase computing power and interoperability – monitors the health and status of all key elements within the IoT ecosystem, including devices, the communications network, the IoT platform, and the end user application.

Speedcast's IoT services are now deployed across the energy, maritime and other sectors. On a practical front, it provides the network that backhauls sensor data for one major oil and gas manufacturer of industrial compressors in the field to the customer's company headquarters, where data analytics predict and schedule maintenance

Image Credit: IEC Telecom

IEA Telecom and Thuraya's Orion Edge V satcom system will bring the benefits of digitalisation to smaller vessels, such as those supporting the offshore industry.

to minimise downtime and costs. When a single pump failure at a remote site can cost up to US$300,000 per day in lost production, payback comes fast; similar economics apply offshore.

But the scope is far reaching: other customers are leveraging Speedcast IoT services for personnel monitoring and safety, tracking and protecting cargo, and driving more efficient maintenance for tens of thousands of assets.

The offshore and maritime industries have never been more connected – but more is to come. ■

A unified approach for artificial lift optimisation

The integration of data-driven, expertise-based and physics-based approaches for artificial lift optimisation can be a differentiator in a prolonged low oil price environment, says Dr Venkat Putcha, PhD in Petroleum Engineering, director of data science at OspreyData.

OIL PRICES HAVE been operating in the US$30-US$65 per barrel range for the majority of time since 2016. The U.S. Energy Information Administration projects Brent oil price will average US$53 per barrel for both 2021 and 2022. The oil and gas industry has been further motivated to innovate to improve efficiency and reduce costs as a result of low oil prices. According to IHS CERA, digital oilfield implementations have led to a 2-8% production increase, 5-25% reduction in operating expenditures, and 1-10% reduction in capital expenditures. The popular strategy for advancing towards a digital oilfield entails the automation of processes and productionised workflows through a centralised system for data collection, integration, processing and analytics.

The Digital Oilfield Outlook Report by GE, Accenture and JWN lists the top four priorities among oilfield digitalisation as fleet management, field productivity, production asset optimisation and predictive maintenance. Currently, 85-90% of oil wells utilise some type of artificial lift. Misconfigured artificial lift systems directly translate to reduced asset production and sub-optimal field productivity. Traditionally, production operators, engineers and managers have used their expertise and engineering intuition, along with physics-based models, to identify inefficiencies and opportunities to improve. These may include simple examples, such as using fundamental physical equations and empirical rules of thumb for decision making, or more sophisticated examples such as employing nodal analysis software for modelling, design and optimisation.

Over the past decade, large volumes of oilfield data have been gathered. Such data includes sensor signals, production data, asset metadata such as deviation, location and completion, event data such as logs of various equipment failures, downtime and maintenance activity. This has enabled the development of data-driven models that help better manage systems through systematically detecting anomalies, identifying inefficiencies and automating the classification of worst offenders.

Image Credit : Adobe Stock

85-90% of oil wells utilise some kind of artificial lift.

> “Expertise-based, physics-based and data-driven approaches have their benefits and limitations when implemented exclusively.”

An expertise-based approach: pros and cons

Expertise-based, physics-based and data-driven approaches have their benefits and limitations when implemented exclusively. Experts employ their experience to provide quick recommendations on systems. This is a simple, fast and hands-on approach when experts are available to monitor wells. Expert-defined rules are a good fall-back when data is not available or sufficient. However, expert supervision is not a scalable solution, as it is not possible to manually monitor and optimise all wells at all times. Furthermore, expert-defined rules may be limited to a specific range of wells, types of wells, fields or plays. Expert-based rules that operate in the North Sea may not be as effective in the Ghawar oilfield of Saudi Arabia.

A physics-based approach: pros and cons

Physics-based models are much more widely applicable than expertise-based systems. However, these models pose a different challenge. Physics-based models must be calibrated with field data in order to make the models meaningful. This process may need updates as well characteristics change, without which the model would fail to simulate and predict well behaviour accurately. In some cases the detailed information or detailed physics-based models required to accurately represent the physical system and study

certain problems may not be available. For example, an advanced simulation model of an electrical submersible pump (ESP) well can estimate the liquid production as a function of the pump head boost, however, it may not be possible to simulate the well's behaviour while the ESP is undergoing gas locking.

A data-driven approach: pros and cons

Data-driven models make excellent candidates for systems where detailed physics-based modelling is not possible. For example, logs of past ESP gas-locks, their corresponding sensor data and other metadata can be utilised in the early detection of gas-locks. Using machine-learning algorithms that harness sensor and event data for predictive maintenance and better field management can lead to significant reductions in operational costs, as IHS CERA writes.

Data-driven models have limitations too. Firstly, they are impacted by data's availability, quality and consistency and the diligence exercised while logging or labelling events. (It is important to note that physics-based models are also impacted by data availability and data quality). Secondly, there is a trade-off between the predictive capabilities and interpretability of data-driven models. The black-box nature of powerful predictive models, such as random-forests or neural networks raises scepticism towards those models, especially in communities belonging to the expertise-based and physics-based schools of thought.

The three above-mentioned approaches have several limitations. The rest of this article will describe the methods to overcome them through the integration of these approaches. Key concepts to be introduced are expert-augmented machine learning; live simulation and history matching with automated recommendations; and anomaly detection assisted optimisation.

Expert-augmented machine learning

Integrating the expertise-driven approach and data-driven approach, expert-augmented machine learning creates a feedback loop where expert input feeds into and improves the machine learning model. Initially, the experts use the historical sensor data to label events. There may also be cases where the experts are unsure if a given historic time period is an event of interest or a different event type. For example, when training a model to detect gas-locks, gas-in-pump or solids-in-pump, there may be other events that deviate from normal well behaviour. All this expert feedback is embedded in the model training and update process. Once a model has been trained and starts making predictions, experts review every prediction the model emits. The model receives negative reinforcement on false positives and false negatives, and positive reinforcement on true positives. Over time, the model becomes a mechanised representation of the expert. The data-driven model can be deployed on a software platform and can detect these trained events perpetually and on thousands of wells.

Image Credit : Adobe Stock

Digital oilfield implementations have resulted in significant production increases and cost savings.

> "Anomalies detected through data-driven models help differentiate between normal and abnormal operating conditions."

Live simulation and history matching with automated recommendations

As mentioned previously, physics-based models need calibration and constant updating with changing well characteristics. Typically, this has been a manual process. With advanced data management and data science capabilities, the physics-based simulation and the model calibration process can be automated. This requires live sensor and production data to be cleaned, processed and integrated with well metadata. This information queues simulations relevant to the operating states of the well that update as states change. Physics-based models are executed on the fly with the work distributed to machines on the cloud. The results of the simulation are stored on a database. These results can be history matched with field conditions using probabilistic and machine learning algorithms. Such history-matched models can be utilised to generate setpoint change recommendations or design evaluations. Examples for this can be gas-lift injection rate optimisation or plunger cycle optimisation.

Anomaly detection assisted optimisation

Anomalies detected through data-driven models help differentiate between normal and abnormal operating conditions. A model simulated using input from abnormal operating conditions or a mixture of normal and abnormal conditions may be incorrectly calibrated due to the incorrect averaging of pressure, flow rates and production rates. A physics-based optimisation system must be integrated with an anomaly detection system to provide accurate design or optimisation recommendations.

Leveraging a unified platform

A unified software platform capable of integrating the three key approaches to artificial lift optimisation using the novel methods of expert augmented machine learning, live simulation and history matching with automated recommendation, and anomaly detection assisted optimisation can be a differentiator in a prolonged low-price oil and gas market. ■

OspreyData is a leader in helping oil and gas firms improve operations and raise profitability by leveraging the digital oilfield. Its Production Intelligence Solutions empower both operators and engineers with unified monitoring and advanced analytics tools that optimise well production and find operational issues faster. For more information about OspreyData and the Production Intelligence Solutions, visit www.ospreydata.com

Redefining the energy industry with digital technologies

The use of digital technologies to redefine the energy industry and accelerate the energy transition was a strong theme at the Baker Hughes Annual Meeting, which had the theme 'Energy Forward'.

THERE IS NO doubt that the COVID-19 pandemic has had the effect of accelerating the digital transformation, particularly the adoption of artificial intelligence (AI). Taking part in a fireside chat with Lorenzo Simonelli, chairman and CEO of Baker Hughes, and Satya Nadella, CEO of Microsoft, commented that during the pandemic, "Every industry is being transformed by that most malleable of resources, digital technology, both for business continuity and resilience. This is the most at scale experiment of highly constrained remote work. If you take energy, everything around operations had to be remoted. But more important is the transformative effect in how we serve our customers, how we improve our outcomes, our efficiency inside a company. Every company will build their own proprietary software edge, and more importantly also use world-class technology so they're not reinventing the wheel."

Asked about the new frontiers in technology and how they will impact the energy sector, Nadella remarked, "The compute architecture, whether it's in the cloud or on the edge, the amount of infinite elastic compute that is going to be available, this distributed computing fabric being embedded in the real world is going to have a transformative effect. And with all this compute, making sense of lots and lots of data, the variety, volume and velocity with which it's being generated, you can reason over it in real time and create predictions and analytical power. So the AI layer is going to bring a lot of value to every firm. When you look at the frontiers of what's happening with augmented reality and mixed reality, it shows where the world is going, and the interface itself becomes more natural and embedded in the real world."

Nadella highlighted the importance of collaboration and partnership in creating opportunities for the energy transition and driving more sustainable operations, with many examples of technology companies teaming up with energy companies to help them to adopt scaled AI solutions across their operations to meet safety, sustainability and reliability goals. A good example is the newly-launched Open AI Energy Initiative (OAI), an open ecosystem of artificial intelligence (AI)-based solutions for the energy and process industries, which brings together the subject matter and industry expertise of Shell and Baker Hughes with the software capabilities of Microsoft and the AI abilities of C3 AI. "Our customers are enjoying the benefits."

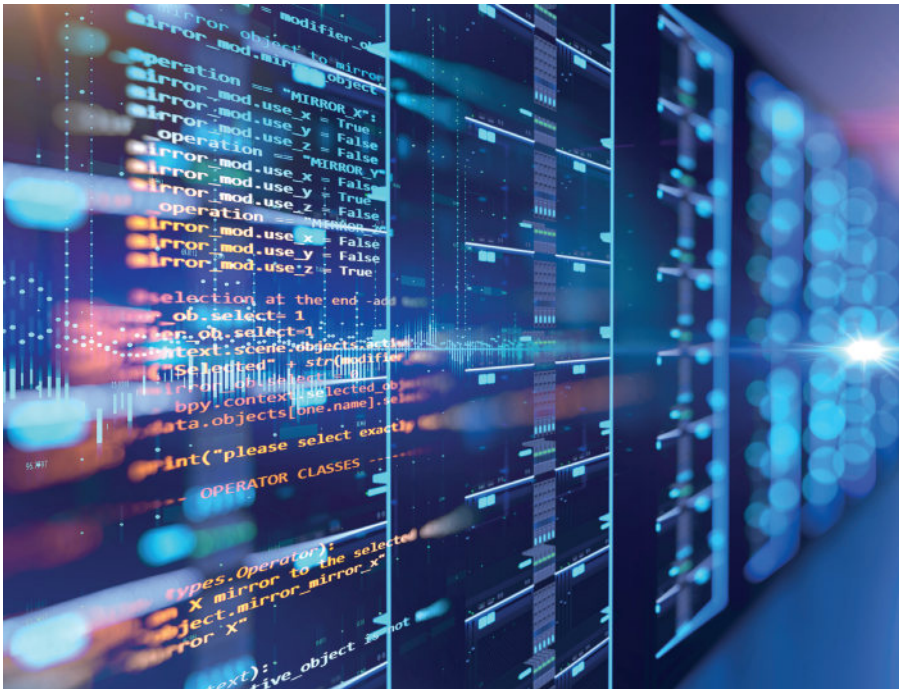


Image Credit: Baker Hughes

The pandemic has accelerated the digital transformation.

> "The AI layer is going to bring a lot of value to every firm."

"We've also partnered with BP to drive their energy transition innovation across cities and energy parks," he added. "That requires edge compute, the cloud plus the edge coming together."

Addressing the future of work, Nadella commented that the key word going forward is flexibility to accommodate the new hybrid nature of work. Collaboration and learning are fundamentally transformed, he added. "Using something like hollow lens you can have a holographic input from an engineer working remotely helping the frontline worker." In terms of wellbeing "it is important to have data and analytics to manage that most precious resource, our time." While technology will facilitate collaboration, learning and wellbeing, good old-fashioned management practices will also be needed to accommodate the needs of all employees, he said.

Rethinking the acceleration of AI at scale

In a conversation with Tom Siebel, CEO of C3 AI, Yuri Sebregts, EVP technology and chief technology officer at Shell, revealed the positive impact of digital transformation on Shell's operations

Tom Siebel highlighted the "massive" interest in digitalisation for oil and gas and paid tribute to Shell's leadership in the digital transformation as it seeks to reinvent itself to become a net zero company.

"The largest AI applications we're aware of are in the utility industry and oil and gas industry," he said.

Yuri Sebregts commented that Shell has already seen a significant positive impact of the digital transformation on its operations, giving as an example two major use cases, in safety and environment.

The number of AI-equipped robots in the field has increased significantly, he said.

"We're now up to a few hundred cleaning and inspection robots actively in the field, going to places where we'd rather not send humans, and keeping them out of harm's way. "

The company has operated more than 1,200 drone flights to monitor emissions, using drones equipped with sensors, coupled with AI and machine learning. "This is bringing our environmental footprint way down, as we can continuously monitor so much more equipment than we could do using humans driving around in trucks," he said.

Asset reliability has been a focus area jointly developed with C3 AI, using machine learning to monitor equipment in the field, such as valves and pumps. "About a year ago we had just a couple of machine learning models up and running, and the scale of acceleration now we have the foundations in place is tremendous. As of last week we had 5,200 pieces of equipment in the field being continuously monitored with machine learning, and we're adding three hundred every week.

"A third area where it's starting to make a big difference is in advanced optimisation and process control, historically a field where you had engineering-based models which your controllers would act upon," Sebregts continued. "We can now blend these with machine learning-based models, which allows us to squeeze several more percent value out of the asset, so when you talk about big assets that makes a very material difference. "

Support from the top critical

What are the ingredients for success? Siebel noted that nine out of 10 companies who attempt digital transformation and AI projects on a large corporate scale, fail. The companies that succeed, he said, are those such as Shell, that are led from the top, where the entire executive leadership team is behind digital transformation and the entire company buys into it.

"Support and leadership from the top is a prerequisite," agreed Sebregts."You also have to make sure you focus on value, not just the technology itself – think about how you drive value for your operations and your customers. That's what we're doing here with AI. And it's important to focus on getting the basics right – with strong foundational platforms across the company and data standards, to ensure we can leverage what we build through common ways of working." He added that having strong alliances with companies, such as C3 and cloud computer providers is a core part of that.

Sebregts stressed that having the right talent is another critical factor, in order to get the digital transformation right in the field, through alliances with other relevant companies and having the people in the company that really understand it at the core.

"We have built a team of around 350 cutting edge specialists in AI and machine learning and other types of digital technology, such as blockchain, that work with yourselves and support our teams in the field. We have a significant multiple of that number of people that we upskill throughout the company using common learning platforms, who might be first and foremost, say, process engineers, but also know a good deal about AI and can bring that into their work.

"Finally, it is really important to embrace the thinking that you have to adopt your work processes to what AI makes possible. You don't want to use AI just to do the things you always did, but faster. You want to step back and be willing to change the core ways your work is done, change your business processes, to unlock the power that AI and machine learning bring. We're really seeing the fruits of that happening."

Sebregts concluded by expressing high hopes for the Open AI Energy Initiative (OAI), which provides a framework for energy operators, service providers, equipment providers, and independent software to offer interoperable solutions, including AI and physics-based models, monitoring, diagnostics, prescriptive actions and services, powered by the BHC3 AI Suite and Microsoft Azure.

"We see this as a core next step," said Sebregts. "If we can unlock solutions and innovations across the industry and make them available on a much broader scale, we will see a huge acceleration. Through this initiative, I can see us putting in place common standards for connecting innovations that different companies come up with, and making them interoperable. That will stimulate innovation and stimulate the takeup. We're excited to make what we've developed with C3 AI commercially available to the market through an open ecosystem with interoperability, that will attract other solutions that we then can benefit from as well." ■

Survive and thrive with digitalisation

Tariq Bakeer, Regional Managing Director of Endress+Hauser Middle East, says digitalisation is all about the added value it brings.

I COME FROM a telecommunications industry background where the word 'digital' has long been the industry standard; computer network protocols, such as Ethernet and Wireless LAN as well as mobile networks standards, such as GSM, GPRS and UMTS were all based on digital communication. It has been more than 20 years since digital was already at the core of the telecommunications industry.

The automation industry, on the other hand, was more conservative in adopting digital communication and all the benefits that come with it. Throughout my journey in this industry over the past 15 years, I have seen the introduction of many digital standards such as FF, PROFIBUS and WirelessHART to integrate the field transmitters with control/monitoring systems. In my point of view, this had very limited success in terms of industry acceptance as well as the applications in use. Even the HART digital protocol, which came as a standard protocol in the field transmitters, was mainly used to configure and commission a device rather than to make higher value information-based decisions. Analogue stayed at the core of the automation industry.

I am very proud to be working for a company, which is well ahead of its time in terms of understanding the power of digitalisation and digital transformation and further utilising it as a differentiator in the industry in specific applications to create higher value for our customers. For instance, for more than 10 years, we have addressed topics such as conditional monitoring as means of preventive maintenance for higher plant availability; digital sensors (Memosens technology) in liquid analysis, which disrupted the traditional analogue sensors and drastically improved the way we maintain them; and HART communication on top of the tank as means of safety in tank gauging applications, among many other innovations. Endress+Hauser has constantly built the architecture and foundation for digital transformation.

Image Credit: Endress+Hauser

Tariq Bakeer, Regional Managing Director, Endress+Hauser Middle East.

> "Adopting, adapting and managing digital transformation will decide which businesses survive and thrive and which do not."

In the last few years, the words digitaliation and digital transformation have gained momentum, and now it is stronger than ever. They came along with many terminologies, such as Industry 4.0, IoT, M2M, Big Data and many others. All of us started talking about this, each one probably referring to something different depending on our backgrounds and understanding. It felt that all industries were merging together, and what was not relevant some years back, became highly relevant. This was, and probably still is, an overwhelming topic and experience.

The way I define digitalisation today goes way beyond the basic connectivity and the communication which has already existed for many years. I would define it based on the added value it brings and the ways it has drastically and positively changed:

- The way we interact with one another: whether with a customer, a partner or a colleague, digital transformation makes us more efficient, more collaborative and certainly more available. COVID-19 taught us a lesson on how important this value is.
- The way we make decisions: whether this is to optimise a process, proactively predict and prevent or a go/no go for an investment, digitalisation allows us to better utilise the data and make more intelligent, informed and even faster decisions.

Consequently, I categorise the topic of digitalisation as a survival topic, for individuals as well as for businesses alike. It is a long-term game. Adopting, adapting and managing digital transformation will decide which businesses survive and thrive and which do not. ■

Image Credit: Adobe Stock

Digitalisation has promoted more collaborative ways of working and effective decision making.

Transforming pipeline operations with digital technologies

Saul Zambrano, global industry director, energy and utilities digital transformation leader, Software AG, discusses how digital technologies can help pipeline operators to optimise their operations.

What are the main asset management challenges facing pipeline operators?

One of the greatest challenges facing the oil and gas sector is that the industry is stuck at the moment. While overall pandemic-related demand reduction has stabilised, no one is quite sure when a return to normal will happen and what it looks like. And while everyone can agree that accelerating "digital transformation" initiatives will be good for the bottom line; the reality is that almost all oil and gas companies are in cash conservation mode – which limits their appetite for transformation projects. Fortunately for pipeline operators, their business model is moving in the opposite direction. First, pipeline and storage companies are seeing their cash balances grow as a large percentage of contracted volumes are under long-term contracts. Second, storage revenues have increased as the industry is still producing more oil and gas than the world can consume, which has inflated storage fees.

And quite a few pipeline operators are taking advantage of this window of profitability to accelerate their digital transformation initiatives.

The greatest areas of focus on improved asset management is centered on three areas:

- How can blockchain technologies be utilised to make the custody transfer process more secure and efficient?
- How can they create more real time visibility of asset performance to assist in capacity and maintenance planning?
- In the age of increasing concerns of the industries impact on carbon emissions, what types of technologies are available to monitor and mitigate Scope 1 carbon emissions?

And, while it is easy to focus on the technical challenges for these three areas, the bigger challenge is an organisational one. Will executives allocate the budgets and resources to prioritise expansion of these capabilities during a window of unexpected margin strength?

How can IIOT technologies help operators to manage their pipeline assets more effectively and obtain visibility across their operations?

One of the greatest challenges facing pipeline operators is that a fair amount of industry standard pipeline management practices are built on fragmented data. When one looks at the number of assets that are deployed by multiple vendors across both pipeline and storage operations, the challenge of data integrity becomes evident. For each asset vendor there is a different set of data points being generated. Harmonising this data so that it is normalised and made actionable is not a trivial exercise. Compounding this problem is that a large percentage of these assets are not being centrally monitored through digital technologies. As a result, data is not being recorded or being recorded manually. A fully capable industrial IoT platform must have the ability to connect to both legacy PLC and RDU sensors, as well as greenfield sensors that are deployed to create more visibility. And as this capability is enabled, an integrated view of operations is created where data is available, timely, and easy to access by the resources who need it.

How can predictive analytics, machine learning and AI help to pinpoint problems before they occur, and promote better decision making?

Most asset maintenance procedures are preventative in nature. This is primarily driven by the fact that many field assets have not been digitalised. Consequently, if asset performance data is being logged through manual processes, it is not being done, according to a standardised data model across operations. As a result, while the capabilities of AI/ML enabled predictive analytics have been documented across multiple industries, the oil and gas sector suffers from lack of data quality. Unfortunately, this low data quality limits the ability to deploy AI/ML capabilities. The best way to understand this constraint is "garbage in garbage out!"

What are the benefits of migrating to the cloud for pipeline operators?

For quite some time, one of the principal debates on cloud strategies was whether the benefit was there in relation to cost efficiencies and technical capabilities. The answer is yes and yes. The more critical question for oil companies is how they migrate to the cloud and manage their data across both cloud and on-premises applications that are not migrated. API management will become the critical enabling technology to navigate this requirement.

How would you advise companies to approach a digital transformation programme?

All great journeys begin somewhere. And the one key element of all great journeys is that there is a rigorous and thorough inventory exercise at the beginning to ensure that the provisions are sufficient to support the goals of the journey. As companies undertake their digital transformation journeys, they should keep in mind two key areas. One, what are we trying to accomplish? Two, how will we accomplish it? Consequently, it is critical that companies take an inventory of their existing OT/IT application portfolios to understand whether they have the right tools to execute on their goals in a scalable, sustainable and secure manner.

To what extent do you think the pandemic has accelerated the deployment of 4IR technologies?

The results have been mixed. 4IR refers to a broad set of technologies. Within this set, there have definitely been technical areas that have been accelerated. For example cloud computing, system integration, big data, cybersecurity and autonomous robots. Areas that are seeing a lot of activity via Proof of Concept trials are IIoT, augmented reality and autonomous vehicles. ■

Addressing corrosion challenges with digital solutions

Pankaj Lahoti, MEA Corrosion & Erosion subject matter expert, Emerson Automation Solutions, discusses how digital solutions can be leveraged to improve and facilitate internal corrosion monitoring and inspection.

OIL AND GAS operators across the Middle East face tremendous pressure to improve their production margins to stay competitive. Production facilities – refinery, gas plant or gas-oil separation units – are expected to reduce their operational expenditure, delay shutdowns, improve the HSE index of their facility – and achieve all of this with limited access to CAPEX budgets. Restricted personnel movement due to COVID is further restraining plant corrosion and inspection teams to conduct even the regular maintenance and inspection activities. With infrequent or reduced data collection, the threat of loss of primary containment is imminent.

Advancements in technology around connectivity and analytics provide operators with an opportunity to navigate these difficulties by digitalising their corrosion monitoring and inspection methods.

The traditional method

Oil and gas operators have been using several types of instrumentation for corrosion monitoring, and two of the most common are corrosion probes and manual ultrasonic inspection.

Intrusive corrosion (or Electrical Resistance, ER) probes have been in use for more than 60 years. They are considered a very well-established technology that often consists of an intrusive element with a sacrificial tip sitting in the fluid. It is typically made of the same material as the surrounding equipment. Data collection happens via offline dataloggers or wired connection to the control system.

On the other hand, **manual ultrasonic inspection** has been used for half a century and is considered a conventional technique for measuring metal wall thickness. This involves the generation of ultrasound from a transducer placed directly onto the metal surface or back wall. The reflected ultrasound or A-scan is then recorded, and the time difference or "time-of-flight" between the sending and reflected signals provides the measurement of the wall thickness. Although the technique is reliable, completing a full set of measurements for a typical production plant with thousands of corrosion measurement locations (CMLs) tends to be very time-consuming and labour-intensive. Other disadvantages associated with this technique are:

Poor repeatability – It is highly unlikely that consecutive measurements will be taken in precisely the same location by the same NDE technician. Also, the equipment used and the NDE technician's skill level can vary between measurements, introducing high variability to the measurements.

High temperatures above 100°C (212°F) can, at times, permanently damage the NDT (Non-Destructive Testing) equipment. There are also safety risks to the NDT technician at higher temperature locations.

Physical access – the NDT technician requires access to the equipment at the measurement location of interest, which involves scaffolding (possibly permanently installed) and stripping insulation to expose the metalwork to make the manual measurements, involving high costs. At times, it also delays measurement until shutdown.

> "Online corrosion monitoring is only as good as the software used to analyse the data."

Image Credit: Emerson Automation Solutions

Pankaj Lahoti, MEA Corrosion & Erosion subject matter expert, Emerson Automation Solutions.

Continuous corrosion monitoring solutions

The best practices now consist of using permanently mounted ultrasonic sensors that measure wall thickness and employ wireless data retrieval. Once deployed on critical TMLs, these sensors provide good quality and frequent data otherwise unavailable, and are cost-effective and straightforward to deploy at a scale. The information supports a wide range of operational decisions due to its sensitivity to small changes in wall thickness, robustness to extreme plant conditions (up to 600ºC), and extended battery life enabling reliable operation over the entire cycle between turnarounds. Data is transferred using industry standard Wireless HART communications to the multiple end users' desk, allowing frequent, reliable, and safe wall thickness monitoring.

Online corrosion monitoring is only as good as the software used to analyse the data. Independent market research shows corrosion monitoring software and software services growing faster than any corrosion monitoring hardware over the next five years. Operators may gain access to an abundance of data, but knowing how to use it to produce actionable insights is the key.

Emerson Automation Solutions identified

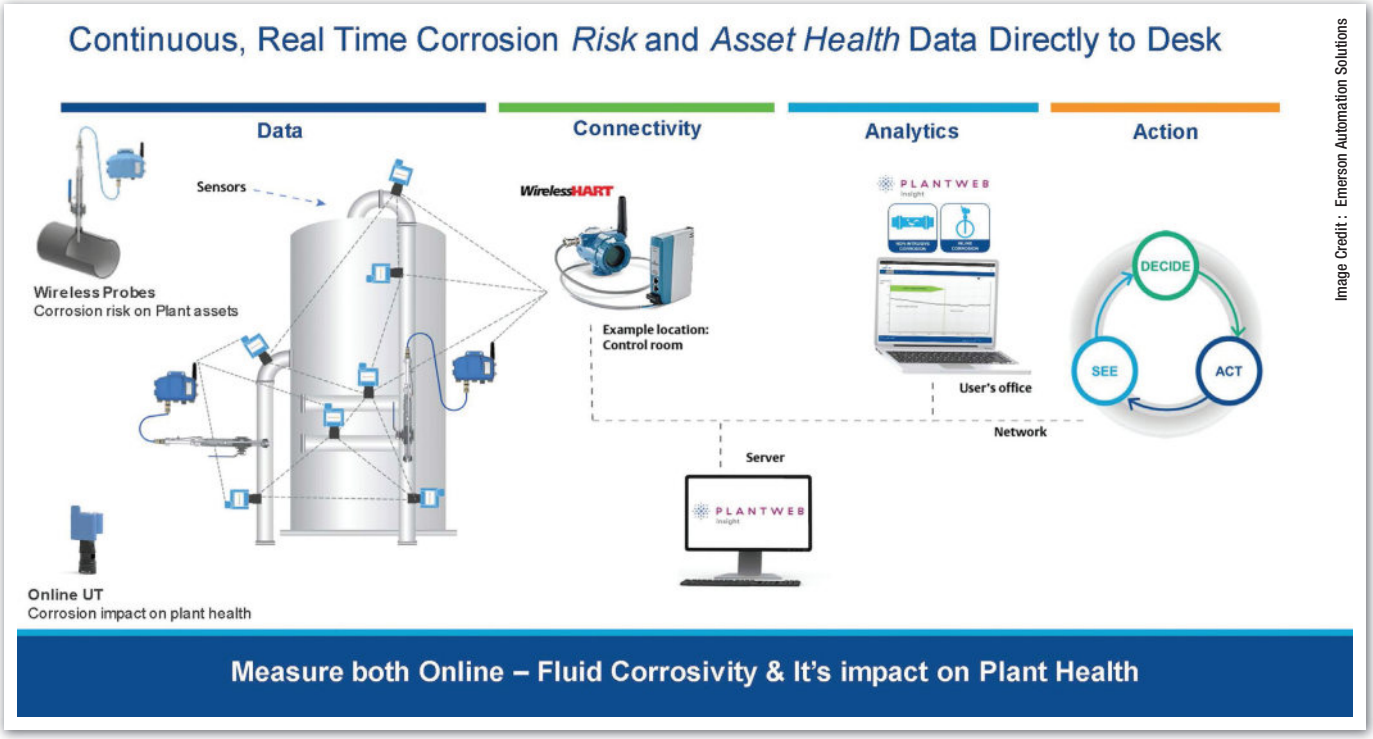


Image Credit : Emerson Automation Solutions

this several years ago and began to develop a new application platform. Plantweb software is a web-based application platform designed for pre-configured easy analytics and actionable information. Real-time asset monitoring means providing end-users with continuous, consistent analytics instead of relying on exporting data to perform manual calculations. Abnormal situation identification allows end-users to focus on real problems rather than data gathering. Operations teams can use the continuous online data to maximise production confidently, optimise inhibition strategy and drive high-level strategic initiatives, such as crude slate optimisation (refinery).

The benefits can be extended using built-in connectors to link your corrosion data quickly and easily to external host systems, such as process historians. End users can promptly correlate process data with corrosion data and, combined with their understanding of the corrosion risk posed, seek to learn the root cause analysis of corrosion at any given time.

The inline corrosion application supports a range of wireless corrosion probes (ER, LPR, Sand, etc.). The non-intrusive corrosion application supports widely used and currently available non-intrusive ultrasonic transmitters. The corrosion software application provides end-users with the ability to monitor corrosion risk and its impact on their plants.

These solutions also fit perfectly under the digital transformation vision of major oil and gas operators in the region, and provide a means for the plant's more sustainable operation by empowering the operations team with practical decision support tools. ■

Saudi Aramco Energy Ventures invests in CorrosionRADAR predictive corrosion monitoring technology

NEW INVESTMENT FROM Saudi Aramco Energy Ventures (SAEV) is driving the next phase of global growth for UK-based company CorrosionRADAR Ltd. The funding will enable CorrosionRADAR to strengthen its operations and widen efforts to address Corrosion Under Insulation (CUI) and other operational challenges through digitalisation.

This follows successful on-site installations of CorrosionRADAR predictive corrosion monitoring systems at a primary Aramco production facility.

Dr Chiraz Ennaceur, CEO at CorrosionRADAR said,

"We welcome this exciting collaboration with Saudi Aramco Energy Ventures as we step up the global response to CUI through the adoption of digital solutions. This investment demonstrates a surge of confidence from the sector in the use of real-time data systems that will accurately predict leakages and the onset of structural failure. With the worldwide cost of corrosion at US$2.5 trillion, a co-ordinated effort cannot come soon enough. CorrosionRADAR is showing that a sustainable path to increased safety and dramatically reduced costs is achievable right now, using new technology and wireless connectivity."

CorrosionRADAR is seeing growing demand for its smart solutions as oil and gas, petrochemical and chemical companies look to make their operations safer, cleaner and more energy efficient through improved maintenance and management of their assets. Its data-driven predictive corrosion monitoring systems are transforming the approach to on-site inspection and maintenance programmes – yielding cost savings of between 40 and 60% following installation, and extending the lifetime of assets. It means an end to intensive cycles of manual inspection and maintenance and in their place, optimised and predictive asset integrity management.

Mike Hill of Saudi Aramco Energy Ventures said, "CorrosionRADAR's solution will help operators around the world manage their capital spend better and increase the economic life of their existing assets, in a cheaper, safer and more efficient manner whilst reducing people movement."

CorrosionRADAR systems combine patented Electro-Magnetic Guided Radar (EMGR) wireless sensing technology and Industrial Internet of Things (IIoT) applications to continuously monitor and safeguard complex structures and critical assets from the effects of corrosion. With a series of sensors embedded under the asset insulation, the systems have exceptional range and will relay real-time data to localise CUI well in advance of damage or structural failure. Pilot project outcomes have included increased pipeline uptime with an early detection of moisture, corrosion avoidance in production columns, and optimised downtime for inspection and repair in assets with complex geometries.

Process safety fundamentals

A new report by The International Association of Oil & Gas Producers (IOGP) outlines 10 process safety fundamentals to support companies as they seek to reduce, and ultimately eliminate, fatal and high severity process safety events.

THE OIL AND gas industry is by its nature potentially hazardous. Typical hazards include flammable liquids and vapours, combustibles, toxic chemicals, asphyxiants, corrosives, pyrophorics, and high pressure/temperature.

Data reported by IOGP members over a 10-year period shows that 128 people lost their lives in 56 process safety events. IOGP's Process Safety Fundamentals (PSFs) have been developed to support those working in front-line operations, maintenance, and on wells teams in the oil and gas industry to eliminate fatal or high severity events. 91% of fatal process safety incidents can be linked to the 10 IOGP PSFs, the Association says,

Based on an approach similar to that of IOGP's successful Life-Saving Rules (which they complement), the Association's new Process Safety Fundamentals (PSFs) are data-driven, and draw attention to those situations that are most likely to lead to process safety fatalities.

"The PSFs are not intended to exhaustively address all process safety risks and hazards in our industry. Instead, they should be used to supplement a company's own underlying systems for process safety management," said the Association's Safety Director, Olav Skår. The Association stresses the importance of good communication between front-line workers and management, and hopes the PSFs should empower people on the frontline to raise issues and dilemmas as they arise, without fear of criticism, for effective process safety performance.

The IOGP stresses that it is important to remain constantly aware of the potential for process safety accidents, sometimes described as maintaining a state of "chronic unease". Always being aware of our vulnerability to a process safety event helps us to avoid having one, it says.

IOGP's 10 process safety fundamentals are as follows:

1. We respect hazards – Lack of hazard awareness is an underlying cause of many process safety events. It is important that workers understand the process safety hazards that they face at their facilities and their roles in controlling them. Managers should discuss major accident hazards with frontline workers; check that risk assessments address both personal and process safety hazards; and ensure that front-line workers do not become desensitised to process safety hazards, as can happen when routinely working close to such hazards.

Image Credit: Adobe Stock

The oil and gas industry is by its nature potentially hazardous.

2. We apply procedures – Many of the operations or activities performed in oil and gas facilities are complex and/or have the potential to release hazardous materials if they are not performed correctly. Step-by-step procedures are developed to perform these tasks safely and prevent hazardous situations. It is good practice to use procedures on site and use job aids (e.g. sign off) to confirm that key steps have been completed in the correct sequence as the activity proceeds. The IOGP cautions against complacency if an activity has been performed many times before without hazardous or unwanted outcomes. No matter the level of experience, it is easy to make a mistake, and therefore it is important to apply the procedures thoroughly, every time. It is also important for workers to be familiar with, and practice, emergency response procedures.

3. We sustain barriers – A barrier is a risk control that prevents unintended events from occurring or stops escalation to harmful consequences, whether a hardware or human barrier. Process safety events can result from degraded or failed barriers. These should be addressed without delay and normally require approval for continued operations.

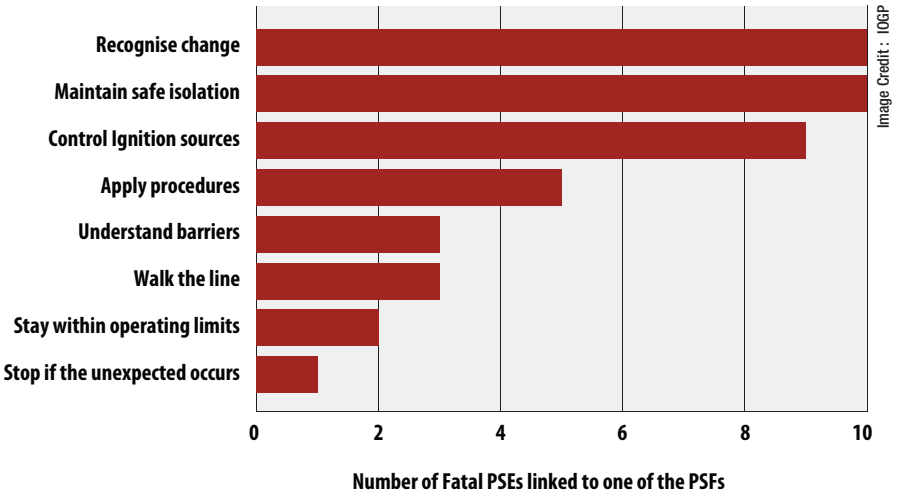
4. We stay within operating limits – Equipment operated with process conditions (e.g., temperature, pressure, level, flowrate)

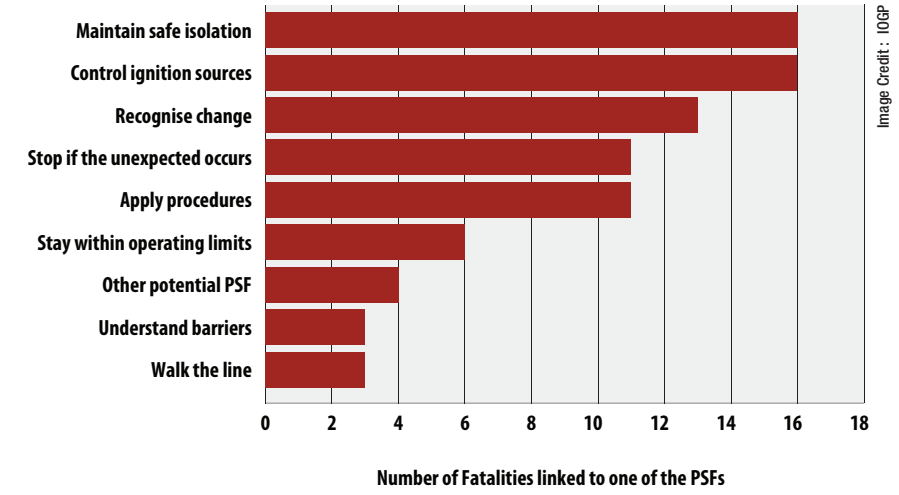
outside of safe operating limits can result in unstable and unpredictable operation and the potential for process safety incidents. It is therefore important to understand and keep to the operating limits of the plant. Overfilling and overpressure are the most common operating limit excursions that lead to process safety incidents. One common type of fatal incident occurs when a temporary source of high pressure (e.g., pump, compressor, nitrogen bottle, etc.) is connected to the process with inadequate overpressure protection. This can lead to catastrophic failure impacting those working in the area, even if the release does not ignite. Excursions outside operating limits should be systematically investigated.

5. We maintain safe isolation – It is important for every activity that requires breaking containment,that an appropriate isolation plan for the specific activity is used and followed. Some process safety incidents have occurred when an isolation plan for a similar (but not identical) task has been used but did not address all the relevant hazards. Isolation plans should therefore match the particular task and be based on up-to-date process safety information. After breaking containment, it is important to remain vigilant to potential signs that might indicate that the effectiveness of the isolations, venting or draining arrangements have changed.

6. We walk the line – To avoid releases of hydrocarbons and other chemicals, we often need to check that our process systems are ready for the next stage of intended operation. Incidents have occurred when a process system was followed but its condition was not as intended, such as a valve inadvertently left in the wrong position or a piping joint not fully tightened. It is therefore important to check that systems are in good condition and correctly set up each time we start them up or make a significant change in their use. This involves a physical, systematic inspection of the system in the field, sometimes in tandem with monitoring from the control room. Managers need to regularly confirm that process safety information (eg P&Ids) used to confirm readiness is accurate and up to date.

7. We control ignition sources – Around half of the fatal process safety incidents reviewed by the IOGP involved ignition. Some sources of ignition may be obvious, lsuch as hot work or nearby fired heaters, but others are less so. Ignition sources can include vehicles, open flames, grinding tools, pyrophoric materials, electrical equipment, hot surfaces, lightning, static electricity, and other portable electrical equipment. Personnel need to understand the full range of potential ignition sources and the requirements for ignition source control. Control of work risk assessments should evaluate the potential for flammable hazards, even outside classified/zoned areas.





8. We recognise change – Management of change (MOC) failure is linked to many fatal accidents. Most typically this is when a change was made without passing it through the MOC process, meaning that it did not get thoroughly reviewed and risk assessed. Sometimes changes – whether of or to equipment, procedures, materials or operating limits – that might appear quite small, can have a large impact on process safety, either by introducing new hazards or degrading existing barriers. Change must be systematically managed in all situations to avoid unwanted incidents.

9. We stop if the unexpected occurs – Often process safety incidents have occurred when an activity has deviated from the expected path, but those involved have continued regardless or informally adapted the plan on-the-run. The IOGP highlights the importance of recognising when things are not progressing as expected and workers should be encouraged to pause and seek guidance when this occurs.

10. We watch for weak signals – One characteristic of most major process safety incidents is that there were warnings before they occurred. Examples of weak signals include unusual vibration, ice unexpectedly forming on the outside of a pipe, weeps and seeps, reoccurring alarms,or abnormal field readings. The key is to identify these "weak signals" and respond to them before something more serious occurs. Front-line workers are often those best placed to pick up on weak signals as they become very familiar with what is normal and what is not. Personnel should therefore be encouraged to remain alert to such signals, even if they seem unimportant, so that they can be discussed and evaluated. ■

IOGP's PSFs have received endorsement from operating and contractor companies as well as regulators around the world. The report, which includes extensive guidance on the implementation of the PSFs, can be downloaded free of charge at https://www.iogp.org/bookstore/product/process-safety-fundamentals/

Transforming the Gulf downstream industry

The Gulf Downstream Association's (GDA) "TRANSFORM" Virtual Conference provided valuable insights on the evolving future of leadership and project management for the region's oil and gas downstream industry.

PUT TOGETHER BY the GDA's Leadership & People Development and Project Management technical committees, the event explored the leadership qualities needed to forge ahead with strategic partnerships and bold investments for a positive 2021, and the ingredients needed for delivering efficient capital projects, at a time when the COVID-19 pandemic has caused unprecedented disruption to business.

Day 1 focused on "The New Reality of Transformational Leadership" and discussed the role of transformational leadership in empowering people, embracing digitalisation, fostering accountability and encouraging innovation.

Following the opening remarks from Rayyan S. Tayeb, vice-chairman, GDA TRANSFORM Virtual Conference, Suleman A. Al-Bargan, vice president of domestic refining and NGL fractionation at Saudi Aramco, and president of the GDA, gave the keynote address. He commented that the people who bring about change and transformation are those with exceptional leadership capabilities.

"If it's any time we need this capacity, it's at this time, with all that's ongoing in the world at this stage," Al-Bargan said.

Leading by example

"What matters in leadership is the attitude and behaviour of the leader himself, to truly show the values he and the organisation believe in are demonstrated in every action he does, with the flexibility and agility to be able to adjust to the changing environment around him. These issues have to be carefully developed in the future leadership. Leadership is not about dictating and being forceful, it is about how you tap into the best potential of your people. That has to come from your own understanding, compassion and real appreciation for the effort of your people."

He stressed the importance of the 'servant leaders' concept, when the leadership cares about the people, their wellbeing and best interests. This has been manifested in the way the leadership of Saudi Arabia and the Gulf states has handled the pandemic, he said.

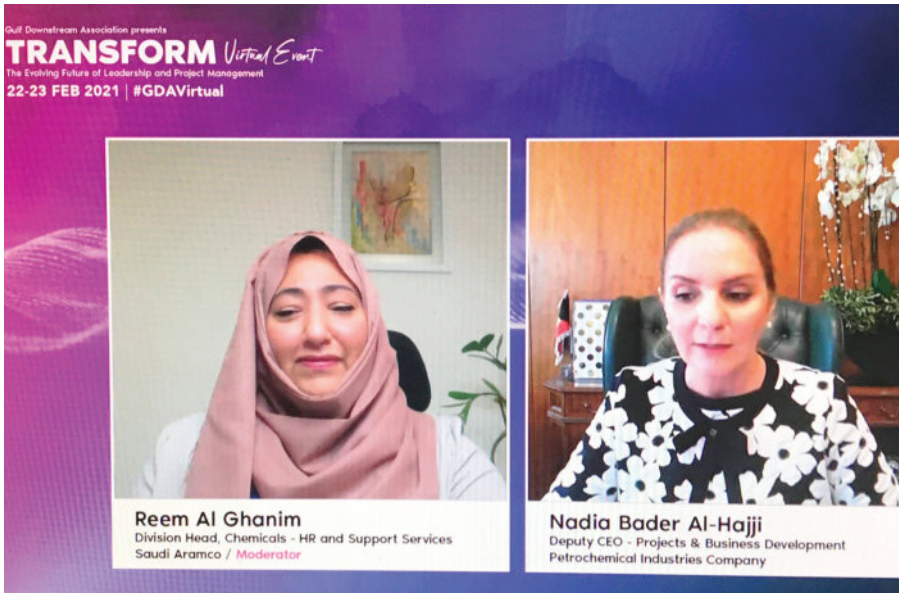


Image Credit: GDA

Reem Al Ghanim, division head, chemicals - HR and support services, Saudi Aramco; and Nadia Bader Al-Hajji, deputy CEO - projects & business development, Petrochemical Industries Company (PIC).

> "Leadership is about how you tap into the best potential of your people."

"Leadership at different levels, whether in government or individual organisations, have shown their capacities and capabilities to excel at this tough time," he commented.

Turning to the human resource challenges posed by the older generation retiring and large numbers of young people entering the workforce, he said that Saudi Aramco sees this as an "opportunity more than a challenge."

"The differentiator, which is I believe is an asset and a benefit, is that they are well educated, very talented, willing, and see themselves as important contributor to our industry," he said.

He shared the example of the Jizan refinery, where there had been a need to augment the capabilities of the young workforce in advance of the start-up. Saudi Aramco had addressed this challenge by attracting talent from all over the globe and accelerating the development and training of the workforce in refineries and facilities both in-kingdom and outside the kingdom. Today, Jizan's leadership, comprising more than 70% young generation, is "doing a fantastic job".

"Have your faith and trust in the younger generation; they usually surpass your expectations," he urged.

In the following session, moderated by Saudi Aramco's Reem Al Ghanim, Nadia Al-Hajji, deputy CEO, projects & business development at Kuwait's Petrochemical Industries Company (PIC), shared insights

from her leadership and development journey. This has seen her spearhead many initiatives, from integration across refining and petrochemicals to readiness programmes for mega projects and new company start-ups.

"During the formation of KIPIC as a new company under the umbrella of KPC, a leader came on board, having a very clear vision of what that company was going to be and how it was going to achieve that, set the strategy to meet the vision, and started detailing out the steps required to work out that vision," she said. "This leader got the team on board, because they believed in the inspirational vision that person had created and were willing to go above and beyond to make it happen, to work as a team and be part of that experience. It was a phenomenal example of how when going through a transformation, one person can really make a difference."

"Trust is important, and comes from knowing that the leader is willing to walk the talk and has a full appreciation of what it takes to get things done. Having that established and addressed brings in a mutual trust; you'll start to see expectations being met rather than people working in silos."

Turning to leadership strategies and processes post-COVID, she said that flexibility is a key aspect in addressing the challenges, as well as generating an atmosphere that allows the "brilliant minds we have in the industry" to innovate.

"The leader's role is to be able to spot the talent or potential talent in the team, and focus on creating a wave of new leaders rather than focusing on a particular individual; leaders that can carry us into the challenging era we're heading into," she said.

"Pockets of leaders" are needed, who may not necessarily be in a position in authority, but who may possess leadership in certain skills or areas of expertise, she suggested.

Further sessions on Day 1 covered leading through a pandemic; empowering women in leadership roles; and talent management and knowledge-sharing.

The new reality of project management

The second day of the conference was opened by Raj Jhajharia, technical manager of GDA, who outlined the new reality of project management (the day's theme) as the industry strives to overcome the new challenges posed by today's world.

No-one would understand this new reality more than Ebrahim Talib, deputy chief executive of Bahrain Petroleum Company (BAPCO), who is in the process of overseeing the BAPCO Modernisation Project (BMP) – the biggest investment in the company's history – to increase refining capacity, enhance produce slate, improve energy efficiency and help achieve its long-term sustainability goals. Jhajharia sat down for a fireside chat with Talib to discuss the management challenges and key considerations of conducting such a large project.

Image Credit: GDA

Raj Jhajharia, technical manager, GDA and Ebrahim Talib, deputy CEO, BAPCO.

As Jhajharia pointed out, these mega projects do not get completed easily, and there are a multitude of issues (such as the benefits not realised or budget over-running) that will have to be faced along the way.

Talib responded, "When you make the biggest investment in the history of your company, you have to be clear on your objectives. Cost and schedule are the first things that come to mind, but focusing on that approach only is short sighted." The company had focused on four enablers:

> "When you make the biggest investment in the history of your company, you have to be clear on your objectives."

"First, health, safety and environment of the people working in the facility and the community around us. This is non-negotiable. We have taken a commitment with every employee and contractor that everyone who steps into our facilities will return safely to their families every day.

"Equally important is quality. Getting the quality right first is an absolute must. This needs to be embedded through each step along the way. Investment and quality assurance cannot be underestimated. The more you get, the more checks and balances, the safer you will be. And you will come below cost and schedule.

"Third is system completion. What we have done differently this time is look at the equipment, processes, operations, technologies and support with a systematic approach. We have divided them, assigned ownership, custodianship and accountability to each system. It will reduce cost and bring the schedule even lower."

"Last but not least, we have three things: training, training and training. This needs to be done right through the whole process. Where we are here, there is no other refinery, and so we have to plan for that well in advance in terms of recruitment and training."

Offering advice for those looking to embark on similar large projects, Talib said, "For the future you need to look at your partner, establish strong communication and alignment. But it is also important to look at doing things differently. Modularisation has proven its benefits in the past, but we have found it be very region specific. It makes sense to have the procurement, fabrication, testing and commissioning all in one place on the face of it, but look how this has functioned in these unprecedented times. We have experienced lockdowns and curfews everywhere, and every part of the supply chain was impacted. This can have serious consequences if you have all your eggs in one basket; we have therefore taken multiple contracts to spread the risk."

Other sessions covered priorities for investment post-COVID-19, the evolving future of managing projects, digitalisation, and modularisation and advanced work practices. ■

The Gulf Downstream Association (GDA) acts as a common voice and knowledge-sharing platform for the Gulf downstream industry. The GDA International Conference & Exhibition will be held from 14-16 September in Bahrain. See www.gda.org.bh and www.gdaconference.org

Emad A. Al-Muhaisen, chairman, GDA TRANSFORM Virtual Conference

"AMIDST THE CURRENT business environment, clients and service providers should be agile and resilient to adopt to necessary changes and any similar outbreak, such as the COVID-19 pandemic. Due to the precautions and restrictions that have mandated social distancing, productivity and efficiency are at the edge. Managing projects is facing a new reality that includes deploying and adapting technologies to enhance working remotely, and taking advantage of the available virtual communication and teleconferencing tools, as well as virtual construction: VR-enabled project delivery.

"We need to align investment decisions to strategies, cultivate a road map demonstrating how to be more cost effective, and establish means and tools to measure and ensure sustainable benefit realisation.

Enad A. Al-Muhaisen.

"Modularisation, Advanced Work Packaging (AWP) and digitalisation are valuable solutions and best practices that project teams should consider and leverage. Organisations must establish oversight and governance bodies to look over the development and implementation of complex projects with decision-making gates during project front-end planning, as well as mandating "check gates" during execution. This will safe-guard against late project changes and minimise risks of scope creep, higher cost and schedule delays. It helps in timely decision-making on Go/No-Go throughout the project life cycle.

"Last but not least, and to create value, target setting and value assurance enablers must be instilled through all stages of projects' development."

https://www.oilreviewmiddleeast.com/petrochemicals/gda-transform-virtual-conference-addressing-the-challenges-facing-the-downstream-industry

Rayyan Tayeb, vice chairman, GDA TRANSFORM Virtual Conference

"COMPANIES CAN ATTRACT talent by building their own culture and work environment around values that make employees feel safe, trusted, and engaged. When employees feel safe, they speak their mind, achieve greater potential and even take the extra mile. A trusting and caring manager will translate into highly responsive and engaged employees. I believe it is the role of every manager to develop the skills to build the trust in the organisation, making their company attractive for talents to join.

"The World Economic Forum has highlighted some of the skills that will be at the centre of attention in the few years. Around 50% of the workforce will need reskilling by 2025 as technology and automation accelerate. Jobs are being transformed as the pandemic has created a faster pace toward automation and the virtual space. As those jobs transform, it is expected that around 85 million jobs might be displaced to machines and algorithms. But even more jobs, 97 million, are expected to emerge, and that requires upskilling. This includes skills like technology use, monitoring and control in addition to complex problem solving. It is believed that these skills could be acquired on the job using various learning methodologies. Such reports show that the new skills learning will be accessible through the technology. However, individuals will need time and funding to actually acquire those skills."

Rayyan Tayeb.

https://www.oilreviewmiddleeast.com/petrochemicals/gda-transform-virtual-conference-leadership-and-people-development-under-the-spotlight

Raj Jhajharia, technical manager and acting marketing & communications manager, GDA

"ADAPTING NEW DIGITAL technologies is no longer an option for the downstream industry. Fortunately, the oil industry has always been at the forefront of adapting new technologies ever since it started. Whether collecting and interpreting geological/geophysical data from subsurface structures or simulating underground oil reservoirs into complex mathematical models or operating plants through remote sensors and controls, this industry has always been on the lookout for the ways to enhance its operational efficiency and business value.

"Digitalisation is the new buzz word meaning different things to different people. For me, digitalisation is the use of digital tools in conjunction with related business processes to achieve tangible business values. This aspect of the new technologies has immense potential for the downstream industry, where instant decisions are taken based on constantly changing massive data.

Raj Jhajharia.

"AI systems can greatly augment human intelligence to take better decisions. Data is the fuel of new digital technologies. It is crucial to ensure accuracy and completeness of the data entering such systems.

"The downstream industry can gain many business benefits from digitalisation, such as real time optimisation of different products (middle distillates) in line with changing market demands, advanced predictive maintenance to optimise cost and enhance equipment life, advanced operator consoles to take preventive actions and better manage the operations, and 3D/VR based operator training simulators to train operators in a life-like and safe operating environment.

"GDA's Digitalisation Technical Committee is currently developing a digitalisation framework based on the best attributes of different frameworks among different founding companies. Such a framework will hugely benefit the downstream industry soon."

https://www.oilreviewmiddleeast.com/petrochemicals/transforming-the-downstream-industry

Egypt's new Upstream Gateway

THE EGYPTIAN MINISTRY of Petroleum and Schlumberger have launched the Egypt Upstream Gateway, a national project for the digitalisation of subsurface information.

This digital platform will enable access to the country's subsurface data, unlocking Egypt's exploration and production potential.

Image source: Schlumberger

The Egypt Upstream Gateway was launched in Cairo.

Speaking at the launch event in Cairo on 17 February, HE Tarek El-Molla, Egypt's minister of petroleum and mineral resources, highlighted the importance of digitalisation as a 'pivotal enabler'.

"Digital transformation is playing a significant role in driving efficiencies at both a strategic and operational level in oil and gas, and becoming a critical factor for success in the post-pandemic period," said El-Molla. "As the oil and gas industry is Egypt grows, there will be a great opportunity to leverage big data, the use of data science and new and emerging technologies that will accelerate opportunities. The Egypt Upstream Gateway is a unique and innovative national project that significantly enhances the national data repository solution by digitalising all subsurface information and putting data at your fingertips."

"The Egypt Upstream Gateway is the embodiment of the Egyptian Ministry of Petroleum's vision, leveraging digitisation to modernise the country's petroleum sector," said Rajeev Sonthalia, president, digital and integration, Schlumberger.

The Egypt Upstream Gateway provides digital access to over 100 years' worth of accumulated national onshore and offshore seismic, non-seismic, well-log, production, and additional subsurface data under a single platform. This data, which empowers de-risked decisions through the ability to explore multiple basins and evergreen data, can be accessed virtually from anywhere using the platform's online portal.

At the event, Egypt's first digital international bid round was launched through the EUG. 24 blocks are being offered by EGPC and EGAS in the Gulf of Suez, Western Desert, Eastern Desert and the Mediterranean Sea.

Shell, C3 AI, Baker Hughes, Microsoft launch OAI

SHELL, C3 AI, Baker Hughes and Microsoft have announced the launch of the Open AI Energy Initiative (OAI), an open ecosystem of artificial intelligence (AI)-based solutions for the energy and process industries.

The OAI provides a framework for energy operators, service providers, equipment providers, and independent software vendors for energy services to offer interoperable solutions, including AI and physics-based models, monitoring, diagnostics, prescriptive actions and services, powered by the BHC3 AI Suite and Microsoft Azure.

"This initiative is about combining the efforts of global leaders to accelerate the digital transformation of the energy industry to new, safe, and secure energy and to ensure climate security," said C3 AI CEO Thomas M. Siebel.

The first set of OAI solutions provided by Shell and Baker Hughes are focused on reliability and designed to improve uptime and performance of energy assets and processes. These reliability solutions will serve as extensions to the current BHC3 Reliability application, an AI-based application that provides reliability, process, and maintenance engineers with AI-enabled insights to predict process and equipment performance risks for the energy industry.

Image source: Adobe Stock

BP joins IBM Quantum Network

BP IS THE latest industry partner of the IBM Quantum Network, giving the oil and gas giant access to IBM's quantum expertise, software and cloud access to some of the most advanced quantum computers available. This includes the industry's largest universal quantum system, a 65-qubit computer.

Image source: Adobe Stock

The network brings together Fortune 500 companies.

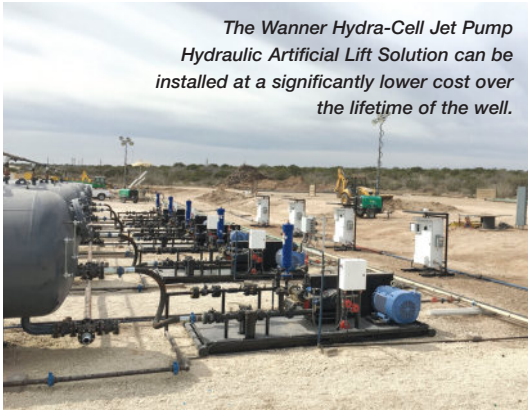
The partnership hopes to explore how quantum computing can be best applied to solve engineering and industry challenges in the oil and gas sector. A notable aim of the network is exploring the potential applications for driving efficiency and reducing carbon emissions of worldwide oil and gas companies' operations.

Senior vice president, digital science and engineering for BP, Morag Watson, commented: "BP's ambition is to become a net zero company by 2050 or sooner and help the world get to net zero. Next-generation computing capabilities such as quantum computing will assist in solving the science and engineering challenges we will face, enabling us to reimagine energy and design new lower carbon products."

Quantum computing's potential applications include: modelling the chemistry and build-up of clay in hydrocarbon wells; monitoring and managing fluid dynamics in wind farms; optimising autonomous facility inspection; and creating opportunities to deliver clean energy.

Wanner's new jet pump hydraulic artificial lift for lowest cost of lifting a barrel of fluid

WANNER INTERNATIONAL LIMITED has launched its new Hydra-Cell Jet Pump Hydraulic Artificial Lift Solution that offers the lowest cost of lifting a barrel of fluid, reducing costs in oil and gas production, generating huge savings over the lifetime of a well. The seal-free, no packing API 674 system is suitable for mainstream oil and gas production. It does not require a workover rig, pulling unit or slick line unit for servicing or well production optimisation.



The Wanner Hydra-Cell Jet Pump Hydraulic Artificial Lift Solution can be installed at a significantly lower cost over the lifetime of the well.

Image credit: Wanner International Limited

The lifetime costs of this new artificial lift solution are lower than any other hydraulic artificial lift methods:

- Energy saving – when combined with the 90% efficient Hydra-Cell seal-less surface pumps, jet pumps have the best overall total process efficiency, in barrel per day produced per horsepower consumed.
- Maintenance and servicing saving – no workover rig needed – forward and reverse flow mode for easy retrieval of the jet pump for easy servicing and maintenance. The seal-less, packing-less design of the API 674 Hydra-Cell pump results means no sperate lubricators, or site services for lubricators, no seal flushing and no fine filtration needed.

With production rates of 10 bpd to 10,000 bpd, typical applications of the Wanner Hydra-Cell Jet Pump Hydraulic Artificial Lift Solution include conventional oil and gas production, high volume frac fluid unloading, gas well dewatering, well tests, and wells with bad casing. As well as standard production, the solution maximises production from a range of well types, including deviated or horizontal wells, or those with damaged casing.

On the surface, the positive displacement Hydra-Cell seal-less hydraulically balanced diaphragm pump has a minimum suction pressure of approximately -ve 0.2 barg and maximum suction pressure of 34 barg. The pumps have a flow rate controllable available to meet API 675 performance standards to provide ultimate optimisation of Jet Pump production and up to 90% significant energy savings.

Vaisala launches next-gen humidity and temperature transmitter series HMT370EX for hazardous environments

VAISALA, A GLOBAL leader in weather, environmental and industrial measurements, launches a new next-generation humidity and temperature transmitter series to take advantage of advancements in technology and to meet and exceed current hazardous area regulations.

The new Vaisala HUMICAP Intrinsically Safe HMT370EX Humidity and Temperature Transmitter Series builds on over 20 years of experience with the trusted Vaisala HMT360 series with an even more robust and easy-to-use design.

HMT370EX series is designed specifically for hazardous and explosive environments. The entire transmitter can be installed directly in explosive areas, up to zone 0 and zone 20.

"HMT370EX operates safely and reliably even in the most hazardous environments, with no need for additional protective enclosures. Thanks to its rugged display, the transmitter can withstand continuous exposure to potentially explosive areas that contain flammable gases or dust," Lehto continues.

The new HMT370EX series will be available in the first quarter of 2021 with European ATEX and Global IECEx certificates.

Image credit: Vaisala

Typical applications for HMT370EX include paint booths in automotive industry, hydrogen cooled generators in electricity generation, chemical plants and processes, baking industry, pharmaceuticals manufacturing, oil and gas drilling platforms, and fuel tanks and storage.

HMT370EX can replace the HMT360 series in all the same applications where the HMT360 has been employed.

The new HMT370EX series will be available in the first quarter of 2021 with European ATEX and Global IECEx certificates. Ex certification for other regions will be available later during 2021.

IRM Systems unveils new Pipeline Integrity and Budget Optimisation Tool (PIBOT)

IRM SYSTEMS (IRMS), the independent authority in emergency pipeline repair systems, announced the introduction of the Pipeline Integrity & Budget Optimisation Tool (PIBOT), a new modular software package. The new tool reduces the amount of time and costs associated with carrying out a diverse range of pipeline integrity engineering and management activities via data management, integration, and smart data analytics.

Deriving greater value from data key to maintaining pipeline integrity

IRM Systems developed the PIBOT in response to continuing demand from the industry for ways to derive the utmost value from data. "This software solution makes it possible to instantly clean, structure, align, standardise and visualise data, in addition to carrying out pipeline integrity management and smart data analytics," said Rahul Raghukumar, pipeline engineer for IRM Systems.

Multi-tasking tool improves efficiency

The new technology is composed of several stand-alone software modules that can be combined to work in unison. Access to a single module allows the user to be more efficient at a single task. Alternatively, a pipeline operator can enhance the efficiency of a broad range of activities that are essential to maintaining pipeline integrity by incrementally implementing more modules to suit specific requirements. With all PIBOT modules working together, a database consisting of secure data, open-source databases or combination thereof can be automatically integrated. As a result, the data needn't be input twice, reducing costs and saving time. It means that the software provides more insights, giving real value from the data to the user, while simultaneously ensuring that the system is AI-ready.

Stand-alone module integrates Emergency Pipeline Repair System

Another key feature is the Emergency Pipeline Repair System (EPRS) module. This module provides a comprehensive insight into the unique EPRS that is available for the individual pipeline. Because this module ensures that all aspects of the EPRS are fully integrated, an emergency pipeline repair can be simulated, managed, and optimised.

Kongsberg Digital launches remote, simulation-based DP training, accredited by The Nautical Institute

KONGSBERG DIGITAL (KDI) and The Nautical Institute have announced an approved remote simulation solution for Dynamic Positioning (DP) Induction Courses. This has been developed by KDI to support training centres worldwide during the COVID-19 pandemic lockdowns, and has now been approved by The Nautical Institute.

Image credit: Kongsberg

Kongsberg Digital's cloud-based solutions give students access to advanced simulations from their own PCs.

Since the start of the pandemic, Kongsberg has been ramping up the delivery of cloud-based e-learning and remote training solutions to support education and training institutes and meet the challenges imposed by the impossibility of carrying out tuition in a physical classroom situation. The latest addition to its cloud-based simulation training solutions is a remote DP simulation application, which enables instructors to continue providing their students with mandatory DP simulation-based education through remote access to Kongsberg's K-Sim DP technology.

As a response to the COVID-19 situation, the NI has reviewed and approved the use of Kongsberg's cloud-based remote DP simulators, equivalent with the NI Class C DP simulators required for the DP Induction courses. By temporarily approving remote simulation training, The Nautical Institute is helping the industry to maintain mandatory DP skills through the pandemic crisis. The remote training solution is valid until 1 April 2021, with the option to further extend approval depending on the coronavirus situation.

KDI's e-learning modules and remote training solutions provide online access to many of the company's high-fidelity simulators via the K-Sim Connect portal, enabling distance learning and permitting students to continue to take courses and acquire basic skills.

Emerson unveils TopWorx Magnetic Target Switch for position sensing applications

EMERSON, A GLOBAL leader in fluid control and pneumatics technology, has released its TopWorx Magnetic Target Switch (MTS) to provide ready-to-install, universally-certified position sensing for explosion proof and intrinsically safe applications. The hazardous locations-approved TopWorx MTS joins the TopWorx GOTM Switch in the Emerson portfolio of position-sensing products, providing a single source for both standard and heavy-duty position sensors.

Image credit: Emerson

The TopWorx Magnetic Target Switch (MTS).

The TopWorx MTS is a magnetic, target-actuated, barrel-style switch designed to deliver trusted performance and outstanding value in applications ranging from standard industrial to extreme-duty. Featuring universal certifications including IECEx, ATEX, UL, and CSA, the TopWorx MTS can help reduce time to market by avoiding approval delays.

Available in general purpose, intrinsically safe or explosion proof area classifications, the 316L stainless-steel design of the MTS resists corrosion, making it suitable for use in environments including oil and gas, chemical, industrial energy, on-site utilities, mining, minerals and metals, power generation, pulp and paper, waste and wastewater.

"With a tiered range of sensing products, our customers can rely on a single, trusted supplier for everything from standard to extreme-duty capabilities," said Jeff Jones, global sensing products leader, Emerson. "Alongside our heavy-duty GO Switch, the MTS is the perfect choice for cost-conscious position sensing in explosion proof and intrinsically safe applications."

The TopWorx MTS is built to the same industry-leading standards as the TopWorx switchbox, switchbox enclosures, bus networking, sensor and solenoid valve technology to deliver outstanding value and trusted performance in hazardous locations requiring explosion proof and intrinsically safe applications.

Pipeotech signs partnership deal with Safari Oil & Gas Company

PIPEOTECH HAS SIGNED a key partnership agreement with leading Saudi Arabian pipeline products and service provider Safari Oil & Gas Company (SOG) to deliver guaranteed leak-proof DeltaV-Seal gaskets to industries across Saudi Arabia.

The two companies have been working together for several years but have now formally sealed this partnership, giving SOG exclusive rights for the distribution, sale, servicing and training of Pipeotech's next-generation DeltaV-Seal technology in Saudi Arabia.

Image credit: Pipeotech

DeltaV-Seal Hero 5

This deal provides an opportunity for Pipeotech to expand its reach within Saudi Arabia through SOG's diversified services and supply network in the oil and gas, water and petrochemical industries.

The two companies have a potential plan for future local manufacturing and supply of the DeltaV-Seal technology, fulfilling SOG's commitment to Saudi Arabia's 2030 Vision diversity and local content programme.

SOG works closely and provides services to industry giants as Saudi Aramco and multinational chemical manufacturing player SABIC, among many others, and the company recently successfully conducted trial test installations of Pipeotech's DeltaV-Seal at two Saudi Aramco's oil and gas facilities.

Pipeotech's head of business development Andrew Patrick sees a high value in partnering with SOG and sharing its experience and strong connections across the region.

"This exclusivity deal with Safari Oil & Gas cements our close relationship after years of positive and productive collaboration and demonstrates just how valued the DeltaV-Seal is across key industries, having proven its worth by providing reliable, trustworthy leak-proof tightness in the most sensitive of environments," said Patrick.

Project Databank

Compiled by Data Media Systems

OIL, GAS AND PETROCHEMICAL PROJECTS, BAHRAIN

Project	City	Facility	Budget (US$)	Status
BAPCO - BAPCO Modernization Program (BMP) - Overview	Sitra	Petroleum Oil Refinery	6,000,000,000	Construction
BAPCO - BAPCO Modernization Program (BMP) - Residue Conversion Unit	Sitra	Petroleum Oil Refinery	800,000,000	Construction
NOGA - Aromatics Complex	Sitra	Aromatics	1,000,000,000	FEED
NOGA - Offshore Blocks 1,2,3,4 Exploration and Production	Various	Offshore Oil & Gas Field	80,000,000	Engineering & Procurement
Tatweer - NAG Long Term Field Development (LTFD) - Overview	Awali	Non Associated Gas	400,000,000	Construction
Tatweer - NAG Long Term Field Development (LTFD) - Phase 2 - Gas Dehydration unit (GDU)	Awali	Non Associated Gas	400,000,000	Engineering & Procurement
Tatweer - NAG Long Term Field Development (LTFD) - Phase 2 - Non-Associated Gas Compression Facilities (NCF)	Awali	Non Associated Gas	120,000,000	Engineering & Procurement
Tatweer - NAG Long Term Field Development (LTFD) - Phase 2 - Remote Gas Dehydration Units	Awali	Non Associated Gas	200,000,000	EPC ITB
Tatweer - NAG Long Term Field Development (LTFD) - Phase 2 - Two New Well Manifolds Facilities	Awali	Non Associated Gas	400,000,000	EPC ITB
Tatweer - NAG Long Term Field Development (LTFD) - Phase 2 - Wellhead Compression Facilities	Awali	Non Associated Gas	40,000,000	EPC ITB
Tatweer - NAG Long Term Field Development (LTFD) - Phase 2 - WO Rigs and Associated Services	Awali	Gas Field	150,000,000	Engineering & Procurement

Shaping the future of energy in a dynamic world

THE 2021 SPE Middle East Oil & Gas Show and Conference (MEOS 2021) will be held on 24-27 May 2021 at the Bahrain International Exhibition and Convention Centre in the Kingdom of Bahrain.

The MEOS exhibition serves all areas of the oil and gas industry. Over the last 40+ years, it has established a solid reputation as a high quality event with a unique calibre of attendees. Attended by every oil producing state in the region, the exhibition attracts specialised businesses and some of the oil and gas industry's largest corporations, facilitating the exploration of new technologies, business opportunities and partnerships.

MEOS is also privileged to receive full support from GCC national oil companies including ADNOC, BAPCO, KPC, PDO and Saudi Aramco, who take showcase stands at the exhibition, implement major visitor delegations and play an active role on the conference organising committee.

Organised by the Society of Petroleum Engineers (SPE), the parallel conference takes place under the theme 'Shaping the Future of Energy in a Dynamic World'. It will feature high quality technical presentations focused on Middle East issues, offering unique insights on the region's mega projects, new technologies, case studies and topical discussions led by international industry leaders. The conference typically features more than 300 papers, a series of panel sessions led by presidents, CEOs and chairmen of key players, and a high ranking collection of keynote speakers. New topics this year include midstream gas, carbon footprint management, and business continuity through challenging times.

"The MEOS 2021 edition provides a unique opportunity to learn, share, and exchange ideas and solutions in one of the toughest periods in recent world history," says a message from the Programme Chairs.

"Tough times, however unpleasant they maybe, offer great opportunities for innovative solutions. As we move forward, we can't escape the role technology has played in our lives during the pandemic period. It kept the world in touch and wheels of the economies rolling.

"The oil and gas industry thrives on technology advancement to cope with new challenges, a reality we all witnessed during the past years. The

Image Credit : Informa

MEOS 2021 will facilitate the exploration of new technologies, business opportunities and partnerships.

MEOS 2021 technical programme reflects how the oil and gas industry has embraced the 4th Industrial Revolution (4IR) in all aspects of its business and the role it is playing in shaping the future.

"As we look towards the future, we are certain that our reliance on digital transformation will increase as we incorporate it into every aspect of our work. This will be true reality from the office to the rig.

"The MEOS 2021 programme will also feature aspects of sustainability and environmental stewardship. This is where our industry leads the conversation on the carbon footprint of fossil fuels and springs towards climate resiliency and net-zero emissions."

For further information see the website at www.meos-expo.com

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The DNA for Success

Project Databank

Compiled by Data Media Systems

Project Focus

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Project Summary

Name of Client & Project	NOGA - National Oil & Gas Authority, Bahrain, Offshore Blocks 1,2,3,4 Exploration and Production
Revised Budget (US$)	230,000,000
Facility Type	Oil & Gas Field
Status	Engineering & Procurement
Location	Various
Project Start	Q3-2015
End Date	Q1-2024
PMC	Vinson & Elkins
Main Contractor	Eni Halliburton
Award Date	Q2-2018

Background

NOGA is spearheading several initiatives from upgrades to the existing Awali field to major offshore exploration partnerships with international oil companies to secure oil and gas supplies for the future. The country is keen to increase its gas production and reduce its dependence on gas supplies from other countries in the region.

Project Status

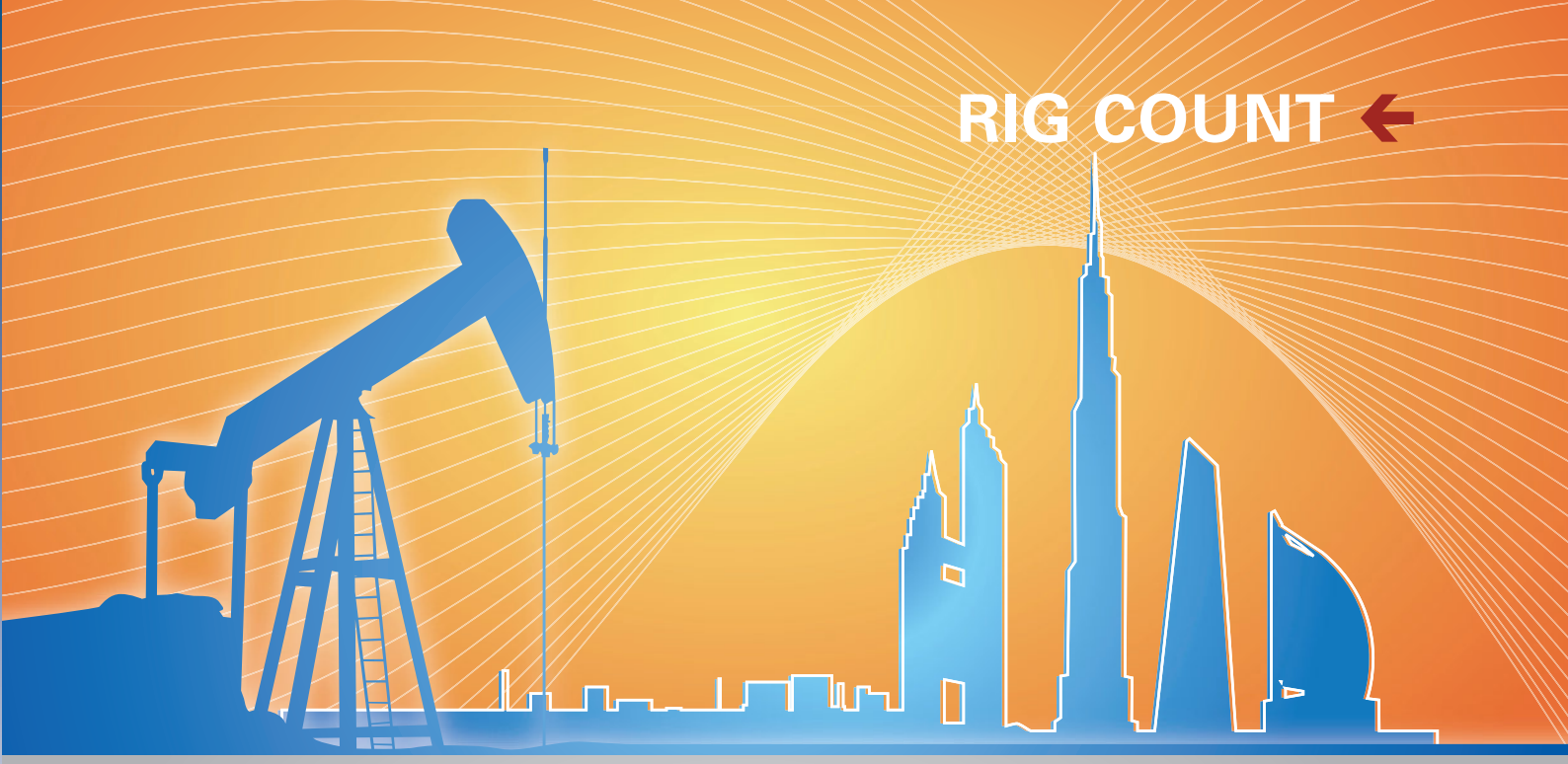
Date	Status
Feb 2021	Drilling has previously been expected to start in Q1 2020 but has been delayed. To date, Eni has not yet determined the drilling work schedule.
Sep 2020	Tatweer has signed an agreement with Eni to conduct a joint study to evaluate the hydrocarbon potential of Offshore Block 2 through an integrated interpretation and assessment of the geological and geophysical data relevant to the area.
Apr 2020	Bapco expects that seismic interpretations and processing will be finished by June 2020. Drilling for wells is progressing, however, adding additional wells will depend on the gas market value.
Oct 2019	Eni is set to drill the first exploratory well for Block 1 by the end of 2019. The other blocks are still being evaluated and surveyed.
Jun 2019	Bahrain has issued an official order allowing foreign companies to fully own the drilling activities they perform in the country. The companies must first enter an exploration and production agreement with the government before ownership is granted.
May 2019	Eni has signed an Exploration and Production Sharing Agreement (EPSA) for Block 1. They will perform exploration activities in an area of over 2,800 square-kilometers with water depths ranging from 10 to 70 metres.

Project Scope

The project scope includes:

- Exploration of offshore blocks 1, 2, 3 and 4.
- 2D and 3D seismic survey.
- Exploratory drilling.
- Associated works.

A discovery of 80 billion barrels of tight or shale oil and 280 billion to 560 billion cubic metres of natural gas was made off the north and west coast of the country in April 2018.



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.

	JANUARY 2021			VARIANCE		DECEMBER 2021		
Country	Land	Offshore	Total	From Jan 2020	From Dec 2020	Land	OffShore	Total
Middle East								
ABU DHABI	26	16	42	-22	+2	28	12	40
DUBAI	0	0	0	-2	0	0	0	0
IRAQ	32	0	32	-45	+2	30	0	30
JORDAN	0	0	0	0	0	0	0	0
KUWAIT	29	0	29	-24	+1	28	0	28
OMAN	40	0	40	-13	-2	42	0	42
PAKISTAN	13	0	13	-4	0	13	0	13
QATAR	2	7	9	-4	+1	2	6	8
SAUDI ARABIA	52	10	62	-49	+3	51	8	59
YEMEN	1	0	0	0	0	1	0	1
TOTAL	195	33	228	-163	+7	195	26	221
North Africa								
ALGERIA	19	0	19	-22	-3	22	0	22
EGYPT	17	3	20	-11	+3	15	2	17
LIBYA	11	0	11	-5	0	11	0	11
TUNISIA	0	1	1	-1	0	0	1	1
TOTAL	47	4	51	-39	0	48	3	51

Source: Baker Hughes

تطوير الغاز في الإمارات العربية المتحدة، من جانب شركة تيليدين لتقنيات أنظمة الكشف عن الغاز واللهب وشريكتها في دولة الإمارات العربية المتحدة؛ شركة المسعود للتوريدات والخدمات البترولية. وقد أعلنت هاتان الشركتان، في ديسمبر/كانون الأول الماضي، عن حصولهما على عقد كبير يتضمن اعتماد التقنيات اللاسلكية للكشف عن الغازات، وذلك كجزء من مشروع تطوير الغاز الحامضي في منطقتي حائل وغشا الذي تنسقه شركة بترول أبوظبي الوطنية (أدنوك). وسيشهد هذا المشروع الضخم إنشاء جزر صناعية لحفر الآبار، ودعم مرافق الإنتاج، وقاعدة العمليات وأعمال الصيانة البحرية.

كذلك ستقوم شركة تيليدين لتقنيات أنظمة الكشف عن الغاز واللهب، بتوريد وتثبيت وتشغيل مجموعة من أحدث تقنياتها وأجهزتها في استشعار الغاز، بما في ذلك نظام الإنذار والتحكم اللاسلكي MCX – 32 ونظام الإنذار والتحكم اللاسلكي في الموقع ومستشعرات CX الذكية اللاسلكية للكشف عن الغاز. هذا بالإضافة إلى أجهزة مراقبة المنطقة اللاسلكية متعددة مستشعرات الكشف عن الغازات BM – 25 ونظام إنذار وتحكم لاسلكي X – 40 من الفئة (7) وفقا لتصنيف الرابطة الوطنية لمصنعي الأجهزة الكهربائية.

وبالإضافة إلى إمكانيات وحلول شركة تيليدين لتقنيات أنظمة الكشف عن الغاز واللهب، فقد تمحور تعيين المشروع حول التزام الشركة بالأمن والسلامة مدعوما بأكثر من 100 عام من الخبرة في مجال أجهزة الكشف عن الغازات، كما تزعم الشركة. وفي شهر يوليو/تموز الماضي، أطلقت شركة تيليدين لتقنيات أنظمة الكشف عن الغاز واللهب جهاز مالتي توكس (كاشف أشباه الموصلات وأكسيد المعادن) مخصص للصناعات النفطية والغاز والبتروكيماويات والتكرير.ومن خلال استخدامها أحدث تقنيات أشباه الموصلات المعدنية ذات الحالة الصلبة داخل رأس كاشف متين وقوي، فإنها تتيح اكتشاف غاز كبريتيد الهيدروجين بسهولة، دون التعرض لخطر التسمم. هذا فضلاً عن توفير

جهاز تيليدين BM-25 وأجهزة MX-40 الكاشفة عن الغازات

مستشعر يصل عمره الافتراضي إلى 10 سنوات، وضمان ممتد لمدة خمس سنوات كمواصفات قياسية.

يتيح هذا، جنبا إلى جنب مع برنامج إدارة الأصول عن بُعد، الذي تم تطويره بالشراكة مع شركة بترول أبوظبي الوطنية (أدنوك)، التصور التلقائي والعرض الرسومي للمعلومات المهمة، بما في ذلك الوصول الفوري إلى بيانات المعايرة التاريخية، مما يوفر التحليل السريع والدقيق للبيانات بدلا من الاعتماد على العمليات الورقية البطيئة. وعلاوة على ذلك، صرحت الشركة أن البرنامج يبسط عملية المعايرة عن طريق تقليل عدد المشغلين المطلوبين من اثنين إلى مشغّل واحد، ويخفض قيمة النفقات التشغيلية وضمان بقاء الأصول قيد التشغيل الكامل لفترة أطول.

تطوير القدرات المحلية

وفي الوقت نفسه، يجري تعزيز قدرات تصنيع أجهزة الكشف عن الغازات في المنطقة مع تصريح شركة هانيويل أنها تخطط لفتح منشأة لإنتاج أجهزة الكشف عن الغاز في المملكة العربية السعودية. ويتماشى هذا مع التزام الشركة ببرنامج القيمة المضافة الإجمالية في المملكة (IKTVA) والذي يهدف إلى تحقيق توطين بنسبة 70 في المائة للإنتاج والوظائف خلال العام الحالي (2021). ويكون بمثابة عامل تمكين رئيسي لرؤية المملكة العربية السعودية 2030. وسيخلق مصنع هانيويل الجديد «صنع في المملكة» فرص عمل إنتاجية للمواطنين السعوديين والتي من شأنها أن تعزز مهارات وقدرات القوى العاملة.

وبإنشاء المصنع الجديد، ستصبح شركة هانيويل أول شركة دولية تنتج أجهزة الكشف عن الغاز في المملكة العربية السعودية ـ كما تقول الشركة ـ مما يتيح التوفر المحلي للمعدات وأوقات تسليم أقصر وتقديم خدمات دعم العملاء على أرض الواقع. كما ستوفر الأجهزة طريقة موثوقة وفعالة من حيث التكلفة لضمان سلامة وامتثال وإنتاجية العمال الذين يعملون في بيئات خطرة في المملكة العربية السعودية. وقد صرح جون والدرون، الرئيس والمدير التنفيذي لشركة هانيويل لحلول السلامة والإنتاجية قائلا: «تساعد أنظمة الكشف عن الغازات المتقدمة ـ الخاصة بنا ـ في الحفاظ على سلامة العمال وتمكينهم من الاستجابة السريعة لتسريبات الغاز وحوادث الموقع». ويقع مقر منشأة شركة هانيويل في امتداد وادي الظهران للتقنية، وستنتج عدد (10,000) جهاز محمول للكشف عن الغاز وعدد (800) جهاز ثابت للكشف عن الغاز سنويا، وذلك عند وصولها إلى الإنتاج الكامل في عام 2022. كما يشتمل خط الإنتاج على سلسلة أجهزة الكشف عن الغازات متعددة المستشعرات من هانيويل بي دبليو. وهي منصة الجيل التالي من كواشف الغازات متعددة المستشعرات، هذا بالإضافة إلى الكاشفات الثابتة، بما في ذلك تحسين نقطة البحث ونقطة كاشف الغاز الهيدروكربونية بالأشعة تحت الحمراء وجهاز الإرسال العالمي إكس إن إكس.

مفكـرة الفعـاليات 2021

أبريل/نيسان			
7 ـ 6	منتدى الإمارات للصحة والسلامة والبيئة	دبي	www.hse-forum.com
مايـو/أيـــار			
27 ـ 24	معرض الشرق الأوسط للنفط والغاز ـ MEOS 2021	المنامة	www.meos-expo.com
أغسطس/آب			
19 ـ 16	مؤتمر تقنية حقول النفط البحرية ـ OTC 2021	هوستون	http://2021.otcnet.org
سبتمبر/أيلول			
15 ـ 13	معرض عُمان للبترول والطاقة	مسقط	www.omanpetroleumandenergyshow.com
16 ـ 13	معرض ومؤتمر تقنية الغاز ـ Gastech 2021	سنغافورة	www.gastechevent.com

بيئة النفط والغاز القاسية في الشرق الأوسط تستدعي حلولا موثوقة وفعالة

حلول الكشف عن الغازات في الشرق الأوسط

عمليات الكشف الموثوقة عن الغازات، والتي يحتمل أن تُشكّل خطورة، تعتبر أمراً ضرورياً في صناعة النفط والغاز، وليس هذا في أي مكان أكثر من بيئة الشرق الأوسط الغنية بالغازات الحمضية المتواجدة في بيئة تتسم بظروف الضغط العالي ودرجة الحرارة المرتفعة حيث يمثّل غاز كبريتيد الهيدروجين (H2S) خطراً دائماً. وهناك حاجة ماسة إلى حلول موثوقة وفعالة وتتسم بالمرونة يمكنها الكشف عن غاز كبريتيد الهيدروجين في درجات الحرارة العالية في بيئة النفط والغاز القاسية في الشرق الأوسط.

تمت الدعوة لمثل هذه الحلول من جانب شركة بترول أبوظبي الوطنية (أدنوك) وشريكتها شركة توتال، اللتين قامتا بتكليف شركة هافن فاير اند سيفتي (ش. ذ. م. م) العاملة كموزع لأنظمة الكشف عن الغازات لدى شركة كروكون، وذلك بتوفير نظام كامل للكشف عن الحرائق والغاز لمنطقة امتياز الغاز غير التقليدي في مدينة الرويس دياب في أبوظبي، والتي تمتد إلى أكثر من 6000 كيلومتر. وهو نظام لأجهزة الاستشعار والكشف عن غاز كبريتيد الهيدروجين. وقد علقت شركة كروكون على منطقة الامتياز هذه قائلة: «إن مناخ المنطقة يجعلها من بين البيئات الأكثر تحديا لأي نوع من المعدات الإلكترونية، بما في ذلك أجهزة الكشف عن الغاز». ففي منطقة الرويس دياب، يمكن أن تتراوح درجات الحرارة من 10 درجات مئوية إلى 65 درجة مئوية. هذا فضلاً عن تقلبات واسعة في نطاق الرطوبة النسبية.

وقد اقترحت كلٍ من شركة هافن فاير اند سيفتي (ش. ذ. م. م) وشركة كروكون تركيب عدد (27) جهاز موديل (إكس جريد أي كيو) للكشف عن غاز كبريتيد الهيدروجين في درجات الحرارة العالية، جنبا إلى جنب مع نظام شركة هافن فاير اند سيفتي للكشف عن الحرائق والغاز. وبناء على ذلك تم تقديم الطلب على النحو الواجب.

وقد تم تصميم جهاز الكشف والاستشعار الجديد (إكس جريد أي كيو) من جانب شركة كروكون، من أجل الكشف عن غاز كبريتيد الهيدروجين في درجات الحرارة المرتفعة لتحسين تكنولوجيا المستشعرات الكهروكيميائية حتى في الظروف البيئية القاسية مثل تلك الموجودة في الشرق الأوسط. ويتضمن المستشعر الجديد تعديلات مبتكرة لمنع التبخر، بما في ذلك إلكتروليت ذو درجة الرطوبة الأعلى، لتجنب مشكلة الجفاف التي تظهر في المستشعرات الكهروكيميائية التقليدية. هذا بالإضافة إلى تقليل حجم المسام لتقييد دخول الماء. وعلى عكس الموديلات التقليدية، يمكن لهذه المستشعرات وأجهزة الكشف أن تعمل بشكل موثوق في درجات حرارة تصل إلى 70 درجة مئوية ونطاق رطوبة نسبية يتراوح من (0 – 95 في المائة) والظروف القاسية الأخرى. لذا فهي مثالية لبيئة الشرق الأوسط، كما يبلغ متوسط العمر المتوقع لها 24 شهراً. هذا بالإضافة إلى وقت استجابة قصير.

ويعتبر جهاز (إكس جريد أي كيو) كاشف غاز ذكياً ومتعدد الاستخدامات ومعتمد من قِبل معيار مستوى كمالية السلامة. كما أنه يتمتع بجميع تقنيات أجهزة الاستشعار من شركة كروكون بما في ذلك تقنيات الكشف عن غاز كبريتيد الهيدروجين في درجات الحرارة المرتفعة. ولهذه الأجهزة والمستشعرات تقنيات معايرة غير تداخلية ولا تحتاج إلى تصريح عمل ساخن من خلال المراقبة التشغيلية أو أدوات خاصة (مما يوفر وقت التوقف)، هذا إلى جانب وظائف الاستشعار التلقائي والضبط والإعداد الأتوماتيكي.

وقد تم توفير أجهزة الكشف عن الغاز، في مشروع

محتويات القسم العربي

تحليلات

ملخص محتويات القسم الإنجليزي:

تقارير خاصة: البحرين، العراق.

استطلاعات: الاستخراج المعزز للنفط، الطاقة في موقع العمل.

تقنيات: البيانات السيزمية، الحماية من التآكل، الرقمنة، اتصالات حقول النفط البحرية.

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