

Oil Review

Oil · Gas · Petrochemicals

Middle East

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- Latest developments in marine crew transfer
- Promoting the acceleration of sustainable development
- Saudi Arabia's leading refining & petrochems projects
- Enabling transformation with digital twins
- Buoyant mood at ADIPEC

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Saudi Aramco - sharpening the focus on gas

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→ Editor's note

THE MOOD AT ADIPEC was buoyant this year, with many exhibitors commenting on the strong business potential in the region. Major announcements by ADNOC during the four days of the show contributed to the positive atmosphere. Our ADIPEC Review on p24 brings you news of the show and insights from leading exhibitors.

Saudi Aramco continues with its massive push on gas, in a bid to become a net gas exporter, and is bolstering its refining and petrochemicals capacity (see p18). We also take a look at the Kingdom's major projects aimed at increasing refining scope and depth and strengthening the integration between refining and petrochemicals (p22).

As always, we continue to bring you all the latest news and product developments.

Best wishes for the festive season to all our readers and supporters.

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Cover image: Hawiyah Gas Plant, Saudi Arabia. Source: Saudi Aramco

→ Executives' Calendar 2019

JANUARY			
14-17	World Future Energy Summit	ABU DHABI	www.worldfutureenergysummit.com
20-22	Intersec	DUBAI	www.intersecexpo.com
21-23	MERTC	MANAMA	https://mertc.wraconferences.com
FEBRUARY			
11-13	Egypt Petroleum Show	CAIRO	www.egyptps.com
19-21	Petro Environment 2019	AL KHOBAR	www.petroenvironment.com
26-28	ME-TECH 2019	ABU DHABI	www.europetro.com/events
26-28	IP WEEK	LONDON	www.ipweek.co.uk
MARCH			
5-6	Saudi Downstream Forum	YANBU	www.saudidownstream.com
5-7	Middle East Electricity (MEE) 2019	DUBAI	www.middleeastelectricity.com
18-21	MEOS	MANAMA	www.meos19.com
25-26	Gulf Safety Forum	MANAMA	www.europetro.com
27-28	OpEx MENA 2019	MANAMA	www.europetro.com
27-29	OMC	RAVENNA	www.omc2019.it
APRIL			
2-4	Lebanon Int'l Oil & Gas Summit	BEIRUT	www.liog-summit.com
8-9	Annual Middle East Petroleum & Gas Conference	DUBAI	www.mpgc.cc
28-2 May	SOGAT	ABU DHABI	www.sogat.org

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

MERTC – shaping 2019 with the connections, technologies and strategies that matter

THE REFINING AND petrochemicals industry in the Middle East is evolving to respond to many challenges, such as retaining the region's competitive advantage, bracing for the 2020 IMO regulations, the ongoing transition to chemicals and the downstream digital transformation. Held under the Patronage of H.E. Shaikh Mohammed bin Khalifa bin Ahmed Al Khalifa, Minister of Oil, Kingdom of Bahrain, MERTC, which celebrates its third anniversary in 2019, will provide a forum to address these challenges. Taking place from 21-23 January in Manama, it brings together senior decision makers and engineers from refining and petrochemicals alongside global leading technology and solution providers. The event promises to be an excellent gathering of thought-leadership, innovation and in-depth discussions with high levels of interactivity and insight.



The event will provide a forum to discuss challenges for the refining and petrochemicals sector.

Image Credit : Shutterstock

Key technical themes are

- Refinery-petrochemical integration opportunities
- Catalyst advances and catalyst management
- Advances in refining and petrochemical processes
- Operational excellence and margin improvements
- Refinery configuration and conversion processes advances
- Digital transformation and optimisation technologies.

Exclusive seminars, high level market keynotes, regional project updates, as well as the latest in process and technology advancements make MERTC the Middle East's premier platform to gain cutting edge insights and showcase innovations.

For further information see the website at <https://mertc.wraconferences.com>.

Precious Metal Mentality

Metals price volatility. Owning versus leasing. Insurance and liability. Environmental concerns. The complexity of international shipping. Lengthy payment terms. Complicated contracts.

As if the oil refining business didn't have enough to worry about ... your company now has a full turn-around of a unit containing precious metals catalyst coming up and you have all of the above to contend with as well.

Many responsible parties around the world believe that the first decision to be made is whether it would be best to send the catalyst to a precious metals refiner or simply sell it outright by the kilo. When you get past all of the 'fake news', REFINING is the only smart choice.

The problem usually begins when someone assumes that they could sell the catalyst by the kilo to a broker to "save money" or "save the trouble" of international



In terms of the number of platinum ounces recycled and refined each year, if Sabin Metal were a platinum mine, it would be the sixth largest in the world.

shipping, etc. This is a huge risk, as brokers are offering 50 to 60% of the PGM value at best. Refining, including international shipping and all costs, still returns a net average over 90% on petroleum catalysts true precious metals value.

One metric ton of catalyst (2205 lbs.) is about \$70K, so that means that selling to a broker by the kilo is the equivalent of losing between \$28K and \$35K on every metric ton you sell. In addition, many countries

enforce a "Grandfather Clause" regarding the liability of a corporation indefinitely into the future. The bottom line; if you sell your catalyst to a company who disposes of it improperly, your company may still be responsible for the pollution fines, the clean-up, the lawsuits, etc.

Advantages of Refining:

- Net return after all costs typically over 90% of precious metals value contained
- Only requires lease or purchase of "make up" ounces for replacement catalyst
- With proper documentation and good standing, metal advance available
- Zero liability: fully insured from point of Sabin possession; certificate of destruction at finish

Disadvantages of Direct Sale:

- Net return after all costs typically less than 60% of precious metals value contained
- Assets sold at over 30% loss can trigger corruption investigation
- Replacement catalyst now require full new lease or purchase of platinum
- Unending liability: uninsured transport and final treatment; no traceability of proper environmental disposal

The Take-Away: Make sure your precious metals end up with a responsible recycler, root out and eliminate the unethical and the wasteful, and forge global partnerships; allow for fair margins, invest in research and development; discard perceived limitations and challenge what is 'normal'.

At Sabin, we believe that long-term wisdom and meaningful innovation is best for business, and as a result, it is what is best for the society of Mankind. If you'd like to learn more about this topic, or any of the other Sabin Metal Precious Metal bulletins, please visit us at www.sabinmetal.com.



safely and responsibly processing, sampling and refining precious metal-bearing catalysts.

The Sabin Metal group of companies celebrated their 70th Anniversary in 2015. Based in the United States and with sales/service offices around the world, Sabin is the largest privately owned precious metals refining organization in North America. Sabin provides customers with logistical support, precious metal financial services, pre-reclaim kilning and some of the most sophisticated facilities in the world for



PetroEnvironment 2019 at the forefront of Innovative Technologies for Environmental Sustainability

THE THRIVING ECONOMIES in the GCC continue to see rapid population growth and accelerate industrial expansion, and it is vital that leaders in oil, gas and petrochemical industry are at the forefront of implementing best practices and sound environmental standards.

As part of Saudi Arabia's commitment to setting environmental benchmarks, this year sees the return of PetroEnvironment 2019 – the 9th Symposium on Environmental Progress in the Petroleum & Petrochemical Industry. It will take place from 19-21 February 2019, at the Seef Center in Al Khobar, Saudi Arabia.

Held under the patronage of HRH Prince Saud bin Nayef bin Abdulaziz Al Saud, Governor of the Eastern Province, under the theme 'Innovative Technologies for Environmental Sustainability', the symposium offers an opportunity for the global oil and gas, petrochemical and environment community to come together and focus on the future of environmental sustainability.

Under the auspices of ETMA (Environmental Technology & Management



Image Credit: AWM Events

The 2016 edition of the event.

Association), led by Principal Sponsor Saudi Aramco, PetroEnvironment 2019 is a three-day gathering of environmental practitioners, policy makers, scientists end users, technicians and engineers offering an unrivalled combination of technical and commercial content and attracting senior influencers worldwide.

The forum features an industry showcase exhibition dedicated to environmental progress in the upstream and downstream

industry, featuring game-changing innovations and technological advances.

The PetroEnvironment symposium explores in detail a range of topics pertaining to the effective operation and management of environmental considerations within the petroleum and petrochemical industries.

Developed by the technical committee, which is formed of environmental experts from Saudi Aramco, the General Authority for Environmental Protection, King Fahd University for Petroleum and Mineral Resources, Prince Mohammed University and Imam Abdulrahman Bin Faisal University, the programme will be of high-level technical relevance and cover topics such as air quality, water and wastewater, biodiversity, naturally occurring radioactive materials, clean fuels, crisis management and emergency response, industrial and hazardous waste, marine protection, oil spill, laws and regulation, industrial hygiene etc.

For further information see the website at www.petroenvironment.org.

World Future Energy Summit to promote the acceleration of sustainable development

THE WORLD FUTURE Energy Summit (WFES) returns to Abu Dhabi 14-17 January 2019, with the theme of 'Accelerating Sustainable Development'. Held at the Abu Dhabi National Exhibition Centre, the 2019 event will feature some new innovations to keep it relevant to the dynamic global renewable energy industry.

The WFES Conference will now be known as The Future Summit, and will give delegates the opportunity to hear about future infrastructure plans, government strategies and market-leading innovations in energy, water and waste management.

More than 850 exhibitors from more than 40 countries, ranging from global enterprises to rising start-ups, will showcase the latest solutions in clean energy, water and waste management.

The WFES forums on subjects including solar power, energy efficiency, water and waste will provide a platform for world class experts to share their experience and best practice.

New for 2019, the WFES Energy Transition Forum focuses on the dynamic, long-term shift taking place in the energy sector as it adds more alternative fuels into the energy mix to meet rising capacity demands. It will discuss the changing requirements in energy provision, the structural and commercial challenges of reducing the role of hydrocarbons and the future role of clean fuels, such as nuclear and hydrogen. From industry-wide considerations on the major considerations that will enable successful energy transition, to the specific applications of individual advances like blockchain and the future role of hydrogen in storage and energy management, it will provide



Image Credit: Reed Exhibitions

The busy exhibition floor at the 2018 event.

insight into the trends shaping the changing energy landscape.

The Solar Energy Forum will focus on the evolution of solar energy provision, discussing country plans to install and manage solar schemes, research and development being undertaken to improve the efficiency of solar, the future of battery storage, technologies such as artificial intelligence and blockchain, and future pricing models. While Green buildings, an ongoing concern for the construction industry around the world, will be discussed at the Green Buildings Forum, where building owners and EPCs can discover the benefits of building in a sustainable way.

Climate Innovations Exchange (CLIX), launched in 2018, returns in 2019 with the themes of space, the future of energy and food and agriculture. This youth-focused initiative promotes the sourcing and funding of climate

change solutions and technologies and aims to prepare youth to carry forward the sustainability agenda. Last year, investors pledged more than US\$17.5mn in support of projects presented by the finalists.

There will be a series of WFES Hosted Events at the 2019 Summit, allowing international organisations and global associations to hold specialised events. These include the return of the International Solar Alliance (ISA).

Environmentally friendly transport will again be on the agenda, and the Electric Vehicle Road Trip Middle East will take place as a Hosted Event. The nine-day road drip will showcase the outstanding electric vehicle technology, while raising awareness and educating the public on topics such as charging, financing, vehicle range and insurance.

For further information see the website at www.worldfutureenergysummit.com.

The Largest Drydocking Facility in Abu Dhabi



ADSB owns and operates two state-of-the-art drydocking facilities. Each year, an average of 300+ vessels are drydocked and serviced. The new floating drydock in Mina Zayed and the Synchro Lift in Mussafah are fully equipped to meet clients' needs with high quality services and competitive rates.

Siemens and Aker Solutions collaborate to strengthen digitalisation

SIEMENS AND AKER Solutions have signed a strategic collaboration agreement to further develop digital offerings in engineering, operations and services.

The collaboration focuses on the creation of software applications and joint service offerings including the development of industrial digital twins that will drive efficiency throughout the entire plant lifecycle. In addition, the companies will further develop specific offerings for the oil and gas sector based on Siemens' Comos engineering platform. These solutions will help customers to reduce engineering and operational cost and enable improved decision making.

The agreement builds on a long-standing, successful relationship between both companies by combining individual strengths and promoting joint offerings.

Aker Solutions will bring in its domain expertise and sector-specific digital offerings in field development, asset performance and integrity, while Siemens will provide a wide range of digital offerings for the process industries – ranging from automation equipment to software applications for engineering and simulation.



The collaboration will strengthen asset performance and integrity.

Image credit: byronv2/Flickr

Mubadala Petroleum acquires Egypt stake

MUBADALA PETROLEUM HAS completed the acquisition from Italy's Eni of a 20 per cent participating interest in the Nour North Sinai Offshore Area ("Nour") concession, an offshore exploration block in Egypt.

In the concession, which is in participation with Egyptian Natural Gas Holding Company (EGAS), Eni as operator through its subsidiary, IEOC, now holds a 40 per cent interest. The other partners in the concession are BP with 25 per cent interest and Tharwa Petroleum Company with 15 per cent interest.

Dr. Al Katheeri, CEO of Mubadala Petroleum, said: "This acquisition of a 20 per cent interest in the Nour concession is another step in Mubadala Petroleum's growth strategy, marking our second investment in Egypt this year."

The Nour exploration block is located in the prolific East Nile Delta Basin of the Mediterranean Sea, approximately 50 km offshore in the Eastern Mediterranean, with a water depth ranging from 50 to 400 metres, and covering a total area of 739 sq km. Eni and Tharwa Petroleum Company are currently carrying out the drilling of the exploration well.

Saudi Arabia gets first service station

ADNOC DISTRIBUTION, THE UAE's fuel and convenience retailer, has announced the start of operations in the kingdom of Saudi Arabia, with the opening of two service stations, one near Riyadh and one in the Eastern Province.

This marks the first phase of a commitment the company made at the time of its IPO in December 2017 to grow its business, not only in the UAE but also internationally. The company is currently reviewing a number of potential options to grow its international operations.

The first of the two service stations is on the Riyadh-Dammam highway around 40km from the capital. The second is in the city of Hofuf within Al Ahsa Governate. The stations have undergone extensive reconstruction to bring them into line with ADNOC Distribution's operational standards and branding guidelines. Customers should expect the same levels of service as those applied in the UAE.

Commenting on the openings, Saeed Al Rashdi, acting CEO of ADNOC Distribution, said, "This is an important moment in our company's history – our first step into the international arena. We promised this to our investors a year ago and these openings mark the beginning of an exciting new chapter for our organisation.

"These initial two stations are significant in that they will enable us to interact directly with Saudi customers and, where necessary, tailor our services for this important market as we continue to look at options for growth."



ADNOC Distribution opens service stations in the kingdom.

Image credit: ADNOC Distribution

GIQ survey: Oman should prioritise energy transition policies

OMAN NEEDS TO prioritise strategies for reducing national demand for power rather than investing in delivering new energy supplies to meet its soaring call on energy, according to the Gulf Intelligence survey of 200 Omani energy executives and officials.

There is a two-part solution to the country's energy transition challenge. The first is reducing emissions stemming from energy supply by increasing the share of zero-carbon energy into the supply mix such as wind and solar.



Oman should plan to add new energy supplies

Image credit: Gulf Intelligence

The second solution, moderating growth in demand for energy by radically increasing energy efficiency and productivity, received the support of 69 per cent of those polled in the GIQ survey conducted in Muscat.

Oman's total domestic use of natural gas tripled from 381,519mn scf in 2008 to 1,447,422mn scf in 2017. The country's semi-arid environment, reliance on air conditioning, a rising standard of living, growth in energy-intensive industrialisation, population growth, an introduction of new households and infrastructure investments are factors behind the dramatic increase in domestic demand for energy.

"At some point of time we're going to be having shortages of gas," said Salim Al Aufi, undersecretary at Ministry of Oil and Gas, Oman, who also participated in the GIQ survey. "If we don't pull it all together under a proper energy transition masterplan, we will find ourselves led in directions that we probably need to spend more time recovering from and correcting," he added.

Oman has one of the world's highest solar densities and has already made some significant steps towards its Energy Transition strategy in its goal to generate 10 per cent of its power supply from new sources of renewable energy by 2025, and a majority of those surveyed in the GIQ poll were confident that Oman would achieve this target.



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AllAssets to digitalise inspection and maintenance for oil and gas: Lloyd's Register

LLOYD'S REGISTER (LR), a leading global provider of engineering and technology-centric professional services, has launched AllAssets, a SaaS-based asset performance management (APM) platform, which aims to maximise asset availability and reduce costs and risk of unplanned maintenance or asset failure.

AllAssets aims to deliver greater certainty, operational efficiencies and cost savings. It delivers a suite of features and capabilities such as LR's model builder and ERP system integration (SAP and IBM Maximo).

"The ability to build custom models in days rather than months using code-free techniques

brings immediate benefits. Once built, the custom models can rapidly provide new performance and risk insights that better inform teams across an enterprise. Increased knowledge sharing and productivity between different teams and disciplines are some of the measurable benefits that may accrue. The efficient data link with ERP systems further drives operational efficiencies, through greater clarity and certainty in the maintenance and planning schedules," said LR.

"As organisations seek to do more with less, so the need for certainty, clarity and assurance becomes ever more critical. AllAssets has been

developed in response to this and draws on LR's extensive industry knowledge, engineering prowess and integrity and risk management experience," said Tim Bisley, senior VP for software at LR.

A conflux of fiscal, regulatory and technology issues has driven a need for more dynamic and imaginative solutions that can underpin asset risk and performance management strategies. LR's approach has focused on engineering a highly 'user-customisable' software platform that is built to support process and individuals to modify processes to suit the needs of the technology.

SABIC signs MoUs with six multinational suppliers

PETROCHEMICAL COMPANY SABIC has signed memorandums of understanding (MoUs) with six multinational suppliers to establish strategic alliances. The suppliers include German conglomerate Siemens, Swiss technology firm ABB, the US-Japanese manufacturer Elliott Group, two Japan-based engineering companies Yokogawa and Mitsubishi and the US manufacturer Emerson.



Image Credit : SABIC

The MoU sets out the framework of cooperation between the parties to enable SABIC to seek joint opportunities and boost performance in manufacturing.

The agreements set out the framework of cooperation between the parties to enable SABIC to seek joint opportunities and achieve top quartile performance in manufacturing. The strategic purpose of these alliances is to support the Saudi 2030 vision by stimulating the national economy and local content, achieving industry-leading performance, leveraging technology innovation, enhancing knowledge sharing and identifying lucrative opportunities with market-leading organisations.

Bilfinger and RATE to drive sour gas monetisation in Middle East

BILFINGER, AN ENGINEERING and industrial solutions company, has signed an agreement with RATE, California-based sour gas and sulphur management technology licensor, to establish a strategic cooperation that would position both companies to accelerate growth in the Middle East region.



Image Credit : Bilfinger

Ali Vezvaei is the president and CEO of Bilfinger Middle East.

The agreement, in harmony with the strategic focus of the national oil companies in the Middle East, aims at maximising the monetisation of gas resources and harnessing the growth opportunities in the oil and gas sector.

"The partnership is a great strategic fit, building on the two companies' complementary portfolio. We will together focus on delivering advanced solutions to our customers aiming at maximising the value of their vast natural resources while creating unparalleled local value-add," commented Ali Vezvaei, president and CEO of Bilfinger Middle East.

Mahin Rameshni, president and CEO of RATE, emphasised, "Our technology, coupled with the strong knowhow and capabilities of Bilfinger, enable us to provide the market with cutting edge solutions, in line with the strategic focus of our customers."



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Focusing on all aspects of safety and security

More than 1,300 exhibitors from 59 countries, including 18 of the world's top 20 commercial security providers, are set to participate at Intersec 2019, which takes place from 20-22 January at the Dubai International Convention and Exhibition Centre.

THE ANNUAL EVENT, organised by Messe Frankfurt Middle East, covers the seven sections of Commercial Security; Fire & Rescue; Perimeter & Physical Security; Safety & Health; Homeland Security & Policing; Information Security; and Smart Home & Building Automation.

The event enjoys the support of long-standing Government partners such as the Dubai Police, Dubai Civil Defence, Dubai Police Academy, Dubai Municipality, and the Security Industry Regulatory Agency (SIRA). A number of new international partners are coming on board, such as the Kuwait Fire Protection Association, the Royal Society for the Prevention of Accidents (ROSPA), the Institution of Occupational Safety and Health (IOSH) and the National Examination Board in Occupational Safety and Health (NEBOSH).

It takes place as the Middle East market for commercial and cyber security, fire protection, smart home solutions, and drones, worth a combined US\$7bn in 2018, is set to grow to US\$16.4bn in 2024, according to analysts 6WRResearch.

Plans for a new three-day conference format are also underway, bringing together equipment manufacturers, integrators, consultants and services providers with regulatory agencies and government authorities.

"A three-day Intersec Future Security Summit will raise key issues on Artificial Intelligence, security integration, emergency preparedness and response, data protection, IoT and much more," said Intersec's show director Andreas Rex. "A range of practical workshop sessions are also being organised for security managers to support skills development, professional expertise on security risk intelligence, threat identification, and disaster management.

"The SIRA Forum will also return with the latest updates in security law and industry regulations in Dubai, while a one-day Fire Safety and

Protection Conference will involve authorities, fire chiefs, engineers, fire fighters and emergency response professionals."

Returning popular features at Intersec 2019 include the Drone Zone, an Outdoor Demo Area, a Smart Home Pavilion and the Safety Design in Buildings Pavilion.

More than 150 exhibitors will be participating for the first time, while Canada, China, Czech Republic, France, Germany, Hong Kong, India, Italy, Korea, Pakistan, Russia, Singapore, Taiwan, UK, and the USA comprise the 15 country pavilions. ■

For further information see www.intersecexpo.com.

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Progress is Life



Image Credit : Messe Frankfurt

The show covers all aspects of health, safety, fire safety and security.

Worker well-being and safety vital for business growth

The 4th Annual Health, Safety & Security Forum, the latest in the highly acclaimed annual event series, took place from 27-28 November in Dubai.

WORKER WELL-BEING WAS the core theme of the 4th Annual HSS Forum, committed to promoting health and safety across all sectors in the UAE. Held under the patronage of the UAE Ministry of Health & Prevention, the event was researched and developed by Health, Safety & Security Review magazine.

Day 1 began with a keynote presentation from Dr Ola Ahmed Mira, director – OHS and head, UAE Ministry of Health and Prevention. To ensure better business practices, she advised participating



Image Credit : Alain Charles Publishing

Dr Waddah S Ghanem, senior director – Sustainability, Operational and Business Excellence, ENOC, gave a keynote presentation on Operational Excellence Management Systems.

organisations to invest in employee health to create a resilient and productive workforce, adding that today’s work environment has a big impact on employee health. Therefore, it is critical to follow employee health initiatives and put them first. She also mentioned that the UAE government supports wellness initiatives such as ergonomics training programmes onsite.

“Efforts must be taken by project managers to ensure that equipment used is certified and faultless.”

During summer, Dubai records high temperatures, but the show must go on. Emirates Global Aluminium (EGA) is one of the biggest aluminium producers in the world. Therefore, expectations pose a challenge. EGA’s worker wellbeing initiative to address the challenge of working in a hot and humid environment consists of three steps – awareness programme, hydration and healthy lifestyle. According to EGA’s Executive VP, HSSEQ and Business Transformation Salman Dawood Abdulla, the producer invests a great deal in technology and data collection methodology to regularly monitor HSE standards in the organisation. “EGA to date continues to achieve and sustain zero harm to workers.”

Eng. Raed Al Marzooqi, head of Occupational Health & Safety Section, Health & Safety Department, Dubai Municipality, spoke about the Dubai government’s efforts to make working at a height safe. “Efforts must be taken by project managers to ensure that equipment used is certified and faultless.” In particular, they should avoid using

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defective formwork and scaffolding, to prevent falls. He added that many organisations still need to strategise their HSE norms, follow safety regulations and redesign job practices.

Getting to safety during an incident is a priority. But how do you get to safety safely? The global leader in evacuation chairs Evac+Chair's general manager Gary Hicks demonstrated the concept with case studies from the 2001 World Trade Centre incident.

From construction to oil and gas – the HSE standards are different yet the aim is same: to save lives. Mohammed Suwaidan Al Ameri, manager – HSE Compliance and Assurance Dept at ADNOC, discussed ADNOC's continuous efforts to achieve the industry benchmark for HSE globally. However, he also said that the goal can only be realised if we have data to record incidents. Right now such data sets are not available in the UAE. But he added that efforts are ongoing to improve employee wellbeing every day at ADNOC.

To address data collection challenges, Akriovia has introduced an IoT-based health and safety management solution to meet HSE needs. It can assist in incident reporting, cause analysis, corrective and preventive measures. Nikhil Bhat, Manager Business Operations, explained that it is a cloud-based solution and can be used on premises with a dedicated server.

“Operational excellence is not a goal, it is a journey.”

Jorge Manuel Miranda Dias, professor, Electrical and Computer, Khalifa University, Abu Dhabi, gave an overview about the use of video surveillance for crowd management that in turn can help in behaviour analysis of individuals.

Day 1 concluded with an Eaton presentation by Qasem Niureddin, regional sales director, Life Safety Division. The electrical company is bringing new products in compliance with the latest safety standards. Its adaptive signages for building evacuations direct people out through the safest route.

Day 2 centred on the different types of methodologies, safety operations and systems that the industry can adopt to achieve worker well-being in the UAE.

It started with a workshop focused on occupational health and safety services in the UAE, covering a wide array of topics from the employee assistance programme – metabolic health, to protecting and promoting health at the workplace (dynamics and biomechanics), improving the performance of and access to occupational health services, providing and communicating evidence for action and practice, incorporating worker health into other policies and promoting happiness and well-being at work.

Becoming a High Reliability Organisation

Dr Waddah S Ghanem, senior director – Sustainability, Operational and



A panel discussion in session. From left: ESMA's Dr Rehab Al Ameri, UAE Ministry of Health & Prevention's Dr Ola Mira, Dubai Municipality's Raed Al Marzooqi, ADNOC's Mohammed Suwaidan Al Ameri and Dubai Civil Aviation Authority's Hafidh Masoud Al Zaraei.

Business Excellence, ENOC, gave a keynote presentation on Operational Excellence Management Systems. He stated that the management of most organisations may not accept the root cause of an incident, especially if it is the lack of proper maintenance or preventive maintenance by their department that caused the failure. The first step to becoming a High Reliability Organisation (HRO) is to acknowledge the problem and resolve it. "HRO operates on safety, efficiency and reliability. True operational excellence may not be achieved, operational excellence is not a goal, it is a journey, a journey of excellence, and to maintain that excellence we need reliability."

According to Shaun Hannam, head of Safety, International Airport Operations, Emirates Group, "Safety should be simplified. The organisation needs to identify the unsafe conditions and unsafe acts (fatigue, inappropriate use of equipment) and create a safe place for an employee. Simplifying an operational approach is more than auditing on paper, it is to focus on the individual and achieve a safe zone for the employee."

Jason Woods, Middle East and India representative, IPAF, spoke about how reporting an incident is an important step in keeping employees safe in the future. A MEWP analysis of 2013-2015 showed that a fall from height is the highest fatal accident reported and entrapment is on the rise, with three incidents reported in the UAE.

A presentation 'Workplace health and safety in the UAE: a legal perspective' was given by Will Cadwaladr and Rachael Smith from Clyde & Co through a Mock Criminal Investigation Process.

What if incidents can be predicted? Christine Adeline, global EHS product manager, SAI Global, discussed how data collection of incidents and analysing them can help provide better insights to managing hazards and risks while identifying, monitoring, analysing and reporting on EHS performance.

The Forum ended with a panel discussion on AI versus the human workforce, where loss of traditional jobs and the use of AI technology in hazardous environments to safeguard the human workforce were among the topics discussed. ■

Safe & efficient crew logistics through marine transfer

Philip Strong, CEO, Reflex Marine, discusses the latest developments in marine transfer.

TRANSFERRING CREWS SAFELY and efficiently is a vital activity for the offshore sector. The offshore oil and gas industry has from its outset used both air and marine transportation to move its workforce, with millions of transfers performed by air and sea each year. Both transport alternatives carry risks, while sharing the same essential purpose – to transport personnel offshore in a safe and efficient manner.

Helicopters are fast, relatively comfortable and have been favoured in many regions, particularly in further offshore locations, despite inherently high costs associated with aviation services.

However, alongside statistical evidence supporting the relative safety that marine transfer provides, in the current low oil price environment, the potential for significant reductions in operating costs for alternatives to helicopter transfers is attracting considerable attention.

Marine transfer was once seen as the poor cousin of helicopter services; even vessel operators and crane suppliers regarded it as a secondary function – the primary focus being cargo-related duties and not the movement of people. This culture is now changing, as increasing numbers of operators recognise this as a vital logistical option and an alternative to helicopter services. Many operators now plan their marine operations with the same meticulous focus previously only applied to aviation.

Designing out risk

Reflex Marine, a global leader in marine transfer solutions and a founding member of the Marine Transfer Forum, has been at the forefront of developments in marine transfer for the past two decades and is involved in more than one million safe personnel transfers each year. Its more progressive approach to marine transfer started with a comprehensive review of crane transfer operations, which confirmed that the key risks during crane transfers were falls, vertical impact, lateral impact and immersion.



The WAVE-4 is the latest addition to Reflex Marine's range of personnel transfer devices.

Image Credit: Reflex Marine

“Increasing numbers of operators recognise marine transfer as a vital logistical option”

Its first marine transfer capsule, the FROG, was launched in 1995 and is now in regular use in diverse locations worldwide, with a particularly strong presence in the more extreme climates. Reflex Marine's design objectives were based around the risks identified and it developed the most rigorous testing and verification programme ever used by the industry to confirm that these objectives had been met. Around one million transfers are performed in FROGs each year and for the past six years this has been achieved without a single loss time incident.

Speed and safety

While improvements in transfer devices were a significant milestone in the history of marine transfer, another challenge was to provide an alternative to helicopters in terms of speed and comfort – traditionally the helicopter's area of strength. The answer came through a collaboration with Seacor Marine Inc., which was developing the super-fast CrewZer Class vessels combined with a nine-passenger capsule to increase the speed during high-volume crew transfers. Comfort was a vital consideration, and 'business class' style reclining seats and wifi connectivity offered an attractive alternative to flying.

This was the first time that a major vessel operator and a transfer specialist had collaborated to optimise marine transfer operations. In the first year of deployment, off Angola, more than 21,000 passengers were transferred with excellent results in terms of speed, comfort and safety. Cost savings



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compared to helicopters were identified at 30 per cent. This success has since been replicated in a number of regions.

Latest developments in transfer

Crane transfer solutions continue to advance and, in 2014, Reflex Marine decided to upgrade its entire product range. The new FROG-XT series of capsules was intended to set a new benchmark for the industry, with the following key development objectives:

- Increased safety (passenger protection)
- Increased operating envelope (weather capability)
- Better ergonomics – easy entry/exit and intuitive passenger experience
- Improved ownership experience – more durable product, easier shipping, storage, inspection and maintenance.

The XT range includes four, six and 10-person capsules all of which can be simply converted to Med-Evac mode, carrying a stretcher or seated casualty and accompanying paramedic.

The FROG-XT range was subjected to an even more rigorous testing programme than the FROG, once again referencing biomechanical studies carried out by automotive crash test experts, key elements being vertical impact, lateral impact, immersion and self-righting testing. The capsules are hydro-dynamically designed to allow safe entry into water at high velocities, for example in free fall scenarios.

FROG-XTs are now operating in more than 28 countries for applications including routine crew changes, high volume transfers and for operational contingency transfers. Feedback from the industry so far has been extremely positive.

Reflex Marine has recognised a preference in some regions for transfers in the standing position with limited restraints (harnesses). The company is now developing a four-passenger standing carrier. The carrier will have a very small footprint (6 x 6ft or 1.8 x 1.8m) and is also designed for an improved ownership experience (for example durability, shipping, storage, inspection and maintenance). It will be the only standing transfer device that has been subjected to rigorous verification and testing, which will include impact testing and full immersion and self-righting tests. Although less weather capable than the FROG-XT series, it is intended to be suitable for significant wave heights of up to 1.5 metres.

Case histories

Stena Drilling used the FROG-3 for many years on its Stena Carron drillship and the semi-submersible Stena Don for projects in Europe, Canada and Africa. The company recently upgraded from FROG-3 to FROG-XT4 for use on the Stena Carron, a deep-water harsh weather drillship. The vessel is currently located off North West Africa and the FROG-XT4 is its preferred method for weekly crew changes. Stena found pre-use inspections were easier to perform, due to improvements to the rigging arrangements and its barge master commented, “The FROG-XT4 feels robust and passengers feel protected when being transferred in the device.”

Elsewhere, the unit acts as a contingency method for another system: Wagenborg purchased a FROG-XT4 for use on the offshore maintenance support vessel, the Kroonborg. The Kroonborg is equipped with a motion-compensated offshore access system (walk to work); its main method for transferring personnel. The vessel also has a heave compensated crane and a FROG-XT4 as contingency. The FROG-XT4 offers a wider operational window for personnel transfers, so can be used when operating conditions are unsuitable for gangway access. If maintenance is required on the walk to work system the FROG-XT will be used and is also kept on standby for Med-Evac transfers. This combination of a walk to work system and a FROG-XT provides the operator with a flexible personnel transfer system that has removed the need for helicopter transfers.

Accessing normally uninhabited installations

The increased use of normally unmanned installations (NUIs) across the energy industry requires access providers to adapt to new demands. In response, Reflex Marine is developing a new remotely operated winched access concept.

The new concept can support the offshore oil and gas and wind industries, and again is the result of close collaboration between vessel operators and lifting specialists. The core of the system is a FROG-XT1 (single passenger) capsule although it is also suitable for higher capacity capsules.

Winch-based access is very flexible and adaptable to most offshore support vessels. The system can work with a remote controlled crane on the installation, or alternatively, a bespoke remote controlled hoisting davit can be spotted on the installation (the approach is similar to that used for launch and recovery of diving bells and ROVs).

A range of access options

Recent developments in ‘walk to work’ systems involve retractable heave-compensated gangways to connect a vessel and installation. The more advanced systems have proved to be reliable and weather

capable, however associated vessel and equipment costs are high, so applications have focused on high volume transfer operations. The increasing range of options open to operators make it possible to plan higher levels of system redundancy and reduce the risk of extended downtime. For example, marine transfers can be used in situations when helicopters cannot, in weather conditions such as fog, or during disruption to aviation. Crane transfer provides contingencies for gangway or ‘walk to work’ systems and can be used with a wide range of vessels for ad-hoc transfers and occasional inter-field crew movements. This flexible, integrated approach provides greater resilience and increased capability for emergency response.

Role in emergency response

A flexible and integrated approach is particularly important when considering emergency responses. On-site managers have a limited range of tools at their disposal for major evacuations and may call for a range of responses at different phases of an emergency. It is therefore essential that options that do exist are well understood by supervisors and crews and, as always, planning and preparation are crucial.

Crane transfer is frequently used for emergency operations, including life-saving medical transfers and emergency evacuations. Like helicopters, its primary role is logistical, but in emergencies it may be needed for more onerous duties. Emergencies come in many guises – scenarios include hydrocarbon releases, fires, stability issues and external marine hazards (drifting vessels) to name a few. Harsh weather can compound the challenge. Some threats increase steadily with time, others escalate rapidly. Timely and well-executed responses can prevent a minor incident escalating into a major incident.

Crane transfer offers a flexible response immediately available and under the full control of onsite management. Up to 100 personnel could potentially be evacuated prior to arrival of the first helicopter. The situation will dictate the most appropriate method of evacuation, hence the importance of taking an integrated approach to emergency planning.

The past two decades have seen major improvements in marine crew logistics. New transfer solutions and enhanced vessels have played a vital role in this shift. These advances have been supported by operators taking a more strategic approach to their crew supply operations. A focus should remain on designing out risk, increasing risk awareness and disseminating best practice. Increasing numbers of operators are switching to marine based crew logistics as a viable alternative to helicopters. Operators can look to marine crew transfer with confidence, as when carefully planned it offers safety, comfort and efficiency. ■

“Crane transfer offers a flexible response immediately available”



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Saudi Aramco - the next big challenge

Saudi Aramco is turning its attentions to gas exports and bolstering downstream and refining capacity as it navigates changing energy landscapes. Martin Clark reports.



The Fadili gas plant will process gas from both onshore and offshore fields.

Image Credit : Saudi Aramco

AT A TIME when others are second guessing what might happen in the oil markets, Saudi Arabia continues to expand its energy sector – and at pace.

Leading the charge is kingpin Saudi Aramco, the world's leading oil producer. For decades, it has helped maintain stability in the world's oil markets, even during challenging times – from regional wars and extreme price fluctuations, through to times of global recession and subdued demand.

While it continues to do so, Saudi Arabia's state oil company increasingly finds itself moving in new and alternative directions as the global energy markets shift. That includes a massive push into gas.

Though known as an oil exporter, Saudi Arabia also sits atop vast amounts of natural gas, which is used to meet rising domestic demand from the power and industrial sectors.

In typical Aramco style, however, the group harbours ambitions to step up production and become a net gas exporter. Its president and chief executive Amin Nasser said recently that the state oil giant plans to spend big to boost gas output to 23bn standard cubic feet (scf) a day

from 14bn scf now. He said the gas expansion strategy will require some US\$150bn worth of investment over the coming decade. The emergence of renewable energy technologies and nuclear power also mean more gas may be at its disposal and available for export in the years to come.

"We are looking to shift from only satisfying our utility industry – which will happen especially with the increase in renewable and nuclear – to be an exporter of gas and gas products," he told an industry conference in Dubai in November.

It underscores the rapidly evolving energy market that Aramco – like all other energy firms – must navigate.

Saudi Arabia is looking to develop some 30 solar and wind projects to produce around 9.5 gigawatts (GW) of renewable electricity by 2023. It also plans to build 17.6 GW of nuclear capacity by 2032. The net effect is to free up more of the nation's gas for export, drawing on both the vast conventional and unconventional domestic resources available.

Nasser said Aramco now has 16 drilling rigs focusing on unconventional gas, with more than 70 wells completed during 2018.

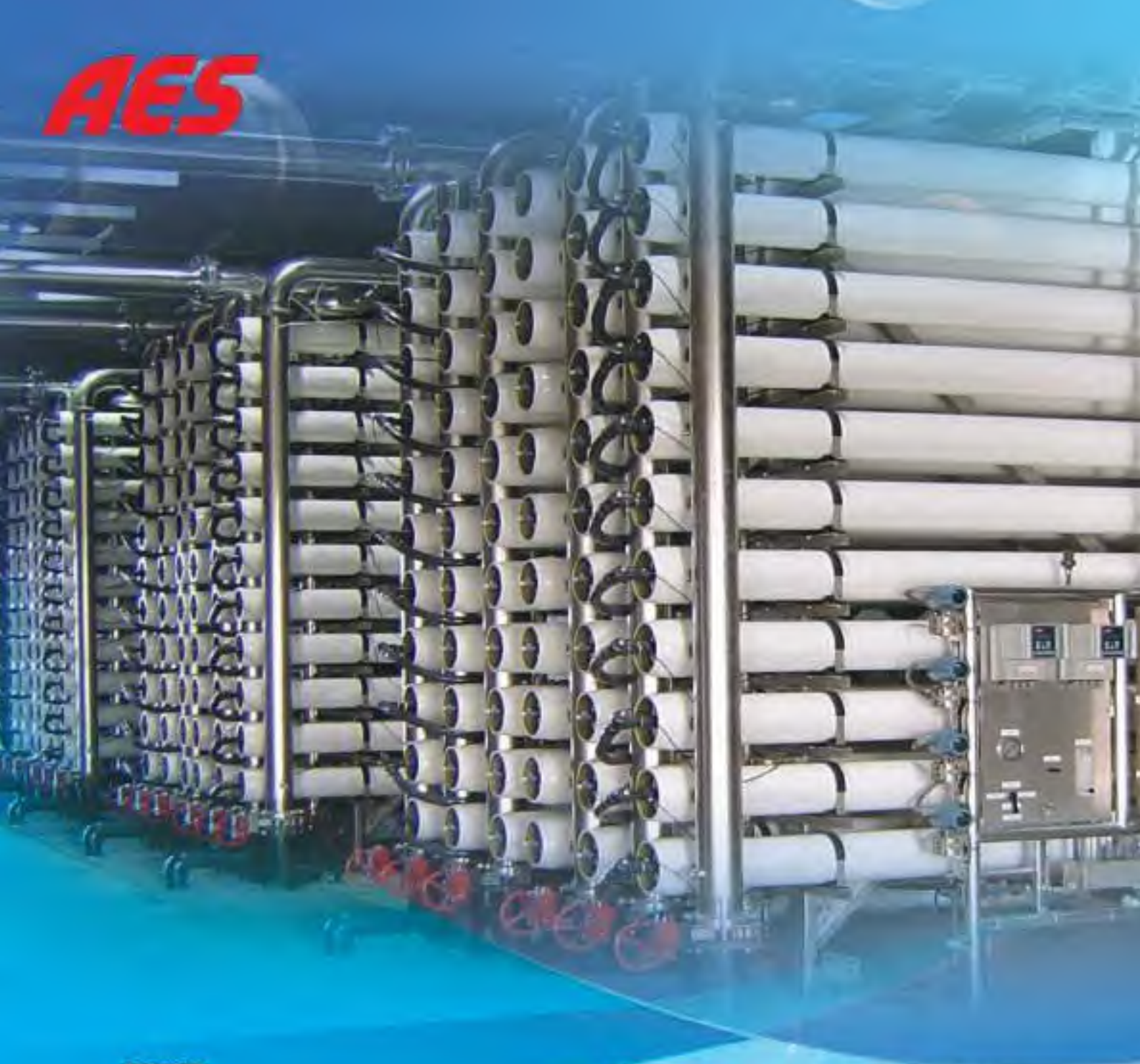
Downstream diversification

At the same time, the company is set to spend big on the chemicals sector too as it seeks to add greater value to the nation's oil and gas output. This is expected to entail investments worth around US\$100bn over the next decade in chemicals globally, in addition to potential acquisitions. It hopes to convert around three million bpd, or about 30 per cent of its daily output, into chemicals.

That might also include a move to acquire a strategic stake in Saudi Basic Industries Corp (SABIC), the world's fourth-largest

“The state oil giant plans to spend big to boost gas output to 23bn scf a day from 14bn scf now”

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Daily crude oil production (millions of bpd)



Includes blended condensate and Bahrain's share of the Abu Safah field

Raw gas processed (millions of scfd)



Natural gas supplied (millions of scfd)



Source: Saudi Aramco

petrochemicals producer, a deal that would give Aramco instant access to downstream markets worldwide. The scale of the potential transaction – estimated at US\$70bn – has meant Aramco has delayed its planned initial public offering (IPO) to 2020 or 2021, Crown Prince Mohammed confirmed in October.

One flagship project – working alongside SABIC – will see Aramco develop an integrated industrial complex to convert crude oil to chemicals (COTC) in Yanbu, on the Saudi west coast. The COTC complex is expected to process 400,000 bpd of crude oil to produce nine million tons of chemicals and base oils annually by 2025. Aramco says the complex will use an economically viable, innovative configuration to convert oil to chemicals, a process it calls “unprecedented” in the industry. The project management and front end engineering contract for project was awarded to Wood and KBR earlier this year.

“A key objective is to bring Aramco’s downstream business to the same prominence as its upstream business”

Similarly, the energy company also plans to expand refining capacity both inside Saudi Arabia and abroad, almost doubling it from around 5.4mn bpd now to 8-10mn bpd.

“Our ultimate target of 8-10mn bpd of integrated refining and marketing capacity will create a better balance between our upstream and downstream segments,” Nasser said. He added that a key objective is to bring Aramco’s downstream business to the same

prominence as its upstream business over the coming decade, as the company drives expansion in areas like refining, marketing and lubes.

Upstream investment

At the same time, Saudi Arabia's upstream oil sector remains as strong as ever. The country maintains its position as a leading exporter to the world's oil markets, investing both in new production and other infrastructure.

This includes the recent commissioning of the new Yanbu South Terminal (YST), which boosts export capacity from the kingdom's west coast – away from the congested Hormuz Strait on the eastern coast – by three million bpd. The terminal consists of a tank farm and offshore facilities to receive, store and load Arab Light (AL) and Arab Super Light (ASL) crude oil.

On the other side of the country, Aramco has commissioned the 112 km AB-4 pipeline, a new crude oil link to meet Bahrain's growing energy needs. The new pipeline – which replaces an existing 73-year-old system which has been supplying BAPCO with crude since 1945 – can carry up to 350,000 bpd of crude oil. It consists of three segments: a 42 km onshore Saudi segment, a 28 km Bahrain onshore segment, and a 42 km offshore segment.

In the field, Aramco has a full slate of projects to maintain or elevate

oil production from its enormous reserves. In its last full year report, for 2017, it noted that the kingdom ended the year with proved reserves in the fields it operates of 332.9 billion barrels of oil equivalent (boe).

Its work also includes exploration, with discoveries still being made on a consistent basis. Two new oil fields were unveiled during the year covered in the last Annual Report – Sakab, southeast of Haradh, and Zumul, in the Rub' al-Khali. A new gas reservoir was also confirmed in 2017– Jauf, in the Sahba field.

It highlights the company's prowess in the upstream business, an area in which it has excelled for many decades. Indeed, a measure of Aramco's reputation was the appointment of its own Sami A. Alnuaim as president of the prestigious Society of Petroleum Engineers (SPE) for 2019.

While global energy markets are indeed evolving, Aramco seemingly remains a beacon of stability amid a sea of change. ■

Saudi Aramco: key upstream projects

- Khurais field: Planned increase of crude oil production capacity by 300,000 bpd in 2018
- Fazran field: Planned increase of crude oil production capacity by 75,000 bpd in 2020
- Dammam field: Expected start up of 25,000 bpd in 2021, increasing to 75,000 bpd in 2026
- Fadhili Gas Plant: Designed to process up to 2.5bn scfd of gas, with start up planned in 2019
- Hawiyah Gas Plant: Planned processing capacity expansion of 1.1bn scfd

“ Two new oilfields were unveiled during the year covered by the report ”



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Important project developments in Saudi Arabia

Stefan Chapman, vice president at Euro Petroleum Consultants [EPC], reviews major refining and petrochemicals projects in Saudi Arabia.

COMPETITION IN THE petroleum industry keeps increasing; hence producers are focused on making sure their assets remain competitive – through new projects, revamps and expansions and the implementation of operational excellence programmes.

The Middle East is the world's biggest oil and gas producer. However, when it comes to oil refining, the Middle East still lags behind some other areas around the globe – notably Asia Pacific and North America.

Indeed, despite the recent impressive growth of oil refining capacity in the region, local refineries are presently capable of processing only around 30 per cent of the crude oil produced here. This situation is however evolving at a fast rate, and this is best highlighted by the region's most important producer – Saudi Arabia.

Saudi Arabia is the region's largest oil refiner, which is not surprising given the country's leading position in the oil production market and serious investments made in the recent years. Figure 1, taken from BP Statistics, shows Saudi Arabia's importance.

According to 2017 data, the country's total refining capacity exceeds 2.8mn bpd, which is around 30 per cent of the region's total capacity. And the Kingdom is not satisfied with what has already been achieved – a number of projects are being implemented in the country aimed at increasing refining scope and depth, strengthening the integration between refining and petrochemicals.

Leading projects

Let us start our journey with Rabigh Refining & Petrochemical Co. – a joint venture between Saudi Aramco and Sumitomo Chemical – and their Petro Rabigh II expansion project.

The project centres on the expansion of the existing ethane cracker, the construction of an aromatic complex and an ethylene cracker debottlenecking plant. It further enables the complex to produce 30 million cubic feet per day of ethane and three million tonnes of naphtha per year, which is used as feedstock to produce a variety of petrochemical products.

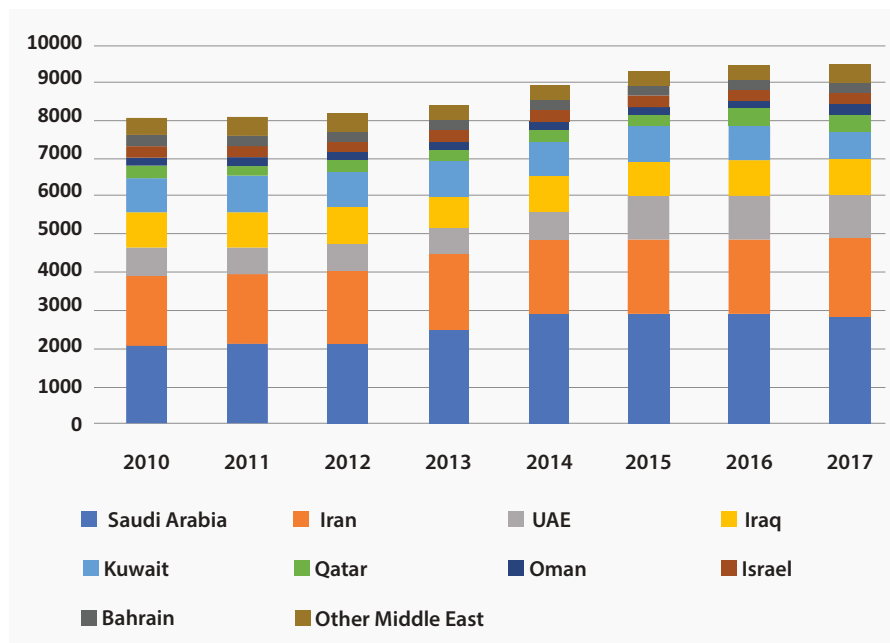


Figure 1: Refining capacities in the Middle East, thousand bpd. (Source: BP statistics)

The petrochemical products slate includes ethylene propylene diene monomer (EPDM), thermoplastic polyolefin (TPO), methyl methacrylate (MMA) monomer, polymethyl methacrylate (PMMA), low density polyethylene / ethylene vinyl acetate (LDPE / EVA), cumene, phenol, superabsorbent polymer (SAP), caprolactam, nylon-6 and polyols. Some of these products are being manufactured for the first time in the country.

Our next stop takes us to SASREF (Saudi Aramco Shell Refinery Co) and the Jubail Refinery revamp and expansion project. The goal of the project is to attain the operating flexibility needed to generate maximum returns through sustainable fuel production, which meets Euro V regulations for lower emissions as Saudi Arabia positions itself among region's leaders in terms of clean technology use.

The principal products manufactured at the facility include gasoline, diesel, jet fuel/kerosene, fuel oil, naphtha and liquefied petroleum gas.



Stefan Chapman, vice president, Euro Petroleum Consultants.

In late 2017 SASREF awarded CB&I (now McDermott) a contract to provide engineering, procurement, and construction management for the modernisation and expansion of its 305,000-bpd refinery at Jubail, Saudi Arabia. Valued at more than US\$95mn, this latest

“ The country’s total refining capacity exceeds 2.8mn bpd, around 30 per cent of the region’s total capacity”

EPCM contract follows SASREF’s previous contract awards to CB&I for conceptual design and front-end engineering and design phases of the project, the service provider said.

Staying in Jubail, but this time with SATORP and their plans for an Integrated Refining Complex. Saudi Aramco and Total signed an agreement to build the Jubail petrochemicals complex. The two oil giants will invest US\$9bn into the project. The complex will be integrated with the Saudi Aramco Total Refining & Petrochemical Company (SATORP) facility in Jubail, a joint venture in which Aramco owns 62.5 per cent and Total 37.5 per cent.

Located next to the SATORP refinery, the complex will comprise a mixed feed steam cracker with the capacity to produce 1.5 million tonnes annually (mta) of ethylene, plus other petrochemical producing units. Front-end engineering and design activities for the project were expected to start in the third quarter of 2018. Total SA announced that the project will also produce more than 2.7 mta of high value chemicals. Feedstock will come from the SATORP refinery, and from Sadara, a joint venture between Aramco and Dow Chemical, also located in Jubail.

These announced projects as well as others are part of the Vision 2030 economic transformation programme, the main goal of which is the creation of a world-leading downstream sector in Saudi Arabia, built on four key drivers:

- Maximising value from the Kingdom’s crude oil production via integration across the hydrocarbon chain;
- Enabling the creation of conversion industries to produce semi-finished and finished goods to help diversify the economy;
- Developing advanced technologies and innovation;
- Enabling sustainable development in alignment with the Kingdom’s National Transformation Program.

One of the most interesting projects is the crude oil to chemicals (COTC) complex, a joint project of Saudi Aramco and SABIC. It is expected that the complex’s capacity will be 400,000 bpd, and the associated product slate will include around nine mta of chemical products and base oils. Investment in the project is estimated to reach more than US\$20bn, and the expected start of operation is slated for 2025.

According to the latest information, the complex is expected to create an estimated 30,000 direct and indirect jobs, further stimulating the Kingdom’s economic diversification efforts. By 2030 the COTC complex is expected to have a 1.5 per cent impact on the Kingdom’s Gross Domestic Product.

In 2018, Wood and KBR were selected to supply project management and front-end engineering services. Saudi Aramco and SABIC also announced in November 2018 that the COTC complex will be located in Yanbu, on the west coast of the Arabian Peninsula.

Today, Saudi Arabia is considered one of the world’s major oil refining centres, and the implementation of the announced development projects can only further strengthen its position – with extra focus on the monetisation of hydrocarbon deposits, increasing the refining ratio and enhancing integration with petrochemical plants, in line with the development trends of the global refining industry. ■

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Positive mood at ADIPEC 2018

The mood at ADIPEC 2018 was buoyant, fuelled by higher oil prices, an uptick in regional project activity and a stream of projects and deals announced over the week by host ADNOC.

THE LEADING GLOBAL oil and gas show welcomed 145,000 visitors, an increase of 32 per cent, according to the organisers, and more than 2,200 exhibiting companies, including 42 major NOCs and IOCs.

Hosting more than 80 ministers, CEOs, and global oil and gas business leaders as speakers, ADIPEC convened the companies, decision-makers and policy-makers who shape the future of oil and gas supply, for four days of focused business, dialogue and knowledge-transfer addressing today's energy challenges and defining tomorrow's hydrocarbon landscape.

ADIPEC's international technical and strategic conference spanned 200 sessions, with 980 expert speakers and more than 10,400 delegates, continuing to evolve in line with emerging trends and challenges.

Reflecting industry trends, a strong theme this year was digitalisation, with the addition of a Digitalisation in Energy conference, addressed by Omar bin Sultan Al Olama, UAE Minister for Artificial Intelligence, and a Digitalisation exhibitor zone.

Other new and revised conference sessions included three closed-door C-suite roundtables, 10 upstream and downstream business leader sessions, two CEO finance breakfast briefings, six inclusion and diversity in energy sessions, 11 C-suite dialogues, and nine downstream technical sessions.

Setting the tone

The opening ceremony set the tone for the event. Delivering the keynote address, His Excellency Dr. Sultan Ahmed Al Jaber, UAE Minister of State and Group CEO of the Abu Dhabi National Oil Company (ADNOC), said the world is on the verge of an era of unprecedented prosperity. This will be driven, he said, by rapid advances in technology and a global middle class, which will grow to five billion people by 2030, creating greater demand for energy and products derived from oil and gas.

"We are at the cusp of a new age of opportunity for our industry, an era in which



H.E. Dr. Sultan Ahmed Al Jaber addressing the opening ceremony.

Image Credit : ADNOC

“ We are at the cusp of a new age of opportunity for our industry”

digital innovation is delivering unprecedented levels of progress,” H.E. Dr. Al Jaber said. “This era, known as the 4th Industrial Age, is creating a paradigm shift in global growth and driving demand for our products. Our industry must step up to enable this massive step-change in global development.

“In short,” H.E. Dr Al Jaber added, “this mission can be given a simple name: Oil and Gas 4.0.”

“This is only the start of a new era at ADNOC,” he said, adding that ADNOC is continuing to put in place the building blocks that would allow it to seize the opportunities created by Oil and Gas 4.0, emphasising the

strategic oil and gas announcements, made recently by Abu Dhabi's Supreme Petroleum Council (SPC), which will see ADNOC increase its oil production capacity to 4 million bpd by 2020 – and to 5mn bpd by 2030 – to meet growing global demand. In addition, ADNOC will develop its vast untapped gas resources.

“As we set out to meet these ambitious goals, we will access our undeveloped reservoirs, tap into our gas caps and further capitalise on our sour gas. Today, we are able to make this happen by thinking outside the box, leveraging technology and reframing our business model. This has finally unlocked the commercial formula that will enable the UAE to attain self-sufficiency and transition to becoming a potential net exporter of natural gas,” H.E. Dr. Al Jaber said. “We are also taking steps, never taken before, to realise our comprehensive gas strategy.

“For the first time, we will jointly develop our unconventional fields in a concession partnership with Total. In addition, our strategy



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will ensure we remain a reliable supplier of LNG well into the future.”

ADNOC, he said, is applying artificial intelligence and the science of predictive analytics to significantly reduce maintenance costs, and building out its state-of-the-art Panorama Digital Command Center to mine for, monitor and measure terabytes of information across its operations.

“Our ambition is to extend technology’s power across our entire value chain from drilling platforms to trading platforms,” H.E. Dr. Al Jaber said. “By embedding innovation into every aspect of our business, we are determined to make ADNOC the destination of choice for a highly skilled, digitally native workforce and a home for the best and the brightest of our young people.”

During ADIPEC week, ADNOC announced the awarding, to Total, of a 40 per cent stake in the Ruwais Diyab unconventional gas concession, and signed an agreement with ENI, awarding it a 25 per cent stake in the Ghasha concession, comprised of the Hail, Ghasha, Dalma and other offshore sour gas fields. ADNOC signed a framework agreement with Saudi Aramco, to jointly assess investment opportunities across the

LNG value chain and a framework agreement with Mubadala, Abu Dhabi’s global investment vehicle, to jointly explore international downstream growth opportunities.

The NOC also announced an AED 5.1bn (US\$1.4bn) investment to upgrade and expand its Bu Hasa field, which will increase crude oil production capacity to 650,000 barrels per day (bpd) by 2020 from the current level of 550,000 bpd, awarding the EPC contract to Tecnicas Reunidas.

New innovations

As in previous years, ADIPEC provided a platform for launching and showcasing a host of innovative new products and technologies. Weatherford launched Vero, which it has trialled in Saudi Arabia. Described as the most disruptive technology released in its tubular running services product line, it brings in AI, automation and digitalisation technology to automate the makeup and evaluation of tubulars. Schlumberger launched its Concert well testing live performance technology, which brings real-time surface and downhole measurements, data analysis, and collaboration capabilities to well testing.

Well-SENSE launched its latest FiberLine Intervention (FLI) development, ‘Active FLI’, developed with investment from Saudi Aramco Energy Ventures.

GustoMSC introduced an evolved design of its multifunctional lifting tool, Chela, which provides increased reach capability under the cantilever, improving its material handling and safety capabilities over the wellhead area. While PPG launched its most advanced passive fire protection coating.

Following ADIPEC, H.E. Dr. Al Jaber said the record number of corporate CEOs, government ministers, policy-makers and innovators – from the world’s most prominent oil and gas majors – who attended the event demonstrated Abu Dhabi’s status as a thought leadership convenor and a driving force in the global energy conversation.

He said, “ADIPEC has, again, set the agenda for the global energy conversation and positioned Abu Dhabi to play a central role in the growth of the global oil and gas industry, as it seizes the opportunities created by Oil & Gas 4.0, to ensure a dynamic and thriving oil and gas industry for decades to come.” ■

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- Sea Shield:** MARINE STRUCTURE CORROSION CONTROL (Image of an offshore oil platform structure).
- STEELGARD:** PROTECTION FOR EXPOSED STEELWORK & PIPES (Image of a worker applying a white protective material to steelwork).
- PREMIER SHRINK SLEEVES:** SELF-REPAIRING HEAT SHRINKABLE SLEEVES (Image of a large black shrink sleeve on a pipe).
- PROTAL:** LIQUID EPOXY COATINGS (Image of a green epoxy coating being applied to a surface).
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Sharpening the focus on the Middle East

UK-based Wood, a global leader in the delivery of project, engineering and technical services to the energy and industry sectors, is sharpening its focus on the Middle East and is committed to making Abu Dhabi the centre of its operations in the region. Louise Waters caught up with Dave Buchan, Wood's president of operations for the Middle East, Russia & Caspian, at ADIPEC.

IN OCTOBER 2017 Wood Group and AMEC, two of the UK's largest energy services companies, came together to form Wood. A year later, the company is riding high.

"A big drive for the acquisition and subsequent merger was to diversify legacy Wood Group's portfolio," explains Buchan. "At that point, we'd been 90 per cent oil and gas dependent, whereas now it's 57 per cent oil and gas, with the balance including nuclear, clean energy and infrastructure. It's been good for us, we employ more 60,000 people across 60 countries, generating in excess of US\$10bn a year revenues, and we have a strong strategy to significantly increase that over the next three years.

"In the last year as Wood we've delivered everything we wanted to through integration, ahead of our plan, we have beat our cost synergy and revenue targets, and we're winning more business as Wood as we would have with the separate companies on their own, to the tune of US\$400mn this year and counting."

The Middle East, where the company has a strong footprint and employs more than 3,000 people, will be central to the company's growth targets as it enters its second year, he says. Wood is active throughout the GCC as well as in Egypt, Algeria and Tunisia, providing operations and maintenance, engineering, PMC management and a full range of technical services to the region. The company has a strong presence in both Abu Dhabi and Dubai; the regional leadership and functional capabilities for the whole region being based in Abu Dhabi, with around 400 personnel, while the 600-strong Dubai office also services Iraq, where Wood is doing a lot of business in the refurbishment of equipment and infrastructure with major operators including Shell.

Uptick in the markets

"We're seeing a real uptick in the markets in the region, lots of developments coming online, lots of front end activity that will lead to



Image Credit: Wood

Wood has a strong footprint in the Middle East.

engineering procurement construction, operation and maintenance, so we're confident that we're centred in the right part of the region and have got the right toolkit to play in the spaces we want to," remarks Buchan. He adds that the company has bid

“The Middle East will be central to the company's growth targets”

for around US\$1bn of contracts in the region. "There are big prizes to be won."

"With the coming together of Wood we have a significantly enhanced service line that we are now looking to sell in the region, and we can tackle any projects whether upstream, midstream or downstream. We want to

increase our involvement in petrochemicals here in Abu Dhabi, we've also got a subsea pipeline capability we would like to bring here, and an automation and control capability."

In Abu Dhabi, the company is keen to build on its strong relationship with ADNOC to play a key role in supporting the NOC to achieve its ambitious targets, highlighted at ADIPEC, among them the boosting of oil production to 4mn bpd by 2020 and the development of Abu Dhabi's vast untapped gas reserves, in line with its 2030 strategy.

"Our relationship with ADNOC goes back over 40 years and we're keen to develop that," he goes on, noting the high levels of activity coming out of the NOC. Amongst the spate of ADNOC contract awards and projects announced in ADIPEC week were three PMC contracts worth US\$53mn awarded to Wood by ADNOC Onshore for major projects across the company's onshore fields in Abu Dhabi, and a multimillion dollar

contract extension from ADNOC Offshore, for services to the Upper Zakum oilfield mega project offshore Abu Dhabi. The scope of work includes PMC services for the development, which comprises four new artificial islands and the associated drilling, production, utilities and infield pipeline facilities.

Promoting localisation

“A big feature of that will be our ability to demonstrate our in-country value add, and to develop local Emiratis and the Emirati supply chain, something we’re doing throughout the region,” he goes on. “‘Think global, be local’ is very much part of our strategy.”

In Saudi Arabia for example, where the company is involved in major projects such as the Saudi Aramco/SABIC crude oil to chemicals project and the offshore Marjan development, the company has signed an MoU with Saudi Aramco signalling its continued commitment to accelerating opportunities for the local workforce. This supports Saudi Aramco’s In-Kingdom Total Value Add initiative, focused on strengthening and diversifying the country’s economy through the localisation of key manufacturing



Image Credit : Wood

Ayat Al-Hajim and Osama Maheed, two of Wood’s Iraqi graduates who joined the company’s development programme as junior engineers.

and service industries, and the creation of new jobs for talented young Saudi citizens.

The company runs a number of initiatives throughout the region to develop local capabilities, including seconding employees to locations worldwide, providing career opportunities and a chance to acquire new skills and broaden horizons, through its Engineer Your Future Programme. This is currently rolled out in the company’s operations in Iraq and Dubai. In Iraq, Wood has a working relationship with Basra University, whereby it employs a certain number of graduates each year.

Buchan stresses the increasingly international focus of Wood and its commitment to the Middle East.

“Wood is committed to truly being an international company, focusing on energy hubs across the globe. By the end of the year, three of our eight leadership teams will be based in Abu Dhabi and one in Australia, so there is a real globalisation of our leaders, and a real commitment to make the UAE and Abu Dhabi a hub for our operations. And that’s only going to increase as our footprint grows from traditional UKCS work, increasing our international portfolio, particularly in the Middle East energy sectors such as downstream and petrochemicals.” ■



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Promoting local capabilities in oilfield services

National Energy Services Reunited Corp (NESR), the first and only NASDAQ-listed oilfield services company in the MENA region, prides itself on its strong ethos of promoting local capabilities, and is looking to play an instrumental role in boosting regional growth. Louise Waters spoke to Sherif Foda, NESR's chairman of the Board and CEO, at ADIPEC.

NESR BEGAN AS a special purpose acquisition corporation, or SPAC, focused on investing in the global oil and gas services space in May 2017. In June 2018, NESR completed the acquisition of two of the most prominent oilfield services companies in the MENA region, Gulf Energy SAOC (GES) and National Petroleum Services (NPS), creating an industry-leading provider of integrated energy services and solutions in the MENA region.

"We brought the best in class regional companies into the structure," says Foda. "NPS is concentrated mainly in Saudi Arabia, UAE, Qatar, Algeria and Iraq, while Gulf Energy is mainly focused on Oman, so they have complementary geographic portfolios. In addition, they have complementary services as well, because Gulf Energy is mainly on the drilling tool side and NPS on the completion and production side. So there's a good fit between the two companies and we now have both the companies capitalising on each other strengths; "as I say, one plus one equals three!"

“An important factor in the acquisition of NPS and Gulf Energy was their commitment to boosting local capabilities.”

Foda anticipates increasing service intensity and increasing activity leading to a tripling of demand for the company's services in the region, due to the decline in the number of 'easy' fields as well as faster monetization of new discoveries.

"I think the most important data point which one needs to look at to understand the service industry dynamics in the region is to look at production per rig trends over the last 15 to 20 years; you will see that you have at least three times the rig count to maintain



Image Credit: NESR

Sherif Foda, chairman and CEO, NESR

almost the same production levels," he says. He notes that the USA produces around 10mn bpd and drills around 20,000 wells a year while the same production is achieved in the region by drilling a fraction of those wells.

"So as we go in to the next decade you will see the region's service intensity converging towards what we see in North America operations. This is already happening as we have more of this high intensity work, which means the industry will need more services and that is what is the main macro driving our growth."

He notes too the increased expenditure on developing gas resources to satisfy internal consumption. "The spend on gas is huge."

Foda adds, "I believe the compounded annual growth rate in the region will be more than six per cent a year. Our plan at NESR is to be at double this rate as we have the advantage of being small, which means we can grow much faster."

The region is ensuring it has sufficient capacity by investing in infrastructure as well

as in education to increase local capabilities. "National oilfield services companies today account for only around 10-15 per cent of the region's US\$20bn business. There is a big drive to strengthen national content and have the region's companies run by people from the region. A lot of people are now being trained to become the leaders of the future."

This is something that NESR has at the top of its agenda. Foda stresses that an important factor in the acquisition of NPS and Gulf Energy was their commitment to boosting local capabilities. "When we looked at our acquisition and looked at NPS and Gulf Energy, versus the others, it was for exactly that reason. They have good portfolios and a good name, but more importantly, good national social responsibility. The key is to invest inside the country, employ people and go to the next level of national content, i.e. manufacturing and R&D."

"Gulf Energy in Oman is already 80 to 90 per cent local content, in terms of its people; the entire management team and all the directors are Omani. On the manufacturing side, we manufacture tools in Oman, and now we are looking to export. That is the highest level of national content, but it takes a lot of investment and effort to build the core expertise. You have to have a belief that this is the right way to deliver sustainable growth, that it makes a difference for the country and you need to believe in it, even though the initial investment costs are high."

"The second aspect, and the ultimate goal of local content, is to invest in R&D to develop fit for purpose solutions for our customers, which we have done in Saudi Arabia – the only national company to do that in the region. We have invested in Dhahran Techno Valley for oil and gas, taking the same amount of space as GE and Schlumberger, and committed to bring partners from Europe and USA to build a state of the art research lab inside the facility, employing Saudi researchers through a joint project with King Fahad University of Petroleum and Minerals

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(KFUPM). It's the first perforation lab outside Houston, here in Saudi Arabia. It's a big investment and commitment, but we believe it is the right business model, and that's what will make NESR in Saudi Arabia sustainable, and will align NESR to the overall vision of the country. We are socially responsible, and that's why our partners are here with us."

"The third aspect is to ensure that you create an environment for your local employees to foster excellence and have them share in the benefits of the results. That is possible as we are a listed company and have publicly traded stocks and are awarding our top performers with company shares. As owners of the company, these employees will be incentivised to drive the overall growth. This is line with our motto 'from the region, for the region'."

NESR's aim is to become the largest national oilfield services company by far, says Foda. "We are already the biggest in the region, but we want to be the largest national company that competes internationally with all the majors. We want to quadruple the company size in five years."

"We want to enlarge our geographical footprint, and be as big in North Africa and the rest of the GCC as we are in Saudi Arabia

“ We want to be the largest national company that competes internationally with all the majors.”

and Oman. We have a strong ambition to grow in Africa as well. We are in discussion with ministers of countries in Africa, and I believe there is potential for collaboration between MENA and Africa. There are a lot of similarities, and we can export and import people as well. Corporate Social Responsibility (CSR) in Africa is badly needed."

The company also has high standards in terms of its service offering. "We bring in partners that we know have the best technology," says Foda. "The whole ecosystem of technology is different than it was ten years ago, when the biggest three or four companies developed everything in-house. Now this dynamics have changed. It's the small companies which are leading the innovation and have something very unique,

and we as integrators look at how can we put this together and offer it to the client to address their challenges. The key is to be honest and transparent and put together a package that is fit for purpose. So for the unconventional reservoirs development, which we are now working on, we are bringing best in class technologies, putting them together as a package and going to the customer with it. Some of the technology will be ours, some of it will be provided by our partners.

"We are happy with our structure, and the fact that it gives transparency to a national company, which is very unique," Foda concludes. "We are the first national company in the region that has gone public on NASDAQ, one of the largest and stringent stock exchanges. That's our vision, we brought in public investors to give the company a strong and diverse investor base which has participation from the Middle East, North America and Europe. This will allow the company to grow much faster than everyone else. Our technology partners appreciate the fact that we are transparent and are US-compliant. This governance structure is unique in the region, and it is something which I am very proud of." ■

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Forging ahead in the Middle East

PUNE-BASED KUMARS Forge & Valves, which specialises in the production of steel forgings, machined components and valves, participated at ADIPEC with a view to further developing its Middle East business.

Giving some background to the company, its director, Sujithkumar AA, explained that Kumars is an 18-year-old company with a strong portfolio and experience in the engineering sector. It started as a forging unit and graduated to the addition of machining facility for further value addition, which was followed by forward integration of its valves business.

“Today we are a single point solution for customers’ requirements in forgings, flanges, fittings and valves which are extensively used in the oil and gas industry globally.”

He is positive about business prospects in the region: “The Middle East has a prominent oil and gas sector and we have high hopes there. Our products are in demand in the region and are well accepted. Our new developments will provide a great value addition to the demand in the oil and gas projects.

“We have recently partnered with a local company in UAE to service the Middle East demand. We will also shortly be having a stock point in the UAE for all our products, especially our range of Gate, Globe, Check and Ball valves, to provide immediate delivery for the urgent demands of our valuable clients. We will be soon planning some future investments to generate more in-country value locally.

“We have also designed some interesting new products for the Middle East market and will be launching them in the first quarter of 2019.”

Continuous improvement and innovation are a hallmark of the business, he comments.

“We strongly follow innovation and continuous improvement across all our business verticals. Our growth and reputation in the market are a result of providing niche solutions and continuous development of speciality items. Our customers today trust us with the most critical service requirements and challenge us with opportunities that push our limits to explore.”

So what is the secret of the company’s

success? “Innovation and expertise in speciality solutions is what has been the driving force of our success,” says Sujithkumar. “We are known today for all kinds of critical solutions such as high pressure valves up to 4500 bar, special project requirements, special design requirements and special metallurgy. Our USP is we are single point solution for customer demand, with all facilities right from design, development, forging, casting, heat treatment, machining and valve manufacturing being in-house. This provides us with a very unique advantage to create speciality.

The company’s experience of participating at ADIPEC was “fantastic,” he adds.

“ADIPEC 2018 was a wonderful experience. Having a stand gave us great exposure and presence. It has given us the opportunity to meet and explore partners globally. It is always a pleasure to be at ADIPEC and explore new business and new challenges. There is a lot of learning here. We are also expecting good business opportunities to be converted courtesy of this exhibition.”



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Ducab wins three contracts at ADIPEC 2018, secures ICV position

IN NOVEMBER, DUCAB secured three major contracts in Abu Dhabi for the supply of more than 5,000km of extra high voltage (EHV), high voltage (HV), medium voltage (MV) and low voltage (LV) cables and all aluminium alloy conductor (AAAC) overhead conductors for ADNOC's clean fuel projects.

The new contracts include the design, manufacturing, and supply of 220kV EHV cables, 132kV HV along with a range of MV, LV power and control cable systems for the Clean Fuel and Waste-Heat Recovery project that is being delivered through SAMSUNG-CB&I and is worth US\$60mn.

Ducab will also be supplying complete range of cables for the Bab Integrated Facility Project, as well as cables and aluminium overhead conductors from its newly opened DAC factory for ADNOC's onshore Qusahwira Field Development Phase II Project.

The announcement came on the sidelines of the company's participation in Abu Dhabi International Petroleum Exhibition and Conference (ADIPEC) 2018.

Speaking to *Oil Review Middle East* about the latest wins, Ducab's managing director Andrew Shaw, said that ADNOC's in-country value (ICV) agenda as well as the 'Made in the UAE' manufacturer's ability to provide smart, safe and environmentally conscious cable solutions has had a tremendous impact on Ducab's success. "We are delighted to be the chosen supplier of power cable requirements for these projects as we have invested in developing this full range of cable solutions for the oil and gas sector."

Ducab's PetroBICC cables are designed to meet even the most stringent quality standards, including hydrocarbon resistance and high toxicity levels. This takes into account that cabling in the OGP sector is often deployed in hazardous conditions. Ducab offers polyamide and lead-sheathed cable construction within its PetroBICC range, designed for onshore applications, and a full range of rubber cables for offshore applications, supported by technical services and joint supervision during installations.

To provide comprehensive 'Made in UAE' cabling solutions, Ducab HV, the first dedicated high voltage and extra high voltage power cable manufacturing facility in the Middle East offering upto 400kV, now operates at the highest voltage used within the region, 1,000 times the voltage of the power socket in an ordinary home.

These factors have made Ducab an ideal partner for ADNOC's ICV programme that prioritises local supplier selection, development of local talent and the localisation of other critical manufacturing operations.

The awarded contract is also a landmark one, according to Shaw, because it aids the first supply of extra high voltage power cable of 220kV manufactured locally by Ducab for an international project. This will further the ICV score of the company internationally through ADNOC's collaboration with global companies, he added.

Ducab cables are all designed and produced within the UAE, reducing the traditional need for oil, gas and petrochemical companies (OGP) to rely on international suppliers to source their power cabling solutions. The transition to a local supply chain in recent years has provided regional OGP companies



Managing director Andrew Shaw is one of the driving forces behind Ducab's success

with more agility in their infrastructure planning, and additionally provides them better control of their supply chains.

However, the cable market competition remains aggressive. "If we look at the UAE alone, there are several manufacturing facilities producing commodity cables. Looking beyond the country, the GCC has more than 50 local cable and wire manufacturing plants. But Ducab remains the dominant player because of its quality and its ability to deliver on time. Our local logistical support in the region as well as the timely completion of projects has made us the preferred supplier to EPCs. Our reputation is built on our response time and our tailored products," Shaw maintained.

In addition to dedicated products for the OGP sector, Ducab has also developed a portfolio of cables – power, control, instrumentation cables – joints and terminations, and technical services suitable for use across a number of industries. These include Ducab FlamBICC, the complete Fire Performance cable series; Ducab RuBICC range of rubber cables for flexible applications; Ducab SolarBICC, specifically created for the solar power market; Ducab NuBICC, which has been specially developed and certified for more than 60 years operations for the nuclear power generation sector; and Ducab MarineBICC, a range of cables customised for the marine and offshore industry.

As one of the few manufacturers offering the complete end-to-end solutions, in addition to the cable and wire products, Ducab also offers an array of copper and aluminium value-added products for the electrical and allied industries through its copper rod and aluminium rod plants, based out of Abu Dhabi.

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Mazrui Energy Services: Fostering ties, creating new streams

MAZRUI ENERGY SERVICES, a Mazrui International Company, and two of its operational business units: Sigma Engineering Works (SEW) and Petrochem Performance Chemicals [PPC], celebrated the signing of two JVs at this year's ADIPEC trade show; SEW with RAMCO Tubular Services, and PPC with the Eni chemical company, Versalis, which specialises in the production of oilfield speciality chemicals and is a wholly owned subsidiary of Eni, the Italian multi-national oil and gas company.

Market leader RAMCO has been delivering service excellence for more than 40 years. It is an independent company specialising in the inspection, internal and external blast cleaning and protective coating of drilling tubulars, used in the exploration and production sector for the recovery and transmission of oil and gas.

The JV with Eni establishes a new company between Versalis, Petrochem Performance Chemicals and Mazrui Energy Services. Known as VPM Oilfield Specialty Chemicals, the joint venture is for the commercialisation of innovative production chemicals for the oil and gas industry in the Middle East.



(From left) Charbel Khoury, Group CEO of Mazrui International LLC, Stefano Soccol, Executive Vice-President of the Intermediates Business Unit, Versalis; Abdullah Al Mazrui, Chairman of Mazrui International LLC; Bertrand Chavignon, General Manager of Petrochem Performance Chemicals; and Jurgen Joman, Director of Mazrui Energy Services LLC, a company of Mazrui International LLC.



(From left) Robert O'Neill, Business Development Director, RAMCO Tubular Services Ltd.; Russel Davies, CEO of RAMCO Tubular Services Ltd.; Abdullah Al Mazrui, Chairman of Mazrui International LLC; Charbel Khoury, Group CEO of Mazrui International LLC; Jurgen Joman, Director of Mazrui Energy Services LLC, a company of Mazrui International LLC

The new JV draws on Versalis' expertise and long-standing experience in industrial production and, in particular, will look to leverage its research and development capabilities to guarantee flexible, responsive, and personalised services to the end customer.

According to Mazrui Energy Services, VPM Oilfield Specialty Chemicals is already well-positioned to offer a broad portfolio of high value-added oilfield chemicals under the brand Versalis e®, designed to meet the specific needs of the O&G sector, improving the quality, quantity, reliability, and sustainability of production in the oil wells. The brand will be manufactured locally at Sicheem, a Mazrui Energy Services operating company with its facility in the United Arab Emirates.

The new company will use locally manufactured oilfield chemicals to ensure prompt product availability and competitive advantages in terms of logistics, reliability and customer assistance, within a highly demanding and specialist market such as the Middle East. The partnership will enable Versalis to extend its oilfield chemicals business across the Middle East including the GCC, Yemen and Iraq, following its recent access to the US market. Versalis already operates in Africa through commercial companies in Ghana and Congo, and in Italy.

Jurgen Joman, Director of Mazrui Energy Services added that the new partnership with Eni will provide them access into the chemical production sector. "Until now, we were mainly focused towards drilling fluids. This will provide our clients with a comprehensive portfolio of oilfield chemicals, within local reach." ■



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Unlocking value from oil and gas with AI

During ADIPEC week, the Abu Dhabi National Oil Company (ADNOC) hosted senior oil, gas and technology leaders at the inaugural ADNOC Artificial Intelligence (AI) Forum.

THE EVENT WAS held at ADNOC's HQ, in its state-of-the-art Panorama Digital Command Center, to discuss radical industry shifts, the rise of AI and how, collectively, the industry can accelerate AI advancement to unlock new value from oil and gas resources.

The potential impact of AI on the future course and competitiveness of the oil and gas industry could be dramatic, radically changing the traditional practices and delivering new sources of value. According to the World Economic Forum, primary savings generated from robotic applications and big data analytics could total US\$500bn by 2025.

His Excellency Dr. Sultan Ahmed Al Jaber, UAE Minister of State and ADNOC Group CEO, said, "Digital innovation is delivering unparalleled levels of progress and prosperity across the world, as we enter a new age of opportunity and growth. ADNOC is embracing Oil and Gas 4.0 and helping to drive the 4th Industrial Age, by using AI, Big Data and Blockchain to enhance our operational efficiency, maximise our performance, drive our profitability and empower our people.

"And as we continue our transformation into a more commercially minded, performance-driven company, it will be the rapidly evolving power of technologies, like AI, that will enable us to access opportunities never before seen and ensure ADNOC not only thrives in the new energy landscape, but also leads."

The forum focused on exploring the possibilities beyond the confines of 'AI Today' to imagine the highly improbable but not actually impossible advancements of tomorrow, along with the capabilities, investments and horizons that will need to be matured if the benefits are to be realised.

“We need not only to embrace technological disruption, but also to foster cultural change”



The Forum discussed how to unlock new value from oil and gas resources with AI.

Image Credit : ADNOC

Abdulmunim Al Kindy, ADNOC Upstream director and chairman of ADNOC Digital Transformation, said, "If we are to thrive in the future, we need to not only embrace but champion and evolve technologies such as AI and open our minds to consider the 'what-ifs' in 2030 and beyond. In this regard, today's inaugural event demonstrated ADNOC's leadership and sent a message from industry leaders that we are pushing the boundaries of new technologies and perspectives in our continued pursuit of maximising value."

Since the Forum, ADNOC has announced a collaboration with IBM, piloting a Blockchain-based automated system to integrate oil and gas production across the full value chain. The groundbreaking system provides a secure platform for the tracking, validating and execution of transactions at every stage, from production well to the end customer.

According to ADNOC, using Blockchain technology will reduce the time it takes to execute transactions between ADNOC's operating companies and significantly increase operational efficiencies across its full value chain. It will also improve the reliability of production data by enabling greater transparency in transactions.

The ADNOC AI Forum was moderated by Tracy Countryman, global managing director and Industry X.0 lead for Accenture's Resources practice, who said, "Today's event was a remarkable coming-together of global innovation and technology thought leaders. We really stretched the boundaries of traditional thinking and a number of interesting perspectives and paths were drawn, from which clear value was present."

Sarah Karthigan, Global AI executive at ExxonMobil, said, "ADNOC has brought together an influential cross section of technology and industry leaders who are looking beyond AI today to how we seize the opportunities of tomorrow. It was a very insightful and collaborative working session. We all agree we are still only scratching the surface of how technology, and different ways of thinking, can truly unlock our full potential.

"Our plans for AI need to be bold, and if we are going to see value creation, we need not only to embrace technological disruption, but also to foster cultural change. We need to build organisations that have truly agile people, without compromising the strongest standards and processes the oil and gas industry is renowned for." ■

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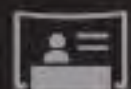
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Airpack: Committed to a sustainable future

AIRPACK, THE NETHERLANDS-BASED manufacturer of customised air compressors, nitrogen generators and air dryer packages, showcased its latest range of desulphurisation units for the oil and gas sector at ADIPEC 2018 from 12-15 November in Abu Dhabi.

Speaking to *Oil Review Middle East* at the show, Petra Warnar, vice-president of Airpack, said that a worldwide commitment to manage climate change risks has encouraged Airpack to create the innovative solutions required in the oil and gas industry today. This is why it introduced its desulphurisation units at ADIPEC this year.

One of the burning issues in the climate change adoption is gas flaring. Environmental consequences associated with gas flaring have a considerable impact on local populations, often resulting in severe health issues.

Desulphurisation is the process of cleaning gas to reduce the sulphur content in hydrocarbons thus reducing the emissions of sulphur oxides which are responsible for acid rain.

The UAE is also committed to reducing emissions from flaring, which involves burning off waste gas or oil during petroleum testing or production. Abu Dhabi National Oil Company (ADNOC) has zero-flaring as a strategic objective.

The desulphurisation units available with Airpack help convert the flared gas into reusable gas. Currently used in biogas production in pilot projects, Warnar said that the company is in talks with ADNOC to sell these units because they are sustainable and in full compliance to their high technical standards.

Not only can the units provide sulphur-free gas for reuse but also converts the same sulphur from flare gases into sulphuric acid to be reutilized in battery production, Warnar points out. This is what makes Airpack's solutions



Vice-president Petra Warnar with her father and founder and president of Airpack JP Warnar

Image Credit: Airpack

unique from its competitors, all outgoing products are reusable.

With a 40-year old relationship in the Middle East and a brand new product in hand, Airpack is now looking out for new partners and dealers in the region. Although UAE and Saudi Arabia has been a stronghold, Airpack needs more support in places such as Oman, Qatar and Bahrain.

"Every year, we have a training week in our facility in The Netherlands where new agents gain thorough knowledge of our products and the right way to sell them, the way we want it sold. Now we have a new product and we need new partners to push our market share in the region."

Airpack is working with many national oil companies in the Middle East including Saudi Aramco and Kuwait Oil Company. It is also in the process of signing a contract with the State Refinery Company of Iraq.



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The driver of Industry 4.0

Engineering specialist Bosch Rexroth's business development manager, oil and gas Tariq Adaileh speaks to *Oil Review Middle East* about how automation is driving innovations within the company.

Oil Review Middle East (ORME): What are some of the new solutions for oil and gas from Bosch Rexroth?

Tariq Adaileh (TA): For the oil and gas sector, we are currently testing a crude oil pump to replace the existing artificial pumping system. Besides being smarter, this pump is equipped with controllers, sensors, and can be connected to the Internet as part of IoT and digitalisation.

The pump is a standalone onshore surface unit connected to the downhole tubes and electro-hydraulics systems, the new pump guarantees smooth operations onshore. Higher efficiency is its main benefit that is by using lesser energy to produce more oil. Besides it being programmable, user-friendly and can predict errors, which is an advantage over other existing traditional artificial lift system, it also reduces downtime, which eventually leads to higher productivity.

Another solution that we have come up with is a new electric jacking system to elevate or carry the platforms offshore. It has a sophisticated variable speed drive system, using frequency controlled AC motors which has several advantages including smooth start and controlled operations, load sharing for equal load distribution, accurate speed control, a significant longer lifetime and lower maintenance costs of the entire installation.

ORME: How is automation helping oil and gas companies such as Bosch Rexroth transform their businesses?

TA: Automation, i.e., the digitalisation of oil and gas production is one of the leading trends in the industry today. Apart from developing efficiency and productivity of the existing systems, automation helps increase accuracy as well as precision in the industry. Even in the Middle East, the end users and the contractors are moving towards automation, and are eager to learn more. This is also driving our products and solutions in the market. You can say that we are the drivers of Industry 4.0, the 4th Industrial Revolution and the Internet of Things (IoT).

ORME: How is Bosch Rexroth's business in the Middle East today and where do you see it going forward?

TA: As Bosch Rexroth Middle East, we are part of Robert Bosch Group and cover 14 countries in the GCC and Levant region, including Pakistan.

We are a huge industry in these markets, covering both mobile applications and industrial hydraulics which includes, but is not limited to factory automation, civil engineering, stage technology, oil and gas, offshore and marine etc., servicing the big OEMs. As large as we are, we are also very customer-oriented. Our market in this region is driven by aftersales business and services.

Bosch Rexroth's opportunities lie within companies such as ADNOC and Saudi Aramco; their investment in new onshore and offshore projects is what we look forward to work on and be part of.

ORME: You see a lot of opportunities. Do you face any challenges in aligning your Industry 4.0 strategies with those of national oil companies (NOCs) in the Middle East region?

TA: Many of the end users, including the NOCs, adapt to new technologies fast but since the tools are still new, they need more training and master classes to understand the concept. Which is why we are here – to explain and help them adopt new technologies.

A meeting ground like ADIPEC gives us the opportunity to reach manufacturers and end users and come together to mutually benefit from the new innovations. There is a lot happening every day during the four days of the event.

ORME: How is Bosch Rexroth helping build localised content in the region?

TA: Localisation is very important to Bosch Rexroth. Even though we are a German company, the Middle East provides a huge customer base for us. We have drive and



Image Credit: Bosch Rexroth

Aftersales services are a crucial aspect of Rexroth's business in the Middle East, stresses Adaileh.

control academy in the region where we train and educate clients on our solutions. Our dedicated team provides in-house support to customers from the concept stage to the execution phase whenever required. We are a one-stop shop.

With a wide and good distribution network in the market, we are always available near to the customers when it comes to services and aftersales.

ORME: How are Bosch Rexroth's products unique from others?

TA: We are a 132-year old company. Bosch Rexroth is one of the first to create a hydraulic system in the world. Every year, the company spends US\$5-6bn on research and development, which means our products are hi-tech, well-engineered and of excellent quality. We were also the first ones to start the 'Factory of the Future' concept and now we are ahead of others.

ORME: Could you provide some tips and strategies for effective automation for businesses?

TA: Firstly, educate yourself on automation processes, followed by the right business strategies – meaning having a good consultation team. Then talk to the right manufacturers.

Digitalisation is the future but one concern that dissuades companies from automation is 'lay-offs'. That is not true. Automation will create jobs which did not exist before.

ORME: How is Bosch Rexroth looking for further growth in the region?

TA: By listening to the market and waiting for a demand to come on board where we can expand our offerings. Of course, we are looking to grow within the region at the same time. ■

The digital twin as a digital transformation enabler

RAFI HATTAR, VICE president Middle East at Hexagon PPM, the world's leading provider of asset life cycle solutions for design, construction and operation of industrial facilities, says that digital twin technology can have a significant impact on project performance.

"In the last two years we have created more data than during the whole existence of humanity, and even with all of it, we still don't have enough actionable information available. How can we manage the overwhelming amount of data in the context of facility operations and maintenance, to ensure that we will always have relevant, correct and up-to-date information available for everyone who needs it?"

"The answer is simple – by having full, digital access to up-to-date and actionable information. The only way to achieve this is to digitalise the existing information. The good news is that most of the time, everything you need is already there. The documentation and data needed for digital operations of a facility are often there, but probably not organised, digitised, consolidated, or centralised. A cornerstone of digital transformation and creating a centralised access to information for facility owners is an intelligent digital twin – a digital representation of the physical facility.

"At a minimum, the digital twin may simply be a set of structured data and documents that fully describe the facility configuration, but may contain more sophisticated components, like 3D visualisation, integration with operational systems, advanced analytics, and more. The goal of the digital twin is to provide a virtual representation of both the current and historic facility configuration along with related performance data.



Image Credit : Hexagon PPM

An intelligent digital twin is the cornerstone of digital transformation.

"The benefits of digital twin technology go beyond digital transformation – a digital twin will improve overall project performance by enabling consistent and standardised processes, and shorter communication cycles."

For more information about how digital twin technology can help you to digitally transform your operations and maintenance activities, please visit hexagonppm.com.

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Piezoresistive transmitters for areas at risk of explosion

SWITZERLAND-BASED KELLER AG, Europe's leading manufacturer of isolated pressure transducers and transmitters, has introduced a complete range of pressure transmitters for use in hazardous areas.

Among its latest products are the new intrinsically safe D Ei series piezoresistive OEM pressure transmitters, a new addition to its D-line range which boasts a unique combination of highly robust industrial pressure transducers and the popular I2 C interface. The new D Ei series is approved for Gas Group II

applications and can be used to measure absolute and relative pressures in zone 0.

With its modular structure, the series permits numerous combinations, making it the ideal component for customisations using an I2 C interface:

- OEM pressure transmitters for fitting directly into a system's existing drilled holes: 4 LD Ei-9 LD Ei
- OEM pressure transmitters with ultra-flexible pressure connection for screwing into existing pressure systems: 20 D Ei
- Pressure transmitters with a pressure connection and cable gland: 21 D Ei, 23 D Ei
- Level sensor for measuring the contents of a tank up to a maximum fill level of 3 m: 26 D Ei.

The OEM pressure transmitters are available in various sizes and form the basis for the other models with ultra-flexible pressure connections or level sensors for measuring the contents of a tank up to 3m.

The 21 D Ei and 23 D Ei models are pressure transmitters with metal casings and cable outlets. Each offers a different level of accuracy, dimensions, potential applications and numbers of variants. For example, the slightly cheaper 21 D Ei model has a simple cable gland to relieve strain and is suited to use in dry environments, while the 23 D Ei has a premium-quality cable gland boasting protection level IP 68, allowing it to be used underwater and making it ideally suited to use in flooded areas.

Pressure transmitters with an I2 C interface are normally only available in plastic or ceramic "consumer" housings, with only the compensatory parameters being stored in a memory. The intrinsically safe OEM transmitters from KELLER, however, have their own built-in DSP (digital signal processing) core, which balances and standardises the output values. The I2 C (inter-integrated circuit) interface is designed to connect elements directly on a circuit board. The I2 C is a bus system in that it connects multiple transmitters (slaves) to the same communication line. For instance, the intrinsically safe D-line combines a pressure interface for industrial use in tougher environments with an electrical interface for OEM applications.

The D Ei series consumes very little energy and is optimised for battery-powered applications. The total error band is just ± 0.7 per cent FS over a temperature range of -10 - 80°C . The hermetically sealed sensor electronics and the compact stainless-steel housing (optional Hastelloy C-276) are extremely resistant to environmental factors. With pressure ranges of 1 to 1,000 bar and an internal two-chip solution that keeps the pressure sensor separate from the signal processing, the D Ei series is extremely flexible.

KELLER has also introduced no less than five intrinsically safe electronic pressure gauges for use in areas subject to gas explosion risks. The type approvals are compliant with the ATEX Explosion Protection Directive regarding explosive gases. The electronic design of these devices is trimmed to minimise energy consumption, so it is also possible to replace the batteries inside areas with explosion risks.

Features that are shared by all KELLER digital pressure gauges include simple parameterisation and operation with only two buttons. The pressure display can be shown in various physical units that can be selected freely.



The D Ei series is approved for Gas Group II applications.

TIG welding with speed and ease



The new TIG welding process enables unprecedented speeds.

HIGH-QUALITY WELD seams are a key criterion for many users of TIG welding processes. But in production environments which are constantly being streamlined to achieve maximum efficiency, time also plays an important role. With ArcTig, Fronius has developed a new TIG welding process for mechanised applications, which enables unprecedented speeds.

The newly developed ArcTig welding process builds on the foundations of traditional TIG welding. Yet in contrast to conventional TIG applications, the ArcTig welding torch has a special electrode clamping system that cools the electrode right through to the tip. The resulting increase in the electrode's overall resistance ensures a high arc voltage. The electrons only leak out in a small area and with enormous density, making the arc thin and focused.

ArcTig offers several advantages, such as perfect weld seam quality and up to double the speed and efficiency thanks to a reduction in the amount of preliminary work and reworking. The focused arc allows users to weld components with a material thickness of up to 10 millimetres in just a single pass, unlike with standard TIG welding, where several weld layers are often required. Time-intensive weld seam preparation, such as U-type joint preparation, is also no longer necessary in many cases. Significantly less post-processing work is required because the weld seam is barely super-elevated and the relatively low heat input minimises distortion. The process also enables higher welding speeds, thereby saving even more time. Thanks to the lower weld seam volume, the cost of filler metal is also reduced.

Contact Fronius Middle East FZE in Dubai to find out more about the advantages and application areas of ArcTig.
www.fronius.ae

Schlumberger launches new well testing technology

SCHLUMBERGER INTRODUCED CONCERT well testing live performance technology at ADIPEC in November. The new technology brings real-time surface and downhole measurements, data analysis, and collaboration capabilities to well testing.

In the Concert performance ecosystem, all well test data are digitally integrated via wearable technology, wireless sensors, and video cameras. Robust software drives web dashboards, accessible anywhere customers specify, with separate teams able to view the same data.

“Concert performance significantly increases operational control and collaboration, providing a step-change in operational efficiency with a particular focus on safety and the environment,” said Wallace Pescarini, president, Testing Services, Schlumberger.

Extensive testing of the Concert performance technology has been conducted in Kazakhstan, Saudi Arabia and Australia. The new technology was used in testing the first development wells of a major offshore gas condensate field in Australia. Concert performance introduced new efficiencies to managing the testing spread required for the ultrahigh flow rate wells. The automated real-time data collection and communication enabled collaborative analysis that accelerated the understanding of the testing operation while significantly reducing the personnel required.



Image Credit : Schlumberger

Well test data are digitally integrated via wearable technology, wireless sensors and video cameras.

Weatherford launches Vero automated connection integrity

WEATHERFORD LAUNCHED VERO automated connection integrity at ADIPEC, which Dean Bell, president of well construction at Weatherford, describes as “the most disruptive technology to be released in the tubular running services line.”

The technology uses AI, automation and digitalisation technology to automate precise makeup and evaluation of the tubulars that are permanently installed in the well, eliminating improperly made connections that can lead to safety incidents and costly remediation. The result is secure well integrity to mitigate safety and environmental concerns, as well as cost and efficiency savings in terms of reducing wasted pipe and make-up time.

The technology has been successfully trialled in Saudi Arabia, Qatar, Azerbaijan and the North Sea.



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Decontaminating soil using bioremediation

DURING OIL AND gas exploitation in oilfields, pipelines and storage tanks often crack and contaminate soil as a result. Soil pollution with various oils or diesel fuel also happens during exploration and drilling of new wells. When replacing underground reservoirs at petrol stations, it is necessary to remove the soil around the reservoir. This soil is contaminated with gasoline and diesel fuels.

Croatian company CorteCros, part of Cortec Corporation Group, provides environmentally safe bioremediation solutions for these issues with Bionetix products.

In 2015 CorteCros started a pilot project for INA, a Croatian multinational oil company and one of the biggest oil companies in the region. The customer needed to remove all contaminated soil from the oil and gas fields as well as gas stations. The project involved soil bioremediation using Bionetix products. Based on positive results, the customer built a landfill for the treatment of contaminated soil. According to the customer's plans, 3,000-5,000 tons of soil per year need to be decontaminated using the bioremediation process. Contaminated soil was collected from oil fields and transported to the landfill. It then passed several laboratory testings.

BIOSURF and BCP 35S are products especially formulated by Bionetix for bioremediation of soil contaminated by petroleum hydrocarbons and related wastes. BIOSURF is a new biosurfactant treatment designed to help naturally clean up oil spills. It offers high dispersing power and acts as a strong biostimulant to promote hydrocarbon degradation. It is an excellent alternative to synthetic surfactants and dispersants commonly used to disperse oil slicks. Surfactants work by breaking oil apart into smaller droplets that are more accessible to natural biodegradation processes. However, their



Image credit: Cortec Corporation

BBCP35S and BIOSURF were mixed with fresh water and sprayed on the surface of the contaminated soil, which is simultaneously agitated.

safety is questioned. In contrast, BIOSURF is a non-toxic biosurfactant extracted from plants and fortified with micronutrients that speed up natural biodegradation.

Bioremediation with BIOSURF and BCP 35S with clean deep soils will also enhance natural processes, eliminate unsightly areas, reduce pollution liability and lower disposal costs.

The customer now successfully uses this procedure. The process of mixing contaminated soil and spraying with the fresh water / BBCP35S / BIOSURF mixture is repeated every 10 days. After three to five months, depending on the type of pollution (crude oil, gasoline, diesel), the soil returns to nature completely unpolluted. The bioremediation project generated a high level of satisfaction from the customer.

Pressure surge: a stitch in time saves nine

PIPELINES ARE THE safest and the most economical medium of transporting fluids long distance. Most pipelines are buried, as it provides more safety and less maintenance cost. Many international codes specify the requirement of emergency shut down (ESD) valves or control stations to ensure safe operations. The quick closing and opening of manual or automated valves in the pressurised pipeline can result in the phenomenon of pressure surge in the upstream side with cavitation or vapour formation on the downstream of the valve. In this case, a pressure wave is generated, travels along the pipeline, causes a sudden pressure peak known as a 'pressure surge' and finally results in the high magnitude of forces which can damage the pipeline and break the supports, causing catastrophic failure.

Being a consultant for pressure surge and pipe stress analysis, I have seen many instances where 'No mitigation' would have been needed if the analysis had been carried out at an early stage of the project. Most times the requirement of surge analysis pops up during 'Safety workshops' which happen during the latter half of the project. By this time pump selection and Emergency Shut down valves (ESD) selection is over and sometimes an order is placed. The pump curve, valve Cv (co-efficient of velocity) and valve closing profile play a vital role in the occurrence of the surge phenomenon. The most common mitigations of surge analysis are surge tanks, anti-surge / vacuum breaker valves, surge balancing lines etc. Most of these mitigations can be avoided by just selecting a proper pump, valve closing profile and closing time.

A common mistake is not performing a dynamic stress analysis of the pipeline if the report says 'No surge envisaged'. 'No surge' does not mean 'No force'. If the surge pressure falls below 110 per cent of design pressure then it is considered as 'No surge'. But the differential pressure due to surge still can create considerable forces on the pipe, which can call for Thrust Block. Most stress engineers generate Surge



Image credit: Protton Engineering

Gaurav Bhende, founder and director, Protton Engineering.

force as Surge Pressure x Pipe Area, which gives unrealistic forces. Even engineers, without properly analysing the soil, suggest costly Anchor blocks. A proper use of Transient software is recommended with an experienced engineer who understands both phenomena. Unfortunately we rarely get a combination of good stress engineer with knowledge of surge or vice versa.

The hundreds of thousands in costs can be saved by proper engineering at right time. So a stitch in time saves nine.

*Gaurav Bhende, founder and director, Protton Engineering.
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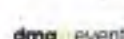
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Project Summary

Project Name	Saudi Aramco - Haradh Gas Increment Program - Freeflow Pipelines
Name of Client	SAUDI ARAMCO - Saudi Arabian Oil Company
Estimated Budget (US\$)	470,000,000
Facility Type	Flowlines
Status	Construction
Location	Haradh
Project Start	Q1-2014
Main Contractor	Q1-2019
FEED	China Petroleum Pipeline Bureau
Award Date	Q4-2017

Background

Raising gas production is key to Saudi Arabia's plan to diversify its energy mix by cutting its use of crude oil and liquids for power generation. In an initiative to meet growing domestic needs, Saudi Aramco plans to boost gas production at its Hawiyah and Haradh plants by expanding processing capacity at Hawiyah by 1.3 billion standard cubic feet per day as well as boosting production from Haradh by building gas compression plants and other facilities. Hawiyah and Haradh are part of Ghawar, the world's largest onshore oilfield. Hawiyah gas plant currently processes 2.5 billion scfd of gas.

Project Status

Date	Status
Nov 2018	CPP are currently using trenching machinery for Line 2 pipelining of the project.
Jun 2018	The project's freeflow pipeline is currently in the construction stage and is progressing as planned.
Jan 2018	Aramco has launched the works to begin on the gas pipeline from Midrikah area near Haradh to the Hawiyah gas plant.
12 Nov 2017	Aramco awards China Petroleum Pipelines a contract to construct a 450 km gas pipeline to carry 290 million scfd of gas from Haradh field to Hawiyah processing plant. Completion is expected to take place in early 2019.
Mar 2017	The pipeline package is an In-Kingdom lump sum procure-and-build contract.

Project Scope

The planned project will transport 290 million standard cubic feet per day of natural gas from Haradh field to the Hawiyah processing plant. The scope includes:

- Expansion and modifications of the Haradh area piping network and
- Construction of a new remote header
- Construction of a new valve station
- Construction of a new liquid separation station
- Tie-ins to the nearby South Haradh gas gathering manifold
- Construction of a single 36" transmission pipeline from Midrikah remote header B to the new valve station
- Two 36" transmission pipelines from the valve station to the Hawiyah gas plant.

Project Databank

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OIL, GAS AND PETROCHEMICAL PROJECTS - SAUDI ARABIA

Project	City	Facility	Budget (US\$)	Status
Aramco - Berri - Gas-Oil Separation Plant Expansion	Berri	GOSP	1,700,000,000	FEED
Aramco - Berri - Two Drilling Islands Project	Berri	Dredging/ Reclamation	150,000,000	Engineering & Procurement
Aramco - Duba - Tabuk Refined Products Pipeline	Duba	Multi Products	300,000,000	EPC ITB
Aramco - Manifa Oilfield Upgrade	Manifa	Oil Field Development	500,000,000	Construction
Aramco - Ras Tanura Pipeline	Ras Tanura	Oil	270,000,000	Construction
Farabi Petrochemicals Company - Yanbu Linear Alkyl Benzene (LAB) Plant	Yanbu	Linear Alkyl Benzene (LAB)	450,000,000	Construction
Maaden - Sabic - Mosaic - Waad Al Shamaal Phosphate City - Sulphuric Acid Plant & Power Plant (Package 4)	Ras Al Khair	Sulphuric Acid	1,500,000,000	Commissioning
Pan Asia - Jizan City for Basic & Downstream Industries - Purified Terephthalic Acid (PTA) Plant	Jizan	Petrochemical Plant	3,800,000,000	EPC ITB
Petro Rabigh Refinery & Petrochemical Complex Expansion - Phase 2 - Clean Fuel Package	Rabigh	Naptha	950,000,000	Construction
Petro Rabigh Refinery & Petrochemical Complex Expansion - Phase 2 (Overview)	Rabigh	Aromatics	5,000,000,000	Construction
Petro Rabigh Refinery & Petrochemical Complex Expansion - Phase 2 - Common Facilities (UO2) & Tank Farm Package (UO3)	Rabigh	Naptha	500,000,000	Construction
Petro Rabigh Refinery & Petrochemical Complex Expansion - Phase 2 - Vanadium Processing Plant & Caustic Soda Disposal Unit	Rabigh	Caustic Soda	220,000,000	Construction
SABIC (JUPEC) - Jubail - EO/EG III	Jubail	Ethylene Oxide	700,000,000	Engineering & Procurement
SABIC - ARAMCO - Yanbu - Crude Oil To Chemicals (COTC) Complex	Yanbu	Petrochemical Complex	20,000,000,000	FEED
Sabic - Debottlenecking and Expansion of Petrokemya Butadiene Extraction Plant	Jubail	Butadiene	450,000,000	Construction
SAGIA - Saudi Aramco - Jizan City for Basic & Downstream Industries - Port Dredging and Reclamation Package	Jizan	Port	1,400,000,000	Construction
Saudi Aramco - Yanbu to North Jeddah NGL Pipeline	Yanbu	Gas	600,000,000	Construction
Saudi Aramco - Annual Onshore Maintain Potential Program (MPP)	Red Sea	Maintenance	5,000,000,000	Construction
Saudi Aramco - Arabiyah and Hasbah Gas Field Development	Arabiyah	Gas Field	3,000,000,000	Construction
Saudi Aramco - Bapco - AB Pipeline	Abqaiq - Sitra	Oil	350,000,000	Commissioning
Saudi Aramco - Berri Offshore Pipeline	Berri	Oil	400,000,000	EPC ITB
Saudi Aramco - Duba - Bulk Plant Terminal	Duba	Oil Storage Terminal	400,000,000	EPC ITB
Saudi Aramco - Fadhili Gas Plant (Overview)	Eastern Region	Gas Treatment Plant	6,600,000,000	Construction
Saudi Aramco - Fadhili Gas Plant - Downstream Packages	Eastern Region	Gas Processing	650,000,000	Commissioning
Saudi Aramco - Fadhili Gas Plant - Main Processing Facilities (Package 1)	Eastern Region	Gas Treatment Plant	2,500,000,000	Construction
Saudi Aramco - Fadhili Gas Plant - Offsites & Utilities (Package 3)	Eastern Region	Gas Field	2,000,000,000	Construction
Saudi Aramco - Fadhili Gas Plant - Sulphur Recovery Unit SRU (Package 2)	Eastern Region	Gas Treatment Plant	2,500,000,000	Construction
Saudi Aramco - Haradh Gas Increment Program (Overview)	Haradh	Gas Compression	1,200,000,000	Construction
Saudi Aramco - Haradh Gas Increment Program - Freeflow Pipelines	Haradh	Flowlines	470,000,000	Construction
Saudi Aramco - Haradh Gas Increment Program - North Haradh Field Gas Compression Facilities	Haradh	Gas Compression	1,200,000,000	Engineering & Procurement
Saudi Aramco - Haradh Gas Increment Program - South Haradh Field Gas Compression Facilities	Haradh	Flowlines	1,200,000,000	Engineering & Procurement

Project	City	Facility	Budget (US\$)	Status
Saudi Aramco - Haradh Gas Increment Program - Satellite Gas Compression Facilities	Haradh	Gas Compression	1,200,000,000	Construction
Saudi Aramco - Hasbah Field Increment II	Hasbah	Gas Field	1,600,000,000	Construction
Saudi Aramco - Hawiyah Gas Plant Expansion	Hawiyah	Gas Processing	1,200,000,000	Engineering & Procurement
Saudi Aramco - Jizan Export Refinery (Overview)	Jizan	Petroleum Oil Refinery	2,100,000,000	Construction
Saudi Aramco - Jizan Export Refinery - Crude Distillation Unit / Vacuum Distillation Unit, Flare & Pipe Rack Complex	Jizan	Crude Oil Distillation Unit	500,000,000	Commissioning
Saudi Aramco - Jizan Export Refinery - Diesel Hydro-Treater Unit	Jizan	Diesel Hydro Desulphurisation (DHDS)	220,000,000	Construction
Saudi Aramco - Jizan Export Refinery - Hydrocracker Unit	Jizan	Hydrocracker	250,000,000	Construction
Saudi Aramco - Jizan Export Refinery - Marine Terminal Facilities	Bish	Marine Terminal	500,000,000	Commissioning
Saudi Aramco - Jizan Export Refinery - Naphtha Processing and Aromatics Complex	Jizan	Hydrotreating	1,040,000,000	Commissioning
Saudi Aramco - Jizan Export Refinery - Sour Water Stripper & Amine Regeneration Unit	Jizan	Oil Production	500,000,000	Construction
Saudi Aramco - Jizan Export Refinery - Tank Farms	Jizan	Oil Storage Tanks	1,500,000,000	Construction
Saudi Aramco - Jizan Export Refinery - Utilities Package	Jizan	Offsites & Utilities	300,000,000	Construction
Saudi Aramco - Khurais Arabian Light Crude Increment Program	Eastern Region	Oil & Gas Field	3,000,000,000	Construction
Saudi Aramco - King Salman International Complex for Maritime Industries & Services (Overview)	Ras Al Khair	Ship Yard	5,300,000,000	Construction
Saudi Aramco - King Salman International Complex for Maritime Industries & Services - Marine Works	Ras Al Khair	Dredging/ Reclamation	5,300,000,000	Construction
Saudi Aramco - King Salman International Complex for Maritime Industries & Services - Phase 2	Ras Al Khair	Port	4,000,000,000	EPC ITB
Saudi Aramco - Marjan - Gas Oil Separation Plant (GOSP)	Marjan	GOSP	5,000,000,000	Construction
Saudi Aramco - Marjan - Oil Field Expansion (Overview)	Marjan	GOSP	15,000,000,000	Construction
Saudi Aramco - Marjan Water Injection	Marjan	Water Injection	5,000,000,000	EPC ITB
Saudi Aramco - Marjan, Berri, Zuluf and Safaniyah IV Expansion - (Overview)	Various	Oil & Gas Field	7,000,000,000	Construction
Saudi Aramco - Master Gas System Expansion (MGSE) (Overview)	Various	Natural Gas Liquefaction (NGL)	4,050,000,000	Construction
Saudi Aramco - Master Gas System Expansion (MGSE) - Phase II - Package 1 - Western Region Pipeline	Western Region	Gas	830,000,000	Construction
Saudi Aramco - Master Gas System Expansion (MGSE) - Phase II - Package 3 - Eastern Region Pipeline	Eastern Region	Gas	374,000,000	Construction
Saudi Aramco - Master Gas System Expansion (MGSE) - Phase II - Package 2 - Central Region Pipeline	Central Region	Gas	367,000,000	Construction
Saudi Aramco - Offshore Maintain Potential Programme (MPP)	Various	Oil & Gas Field	7,000,000,000	Construction
Saudi Aramco - Ras Tanura Refinery - Clean Fuels Project	Ras Tanura	Aromatics	2,000,000,000	Construction
Saudi Aramco - Safaniyah Expansion	Safaniyah	Offshore Platform	1,427,000,000	Construction
Saudi Aramco - Shedgum to Yanbu Natural Gas to Liquids (NGL) Pipeline (SHY 1 Loops 4 & 5)	Shedgum	Liquefied Petroleum Gas (LPG) Pipeline	500,000,000	Construction
Saudi Aramco - Tanjib Gas Processing Plant - Marjan Increment	Eastern Region	Gas Processing	1,200,000,000	EPC ITB
Saudi Aramco - Total - Satorp - Jubail - The Amiral Complex	Jubail	Petrochemical Plant	9,000,000,000	FEED
Saudi Aramco - Unconventional Gas Program - Shale Gas Production	Various	Shale Gas	7,000,000,000	Engineering & Procurement
Saudi Aramco - Unconventional Gas Program - Tight Gas Production Systems A	Turaif	Gas Field Development	200,000,000	Construction
Saudi Aramco - Unconventional Gas Program - Tight Gas Production Systems A and B (Overview)	Turaif	Gas Field Development	3,500,000,000	Construction
Saudi Aramco - Unconventional Gas Program - Tight Gas Production Systems B	Turaif	Gas Field Development	800,000,000	Construction
Saudi Aramco - Uthmaniyah Gas Treatment Units	Uthmaniyah	Gas Network	800,000,000	Construction
Saudi Aramco - Zuluf Oilfield Expansion	Zuluf	Oil Processing Facility	1,700,000,000	Engineering & Procurement

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RIG COUNT ←

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.

Country	THIS MONTH			VARIANCE From Last Month	LAST MONTH			LAST YEAR		
	Land	OffShore	Total		Land	OffShore	Total	Land	OffShore	Total
Middle East										
ABU DHABI	39	17	56	2	37	17	54	38	14	52
DUBAI	0	2	2	0	0	2	2	0	2	2
IRAQ	60	0	60	1	59	0	59	52	0	52
JORDAN	0	0	0	0	0	0	0	0	0	0
KUWAIT	50	0	50	0	50	0	50	49	0	49
OMAN	51	0	51	-2	53	0	53	54	0	54
PAKISTAN	25	0	25	0	25	0	25	20	0	20
QATAR	4	5	9	0	4	5	9	3	5	8
SAUDI ARABIA	105	19	124	6	98	20	118	101	20	121
SUDAN	0	0	0	0	0	0	0	0	0	0
SYRIA	0	0	0	0	0	0	0	0	0	0
YEMEN	0	0	0	0	0	0	0	0	0	0
TOTAL	334	43	377	7	326	24	370	317	41	358

North Africa

ALGERIA	46	0	46	-3	49	0	49	55	0	55
EGYPT	21	4	25	2	20	3	23	20	3	23
LIBYA	7	2	9	0	7	2	9	0	1	1
TUNISIA	2	1	3	0	2	1	3	0	0	0
TOTAL	76	7	83	-1	78	6	84	75	4	79

Source: Baker Hughes

كيف يمكن لها أن تدعم سلاسل الإمداد؟

تقرير Deloitte ألقى الضوء على أربعة مجالات مهمة يمكن أن تساعد في تشكيل النقاش حول قاعدة البيانات المتسلسلة في مجال إدارة سلاسل إمداد النفط والغاز:

الشفافية: يتم تسجيل كل معاملة في قاعدة البيانات المتسلسلة في كتلة معينة ونسخ متعددة من سجل الحسابات، التي يتم توزيعها على العديد من عقد الفرع (الحواسيب)، ولذا يتعلق بأي محاولات يتم القيام بها لتعديل البيانات الموجودة في أية قاعدة بيانات متسلسلة، سوف تلاحظ عقد الفرع الأخرى أن البيانات ليست متسقة مع بياناتها الخاصة وسوف تهتملها، بهذا يمكن لقاعدة البيانات المتسلسلة أن ترفع كفاءة سلاسل الإمداد وشفافيتها، وتؤثر، على نحو إيجابي، على كل شيء بدءاً من التخزين والتسليم حتى الوصول إلى مرحلة السداد، غير أنها مع ذلك تتطلب أيضاً على بعض المشكلات، مثل توحيد البيانات بين الشركات في سلسلة الإمداد، وتخزين البيانات بطريقة فعالة من حيث التكلفة (حيث إن ذلك يمكن أن يكون مكلفاً للغاية) وحماية المعلومات المرية للشركات على أية منصة يُراد لها أن تتمتع بالشفافية، وهذه المشكلات تثير تساؤلاً حول ما إذا كان يمكن لها أن تحقق مستوى الشفافية المطلوب لتحقيق النجاح، مع ضمان أمن أكثر كفاءة لبيانات والأنظمة.

الأمن: بما أن كل كتلة مرتبطة بالكتلة التي تسبقها والكتلة التي تتبعها، فإنه لا توجد سلطة مركزية واحدة على قاعدة البيانات المتسلسلة، ما يجعلها فعالة للغاية وقابلة للقياس، وإن تخزين البيانات في أقسام مواقع متعددة، بدلاً من تركيزها في مكان واحد، يزيد احتمالية تعزيز أمن البيانات حتى بدون نظام مشفر بالكامل.

الكفاءة: سوف توفر قاعدة البيانات المتسلسلة منصة لتصنيف جميع الأصول في فئة منفردة، وسوف توفّر الجوائز بين فئات الأصول منتهية بذلك إلى تحويل النقد، ومنتجات الطاقة، وغيرها من السلع الأخرى.

استنطاق من يريد ماذا في أي وقت وكيف، وأمام هذه التناقضات، هناك اهتمام متزايد بالكيفية التي يمكن أن تحول بها قواعد البيانات المتسلسلة سلاسل إمداد النفط والغاز وصناعة الخدمات اللوجستية.

قاعدة البيانات المتسلسلة في صناعة النفط والغاز

لقد أصبحت الابتكارات التكنولوجية في الجانب الخاص بالعمليات، مثل التكسير الهيدروليكي، وعمليات الاستخراج الاهتزازية، وغيرها من عمليات الاستخراج الأخرى، هي الأمر المعتاد في صناعة النفط والغاز. ولم يتم اعتماد نفس درجة الابتكار في وظائف مكاتب العمليات المساندة، وذلك لأن الصناعة لم تستخدم عموماً الكثير من التكنولوجيا الرقمية الجديدة مع سلسلة الإمداد أو المشتريات أو الجوانب المالية من النشاط التجاري. ومن ناحية أخرى، بدأ المسؤولون التنفيذيون في قطاع النفط والغاز يبدون اهتماماً واسع النطاق بسلسلة الإمداد منذ العام الماضي، وطبقاً لتقرير Deloitte Consulting المنشور في 2016، فقد افق 50 في المائة من المسؤولين التنفيذيين في قطاع النفط والغاز على أن قاعدة البيانات المتسلسلة ضرورية للاحتفاظ بأية ميزة تنافسية، بينما أقر 45 في المائة بما قد ينتج عنها من اختلالات.

ولسد هذه الفجوة، أعلن العام الماضي عددٌ من شركات النفط والغاز، من ضمنها BP plc وRoyal Dutch Shell plc، عن إنشاء مبادلة للبتع قائمة على قاعدة البيانات المتسلسلة، ومن المتوقع أن تبدأ التجارة عبر منصة قاعدة البيانات المتسلسلة بحلول نهاية 2018. وقد تم استخدام تطبيق آخر لتكنولوجيا قاعدة البيانات المتسلسلة من جانب Diamond Offshore Drilling، التي أعلنت عن تدشين خدماتها الخاصة بالحفر بواسطة قاعدة البيانات المتسلسلة، وهو أول تطبيق لتكنولوجيا قاعدة البيانات المتسلسلة في صناعة الحفر في حقول النفط البحرية، هذه الخدمة تعمل على تحفيز الكفاءات ويمكن المشغلين في قطاع النفط والغاز من تقليل التكلفة الإجمالية للمكبنة.

إلى أصول رقمية يتم تداولها على نحو قابل للتشغيل التبادلي. كذلك يمكن الحصول على قيمة إضافية من خلال عدم تقييد النشاط في فئة أصول منفردة.

وتتمثل السبل الأخرى الثقيلة، التي يمكن من خلالها لقاعدة البيانات المتسلسلة أن تعزز كفاءة سلسلة الإمداد، في تسهيل إثبات سجلات وإشعارات الواردات/الصادرات، بما في ذلك المحفقات لوضع برنامج تعريفات مفيدة، والمساعدة على منع وقوع أخطاء بدوية وتكرار الجهود المبذولة، في أثناء معالجة الأصول.

العقود: لا شك أن الحجم الهائل للعقود والصفقات الخاصة بتنفيذ مشروعات رأسمالية في النفط والغاز تسبب - تاريخياً - في مشكلات هائلة تتعلق بالتسويات والتتبع بين المقاولين والمقاولين من الباطن والموردين، وللحد من هذه المخاطر، يمكن لقاعدة البيانات المتسلسلة العمل على إنشاء «العقد الذكي»، وهو شقيرة حاسوبية يتم استضافتها في قاعدة بيانات متسلسلة، تقوم بتحديد وتنفيذ شروط أية اتفاقية مبرمة بين طرفين، علماً بأن العقد الموحد لجميع أصحاب المصالح المشاركين في سلسلة الإمداد، يتمتع بالعديد من المزايا، مثل التحقق من شروط الاتفاقية، وشفافيتها، وتنفيذها ذاتياً، ووضوحها، والوقاية من الاحتيال، وقابلية الاتصال، ولا شك أن الاستفادة من الإثراق من قبل الغير وعن التعاقد الورقي، نتيجة لاستخدام العقود الذكية، سيقلل من التكلفة والمصاريف الإدارية بشكل أكبر.

الخلاصة

ليس هناك أي مقر من الدفعة التي أوجدتها تكنولوجيا قواعد البيانات المتسلسلة. فتطبيقات سلاسل الإمداد القائمة على قواعد البيانات المتسلسلة تنمو بالفعل في صناعات أخرى، ولا سيما بالبيع بالتجزئة والسلع الاستهلاكية، والرعاية الصحية وعلوم الحياة، والتصنيع والتكنولوجيا، والخدمات اللوجستية، بالإضافة إلى العديد من الصناعات الأخرى. ونحن بالفعل بصدد رؤية بعض الأمثلة «الآنية» للقطاعات التي تستخدم فيها قواعد البيانات المتسلسلة في صناعة النفط والغاز.



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قواعد البيانات المتسلسلة في صناعة النفط والغاز

قواعد البيانات المتسلسلة تعزز من أمن البيانات

لا شك أن تطبيقات سلاسل الإمداد، القائمة على قواعد البيانات المتسلسلة، أصبحت الآن أمراً لا غنى عنه في العديد من الصناعات؛ مثل البيع بالتجزئة والسلع الاستهلاكية، والتصنيع والتكنولوجيا، وغيرها من الصناعات الأخرى. وفي هذا المقال يناقش كل من لورا براونهيل وإيدن سكوت كيف يمكن لقواعد البيانات المتسلسلة أن تسهل أيضاً إدارة سلاسل الإمداد في صناعة النفط والغاز.

المققات والتشارك في المعلومات، ونتيجة لذلك، يتم تشارك التكنولوجيا، وقوائم البريد، والعقود والمدفوعات، وغير ذلك من البيانات الأخرى، بشكل مباشر بين الأطراف المعنية من خلال روابط مشفرة.

وفيما يتعلق بصناعة النفط والغاز، يمكن لتبادل السلع عبر قاعدة البيانات المتسلسلة أن يدعم تجارة النفط والغاز بين الأطراف المعنية مباشرة وفي أي مكان في العالم، مع الاستغناء عن دور البنوك، أو شركات السمرة، أو أية جهات وسيطة أخرى.

ونظراً لتعدد سلاسل الإمداد الحالية والنقص الهائل في شفافتها، يصعب للغاية على العملاء أو المشترين أن يعرفوا القيمة الحقيقية. وبالمثل، يصعب للغاية تقصي سلاسل الإمداد عند الشراء في وقوع أية ممارسات غير مشروعة أو غير أخلاقية. كما أنها يمكن أيضاً أن تكون غير فعالة، وذلك لأن البائعين والموردين يحاولون

بمكس معدل هو مريكياً مقداره ٨٧ في المائة، ومع النمو الهائل المتوقع حدوثه خلال السنوات القليلة المقبلة، من الأهمية بمكان فهم الكيفية التي ستشوش بها هذه التكنولوجيا على سلاسل الإمداد، ولا سيما في صناعة النفط والغاز.

ما هي قاعدة البيانات المتسلسلة؟

على الرغم من أن الاستخدام الأكثر شهرة لقواعد البيانات المتسلسلة هو مع العملات المشفرة، فإن الواقع يقيد بأن قاعدة البيانات المتسلسلة، التي هي بشكل أساسي سجل حسابات رقمي موزع، لها تطبيقات عديدة، ويمكن استخدامها في أية عملية تبادل، مثل الاتفاقيات/العقود، والتبعية، بالإضافة طبعاً إلى السداد. وقاعدة البيانات المتسلسلة هي قاعدة بيانات مشتركة تُعني عن وظيفة الأطراف الثالثة في إجراءات

التكامل الرقمي بين سلاسل الإمداد بزوداً ديناميكية مع مرور الوقت، ومع استمرار تطور قواعد البيانات المتسلسلة من مرحلة الاختبارات التجريبية إلى مرحلة المنصات الواقعية في ٢٠١٨، يصبح من المقرر أن تشهد إدارة سلاسل الإمداد تحولاً كلياً بواسطة تكنولوجيا سجلات الحسابات الموزعة هذه. ويجري بالفعل بذل الجهود في هذا الاتجاه؛ مثل المشروع المشترك بين IBM وMaersk الذي يهدف إلى استخدام نظام الشحن الإلكتروني القائم على قواعد البيانات المتسلسلة، والذي سوف يضيف طباعاً رقمياً على سلاسل الإمداد، وينتج الشحن الدولي في الزمن الحقيقي.

ووفقاً للدراسات الحديثة، من المتوقع للسوق العالمية لسلاسل الإمداد، والقائمة على قواعد البيانات المتسلسلة، أن تنمو من ١٤٥ مليون دولار أمريكي في ٢٠١٨، إلى ٣.٣٦ مليار دولار أمريكي في ٢٠٢٣، ما

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