

Eni Embarks On Next Cycle Of Exploration Campaign

Eni is starting a new chapter in its exploration strategy, targeting 2 Bboe of new equity resources with plans to drill about 115 wells in more than 25 countries through 2021.

The goal would build on the Italian major’s integrated development model that features an accelerated time to market along with low operating and production costs.

“During the downturn we not only succeeded in finding 4.4 billion barrels, but we have also been able to increase in an impressive way our exploration net acreage, which now stands at 400,000 sq km [154,441 sq miles], almost three times the level of 2013,” Eni CEO Claudio Descalzi said during a presentation on the company’s 2018–2021 strategy. “We are now ready to start a new cycle of this exploration campaign.”

The company’s strategy will still be focused on conventional plays, mainly those offshore Mexico, West and East Africa, East Mediterranean Sea and the Far East, he said, adding that the company is already familiar with the geology, contractual structure, operations and fiscal terms of these areas. Emphasis will be on exploration prospects with a “short time to market, low development operating costs and high cash flow generation.”

Eni plans to dole out about \$1.1 billion annually on the effort.

The renewed focus comes as the oil and gas industry rebounds from a crippling downturn that slowed activity and spending, especially for exploration. But it also shed light on better ways of operating and lowering costs, while providing opportunities to pick up acreage as companies streamlined portfolios.



Eni CEO Claudio Descalzi presents the company’s 2018–2021 strategy on March 16. (Source: Eni)

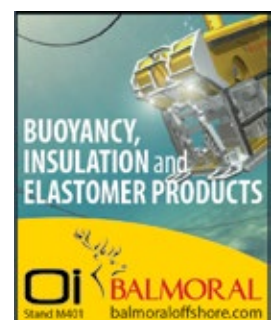
The company has celebrated some major exploration successes in recent years. These have included the large Zohr gas discovery offshore Egypt in the Mediterranean Sea. The field, which started production in December 2017, has an about 850 Bcm (30 Tcf) of gas in place.

Phase 1 for Zohr, which Eni said it would invest about \$4 billion as reported by Reuters, included drilling four wells. Plans are for 20 wells to be drilled at Zohr by year-end 2019. The field is expected to produce between 70.8 MMcm and 85 MMcm (2.5 Bcf/d and 3 Bcf) of gas when it reaches peak production in 2019.

Work on Phase 2 is underway with Baker Hughes, a GE company, having landed a contract in September for project management, engineering, procurement, fabrication, construction, testing and transportation of a subsea production system.

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Eni recently farmed out 10% of the Zohr joint venture (JV) to Mubadala. The JV now comprises operator Eni (50%), Rosneft (30%), BP (10%) and Mubadala (10%).

The company also has experienced success offshore Mozambique, where it leads the Coral floating LNG project and upstream operations in Area 4 with Exxon-Mobil and CNPC. The company aims to produce up to 141.6 Bcm (5 Tcf) of gas at Coral South with startup anticipated in mid-2022.

Eni sees an array of exploration opportunities that span the globe. These include the North Slope and offshore Mexico in North America; the Barents Sea; the Porcupine Basin offshore Ireland; Africa’s Transform Margin and the Lower Congo Basin, Durban, Angoche and Lamu basins; and the Transform Margin and areas offshore Morocco, Egypt and Oman.

More opportunities could be in store farther east in Myanmar, Vietnam and East Kalimantan.

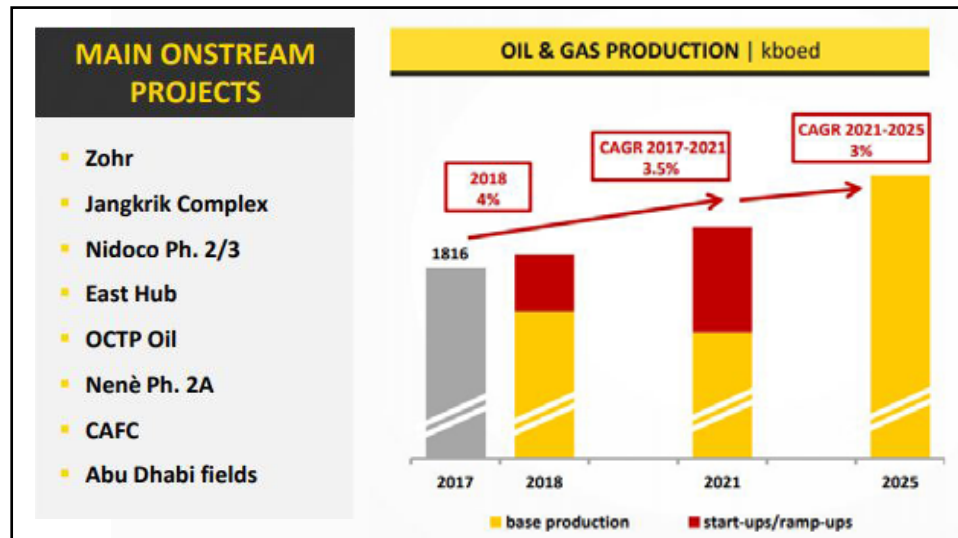
Eni also is working with ExxonMobil on LNG development at the Mamba Field, which Eni said involves drilling 16 subsea wells

and construction of two onshore LNG trains.

But as the company searches for more hydrocarbon resources, it plans to drive production growth with new project startups and ramp-ups, which Descalzi said will account for about 700,000 bbl/d by 2021 and another 200,000 bbl/d of production optimization.

“We will deliver a production growth of 3.5% per year up to 2021. In 2018 we have raised our regional guidance after the conclusion of the Abu Dhabi deals to 4% including the effect of 10% of Zohr’s disposal,” Descalzi said. “All of our growth will come from projects already sanctioned or that will reach FID this year. We will deliver 15 major startups and will operate around 80% of our production.”

Four projects are scheduled for startup this year—Offshore Cape Three Points gas project offshore Ghana, West Hub-Ochigufu (started production in March offshore Angola), Bahr Essalam Phase 2 in the Mediterranean offshore Libya and Wafa Compression (Libya).



(Source: Eni)

“Even more remarkable is that most of these projects come from our exploration portfolio in the last five years and, thanks to our integrated model of development, we start out production with a very competitive time to market,” he added.

—Velda Addison

DEVELOPMENT

Ophir Energy Focuses On Bualuang-IV Development Plan

Ophir Energy has lined up Phase 4 of its development plan for the Bualuang oil field in Block B8/38 in the Gulf of Thailand with plans to drill development wells and install a new platform and associated offshore structures by 2019.

An infill drilling program will kick off the plan’s launch in second-half 2018 followed by installation of a 12-well slot platform in first-half 2019. This phase, set to run from 2018 to 2020, of the development is expected to cost about \$138 million.

“The initial phase has five well activities planned for 2018 from the existing Alpha and Bravo platform, comprising three re-drills using existing slots and two well

workovers,” Ophir Energy CEO Nick Cooper said in an operational update.

The operator intends to install the new 12-well slot platform near the Bravo platform, drill up to 14 new development wells and expand the water disposal capacity on the Bravo platform in 2019.

“We are planning to add an additional 12 well slots with the installation of the Charlie platform, a wellhead structure, bridge-linked to our existing Alpha and Bravo production platforms,” he added.

The plan includes laying a subsea pipeline from the proposed Charlie platform to the existing offshore production facilities, which include the Alpha (BLWPA) and



(Source: Ophir Energy)

Bravo (BLWPB) platforms, and the *Rubicon Vantage* FPSO. The produced liquid from the new wells will be transported to the FPSO for processing and storage until the oil can be offloaded onto a tanker.

Cooper said Ophir identified several prospects in the northern part of the Bualuang Field. “In light of the 2017 infill drilling and the addition of production from the deeper T2 reservoir interval, Ophir is looking at several near-field prospects with possible drilling in 2018. We have also identified a new satellite exploration target, which we are analyzing for potential drilling in 2018.”

The Phase 4 development plan aims to extract identified oil reserves of about 9.9 MMbbl located in the Miocene sandstones of the field, according to the company.

The Bualuang oil field consists of two distinct but related structures: the Main Fault Block and the East Ter-

race. Wells drilled in the central and northern culmination of the East Terrace indicated the presence of significant oil reserves.

The B8/38-9 exploration well, drilled in the northern culmination of East Terrace, found more than 43 m (141 ft) of oil pay in seven stacked sandstone reservoirs in the Miocene T4 and T5 intervals, with pressure data indicating a 14-m (46-ft) column in the key T4.1 reservoir. An exploration well in the Main Fault block encountered oil in the younger T5.2 sand.

Reservoirs in Bualuang Field have different parameters even though they were all deposited in fluvial settings. However, some of them have water at the bottom, and water breakthrough and water coning are considered to be the potential production issues.

The field is estimated to have remaining oil reserves of 28.3 MMbbl of 2P and 10.3 MMbbl of 2C even after the extraction of about 30 MMbbl from the start of production in August 2008.

The operator drilled more than 60 exploration and development wells and constructed two interconnected wellhead platforms, an FPSO, one product and one effluent pipeline in the field during the first three phases of development. The FPSO has a crude oil storage capacity of 570,000 bbl and processing capacity of 24,000 bbl.

However, crude oil production from the field has been decreasing for the last few years. The field produces about 8,300 boe/d, down from 8,700 boe/d in 2016 and 12,300 boe/d in 2013.

The Bualuang oil field, spread over an area of 376.56 sq km (145.39 sq miles), is located in Block B8/38 in the Western Basin of Gulf of Thailand in a water depth of about 60 m (197 ft).

Ophir Energy holds a 100% participating interest in the block.

—Ravi Prasad

Mubadala Advances \$1 Billion Malaysia Pegaga Gas Field Project

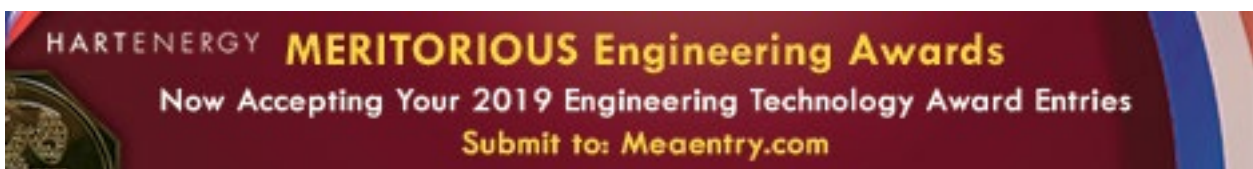
Mubadala Petroleum, Petronas and Royal Dutch Shell will spend more than \$1 billion to develop Malaysia's Pegaga gas field, aiming to produce gas by the third quarter of 2021, Abu Dhabi-based Mubadala said March 21.

The project in Block SK320, located in the Central Luconia province, offshore the East Malaysian state of Sarawak, will proceed to the construction and installation stage, the company said in a statement.

Mubadala is the operator of the block with a 55% share with Petronas Carigali (25%) and Sarawak Shell (20%).

The Pegaga gas field would be the first development in Malaysia for Mubadala Petroleum, which is fully owned by Abu Dhabi-based state fund Mubadala Investment Co. that holds assets worth over \$125 billion.

The company plans to build an Integrated Central Processing Platform consisting of an eight-legged jacket designed for natural gas throughput of 15.6 MMcm/d



(550 MMcf/d) plus condensate to be located in water depths of about 108 m (354 ft), Mubadala said.

The output will be sent through a new 38-in. subsea pipeline tying into an existing offshore network and subsequently to the onshore Malaysia LNG plant in Bintulu, the company said.

Separately, Sapura Energy Bhd, Malaysia's largest oil and gas services company, said it won the contract from

Mubadala Petroleum to undertake the engineering, procurement, construction, installation and commissioning works for the Pegaga gas field.

Sapura has won contracts worth nearly \$765.11 million so far this year, including the Pegaga gas field, the company said in a statement.

—Reuters

DEVELOPMENT BRIEFS

Eni Cranks Up Ochigufu Deepwater Project Offshore Angola



Wells in the Ochigufu Field offshore Angola are tied to the N'Goma FPSO. (Source: SBM Offshore)

Eni has marked its first project startup of the year with the deepwater Ochigufu oil project coming online offshore Angola.

Located in Block 15/06 in a water depth of 1,300 m (4,265 ft), wells in the field are connected to the Sangos production system and tied to the N'Goma FPSO. Production at Ochigufu, part of the West Hub development project, is expected to reach 25,000 bbl/d.

Eni, the operator with a 36.84% stake, said the company has discovered more than 3 Bbbl of oil in place and 850 MMbbl of reserves offshore Angola.

"These discoveries were then developed quickly and efficiently, with the sequential startup of the Sangos Field in 2014, Cinguvu in 2015, Mpungi and Mpungi North in 2016, East Hub in 2017 and now Ochigufu," Eni said in a statement.

The operator is working toward the start of production from the UM8 reservoir and the Mpungi Field's subsea boosting system, expected later this year in the East Hub. If all goes as planned, this will be followed in early 2019 with the start of production at the West Hub's Vandumbu Field. Ochigufu

was discovered by Eni in 2014 when the Ochigufu 1 NFW well hit 47 m (154 ft) of net oil pay in the Low Miocene and Oligocene sandstones.

Eni is the operator of Ochigufu with partners Sonangol (36.84%) and SSI Fifteen Ltd. (26.32%).

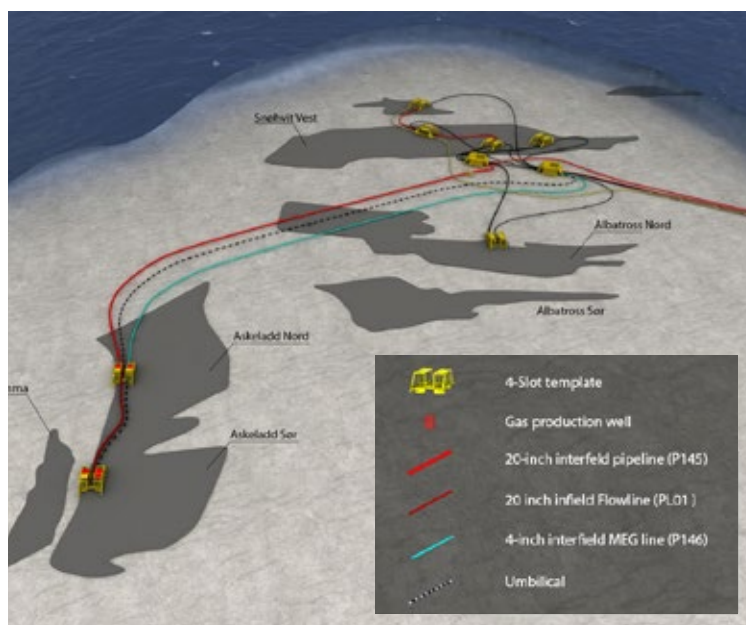
Statoil Moves Forward With Askeladd Development

Statoil and partners are moving forward with the Askeladd development, opting to invest more than \$647.3 million.

The project is part of the Snøhvit project in the Barents Sea that will provide feedstock for the Hammerfest LNG plant.

Askeladd is expected to pave the way toward 21 Bcm (742 Bcf) of gas and 2 MMcm (71 MMcf) of condensate for the LNG plant, according to Statoil. The field is located about 40 km (25 miles) away from the Snøhvit Field in about 250 m (820 ft) of water.

Plans call for the development of three wells via two subsea templates. Each template has four well slots. New infrastructure will be added to tie-in Askeladd to the existing Snøhvit infrastructure, Statoil said in a news release.



(Source: Statoil)

“Askeladd will help maintain a plateau production rate at the Hammerfest LNG plant until 2023 and is a profitable investment that will help secure jobs and ripple effects in the region,” Torger Rød, Statoil’s senior vice president for project development, said in the release.

Earlier this year, Statoil said it had awarded engineering, procurement and construction contracts for delivery of subsea production systems and services to Aker Solutions. The company said it plans to award more contracts in the upcoming months.

Askeladd is expected to go onstream after 2020, Statoil said.

Partners are operator Statoil (36.79%), Petoro (30%), Total (18.40%), Neptune Energy Norge (12%) and DEA Norge (2.81%).

BP Awards McDermott, BHGE Subsea Contracts For West African Project

McDermott International Inc. and Baker Hughes, a GE company (BHGE), will provide FEED studies in advance of a substantial engineering, procurement, construction and installation (EPCI) contract for BP’s Tortue/Ahmeyim field development, the companies said.

The gas project is located on the maritime border of Mauritania and Senegal.

During this initial engineering phase, McDermott will work on defining the subsea umbilicals, risers and flow-lines scope for the project, while BHGE will focus on the subsea production system scope.

The FEED is scheduled to begin and be completed this year. The agreement contains a mechanism to allow transition of the contract to a lump sum EPCI contract at a later date. McDermott will work jointly with BHGE to provide an optimized, integrated solution.

McDermott expects to use the project life-cycle management module from its new digital platform Gemini XD to deliver advanced technology through project

execution and the development of a digital twin of the complete system.

The project also will benefit from BHGE’s RealTrack digital collaboration tool, which provides live, real-time reporting of schedule progress, document status and issues management for more efficient project execution.

Teams from McDermott and BHGE will perform the project management and FEED work from McDermott’s Epsom facility in the U.K.

ADNOC Awards Total Stakes In Two Offshore Concessions

On March 18 Abu Dhabi National Oil Co. (ADNOC) said it signed 40-year agreements with Total, awarding the company a 20% stake in the Umm Shaif and Nasr concession and a 5% interest in the Lower Zakum concession.

Total has contributed a participation fee of \$1.15 billion for the Umm Shaif and Nasr concession and a fee of \$300 million for the Lower Zakum concession, ADNOC said in a statement.

The agreements were signed by Sultan al Jaber, group chief executive of ADNOC, and Patrick Pouyanne, chairman and CEO of Total. The agreements are backdated to March 9, ADNOC said.

BP Selects Kongsberg For Mad Dog Phase 2 Dynamic Simulator

Kongsberg Digital has landed a contract to design, engineer, build, install and perform acceptance testing of a digital twin for the BP-operated Mad Dog Phase 2 project in the U.S. Gulf of Mexico, according to a news release.

The model will cover all of the project’s oil and gas and subsea systems. This includes producing wells for water and gas injection, gas dehydration and regeneration, flare systems including systems for flare gas recovery,

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First Oil
November
2014

Jack/St. Malo
First Oil
December
2014

Lucius First Oil
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The simulator for the BP Mad Dog Phase 2 development will use Kongsberg's K-Spice and LedFlow software. (Source: BP)

fuel gas, produced water and seawater, heating and cooling medium, and identified critical chemical injection systems, Kongsberg said in a news release.

Plans are for the digital twin models to be connected to the Mad Dog 2 facility-integrated control and safety systems "to create a realistic simulation environment that will deliver vital decision support for optimizing production efficiency," Kongsberg said. "Applications of the simulator will include engineering studies, validation of process design, procedure validation, control system verification and operator training."

The company will use its dynamic process modeling software, K-Spice, and transient multiphase flow software, LedaFlow, for the project.

The simulator is scheduled for delivery at least one year before first oil, according to the release.

Woodside Petroleum To Get Control Of Scarborough Gas Field

Oil and gas producer Woodside Petroleum said BHP Billiton has agreed to the sale of ExxonMobil Corp.'s 50% interest in Scarborough, making it the operator of the remote, deepwater gas field off the Western Australian coast.

In February Woodside agreed to pay \$744 million for ExxonMobil's 50% stake in the project that has been stuck on the drawing board for nearly 40 years.

Subsea 7 Wins Contract For Work Offshore Azerbaijan

BP Exploration has selected Subsea 7 to provide subsea inspection, repair and maintenance services for the company's Azeri-Chirag-Gunashli and Shah Deniz fields offshore Azerbaijan, according to a news release.

While the value of the five-year contract was not given, Subsea 7 called the award a substantial contract, meaning it has a value between \$150 million and \$300 million.

The work scope comprises the provision of a Life of Field support vessel, along with ROVs, supported by a Baku, Azerbaijan-based onshore project management and engineering team with assistance from Subsea 7's i-Tech Services operations center, the release stated. Services were scheduled to start in March.

Wood Lands Three Contracts For Projects Offshore Senegal

Woodside has tapped Wood to carry out subsea and flow assurance studies relating to the proposed SNE Field development offshore Senegal.

The contracts cover three concept definition studies:

- A targeted flow assurance study to ensure robust and safe design;
- An engineering assessment to demonstrate the feasibility of a riser and umbilical system at potential FPSO facilities; and
- A subsea flowlines study, according to a Wood news release.

The deepwater SNE Field is located in the Rufisque, Sangomar and Sangomar Deep Offshore blocks.

Statoil Becomes Operator Of Martin Linge Field, Garantiana Discovery

Statoil and Total have completed a transaction that sees Statoil acquire Total's equity stakes in and take operatorships of the Martin Linge Field and the Garantiana discovery on the Norwegian Continental Shelf.

Statoil now has a 70% interest in Martin Linge and 40% in Garantiana. More than 120 employees from Total have been transferred to Statoil in accordance with the sale and purchase agreement and applicable legislation.

—Staff & Reuters Reports

EXPLORATION

Europa Sees Irish Inishkea Fast-track Potential

Europa Oil & Gas is keen to fast-track technical work on the Inishkea prospects in leasing option 16/20 offshore

Ireland with the operator looking to identify a target for an exploration well in 2020.

than 8,000 sq km (3,089 sq miles) in Brazil's deepwater presalt Santos Basin.

Called Santos VIII, the survey is part of CGG's ongoing presalt program that aims to deliver "ultra-modern seismic data, enabling exploration companies to better evaluate presalt opportunities in advance of Brazil's presalt licensing rounds," the company said in a news release.

The survey area is adjacent to the Peroba, Pau Brasil and Boumerangue fields.

CGG said it plans to image the resulting BroadSeis data with its advanced full-waveform inversion technology at its Rio de Janeiro Subsurface Imaging Center and merge it with the Constellation reprocessing project to provide a regional broadband image of the basin.

Fast-track products will be available in fourth-quarter 2018 with final products available in second-quarter 2019.

ION Takes On 3-D Reimaging Program Offshore Australia

ION Geophysical Corp. will carry out a 3-D multiclient broadband reimaging program offshore Australia that spans about 17,000 sq km (6,564 sq miles).

The survey, which ION said will integrate and reimage data from 15 vintage surveys using modern depth imaging, covers the northern part of the Vulcan sub-basin offshore northwest Australia. ION noted the area is known for complex imaging challenges, something the company hopes to ease with its reimaging program that utilizes broadband processing and general moveout tomography.

"This cost-effective reimaging will help de-risk future exploration in this complex area at a fraction of the cost of acquiring new data," ION said in the release. "There are a number of existing fields and discoveries as well as available acreage in upcoming license rounds within the boundary of the North Vulcan 3-D multiclient reimaging program."

—Staff Reports

TECHNOLOGY

Oil, Gas Sector Moves Toward New Subsea Reality

Norwegian oil and gas firm Statoil coined the phrase "subsea factory" in 2012 and set out a vision to build such a system by 2020.

The goal is to enable longer step-outs in deeper and harsher environments. While the operator has been less vocal about the concept in recent years, the subsea factory concept has been put in motion and is driving new subsea technologies in Norway.

A significant step toward the subsea factory was made in 2015 with the launch of Statoil's Åsgard subsea compression station offshore Norway. International conglomerates such as ABB, Siemens and Baker Hughes, a GE Company, are developing the subsea power infrastructure to support the subsea factory. But there's a host of smaller Norway-based technology firms developing other subsea factory building blocks. These include subsea separation, water injection, the subsea Internet of Things (IoT) and resident subsea robotics.

Seafloor separation and subsea water injection are yet to be deployed on a permanent basis. Trondheim-based Seabed Separation is looking to provide a seafloor separation solution with its Dual Pipe Separator. Unlike conventional retention time separators, it separates the stream under flowing conditions without the pressure losses seen in a conventional system by using a set of fixed size, small separator pipes, the number of which can be varied



The full-scale and fully tested Dual Pipe Separator system separates the stream under flowing conditions without the pressure losses seen in a conventional system. (Source: Seabed Separation)

according to capacity requirements. This means it's smaller, lighter and more flexible than a conventional separator.

Removing produced water at the seabed would have a similar impact to boosting, according to Norwegian analysts Rystad. And the closer the system is to the wellbore, the more efficient the system will be, Seabed Separation CEO Asle Jostein Hovda said.

Seabed Separation has received support from Lundin, Wintershall and Aker BP as well as public funding to commercialize the concept. A full-scale pilot was successfully tested at Statoil's Porsgrunn (or P-Lab) test facility near Oslo in 2017 using fluids from Statoil's Troll Field at 30 bar with variable water cut and flow velocities. Seabed Separation has been working with Subsea 7 on project

proposals, and it is looking to carry out onshore trials in either North America or the Middle East this year.

Seabox, developed by a Norwegian firm of the same name, which NOV acquired in 2015, could offer a solution for subsea seawater injection.

In February NOV signed its first contract for the Seabox subsea water treatment system. A major operator plans to deploy the system in the third quarter of 2018 for an extended offshore test. Seabox provides water treatment and then injection at the seabed, allowing operators to optimize waterflooding and improve oil recovery without the need to transport the fluids topside for treatment and reducing flowline and topside equipment requirements.

To connect, monitor and control these systems, easySubsea is creating easyComm, a subsea wireless network, working with Norway's Odda Technology and Odda Digital Systems. "It's going to be the introduction of IoT under water," said Márcio de Alencar, managing director of easySubsea, which is the Norwegian arm of a Brazilian technology spinoff.

The project will develop a data acquisition and communication platform capable of performing the monitoring and control of subsea sensors and electrical actuators via a wireless subsea communication system. This will comprise two units: a data acquisition, conditioning and transmission/reception module for electrical sensors and actuators that will attach to the subsea christmas tree, subsea control module or manifold, and another module that will sit on the seafloor under the host platform. The

latter module is connected via an umbilical, acting as a connection hub.

Both modules couple to equipment that performs the wireless connection—a hydroacoustic modem or a laser modem. Power would be supplied by an interchangeable battery pack that would be changed by an ROV during well intervention to ensure continuous system functioning.

Just as using Seabox would reduce equipment requirements, easySubsea said its system would reduce capex and opex by making electro-hydraulic umbilicals obsolete.

Subsea power and communications infrastructure also could host resident subsea vehicles to monitor and maintain subsea equipment. Statoil is supporting projects to achieve this aim, including IKM Subsea's RROV (resident ROV). The RROV is a "permanently seabed installed" ROV controlled from onshore. IKM, based south of Stavanger, is using a Merlin UCV (ultracompact vehicle) for an extended test, which had reached 50 continuous days of deployment in early March at 345 m (1,132 ft) water depth at Statoil's Snorre B platform.

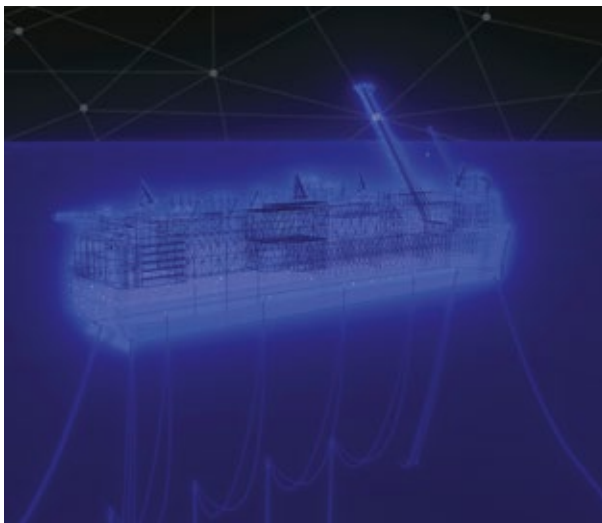
More futuristic maintenance concepts also are being developed. Trondheim's Eelume has developed a snake-shaped underwater robot, without a tether, for subsea inspection tasks. The firm also has support from Statoil and Kongsberg Maritime.

The concept of the subsea factory is advancing with new technologies. Some may not be ready for Statoil's 2020 vision, but the move toward an electrified subsea factory is underway.

—*Elaine Maslin*

TECHNOLOGY BRIEFS

BMT Releases Interactive Asset Data Platform



BMT Deep is an interactive asset data platform that was designed by offshore marine professionals for use by offshore marine professionals. (Source: BMT)

BMT has released BMT Deep, an advanced interactive asset data platform that stores, manages, integrates, post-processes and visualizes vast datasets for offshore assets, the company said in a news release.

Designed by offshore marine professionals, BMT described the platform as "interactive, intuitive and facilitates the exploration of data—from multiple sensor time series to post-processed and statistical data, from a single asset or a fleet, throughout its operational history."

Data are stored, managed and processed in the secure environment provided by BMT, according to the release.

"Using AI [artificial intelligence] and machine learning, we have been able to build advanced models that reinforce the platform's capabilities," Soma Maroju, product development lead for BMT Deep, said in the release. "Couple this with our extensive global network of in-house naval architects, ocean engineers, data scientists and metocean consultants, we can deliver a robust platform that improves the design, operability and integrity of offshore assets."

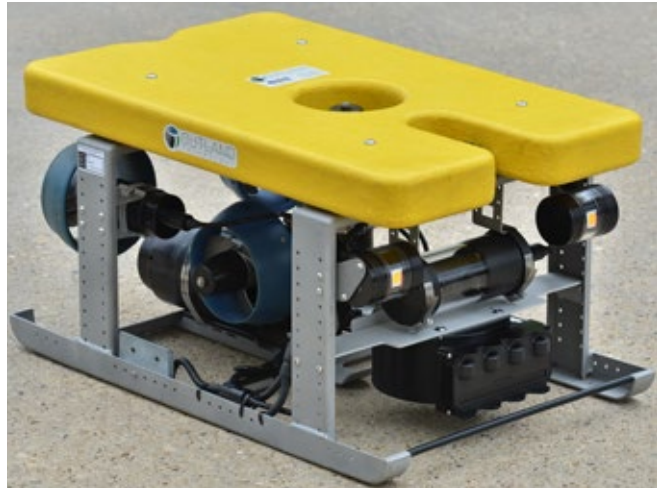
Kongsberg Develops New Sonar For Small Observation Class ROVs

Kongsberg Mesotech has released multibeam sonar technology designed for small observation class ROVs.

Called Flexview, the sonar provides distortion-free images at a range of up to 200 m (656 ft) over a 140-degree sector, reducing the time it takes to search for and locate targets, Kongsberg said in a news release.

“The Flexview’s removable transducer is the first of its kind, offering field replacement of a damaged transducer in the unlikely event of a catastrophic impact,” the company said. “It also allows potential new transducer configurations to be exchanged in the future, depending on the job being performed.”

—*Staff Reports*



The Flexview multibeam sonar features a removable transducer. (Source: Kongsberg)

FLOATERS

Golar’s Floating LNG In Cameroon May Draw More Africa Clients

Golar LNG said it started production at its floating LNG (FLNG) platform in Cameroon, the world’s second working example of the nascent technology and a milestone likely to boost its Fortuna project in Equatorial Guinea.

As the cost of land-based LNG plants more than tripled in the decade to 2013, Golar pioneered the conversion of aging LNG tankers into giant refrigerators capable of chilling gas into its liquid form at -162 C (-259.6 F).

Natural gas when liquefied can be shipped and sold around the world on tankers like oil.

By starting up the pilot floating plant in Cameroon, Golar is removing uncertainty about the risks associated with squeezing equipment into a fraction of the space occupied by an LNG plant on land, shipping analysts and industry sources said.

Success in Cameroon could speed up Golar’s progress in Equatorial Guinea, where a final investment decision (FID) on Fortuna FLNG was delayed after three Chinese banks pulled out last year.

Other projects in Africa also could adopt the technology, such as BP’s plans in Senegal and Mauritania, analysts said.

All of the 1.2 million tonnes of annual output from the Cameroon project, the Hilli Episeyo, has been sold to Gazprom’s trading arm for eight years.

The first cargo would be exported in early April using the *Galicia Spirit* LNG tanker, which Gazprom Market-

ing & Trading has moored off Cameroon, several shipping sources said.

The trader was chartering a second vessel, the sources said.

Golar LNG gave no indication of when the *Hilli* would begin exports. It faces a penalty fee for every day delayed beyond late April. One analyst said the deadline was April 24.

Golar could not immediately be reached for comment.

First LNG deliveries were initially targeted for the second half of 2017.

Golar’s project in Equatorial Guinea, involving oil services firm Schlumberger and Ophir Energy, was dealt a blow last year when Chinese banks offering \$1.2 billion pulled out, delaying the decision to proceed.

Chinese banks’ appetite for financing FLNG import terminal and FLNG investments has waned in response to recent poor returns and delays, according to one market source.

Ophir aims to take its FID on Fortuna FLNG in the first half of this year, with the help of financing from a new Asian bank.

The sources said the success of the Cameroon project was one of several factors that would determine whether the Asian bank supported the Equatorial Guinea project.

—*Reuters*

FLOATER BRIEFS

RockRose Mulls *Bleo Holm* Options

Offshore the U.K., RockRose Energy is considering whether the *Bleo Holm* FPSO, which is producing for the Ross and Blake fields in the U.K. North Sea, should be replaced or have its life extended.

RockRose has commissioned two reports, one to evaluate the potential of the Blake Field and Tain discovery, and another one to review the FPSO options on the Blake and Ross fields.

RockRose has hired ERC Equipoise to evaluate both the existing upside potential within the Blake Field (30.82%) and the nearby Tain satellite discovery (50%), with a view to a final investment decision (FID) on the Tain development.

The Blake Field lies 12 km (7 miles) northeast of the Ross Field and has been producing since 2001. Repsol Sinopec is the operator of the field.

Oil from the Blake Field is produced via a subsea manifold and dual flowlines to the *Ross* FPSO.

RockRose has also commissioned an independent report from Crondall Energy to review the FPSO options on the Blake and Ross fields.

The operator entered all three fields in December 2017 via an acquisition of Idemitsu Petroleum UK and its assets in the U.K. North Sea, which include the Ross, Blake, Tain, Nelson, Howe, Balmoral, Stirling, Beaully, Burghley and Galley fields operated by Shell, Premier and Repsol.

TMC Secures FPSO Compressor Job

Oslo-based TMC Compressors of the Seas will supply the marine compressed air system for SBM Offshore's FPSO destined for ExxonMobil's Liza project in Guyana, the company said on March 19.

The vessel, formerly the Bahamas-flagged *Tina* very large crude carrier, is undergoing conversion at Kepel's shipyard in Singapore. It is designed for a capacity of 120,000 bbl/d of oil along with associated gas treatment capacity of about 4.8 MMcm/d (170 MMcf/d).

No dollar amount was provided for the contract, which involves a large compressed air system that includes 3 x 400 kW frequency-controlled instrument air compressors; 2 x 86 kW feed air compressors; and associated air dryers and filters.

SBM Offshore will construct, install, lease and operate the FPSO.

"This will be a big FPSO, with a maximum storage capacity said to be 1.6 million barrels of crude oil, so it requires some major compressor power, which we are extremely happy to deliver," said Hans Petter Tanum, TMC's director of sales and business development.

MISC Berhad Enters Thai Oil And Gas Sector



FSO Benchamas 2 will be used to develop resources from the Benchamas Field in the Gulf of Thailand. (Source: MISC Berhad)

The on-time completion of *FSO Benchamas 2* after 2.2 million man-hours marked the entrance of MISC Berhad into Thailand's offshore oil and gas sector. It also marked MISC's first partnership with Chevron Offshore (Thailand) Ltd. (COTL).

MISC, an energy-related maritime solutions and services provider, named the new facility on March 20. The FPSO will be deployed to develop the Benchamas Field in the Gulf of Thailand.

The contract for lease and operations was finalized in August 2016, and work began in early 2017. *FSO Benchamas 2* has a storage capacity of 650,000 bbl and a 12-year design life without dry-docking.

"*FSO Benchamas 2* is a significant achievement for MISC, being our first collaboration with Chevron in the offshore segment," said Yee Yang Chien, MISC's president and group CEO. "We are honored for the trust and opportunity given to MISC for us to work together with COTL toward the development and sustainability of Thailand's oil and gas sector."

Chien added that MISC will pursue other opportunities in the region's oil and gas industry.

—Staff Reports

VESSELS

Petrobras PLSV Fleet May Be Reduced For First Time In Five Years

The number of pipelaying support vessels (PLSV) to be operated in Brazil for Petrobras will see a decline in 2018 for the first time in five years. According to the

Brazilian major, the company's PLSV fleet might have 16 vessels by year-end, two less than what were under contract in 2017.

From 2013 to 2017, Petrobras had the world's largest PLSV fleet, mainly because of the company's high investments in offshore presalt activities. To some sources, this drop may not be reversed, considering the uncertain future of using flexible lines in future presalt projects.

Recently, *SEN* published an article about Petrobras' evaluation of the use of flexible pipes in its presalt operations. Two accidents involving flexible risers supplied by TechnipFMC in the Lula and Sapinhoá presalt fields, two main producing fields of Brazil, helped to open the company's eyes to this problem.

Subsea 7's PLSV fleet, contracted by Petrobras, is expected to be cut by half in 2018, closing the year with four vessels for Petrobras.

Another PLSV from the company expected to leave Brazil this year is the *Seven Phoenix*, which has a contract with Petrobras that ends in July.

Dofcon, a joint venture (JV) that includes DOF and TechnipFMC, also had a contract expire in February.

But the JV was awarded a contract to build two new PLSVs that will come into operation for Petrobras by year-end 2018. The construction of *Skandi Recife* and *Olinda* is being completed at Vard Promar shipyard in the northeastern state of Pernambuco.

"In a scenario of lower demand by Petrobras, PLSV suppliers tend to look at other operators in order to find other opportunities in the South American country," said Marcos Ortiz, an expert on Brazil's oil and gas industry for MCZ Consulting Brazil. "Majors such as Chevron, which is working to contract a PLSV for the Frade Field, located in the Campos Basin as well as Statoil and Total, which

respectively acquired the status of operators in the Carcará prospect and the Lapa Field, will also need to contract PLSVs in order to carry out subsea activities for their new phase of development.

"As for Petrobras, PLSV suppliers can offer their services to carry out alternative services," he added.

Currently, Subsea 7 and Sapura continue to lead the market share of supplying PLSVs to Petrobras, operating six vessels. TechnipFMC has four contracted vessels; Subsea 7 and Dofcon will change positions. As for Sapura, the supplier will remain in the same place, since its contracts with Petrobras are expected to expire in 2019.

While the number of PLSVs to support Petrobras' offshore activities is expected to drop in 2018, the number of FPSO contracts over the next five years is rising.

Petrobras is working to launch this year four tenders to acquire FPSOs to be operated in the Santos and Campos basins.

The tenders involve the:

- Installation of a unit in the Sergipe-Alagoas Basin and the presalt Búzios located in the Campos Basin (the fifth FPSO to be installed in the area);
- First production unit of the Marlim Field, located in the Campos basin, revitalization project;
- Mero 2 FPSO for the Libra prospect, located in the Santo Basin presalt area; and
- Installation of a new FPSO in the northern part of the Jubarte Field in Parque das Baleias, located in the Capixaba area of the Campos Basin.

—Brunno Braga

VESSEL BRIEFS

STR Expands Its Falcon Robotic Vehicle Fleet

Subsea Technology & Rentals Ltd. (STR) has expanded its Saab Seaeye Falcon robotic vehicle fleet. All of the company's Falcons are on long-term rentals.

The Falcon boasts five powerful thrusters and the advanced iCON intelligent distributed control system. The power provided by the thrusters makes the vehicles highly maneuverable, according to the company.

iCON provides precise station-keeping that frees the operator to focus on tasks and ensures stability in strong crosscurrents during precision operations.

Prysmian Orders Cable-laying Vessel

Prysmian Group said on March 14 it would invest more than \$209 million in what could be the most capable cable-laying vessel on the market when it is delivered in the second quarter of 2020.

The new vessel will bolster Prysmian's turnkey approach, the company said in a statement, under which it delivers end-to-end engineering, procurement, construction and installation projects from engineering,

manufacturing and installation to full monitoring and diagnostic services. It also will bring long-term growth value in the submarine cable installation and offshore wind project areas of the business.

The new vessel has advanced features:

- Deepwater installation capabilities for depths of more than 2,000 m (6,562 ft);
- Increased cable-loading capacity thanks to large cable rotating platforms;
- Capability to perform complex installation operations supporting a variety of burial systems, including heavy-duty ploughs; and
- Positioning and seakeeping systems and a reduced environmental footprint.

Prysmian's fleet already boasts three of the world's most advanced cable-laying vessels: *Giulio Verne*, *Cable Enterprise* and *Ulisse*, along with installation and burial equipment, which includes the Hydroplow, the PLB machines Sea Mole and Otter, and HD3 ploughing technology.

The new vessel will boost Prysmian's submarine cable operations by insourcing installation activities.

Construction Begins On Saudi Aramco's Shipyard Joint Venture

A \$5.3 billion joint venture to build a shipyard on the east coast of Saudi Arabia has started construction, Lamprell Plc said on March 16.

International Maritime Industries, a partnership that includes Lamprell, Saudi Aramco, National Shipping Co. of Saudi Arabia (Bahri) and South Korea's Hyundai Heavy Industries Co., began operations after securing a \$1 billion loan from the state-backed Saudi Industrial Development Fund.

The project will be headed by an Aramco executive. Lamprell is expected to provide a \$140 million equity contribution.

The shipyard will take up almost 12 million sq m (12.9 million sq ft) and is designed to be able to build four offshore rigs and over 40 vessels a year, including three very large crude carriers and service more than 260 maritime products.

—Joseph Markman

BUSINESS

Energean Lists In London, Raises \$460 Million For Israeli Gas Project

Greece's Energean Oil & Gas listed on the London Stock Exchange on March 16, raising \$460 million to develop two Israeli offshore gas fields in the latest milestone for the rapidly expanding Eastern Mediterranean energy sector.

The firm offered 72.6 million new shares at \$6.35 apiece in the first flotation of an oil and gas producer on London's main market since Zenith Energy Ltd. in January 2017, according to London Stock Exchange data. Energean shares were trading flat at 7:13 a.m. CT March 16.

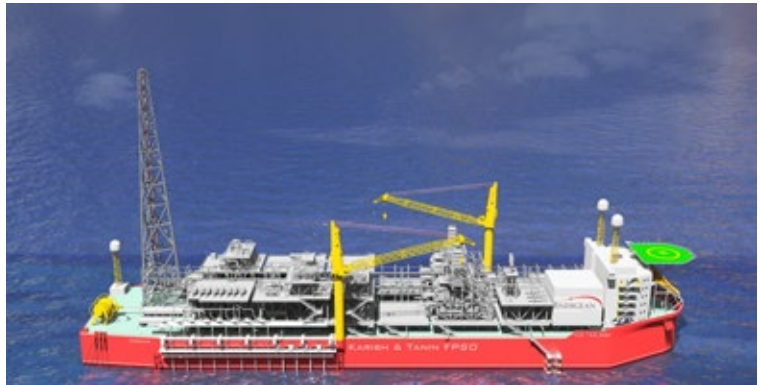
The company will receive about \$460 million from the listing, which gave Energean a market capitalization of about \$968 million, the company said in a statement.

The funds, together with a credit facility signed earlier this month, will go toward the \$1.6 billion development of its Israeli offshore gas fields Karish and Tanin, which have potential reserves of up to 68 Bcm (2.4 Tcf) of natural gas and 32.8 MMbbl of light oil and condensate.

"East Med has had a lot of activity. Investors saw an opportunity to participate in the only independent E&P in the East Mediterranean, which is dominated by the majors," said Mathios Rigas, Energean's CEO.

Companies including BP, Eni and Total have increasingly turned their focus to the Eastern Mediterranean gas basin in recent years following a string of large discoveries off the coasts of Egypt, Israel and Cyprus.

Few international companies have, however, entered Israel because of political tensions with Arab countries.



Energean Oil & Gas is working to develop resources from the Karish and Tanin gas fields offshore Israel. An artistic rendering of the FPSO for the fields is shown. (Source: Energean)

Following the startup of huge gas fields in Egypt and Israel, the Eastern Mediterranean is on the verge of becoming a new hub for exporting gas to Europe and Asia.

Israel, Cyprus, Italy and Greece are planning to construct a pipeline linking the basin to southern Europe, which relies heavily on gas imports.

"This is for us a very important pipeline that, when developed, would open a huge market for us and others," Rigas said. The Karish floating production platform could be linked to other fields and process more gas that would be used for exports, according to Rigas.

Egypt also hopes to increase exports of LNG by the end of the decade.

—Reuters

Statoil To Rebrand As Equinor In Green Energy Push

Statoil plans to change its name to Equinor, reflecting its commitment to become a broad energy company rather than one focused only on oil, the company said March 15.

In a video posted on social media, Statoil presented the switch as a way to show its determination to develop investments in renewable energy.

Reactions by various social media users were mixed.

“Equinor sounds like a princess on a horse in ‘Game of Thrones,’” one Twitter user said. “Equi” is the genitive singular in Latin for “horse.”

Others liked the change.

“Congratulations on an exciting name change. The green shift is happening faster and faster. Norway must be a part of it. Good luck with the process,” tweeted Norwegian Culture Minister Trine Skei Grande.

Equinor is a combination of “equi,” the starting point for words like equal, equality and equilibrium, and “nor” for Norway, the company said.

“Reflecting on the global energy transition and how we are developing as a broad energy company, it has become natural to change our name,” Statoil CEO Eldar Sætre said in a statement.

Rebranding would cost up to \$32.5 million, he later said during a news conference.

Statoil, which is headquartered in the port city and oil industry hub of Stavanger, has come to symbolize Norway’s rise in the past half-century to one of the world’s richest nations.

Local newspaper *Stavanger Aftenblad* ran a straw poll asking readers whether they liked the name change, with

4,730 people voting “no” and 809 voting “yes.”

The proposal will be put to the annual general meeting on May 15, but Statoil said it already had the backing of the Norwegian state, which has a 67% stake in the company.

“The decision reflects that Statoil is developing itself into a broad energy company in line with global developments in the energy sector,” Oil and Energy Minister Terje Sjøviknes told Reuters.

Statoil said it expects to invest 15% to 20% of capital spending by 2030 in what it calls new energy solutions, up from about 5% last year.

Sætre declined to say how much Statoil was planning to spend on renewables in 2018, but the company has said previously that spending for renewable and low-carbon solutions are expected to total \$500 million to \$750 million from 2017 to 2020 and \$750 million to \$1.5 billion for the 2020–2025 period.

In addition, Statoil developed the world’s first floating offshore wind park off Scotland and is looking to install others off countries including the U.S. and Japan.

—Reuters

BUSINESS BRIEFS

Bibby Offshore Merges With Rever Offshore

Bibby Offshore will merge with Rever Offshore, which includes subsidiaries CECON, a global subsea and offshore contractor, and two vessel companies called Cecon Excellence and Cecon Sovereign, Bibby said in a news release March 16.

“The combination of Bibby and CECON Contracting will create a larger and more robust offshore installation delivery business both in the North Sea and internationally, currently focused on the Atlantic and Mediterranean regions,” Bibby said. “Supported by strong ownership, the Bibby-Rever platform is well-positioned to deliver even greater service quality and efficiency for clients. The combined company will continue to evaluate growth opportunities in its core diving and subsea umbilicals, risers, and flowlines markets.”

Bibby added that the transaction is expected to close soon.

Laing Becomes New Director For NSRI

The National Subsea Research Initiative (NSRI) has named Tony Laing, a more than 35-year industry veteran, as its new director of research and market acceleration.

In the role NSRI said Laing will be “tasked with ensuring the U.K.’s subsea technology needs are understood and met within an increasingly diverse business environment and the



Tony Laing

associated complex innovation and funding landscape.”

According to a news release, Laing has been an independent consultant within the oil and gas industry since 2015. Before this he served as global director of integrated solutions at Schlumberger and OneSubsea, where he developed and delivered a new business model, integrating the field development offering

of Schlumberger, Cameron and Framo Engineering. He also held positions at Marathon, Boreas (Atkins), Aker and smaller technology companies.

Axess Wins Subsea 7 Deal For SURF Projects

Axess Group has scooped an eight-year frame agreement renewal to its quality control services contract for Subsea 7’s new subsea umbilicals, risers and flowlines (SURF) projects.

Under the deal, Axess will provide all inspection services to ensure quality, safety and compliance with Subsea 7’s SURF equipment.

The work scope will include onsite inspections, review of procedures and certificates, nondestructive testing, material handling, welding and coating inspection.

Dril-Quip's Jerry Brooks To Retire

Jerry M. Brooks will retire from his position as vice president of investor relations for Dril-Quip Inc., effective March 30, the company said.

Brooks, 66, began his tenure at Dril-Quip as chief accounting officer in February 1992 before becoming CFO in 1999. In 2007 he was named vice president of finance and CFO, Dril-Quip said in a news release. Brooks moved into his current role in March 2017.

"We are thankful for Jerry's 26 years of financial leadership to the company and for his assistance in the transitioning of our finance department over the last year," Dril-Quip CEO Blake DeBerry said. "Jerry was a key contributor to the company's success over the years, and we wish him well in his retirement."

McDermott, CB&I Form Executive Leadership Team

McDermott International Inc. and Chicago Bridge & Iron Co. NV have selected the executive leadership team and integrated organizational structure of the combined company.

Upon the close of the transaction, the combined company's operations will be organized by four areas: North, Central and South America; Europe, Africa, Russia and the Caspian; the Middle East and North Africa; and the Asia-Pacific.

Under this new structure, the global executive leadership team will include David Dickson, president and CEO for McDermott; Stuart Spence, executive vice president and CFO for McDermott; Richard Heo, head of North, Central and South America; Tareq Kawash, head of Europe, Africa, Russia and the Caspian; Ian Prescott, head of Asia-Pacific; and Linh Austin, head of the Middle East and North Africa.

In addition, the following people will continue in their roles: Daniel McCarthy as head of technology, Brian McLaughlin as head of commercial, Jonathan Kennefick as head of project execution and delivery, John Freeman as head of legal, Gentry Brann as head of communications, and Tony Brown as head of integration for the combined company.

Scott Munro will become head of corporate, and Steve Allen will become head of human resources.

Kværner Names Karl-Petter Løken As CEO, President

Karl-Petter Løken has been appointed president and CEO of Kværner, the company said March 20.

Løken will start during the spring as soon as he has ended his current position as head of project development for the oil company Lundin Norway.

"He has a strong understanding of the industry, he knows Kværner also from the customer side, and he has a wide experience in developing teams for high performance," said Leif-Arne Langøy, chairman of the board.

Since 1991 Løken has held key positions in the oil and gas industry for companies like Statoil, Aker Solutions and Lundin Norway.

"The company's expertise, capacity and position are a strong base for continuing this systematic performance and for simultaneously developing the business further," Løken said.

In February Kværner said its former president and CEO, Jan Arve Haugan, was leaving to take on a new position as manager for Aker Energy. Kværner's executive vice president and CFO, Idar Eikrem, will continue as interim CEO until Løken takes on his position.

PTT Picks Technology Chief As Next CEO

Thailand's PTT Plc said it had chosen Chansin Treenuchgron as the next CEO in place of Tevin Vongvanich, who will retire later this year.

Treenuchgron, 57, will take up the company's helm on Aug. 31 after Vongvanich reaches the compulsory retirement age of 60. Treenuchgron will have a term of 20 months, PTT said in a statement. Thai state-owned enterprise law requires employees retire at the age of 60.

Treenuchgron, who joined PTT in 1982, is the company's CTO and engineering officer. He also served as senior executive vice president for the company's petrochemicals and refining business unit.

PTT Chairman Piyasvasti Amranand said the board unanimously voted for Treenuchgron's appointment.

Treenuchgron's expertise in technology is in line with the company's plan of using disruptive technologies to seek new businesses, Amranand said in a statement.

Woodside Names New COO As Utsler Steps Down

Woodside has named Meg O'Neill to become the company's COO in May as Mike Utsler will be leaving the company, Woodside said in a news release.

"Mike joined Woodside in December 2013 and over the past four and a half years has made a valuable contribution to both our Operations Division and the broader Woodside organization," the company said.

Woodside added that O'Neill's most recent role was vice president of Africa for ExxonMobil. O'Neill holds dual bachelor degrees in ocean engineering and chemical engineering and a master's degree in ocean systems management from the Massachusetts Institute of Technology, the release said.

M² Subsea Names New Sales, Marketing Director

Andrew Imrie has been named global sales and marketing director for M² Subsea, where he is expected to lead a push to grow the company's offerings from its Aberdeen and Houston hubs.

Imrie joins M² Subsea from Ampelmann where he was com-



Andrew Imrie

mercial director. He has more than 20 years of experience in the oil and gas industry, according to a news release. Prior to this, he held several senior roles with Proserv, Amec, GE Oil & Gas and National Oilwell Varco.

He will be based at M² Subsea's headquarters in Aberdeen.

BP America Names Susan Dio As President, Chairman

BP said on March 20 it has appointed Susan Dio as chairman and president of BP America Inc., BP's chief representative in the U.S., effective May 1, 2018.

Dio succeeds John Mingé, who will move to chair a study by the National Petroleum Council into carbon capture, utilization and storage technologies and their potential deployment. He will retire from BP in March 2019.

Dio, a chemical engineer by training, has been the CEO of BP Shipping for the past three years, responsible for BP's shipping business worldwide. Previously during her 33-year career with BP and heritage companies, she has held a series of senior commercial and operating roles in the U.S., U.K. and Australia.

Energiean To Invest \$1.6 Billion In Israeli Offshore Fields

Energiean will invest \$1.6 billion in its Karish and Tanin gas fields off the coast of Israel, the company said March 22, days after raising about \$460 million on the London stock exchange.

Karish and Tanin have potential reserves of 68 Bcm (2.4 Tcf) of natural gas and 32.8 MMbbl of light oil and condensate.

Energiean expects first gas from Karish in 2021. Tanin will be developed after Karish.

The company has signed gas supply agreements in Israel for about 4.2 Bcm (148 Bcf) of gas a year.

Energiean is also positioning itself in the eastern Mediterranean with a newly built FPSO with capacity of 23 MMcm/d (800 MMcf/d) and liquids capacity of 800,000 bbl.

Chrysaor Buys Three North Sea Fields From Spirit Energy

Chrysaor, which bought a portfolio of Royal Dutch Shell assets in 2017, said on March 22 it would acquire stakes in three aging North Sea fields from Spirit Energy.

"The acquisition is part of Chrysaor's strategy to prolong asset life, maximize recovery and deliver value from the U.K. North Sea," CEO Phil Kirk said in a statement.

The company will soon begin surveys in preparation of drilling new wells in the fields, he said.

Private equity-backed Chrysaor will become the sole owner of the Armada, Maria and Seymour fields, it said. It expects the deal to close in second-half 2018. The value of the deal was not disclosed.

Spirit, an oil and gas joint venture created last year between Centrica and Bayergas Norge, will retain costs linked to future decommissioning of the fields, Chrysaor said.

—Staff & Reuters Reports

UPCOMING

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Subsea Engineering News (ISSN 0266-2205) is published twice monthly by Hart Energy Publishing LLP, Houston TX, USA. Telephone: +1 713 260 6400; Email: sen@hartenergy.com or custserv@hartenergy.com; Website: www.epmag.com/subsea-engineering. Email for subscriptions: mpigozzi@hartenergy.com.

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