

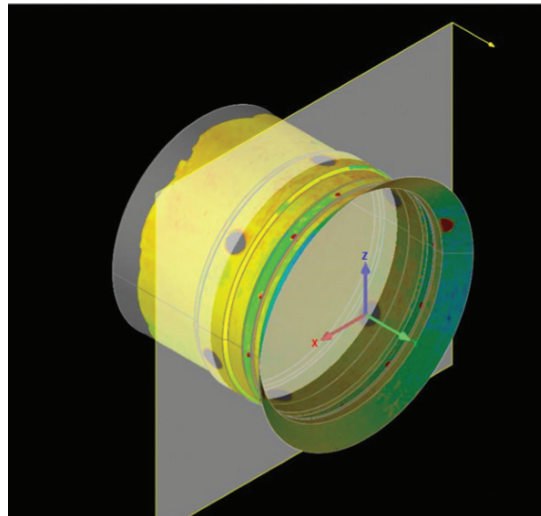
Lasers Provide Option To Lower Subsea Metrology Measurement Costs

New technologies that produce high-precision, detailed 3-D imagery of underwater structures, sites and objects offer a way to efficiently obtain high-quality data as well as reduce costs and engineering and operational uncertainty. Laser scanning is one technique gathering momentum across the industry for doing just that.

There are many applications within the subsea sector where the ability to make precise engineering measurements in 3-D is useful. These include pipework, conductor and wellhead interfaces—dimensional inspection for damage, wear, corrosion and erosion, seal bore inspection and reverse-engineering applications. Without accurate dimensional data, the risk of getting things wrong during operations can be high and have safety implications.

Laser measurements are widely used topside but have only been used for subsea in the past five years. The technology has overcome the challenges of marinization and the optical distortion that comes with underwater use. Historically, photogrammetry, sonar and physical measurements have been employed subsea to collect engineering data. With the advent of subsea lasers it is possible to achieve more accurate measurements cost effectively and in real time.

“One of the big issues with lasers that come into play when you’re working subsea is the refraction and distortion of the images that you need to be able to calibrate to be confident in the measurements that you’re taking,” said Brett Lestrage, Ashtead Technology’s regional director for Europe. “The manufacturers have managed to get to a point where the calibration process is quite well-defined. They have demonstrated the ability to measure subsea consistently using test pieces.”



A 3-D laser rendering of the internal bore of a wellhead shows how cross-sectional slices can be taken to extract specific geometries of interest. (Source: Ashtead)

In its infancy for subsea use, laser technology is advancing. One of the issues is visibility turbulence (i.e., particles in the water) that create noise. There are different ways to reduce the effect of noise, and that’s where some of the technology will move forward.

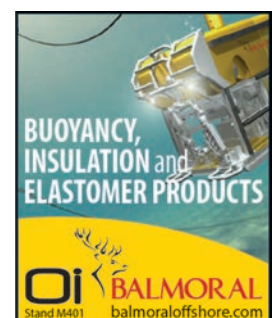
Another area of interest is developing laser platforms for dynamic use. “That’s where a lot of focus is right now, getting the lasers on our moving platform,” Lestrage added. “Instead of having a static tool you can cover a much wider area. But the static tool is still necessary for sub-millimeter accuracy and will be for some time.”

Subsea Lasers

Lestrage said subsea lasers fall into two broad categories: triangulation and Time of Flight (ToF).

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Brett Lestrangle

ToF lasers measure the time taken for an emitted pulse of laser light to be reflected back to the detector. “Knowing the speed of light through the medium allows the calculation of distance,” he said. “This enables the creation of a dimensional model of the object in question by taking many thousands of point measurements and moving around the object.”

ToF works best where there is some offset from the object; typically, in subsea this is from 2 m to 30 m (about 7 ft to 98 ft) depending on visibility. These lasers are commonly used to take field overview images of the installed subsea architecture with centimeter accuracy.

Triangulation lasers use a laser stripe to swipe across an object. “The reflected light is captured by an offset camera.” Lestrangle said. “The angles formed between the laser emitter, the point of reflection on the object and the angle of detection at the camera allows the precise distance to be calculated, building up a dimensional image of the object.”

Triangulation is better at precise inspection but less useful for inspection at distances typically larger than 10 m (33 ft) as the angle of incidence and reflection become small.

Both methods produce an almost instant 3-D point cloud of the object being scanned, which can be directly manipulated in software to provide metrology information.

Benefits and Constraints

Laser scanning is a non-contact method of obtaining sub-millimeter accuracy in real time. The instruments are compact, highly portable and rated for deepwater use. To get sub-millimeter accuracy, however, the laser needs to be stationary.

According to Lestrangle, dynamic scanning, which is where the laser is attached to a moving ROV and gets its location reference from the ROV INS/gyro, provides centimeter-level accuracy at best. “This is for wider-area mapping,” he added. “The position reference accuracy from the ROV limits the overall measurement accuracy that is possible.”

Lasers are a visual instrument in that they work by emitting light and measure the reflected light returned. “If the object can’t be seen because of turbidity subsea making useful measurements will be a struggle,” he continued. “Being a non-contact measurement helps avoid stirring

things up, but this constraint needs to be considered.

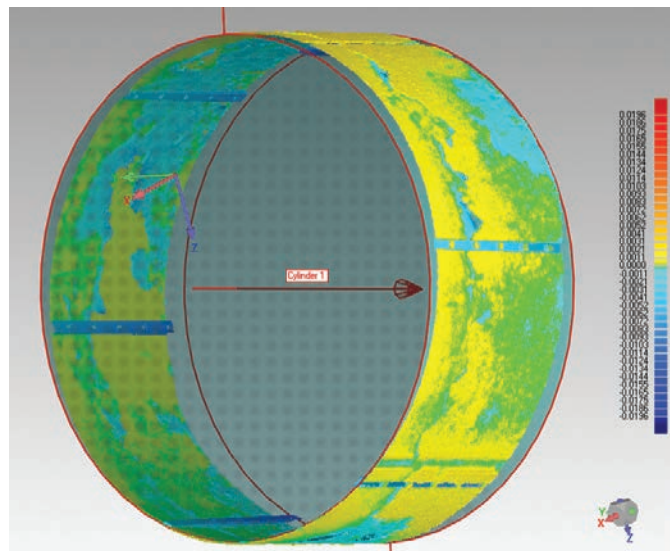
“In theory the power of the laser can be increased, but that also increases the back-scatter and signal noise. For all laser types, deep, dark and clear waters are best. Strong ambient light or even bright sunlight in shallow water reduces the effective range of the laser.”

Subsea Lasers In Action

One recent application of the technology was to assess *in situ* the condition of a wellhead profile that had laid subsea for several decades. The information would ultimately determine whether the wellhead was in a state to be safely used in planned late-life field extension operations.

“This is a typical late-life subsea application where precise dimensional analysis of a relatively inaccessible object is required to de-risk a high-value subsequent operation,” Lestrangle said. “As always, the main question, and one that is often neglected in the excitement around the technology, is what are the specific requirements of the job? What is to be measured and to what level of accuracy?”

He explained these data requirements drive the scan



A 3-D heat map shows deviations from the specified component geometry as measured by the laser. (Source: Ashtead)

plan—a detailed procedural document outlining exactly how to obtain access to the area of interest, locate the laser in a static position, then be able to rotate and pan or tilt as needed to capture the full field of view. The requirements also determine the number of scans, how it will verify the data onsite and be sure it doesn’t come home without all the required information. The plan should also include contingencies based on experience and assessment of hazards and

other potential challenges.

“The need for scan registration targets is also defined in the scan plan,” he said. “These are orientation identifiers used by the software to automatically align multiple scans into a 3-D shape. If there are likely to be few unique features in the object to be scanned, more targets are needed.”

In this instance the job was a diver-assisted operation. The diver placed and orientated the pre-fabricated jig onto the wellhead profile and lowered the laser instrument down into the bore. Connected to surface via standard subsea multiplexer and cable, the topside operator observed the images and controlled the operation of the laser, including the pan/tilt and rotation in real time. The diver moved the registration targets as requested by the topside operator.

“Although this operation did not require it, the presence of the subsea multiplexer means that additional instruments, such as weld inspection tools, could have been deployed if necessary,” he said. “The potential to perform an extensive dimensional and integrity assessment exists.

Software stitches all the scans together using the registration targets, and a 3-D model is then created from which measurements can be taken.”

Future For Lasers

Use of laser scanning subsea has many applications, in particular for detailed up-close sub-millimeter information. Laser scanning is a visual technique; the laser needs to see the area of interest through multiple scans at various angles to build the required scan. Whether topside or subsea, the laser instrument incorporates a real-time video

feed so the operation can be controlled and managed in real time. This becomes critical when it comes to data quality control and onsite operations.

“It might be where there is high cost of intervention, high cost of failure, but where you need these precise measurements,” Lestrangle continued, “or maybe even in the drilling environment where you’re looking at wear or storm damage and need to be assured of the integrity and need more confidence than can be gained from a visual technique.”

Another area of interest in the North Sea is decommissioning. “We have had several inquiries over the past 12 months because people need to know what’s the best way of approaching some of the decommissioning tasks—identifying the results of cuts, how effective the cuts were and how they’re going to take things apart.”

—Mark Venables

DEVELOPMENT

Mozambique Clears Anadarko’s Plans For Golfinho, Atum Fields

Anadarko Petroleum Corp. and partners reached a milestone in the development of natural gas from the Golfinho and Atum fields in Mozambique’s Offshore Area 1, having gained approval of field development plans from the government.

The fields are part of Anadarko’s plans for Mozambique LNG, one of the first subsea developments offshore the east African country. By tying the subsea wells to shore via a subsea gathering system, capable of handling about 57 MMcm/d (2 Bcf/d) of gas, Anadarko and partners will help put Mozambique on the map as a global LNG supplier.

The development takes shape as forecasts show LNG demand will outpace supply.

The Mozambique LNG development and fields are located in proximity to key markets that include Europe, the Middle East, South America and the Asia-Pacific region.

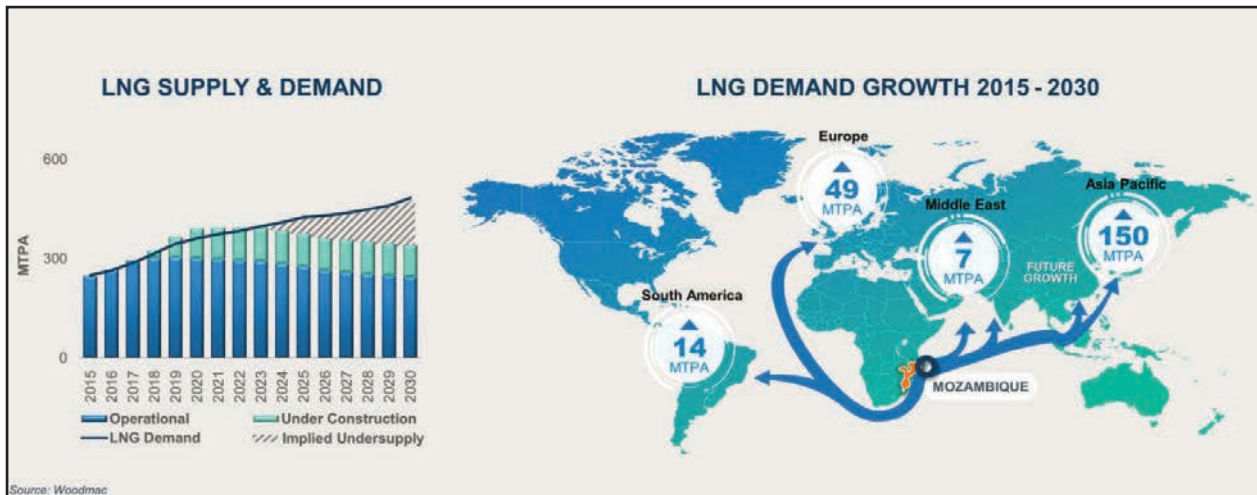
Anadarko, the operator, said on March 5 the onshore part of the LNG project will initially have two LNG trains to support development of the Golfinho and Atum fields, which would also supply about 3 MMcm/d (100 MMcf/d) total for the domestic market. The two LNG trains have a nameplate capacity of 12.88 million tonnes per annum (mtpa), but the project could be expanded to up to 50 mtpa.



An FPSO operates offshore Mozambique where Anadarko Petroleum and partners are working to develop fields in Offshore Area 1. (Source: Anadarko)

“The approval of the development plan continues advancement toward a final investment decision [FID] as it builds upon other recent achievements, including the announcement of our long-term SPA [sale and purchase agreement] with EDF, commencement of resettlement and our ongoing work to secure project financing,” Mitch Ingram, executive vice president of international and deepwater operations and project management for Anadarko, said in a company statement.

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During Anadarko’s latest earnings call, the company said it had put the foundational legal and contractual framework in place and started onshore site prep work with its partners as it continues to negotiate with buyers to bring the development closer to FID.

“We agreed to key terms subject to final approval, including volume and price for approximately 5 million tonnes per annum of LNG offtake. This puts us more than half way to our FID target of 8.5 million tonnes per annum,” Ingram said on the earnings call in February.

He later added that Anadarko has seen the project gain credibility in the market and gain support as the company and partners hit milestones. Delivery of the first cargoes is anticipated about five years after sanction, which Ingram said is a typical time line for developing a greenfield LNG project.

“Once the first two trains are online the potential for peak delivery and scalability of Prosperidade is phenomenal,” he said. “The long-term outlook for Area 1 is expected to deliver stable production volumes, more than 1 billion barrels of net recoverable resource and superior free cash flow. We’re excited about the value that a project of this scale brings to Anadarko’s portfolio.”

Anadarko has a 26.5% working interest in Offshore Area 1 through its subsidiary Anadarko Moçambique Área 1. Partners are ENH Rovuma Área Um (15%), Mitsui E&P Mozambique Area1 Ltd. (20%), ONGC Videsh Ltd. (10%), Beas Rovuma Energy Mozambique Ltd. (10%), BPRL Ventures Mozambique B.V. (10%) and PTTEP Mozambique Area 1 Ltd. (8.5%).

—Velda Addison

How Australia, East Timor Treaty Unlocks \$65 Billion Gas Fields

East Timor and Australia signed a treaty at the U.N. setting their maritime boundary for the first time and striking a deal on sharing an estimated \$65 billion in potential revenues from the Greater Sunrise gas fields in the Timor Sea.

For impoverished East Timor, with a population of just 1.3 million, development of the fields is crucial—its main source of revenue since 2004, the Bayu Undan gas field, is set to run out of gas by 2022.

The treaty signing in New York on March 6 marked the first conciliation under the U.N. Convention on the Law of the Sea—a process UN Secretary-General António Guterres said could offer other countries a path toward resolving contentious maritime boundary disputes.

At current market prices, the Greater Sunrise reserves would be worth more than 23 times East Timor’s annual GDP of \$2.8 billion.

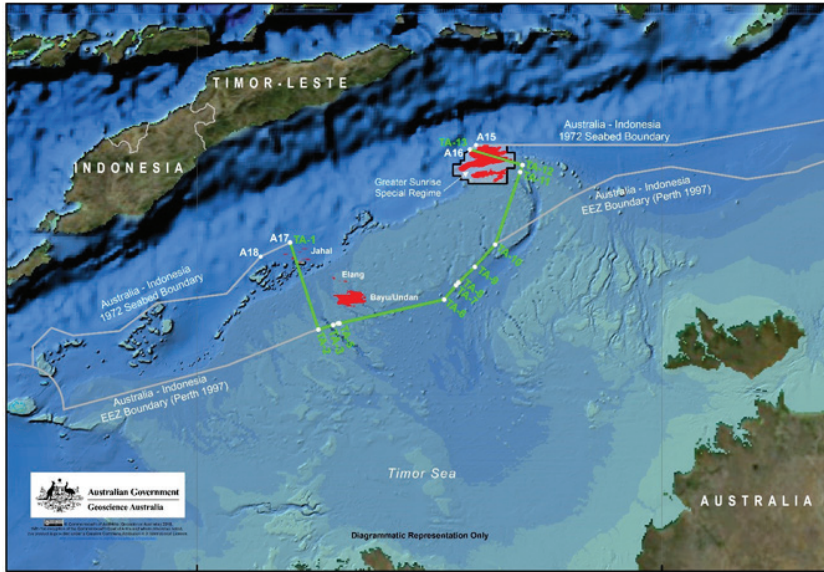
Development of the reserves has been held back by the maritime border dispute between Australia and East



(Source: Shutterstock)

Timor, a former Portuguese colony that gained independence from Indonesia in 2002.

“The treaty is an important step that opens the way for developing a rich, shared resource, the Greater Sunrise gas fields. We know this resource is crucial to Timor Leste’s



The map shows the location of the maritime boundary, which is established by the treaty between Australia and the Democratic Republic of Timor-Leste establishing their maritime boundaries in the Timor Sea. (Source: Australia’s Department of Foreign Affairs and Trade)

development,” said Australian Foreign Minister Julie Bishop, who signed the treaty in New York with East Timor’s Deputy Minister of the Prime Minister for the Delimitation of Borders Hermenegildo Augusto Cabral Pereira.

However, the Greater Sunrise joint venture (JV), led by Australia’s Woodside Petroleum, which has been a key party in the long-running negotiation, said it was disappointed that the treaty did not contain a full development plan for the gas reserves.

“It is disappointing that this process has not resulted in an alignment on a development concept,” the Sunrise JV said in a statement March 7.

The Sunrise partners did not specify what they felt was missing in the agreement, but it is likely that Dili insisted on the gas being processed in East Timor for overseas sale,

while the JV would prefer to pipe the gas to Australia.

Under the terms of the deal, East Timor will get 70% of revenues if processing takes place in East Timor, and 80% should the gas be piped to Australia.

That compares with an equal share under a 2006 agreement between Dili and Canberra.

How Much Gas Is There?

The Sunrise and Troubadour gas fields, collectively known as Greater Sunrise, lie beneath waters 100 m to 600 m (328 ft to 1,969 ft) deep, making them shallow to medium-deep-water developments.

The fields were discovered in 1974 and, according to Woodside, hold about 145 Bcm (5.13 Tcf) of gas, the equivalent of more than one-third of current annual global LNG consumption.

At current market prices, the LNG would be worth almost \$50 billion.

Like most gas fields in the wider region, including Papua New Guinea’s and Australia’s huge LNG exports facilities, Greater Sunrise also contains significant amounts of condensate, an ultralight form of crude oil. Its 225.9 MMbbl of condensate reserves at current market prices would be worth over \$15 billion.

Who Gets What?

Woodside and its partners have long said they would prefer to develop the fields using a floating LNG platform, considered the most cost-effective option, as the fields are 150 km (93 miles) away from East Timor and 450 km (280 miles) away from Darwin in Australia.


Tubular Bells
First Oil
November
2014



Jack/St. Malo
First Oil
December
2014



Lucius First Oil
January 2015





Three
Successful
Startups,
One Common
Denominator

Leader in Topsides Design

However, the agreement signed March 6 lays out just two options—piping the gas either to East Timor or Australia.

Dili has long pressed for the gas to be processed in East Timor, looking to generate thousands of jobs in construction and, once developed, in the lucrative oil and gas processing, storage, transport and petrochemical industries.

Australia, however, has existing gas infrastructure and an experienced workforce, making it the industry's preferred location.

Who Is Involved?

The partners in Greater Sunrise are Australia's Woodside, U.S. firm ConocoPhillips, Anglo-Dutch Royal Dutch Shell and Japan's Osaka Gas.

Even with the new agreement, development could be years away. Woodside said last May it may only develop Greater Sunrise after 2027.

Energy markets are just recovering from years of oversupply that depressed oil and gas prices and deterred development of new gas projects.

Asia's LNG markets, which Greater Sunrise would serve, are expected to remain oversupplied into the early 2020s as production rises in Australia, North America, Papua New Guinea and also Qatar.

It's likely the Sunrise partners will bide their time before committing billions of dollars to develop such a large project.

—Reuters

DEVELOPMENT BRIEFS

McDermott To Work On BP's Third Cassia Compression Platform

McDermott International Inc. has been awarded a detailed engineering and long lead procurement services contract from BP Trinidad & Tobago LLC for the Cassia C Compression platform, the company said March 5.

The platform is located 65 km (40 miles) off the south-east coast of Trinidad and Tobago.

The Cassia C Compression project includes a new unmanned compression platform for the existing Cassia complex. The facility will provide gas compression to the Cassia complex via a new bridge connected to Cassia B. Cassia C is BP's third Cassia platform, handling gas coming from its operations in the prolific Columbus Basin.

McDermott expects to use the Project Lifecycle 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.

McDermott's team in Houston plans to lead the engineering and execution with support from the company's engineering center in Chennai, India.

Aker Solutions, Subsea 7 Win Order For Nova Offshore Norway

Aker Solutions and Subsea 7 have been awarded contracts by Wintershall Norge for the Nova oil and gas field development, the companies said.

The contract award comprises engineering, procurement, construction and installation delivery of the pipeline and riser systems, and the transport and installation of subsea production systems and umbilical system.

The Nova Field development is a subsea tieback to the existing Gjøa semisubmersible production facility. The field is located in the northeastern part of the North Sea, 16 km (9 miles) from the Gjøa Field, in a water depth of about 360 m (1181 ft).

Work for Nova starts immediately and involves facilities in Norway, the U.K. and Malaysia. Final deliveries are scheduled for 2019 and 2020.

Nova has total recoverable reserves of 80 MMboe. The field is expected to come onstream in 2021.

Dril-Quip Lands Contract For Repsol's Ca Rong Do Project

Dril-Quip Inc. said its Singapore-based subsidiary Dril-Quip Asia Pacific has secured a contract to supply top tensioned riser (TTR) systems and associated services for the Repsol-operated Ca Rong Do (Red Emperor) project offshore Vietnam, according to a news release.

As part of the contract, Dril-Quip said it will provide a drilling TTR system and multiple TTR systems for the production, gas injection and water injection wells. The systems will include tieback connectors, tapered stress joints, riser joints, riser connectors, keel joints, tensioner joints, spool joints, flexible jumpers, surface wellheads, surface trees, control umbilicals and tensioner systems, Dril-Quip said in the release.

Repsol sanctioned the project in 2017. Development plans for the field, located in Block 07/03 offshore southern Vietnam, will include use of a tension-leg wellhead production platform, a tender-assisted drilling vessel and an FPSO. Located in a water depth of about 320 m, the platform will host up to 20 wells for oil production along with water and gas injection.

Partners include Mubadala Petroleum, PetroVietnam Exploration Production Corp. and PetroVietnam.

DeepOcean Wins SURF Riser Work In North Sea, Norwegian Sea

Statoil has tapped DeepOcean for a riser replacement and construction work job in the North Sea and the Norwegian Sea.

As stated in a news release, the work scope includes marine operations for replacement, installation and recovery of subsea lines and installation work at the Njord, Kristin, Troll C and Åsgard fields offshore. The onshore engineering and prep work is set to begin in early 2018 with offshore execution scheduled for 2019 and 2020.

DeepOcean said its onshore project team will work from the company's Haugesund and Stavanger offices in Norway.

Shell Gives Up On Gaza's Offshore Gas Field

Royal Dutch Shell is giving up its stake in an undeveloped natural gas field off the Gaza Strip, sending the Palestinians looking for a new foreign group to replace it, Palestinian officials said on March 5.

Cabinet ministers from the Palestinian Authority said in a statement they had been informed that the energy giant was pulling out of the project and were now in the process of "trying to attract a global company" to take its place.

Shell had been struggling to find a buyer for its 55% stake in the Gaza Marine Field, which it took over during its acquisition of BG Group in 2016.

A Shell spokesman said, "We confirm we have been in discussions with various parties about the future of the Gaza Marine project. As of now, Shell continues to hold its equity in the Gaza Marine asset."

Gaza Marine, located about 30 km (20 miles) off the Gaza coast, has long been seen as a golden opportunity for the cash-strapped Palestinian Authority to join the Mediterranean gas bonanza, providing a major source of income to reduce its reliance on foreign aid.

Plans to develop the field—estimated to hold over 28 Bcm (1 Tcf) of natural gas, the equivalent of Spain's consumption in 2016—were put off several times over the past decade. The delays were due to internal Palestinian rivalry and conflict with Israel as well as economic reasons.

With Shell's exit, the Palestine Investment Fund, a sovereign wealth fund, remains the sole stakeholder.

—*Staff & Reuters Reports*

EXPLORATION BRIEFS

Petronas Strikes Oil, Gas Offshore Gabon

Deep water offshore the West-Central African country of Gabon is bearing fruit for Petronas and partner Woodside as Petronas subsidiary PC Gabon Upstream has hit "gross high-quality hydrocarbon-bearing presalt sands." Petronas, the operator, announced the discovery March 5.

Located in a water depth of 2,800 m (9,186 ft), the Boudji-1 ultradeepwater exploration well encountered 90 m (295 ft) of hydrocarbons. The discovery is located in Block F14 (Likuale).

"The discovery in Gabon is an encouraging development for Petronas, as we continue to pursue growth activities beyond Malaysia, in line with the strategy to expand our core oil and gas business by growing our resource base," said Datuk Mohd Anuar Taib, Petronas' executive vice president and upstream CEO, said in a company statement.

He added that the discovery also will spur growth in Gabon and the region, and it "complements [the company's] achievements toward building a significant deepwater portfolio globally."

The next step for the discovery includes determining the commerciality of the find. Petronas plans to work with Gabon's petroleum and hydrocarbons ministry on the effort.

Statoil Contracts Seadrill Rig For UKCS, NCS Drilling Campaign

Statoil and its partners have contracted the West Phoenix rig for exploration drilling on the U.K. and Norwegian continental shelves from summer 2018, the company said.

The contract was awarded to the two Seadrill companies North Atlantic Drilling Ltd. and North Atlantic Norway Ltd.

The semisubmersible rig West Phoenix will first drill an exploration well for the Ragnfrid North license on the Nor-



After completing the Ragnfrid North well, the West Phoenix will move to the UKCS where Statoil will drill three wells. (Source: Seadrill, Statoil)

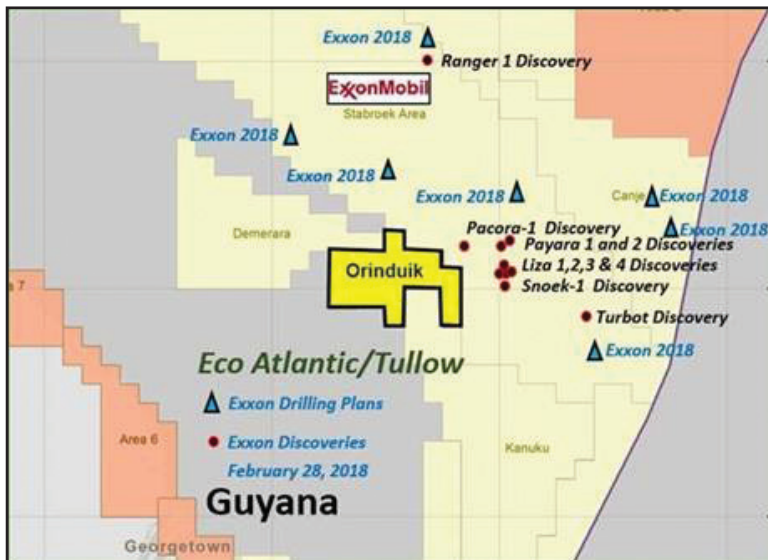
wegian Continental Shelf (NCS), followed by three wells on the U.K. Continental Shelf (UKCS). The rig has been approved by authorities for use on the NCS and UKCS.

The Ragnfrid North well has an estimated value of \$19.5 million, while the estimated value of the three wells on the UKCS is \$18.5 million. The figures include integrated drilling services such as fuel, casing running, ROV, slop treatment, cuttings handling, and mobilization and demobilization.

Ragnfrid North is located in the production license 199 about 20 km (12 miles) south of the Kristin Field in the Norwegian Sea. After completing the Ragnfrid North well, the West Phoenix will move to the UKCS where Statoil will drill three wells.

ExxonMobil Makes Seventh Oil Discovery Offshore Guyana

ExxonMobil Corp.'s winning streak offshore Guyana continues as the company made its seventh oil discovery offshore Guyana.



ExxonMobil well locations in the Stabroek Block are shown in proximity to the Orinduik Block offshore Guyana. (Source: Eco (Atlantic) Oil & Gas)

The Pacora-1 well, located about 6 km (4 miles) west of the Payara-1 well, hit about 20 m (66 ft) of high-quality oil-bearing sandstone reservoir, ExxonMobil said Feb. 28 in a news release. The well was drilled by the *Stena Carron* drillship to 5,597 m (18,363 ft) depth in 2,067 m (6,781 ft) of water, and drilling commenced Jan. 29. The company plans to develop the discovery with the Payara Field as it works to grow production offshore Guyana to more than 500 Mbbl/d.

“This latest discovery further increases our confidence in developing this key area of the Stabroek Block,” Steve Greenlee, president of ExxonMobil Exploration Co., said in a company release.

The company’s other Guyana discoveries include Liza, Payara, Liza Deep, Snoek, Turbot and Ranger.

Following completion of Pacora-1, the *Stena Carron* was scheduled to move to the Liza Field to drill the Liza-5 well and complete a well test, which will be used to assess concepts for the Payara development.

With a 45% interest in the Stabroek Block, ExxonMobil’s Esso Exploration and Production Guyana Ltd. is the operator. Partners are Hess Guyana Exploration Ltd. (30%) and CNOOC Nexen Petroleum Guyana Ltd. (25%).

In a news release, Eco (Atlantic) Oil & Gas Ltd. pointed out that ExxonMobil’s latest discovery is downdip and adjacent to the Orinduik Block, where Eco has a 40%

working interest. The Pacora-1 find helps Eco define resources within its asset, according to Eco Atlantic CEO Gil Holzman.

“These thick sand pathways are defining a migration and a charge of this high-quality sand with hydrocarbons. Our technical team is working carefully and conservatively to define the resources within Orinduik,” Holzman said. “With experts from Total, Tullow, Gustavson, Eco and Kinley all interpreting the processed data as they becomes available, we are building confidence in the world-class potential of this block. This Pacora discovery is very close to our border and has added a new and significantly important dimension to our prospectivity.”

Africa Energy Receives Renewal For Exploration Offshore South Africa

Africa Energy Corp. has received notice from the Petroleum Agency of South Africa granting a two-year renewal of the exploration right for Block 2B offshore the Republic of South Africa, according to a company press release.

Block 2B covers 3,604 sq km (1,391 sq miles) off the West Coast of South Africa with water depths ranging from 50 m to 200 m (164 ft to 656 ft). The block contains a proven oil basin with an existing oil discovery from the A-J1 well drilled by former South African state company Soekor in 1988.

The A-J1 well discovered and tested light oil from a Lower Cretaceous sandstone section. The A-J graben is a typical rift basin related to the opening of the Atlantic in the Early Cretaceous and forms one basin within a greater trend of rift basins.

In addition to the southern A-J graben, Block 2B also includes significant prospectivity in the northern graben. This greater rift trend is similar to the East African Rift trend where major oil accumulations have recently been discovered in both the South Lokichar Basin in Kenya and the Albert Rift in Uganda.

Africa Energy has a combined 90% participating interest and operatorship of Block 2B, and Crown Energy AB has the remaining 10% through a subsidiary company.

—Staff & Reuters Reports

TECHNOLOGY

Shell Brazil, Saipem Team Up To Bring FlatFish AUV To Market

Shell Brazil and Saipem, an Italian oil and gas industry contractor, will together launch commercially the FlatFish project, an R&D venture undertaken by Shell and other partners.

FlatFish is an AUV dedicated to the inspection of sub-sea structures and pipelines. This project was conceived in 2014, and it was a finalist in 2017 for the Brazilian Petroleum Agency’s Technology Innovation Award.



FlatFish is expected to be available commercially in 2020. (Source: Shell Brazil)

This announcement was made in late February 2018 after Shell and Saipem signed an agreement for the industrial production and commercialization of the AUV. According to Shell Brazil, FlatFish is expected to be available commercially in 2020.

“The signing of this agreement is a landmark for FlatFish. The great challenge in research and development is to turn invention into innovation, i.e. to deploy high-impact results into the field and promote benefits to the society,” said Tom Moroney, vice president for deep water and wells technologies for Shell. “We are taking that leap, and I am sure much more is coming in the future.”

The project, the first of its kind to be produced in Brazil, was developed by the Anglo-Dutch operator in partnership with the German Research Center for Artificial Intelligence and the Brazilian Institute of Robotics. The vehicle is designed to reduce the cost of tasks by up to 50%, allowing more frequent inspections without requiring a support vessel and increasing environmental and labor security.

To achieve this, a variety of acoustic and optical sensors are employed and a subsea docking station will be designed. Two identical AUVs will be built, enabling simultaneous software development in both Brazil and Germany.

It is expected the AUV will be used in Brazil and in other countries around the world, with capacity to carry out subsea activities in both shallow and deep waters.

For Stefano Porcari, COO of Saipem’s offshore engineering and construction division, the subsea vessel represents a new addition to the company’s new generation of resident subsea robotic vehicles for more efficient and continuous Life of Field support for operators.” Saipem is very proud and excited to contribute to the development of the FlatFish,” Porcari said.

How Flatfish Works

The vehicle, which is docked near an offshore facility and connected to a power supply and data uplink, enables the operator (either on the facility or at a remote location) to command the equipment to perform an inspection task. Where the inspection target is remote from the facility, the AUV undocks and follows a pipeline or flowline to a target area while collecting acoustic and visual data of the pipeline or flowline. Upon reaching the target area, acoustic and visual data from the inspection object are gathered.

The vehicle then backtracks using acoustic- and visual-homing algorithms to return and connect to the docking station. The recorded data are then uploaded to be processed by automated systems and/or the human operator while the vehicle’s battery is being recharged. At the same time, the operator has the option to define a follow-up mission.

According to Shell Brazil, one of the biggest challenges of FlatFish was to develop a vehicle that can stay underwater and navigate autonomously and reliably with no outside support from operators.

“The vehicle will operate in a totally dynamic and variable environment, capable of handling different possibilities, and having the intelligence to evaluate the best way to solve all types of problems during each mission,” Shell Brazil told *SEN*.

—Brunno Braga

Deepwater Production Advances

A low oil- and gas-price environment encourages efficiencies. Spurred by the need to deliver more value at a lower cost, designers of deepwater production systems are examining ways to modify current designs and existing assets. The goal is to create systems with a broader range of capabilities and applications in a bid to provide units that offer unique value.

Increased activity in the fixed and floating systems sector has given operators enough confidence to move forward

with programs that have been tabled for the last couple of years. January 2017 saw the first signs of resurgence, with the oil price hitting \$55 for the first time in 18 months. The price stayed above \$50 for the first quarter, and as the industry turned the page to 2018, things still appeared to be improving. Brent crude futures held above \$70/bbl and West Texas Intermediate crude futures were at \$66.24/bbl at the end of January, achieving a level analysts say has resulted in the strongest oil price in five years.



Industry needs are advancing, and topsides size and weight are increasing. This 3-D rendering illustrates the past, present and future (top to bottom) using the F4W hull, showing second-generation topsides (past), third-generation topsides similar to those on Brazil presalt FPSO units in operation now by SBM (present) and heavier fourth-generation topsides anticipated in the coming years (future). (Source: SBM Offshore)

Across the board, analysts and investors are predicting a resurgence in deep water. And that means the time is ripe for reevaluating some of the novel concepts designed for deepwater production and examining some new ideas that are in development.

Something Old, Something New

Several of the production units that are preparing to go to work now are moving out of the inactive fleet. One of these is the *BW Adolo* FPSO vessel, which will work on the BW Energy-operated Dussafu project offshore Gabon following modifications at the Keppel FELS shipyard.

The interesting thing about the *BW Adolo* is that it began life as a very large crude carrier (VLCC) called *Fina Europe*, which was built in the Hyundai Heavy Industries (HHI) yard in South Korea in 1988. The VLCC went through several names over the ensuing years, eventually being converted and renamed yet again in 2009 to become the *Azurite*, the first floating, drilling, production, storage and offloading (FDPSO) unit in the world.

The vessel made history when it began production on the Murphy West Africa Ltd. Azurite deepwater field in the Mer Profonde Sud Block offshore Republic of Congo. With a storage capacity of 1.3 MMbbl of oil and processing capacity of 40 Mbbbl/d, its unique design allowed it to be used for drilling and completing production and injection wells. Unfortunately, Murphy shut down the Azurite Field in fourth-quarter 2013 and abandoned it the following year, which left the FDPSO unit without a contract. It has not had a contract since that time.

Making its most recent debut as the newly updated and renamed *BW Adolo*, the vessel, now an FPSO unit, is going back to work. Following modifications at the Keppel yard in Singapore, the vessel features large riser and storage capacity, excess processing and heating capacity and large accommodations and deck space for future field expansion. The newly modified FPSO unit will soon

begin production on the Dussafu Field, which, though not a deepwater development, will be produced using this deepwater production system. First oil is planned for second-half 2018.

First To Float LNG

Another of the assets entering service is Golar LNG's *Hilli Episeyo*. Golar was a first mover in the floating LNG (FLNG) space, building the world's first converted FLNG unit using the Moss LNG carrier, *Hilli*, originally built in 1975. The conversion was carried out by Keppel FELS in Singapore.

While the vessel was still in the Keppel yard, it was part of another first as the recipient of the first commercial LNG bunker transfer in Singapore when FueLNG, a Keppel FELS/Shell Eastern Petroleum Pte Ltd. joint venture, completed truck-to-ship bunkering for the vessel.

In late 2017 Golar reported that conversion and pre-commissioning work on the vessel were complete. The FPSO unit left Singapore in mid-October and arrived in Cameroon toward the end of November, where it will begin work on the Kribi Field for Société Nationale des Hydrocarbures and Perenco Cameroon.

Innovative Concepts

In addition to units about to take the field, concepts are on the design table. R&D efforts are delivering more technologies with the potential to improve drilling and production, and more designs are targeting greater efficiencies.

One of the ways designers move novel ideas from concepts to the field is by getting third-party approval from classification societies. Class societies provide a thirdparty assessment of the design and award Approval in Principle (AIP) for those that are deemed feasible—defined as having no significant obstacles that would prevent the concept from being realized. Normally, this assessment takes place in the early stages of a project to confirm feasibility for the project team, company management and regulators. Recently, a number of AIPs were granted for designs that introduce some impressive new capabilities and efficiencies.

Last year HHI was awarded AIP for an FLNG design that the company said can be constructed for about half the cost of a standard FLNG hull. The design introduces a vessel with a length of 320 m (1,050 ft), a breadth of 60 m (197 ft) and a 12-m (39-ft) draft with LNG storage capacity of 200 Mcm (7 MMcf) using the GTT MARK III membrane technology. According to HHI, the near-shore FLNG hull concept design delivers an estimated one-third cost reduction compared to a standard FLNG hull.

HHI applied the same thinking to a newbuild conversion FPSO hull concept that was awarded AIP in January 2018. The company's *Newbuilding Conversion* FPSO hull also introduces economies, according to HHI. The company said the hull can be built for about half the cost of a conventional FPSO hull. The unit, which features structural reinforcement for topside structure installation, has a barge-shaped hull and is intended to store 2 MMbbl of oil.

Late in December 2017, Dalian Shipbuilding Industry Co. was awarded AIP for its *DSTLP500* deepwater tension-leg platform. The unit, which features four pontoons, four columns and eight tendons, is designed to work in 500 m (1,600 ft) water depth, primarily in the South China Sea.

Fast, Flexible Construction

Meanwhile SBM Offshore is moving forward with what it calls the Fast4Ward (F4W) hull concept, motivated by the belief that reduced complexity and shorter schedules are the key to achieving better safety and economics. The company, which has been developing F4W since 2014, introduced the concept in August 2017 as a faster, cheaper and safer way to reach first oil. The design focuses on standardization, modularization and flexibility. The intent is to deliver what SBM calls maximum interchangeability.

F4W is based on a generic hull designed such that it is ready to receive and integrate topsides modules and a

mooring system. It has large capacity storage, deck space to accommodate complex topsides and construction that requires a single quay. According to SBM, a unit can be completed six to 12 months faster than the typical three-year schedule for a third-generation FPSO unit and at a lower cost.

In June 2017 the company signed a contract for the first standard newbuild, multipurpose hull with China Shipbuilding Trading Co. and the Shanghai Waigaoqiao Shipbuilding shipyard.

Challenges Bring Opportunities

While the oil and gas industry has struggled through an extended downturn, many companies have looked for ways to deliver new designs that deliver economies and capabilities to sustain oil and gas E&P. Innovative thinking has led to designs that could significantly impact economics, and even more inspired designs are still on the drawing board.

—Judy Murray

TECHNOLOGY BRIEFS

Trelleborg Releases Fire-resistant Material For Oil, Gas Market

Trelleborg has released a lighter, thinner fire-resistant material called Firestop, according to a news release.

The material, which is used to protect personnel and equipment by reducing fire escalation, is rubber based and designed to protect structures from surpassing critical temperature limits. Trelleborg said the material is explosion, oil, mud, UV, ozone and water resistant as well as flame retardant and halogen-free.

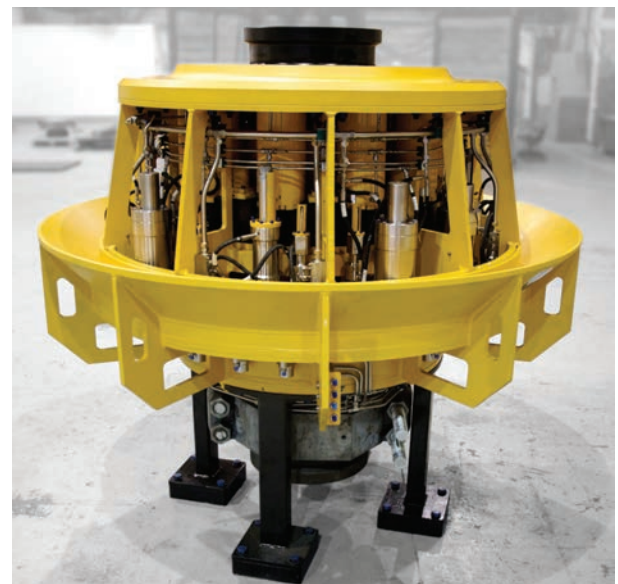
“Based on proven technology, the material is lighter and thinner than our first generation material. The newly formulated compound enables us to reduce both costs and lead time for our customers,” Ben Erik Jansen, business development director for Trelleborg’s offshore operation based in Norway, said in the release. “Since the new material can easily be molded and extruded in all shapes and profiles, we intend to identify new applications for the material in other markets.”



Trelleborg describes Firestop as a passive fire protection material that aims to reduce fire escalation, giving more time to evacuate people, shut down equipment and gain control of the fire. (Source: Trelleborg)

STL Secures Norwegian Patent For Xtreme Release Connector

Aberdeen-based Subsea Technologies Ltd. (STL) has received a patent from Norwegian authorities for its Xtreme Release Connector, which is already being used worldwide.



Subsea Technologies’ Xtreme Release Connector aims to improve safety while lowering environmental risks. (Source: Subsea Technologies Ltd.)

The connector has no maximum disconnect angle, something STL said gives a vessel’s crew ample time to respond to challenges without the risk of getting stuck to the wellhead or damaging the connector if the crew doesn’t react fast enough.

The connector aims to improve safety while lowering environmental risks and in turn saving time and money by increasing a vessel’s operating window.

“We overcame a variety of challenges experienced by existing products in the market, demonstrated by securing this new patent,” Drummond Lawson, STL

managing director, said in a news release. “Our XR Connector differs from other subsea connectors by offering face-to-face technology, which we believe is highly advantageous to both our existing and potential customers.

—Staff Reports

FLOATER BRIEFS

Mexico’s Trion Project Partners Weigh Floating Oil Facility

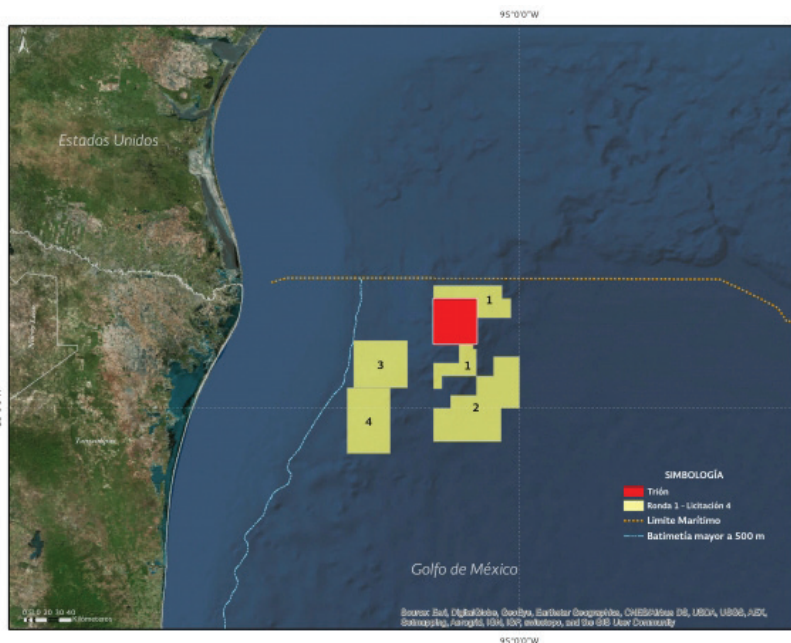
Developers behind Mexico’s flagship deepwater oil venture Trion are considering using a floating facility to handle production from the massive field in the Gulf of Mexico (GoM), the companies said March 6.

There has been no final investment decision on the project signed between the partners. An exploration plan was approved only this month by Mexico’s regulator, said Carlos Trevino, Pemex’s CEO.

Mexico last year said the U.S. could become one the markets for Trion’s oil output, but Pastor said nothing is yet agreed upon.

The executive added that Trion is trying to speed up processes and contracts to turn into Mexico’s first productive deepwater project. A date for early production has not been set.

A drilling vessel was recently contracted from offshore oil service firm Transocean Ltd. under a two-year agreement, BHP said. The company also opened an office in Tampico, in the southeastern part of the state of Tamaulipas, for its land operations.



The Trion Block covers 1,285 sq km. (Source: Mexico’s National Hydrocarbons Commission)

The decision would allow output from the Pemex and BHP Billiton project to be offloaded to tankers, instead of transporting it via pipelines to the U.S. An FPSO could be more expensive but offers greater flexibility in export destinations.

“This field appears to be well-suited for an FPSO,” Steve Pastor, president of operations for BHP Billiton, told a news conference at the CERAWEEK by IHS Markit energy conference on March 6. An FPSO would allow the project to be more efficient, he added.

The \$11 billion Trion, a joint venture signed a year ago after BHP won an auction to become Pemex’s partner and the project’s operator, is near the U.S. border, where companies have developed vast pipeline networks. It is estimated to contain reserves of about 500 MMBbl of oil.

“We all appreciate that there are significant resources near Trion,” Pastor added, referring to existing pipelines on the U.S. side of the GoM with spare capacity.

Woodside To Suspend Australia’s Vincent Oil Output For One Year From May

Woodside Petroleum will suspend production of its Vincent crude oil for a year starting in May as the FPSO for the field undergoes maintenance, according to two traders that participate in the market.

The *Ngujima-Yin* FPSO will be leaving station from the Vincent Field, located offshore of the state of Western Australia, from May for “modifications ahead of forecast Greater Enfield production” from the middle of 2019, a spokeswoman from majority stakeholder and operator Woodside told Reuters in an email.

The spokeswoman did not comment directly on the field’s output during the maintenance period.

The last cargo from the field before the suspension will be exported in May, one of the traders said.

The Vincent project is 60% owned by Woodside and 40% by Mitsui E&P Australia. Production at the field fell to 17,350 bbl/d at maximum capacity in fourth quarter 2017, compared with 18,644 bbl/d in the third quarter, the spokeswoman said.

The suspension of Vincent’s production will likely tighten the supply of high-density, low-sulphur or so-called heavy-sweet crude from Australia, though the

impact on the Asia-Pacific market might be limited because it has a small pool of buyers, the traders said.

About one 550,000-bbl cargo from the Vincent Field is exported per month, and the usual buyers are in Malaysia, the U.S. and India.

“Vincent crude has always been the hardest to sell among all the heavy [crude] grades as there are limited outlets for it as it’s far too heavy,” a Singapore-based crude oil trader said. “I don’t see a massive impact, but there will be some.”

The *Ngujima-Yin* FPSO is being refitted as part of Woodside and Mitsui’s \$1.9 billion Greater Enfield project that will start producing from three fields near Vincent by mid-2019.

Greater Enfield is expected to initially produce more than 40,000 bbl/d of oil at 100% capacity, the Woodside spokeswoman added. This oil will be processed and stored aboard the *Ngujima-Yin* FPSO.

—Reuters

VESSEL BRIEFS

Otto Marine Seeks Insolvency Protection From Singapore High Court

Offshore shipbuilder Otto Marine Ltd. is seeking insolvency protection from the High Court in a bid to salvage the company and stave off liquidation.

Otto Marine, saddled with almost \$900 million in debt, filed to be placed under judicial management in the High Court on Feb. 20 as it seeks to recover.

Otto Marine has been delisted from the Singapore Exchange, and its application for an interim judicial manager will be decided in a hearing on March 12, *The Straits Times* reported.

Executive Chairman Yaw Chee Siew is part of a group that is the single biggest creditor of the company, with \$208 million at stake. Without the court’s relief, the group will likely face an imminent financial collapse, Yaw said in the application.

“I cannot be expected to continue shouldering the financial burden and injecting fresh capital into the company,” he wrote.

New Contracts For Solstad Farstad

Solstad Farstad ASA landed a six-month contract in late February to operate the *Normand Flower* construction support vessel for Fugro Netherlands Marine BV in the North Sea. The contract goes into effect at the end of March.

The company also agreed to terms with Spirit Energy for two platform supply vessels. *Sea Titus* will support *Paragon B391* for one month beginning in March, followed by a 12- to 13-month drilling campaign conducted by *Noble Hans Deul*. *Far Sitella* will begin its support for *Paragon B391* in March as well and continue for about 23 months.

In addition, an undisclosed client awarded Solstad Farstad a contract for the *Sea Spider* platform supply ves-

sel beginning in February for about 70 days. The work involves one well, with two optional wells in the U.K. North Sea.

Corvus Energy Secures Deal To Power Three More Hybrid PSVs

SEACOR Marine and Rolls-Royce have selected Corvus Energy to provide lithium ion-based Orca ESS (energy storage systems) for three hybrid platform supply vessels (PSVs).

SEACOSCO, a joint venture of SEACOR and China COSCO Shipping Group, purchased the vessels and will retrofit them into hybrid vessels. Typical vessel operations will use the ESS for spinning reserve during critical times such as dynamic positioning and to provide support for peak shaving, which will allow the diesel engines to be more efficient.

The Orca ESS will reduce the environmental footprint of offshore operations and cut costs for fuel and engine maintenance.

The contract means the Orca ESS will be providing battery power to 100% of the hybrid PSV fleet in the Gulf of Mexico.

KW Lands Contract for Second Pressure Vessel For Siemens Subsea

KW Designed Solutions will supply a second pressure vessel to Siemens Subsea for production testing of its new DigiTRON fiber-optic connector. The system’s internal tooling will allow mate and demate testing of the connectors while under pressure.

In addition, the new vessel’s working capacity length will be 600 mm longer than the first pressure vessel that KW provided Siemens Subsea.

—Joseph Markman

BUSINESS

Awaiting More Work, Subsea 7 Dives Deeper Into Renewables, Alliance

Market conditions have been brutal for the subsea industry, which is working to recover from the down-

turn, but activity is gradually improving with more work expected this year, according to the head of one



Subsea 7 plans to return its *Seven Inagha* offshore supply vessel to active service this year. (Source: Subsea 7)

of the largest subsea engineering, construction and services providers.

Subsea 7 CEO Jean Cahuzac expects the subsea market will see more awards coming its way in first-half 2018 for subsea umbilicals, risers and flowlines as well as conventional projects. Tenders on the horizon could include awards for work on projects for fields offshore Angola (Zinia), Australia (Gorgon Phase Two), Brazil (Libra), India (98-2) and Mozambique (Golfinho and Mamba)—to name a few—in the short to medium term.

However, the timing of these awards remains uncertain, Cahuzac cautioned while speaking analysts on the company's latest earnings call. Forthcoming conventional awards could also come offshore Nigeria, he added. Gearing up for more shallow-water work, the company is already planning to return its *Seven Inagha* offshore supply vessel to active service this year.

"The oil and gas market has seen a gradual increase in activity with a growing volume assumption in the world. However, at present pricing it's challenging and we expect margins to remain low until excess capacity is utilized," Cahuzac said. "We are addressing this through our lower cost solution using our experience and technical expertise to drive out inefficiencies."

Cahuzac's market outlook came after the London-headquartered company reported March 1 fourth-quarter 2017 net income of \$51 million, up from a loss of \$13 million a year ago. Revenue for the quarter was about \$1 billion, an improvement from last year's \$932 million.

Subsea 7 called its operational performance for the quarter "good with significant progress made on several projects." These included the substantial completion of the Atoll project offshore Egypt, completion of the Maria project offshore Norway and progress with the installation of foundations and cable lay operations at the Beatrice wind farm in the North Sea—to name a few.

Other fourth-quarter highlights include:

- Total vessel utilization rate of 55%, down from 65% in 2016;
- Net operating income of \$28 million included a \$32 million impairment charge relating to vessels and operating equipment plus an \$11 million loss from associates and joint ventures;
- An order intake of about \$1 billion, mainly related to variation and change orders from a client that

experienced some routing issues on projects, according to CFO Ricardo Rosa; and

- Order backlog of \$5.2 billion at year-end 2017. Just more than \$3 billion of this work is set to be carried out in 2018.

In addition to the large projects expected to be awarded by oil companies, Subsea 7 sees opportunity in smaller projects as well. Rosa said these include making some repairs to platforms in the North Sea. The value is small, but "sometimes they grow. So I think it's fair to say that we are seeing opportunities for some of the small projects to come into the market quite quickly and Subsea 7 is generally in a good place to pick up its fair share of those."

Meanwhile, Subsea 7 is strengthening its renewables presence

Strengthening Renewables

Subsea 7 said March 1 it plans to acquire Siem Offshore, which installs subsea inter-array cables and provides repair and maintenance services, along with subsidiary Siem Offshore Rederi's *Siem Aimery* and *Siem Moxie* vessels. The acquisition, which is subject to competition clearance in Germany, is for an initial consideration of \$172 million subject to adjustments.

"By adding cable capability to our EPIC service offering we expect to increase our market share and offer the client a more comprehensive service," Cahuzac said.

The company is no stranger to renewables as it provides engineering, procurement, construction and installation work along with transport and installation services via its subsidiary Seaway Heavy Lifting.

The company remains bullish on renewables and its position in the segment.

"We are seeing growth in the years to come," Cahuzac said. "It's also confidence in the business model that we are seeing in renewables."

The model includes providing integrating services that aim to reduce cost and risk to create a better value proposition, he said. In recent years Subsea 7 has focused on bidding for the foundation of renewable projects, which typically brings along array cable business as part of the package, he added, citing the Beatrice wind farm project in the North Sea as an example. "We see that as part of a longer strategy to strengthen our proposal in renewables and offer a broader package in an integrated manner."

Integrated Alliance

Subsea 7 also recently expanded its relationship with Schlumberger by forming a joint venture (JV). The JV builds upon a subsea integration alliance Subsea 7 and Schlumberger's OneSubsea formed in 2015 to deliver integrated SURE.

"This effort has been very successful with a number of awards and good client interest in the lower-risk, lower-cost solution that have been identified," Cahuzac said.

The new 50-50 JV with Schlumberger aims to strengthen FEED and execution of projects and provide full lifecycle services, he added.

“This joint venture will also simplify our sharing of proprietary information and the creation of new technology, helping us to accelerate our joint innovation and development programs,” Cahuzac

said. “We will be both contributing our Life of Field business creating a unique integrated full field life-cycle offering.”

—Velda Addison

Saipem Sees Tough Year Ahead As Oil Majors Keep Purse Strings Tight

Saipem expects its revenues to fall this year as energy majors keep a tight grip on purse strings and pressure oil contractors’ order books.

Saipem, controlled by oil major Eni and state lender CDP, said it expected sales to be about \$10 billion this year, about \$1.2 billion less than in 2017.

The recent uptick in oil prices has not yet prompted oil service company clients to speed up investments despite a few timid signs of recovery in some segments, the company said.

“Most oil companies are keeping their budgets flat in 2018, if not lower,” CEO Stefano Cao told analysts, after the company reported an 80 percent drop in adjusted net profit for 2017.

Production cuts by OPEC have helped crude prices, but recovery for oil contractors is expected to be patchy, with those finding it tougher to cut capacity and costs lagging others with more flexible business models.

“The company’s outlook for the year is below expectations and that could potentially lead to consensus for 2019 coming down,” said Alessandro Pozzi, oil analyst at Mediobanca.

Saipem, a market leader in subsea engineering and construction, is looking to develop new lines of business to boost order books, including floating wind power farms and dismantling oil and gas platforms, especially in the North Sea.

The company, present in around 65 countries, is looking to expand its footprint in Latin America and is keen to catch opportunities in the Middle East and North Africa.

Cao said he was particularly keen to restore business in Algeria after reaching a deal last month with state energy firm Sonatrach to end a legal dispute that had left it on a blacklist for new orders.

“Saipem is now in a position to access a vital market for our business,” he said.

Asked about alliances and tie-ups, Cao said the company was ready to look at opportunities if they came along, including assessment of its cooperation agreement with Aker Solutions to develop subsea oil and gas projects.

“We need to decide whether to do something more structural with Aker,” he said.

Adjusted net profit last year fell to about \$57 million, far below company guidance of about \$247 million. The adjustment strips out writedowns and restructuring and tax charges which resulted in a reported net loss of about \$405 million for the full year.

Analysts, however, pointed to a good downward trend in debt which is seen at about \$1.4 billion at the end of this year, from about \$1.6 billion at the end of last December.

—Reuters

BUSINESS BRIEFS

Pemex Eyes Partners For Heavy Oil

Mexico’s state-run Pemex might bring partners into two heavy crude oil fields in the Gulf’s shallow waters, the company’s chief said March 6, move that could help ease a lack of heavy barrels in the Atlantic Basin.

After nine bidding rounds in just three years and a presidential election scheduled in July, Mexico’s oil regulator has started a campaign to convince Pemex and foreign investors that this is the moment to develop much needed extra-heavy oil reserves.

“We are looking to increase production, including heavy crude, so we might put on the table some farmouts mainly for those fields that need secondary recovery strategies,” Pemex’s CEO Carlos Trevino said during a news conference during the CERAWEEK by IHS Market energy conference in Houston.

On March 5, Trevino said Pemex was looking for partners for its deepwater Nobilis-Maximino and Ayin-Batsil projects. The heavy oil fields of Ayatsil and Tekel could be offered after that, Trevino said. He did not elaborate on the specific timing.



David Pursell

David Pursell Joins Apache’s Executive Management

David Pursell has been named senior vice president, planning and energy fundamentals, at Apache Corp., effective March 12.

Pursell will oversee corporate planning as well as energy fundamentals systems, processes and analysis.

He previously served as managing director of investment banking for Tudor, Pickering, Holt & Co. (TPH). Before that, he served as head of Macro Research and was one of the founders of Pickering Energy Partners Inc. Before TPH, he was director of upstream research at Simmons & Co. International. Earlier in his career, he worked in various production and reservoir engineering assignments at S.A. Holditch and Associates, which is now part of Schlumberger. Pursell began his career at ARCO Alaska in Anchorage with production and operations engineering assignments in South Alaska and the North Slope.

Oceaneering Acquires Ecosse Subsea For \$69 Million

Oceaneering International Inc. said March 6 it expanded its service line capabilities to the growing renewable energy market with the acquisition of Ecosse Subsea Ltd.

Headquartered in Aberdeen, Scotland, Ecosse builds and operates seabed preparation, route clearance and trenching tools for submarine cables and pipelines on an integrated basis that includes vessels, ROVs and survey services. The company serves the renewable energy and oil and gas industries.

Houston-based Oceaneering said one of its wholly owned subsidiaries acquired Ecosse for about \$69 million.

“The addition of Ecosse reflects our commitment to expand into the adjacent renewable energy market to more comprehensively serve the offshore energy industry,” Roderick A. Larson, president and CEO of Oceaneering, said in a statement. “We expect the acquisition to be accretive to Oceaneering’s 2018 cash flow and earnings.”

Enabling technologies acquired in the transaction include Ecosse’s modular SCAR Seabed System, capable of completing the entire trenching work scope (route preparation, boulder clearance, trenching and backfill) and its newly developed SCARJet trenching system. The SCARJet is an evolutionary trenching system designed for use with standard work class ROVs and adds jetting and post-lay trenching capabilities to the existing pre-cut methods offered by the SCAR plowing tools.

ExxonMobil Quits Some Russian Joint Ventures Citing Sanctions

ExxonMobil Corp. will exit some joint ventures with Russia’s Rosneft, citing Western sanctions first imposed in 2014, while the Russian company said the pullout will result in serious losses for its U.S. partner.

The move is an about-face for ExxonMobil, which had opposed the sanctions over Russia’s invasion of Crimea and argued they unfairly penalized U.S. companies while allowing foreign energy rivals to operate in the country, the world’s largest oil producer.

Yet the sanctions were effective in slowing work on a project by ExxonMobil and Rosneft on what was hailed as a major discovery in the Kara Sea above the Arctic Circle. Rosneft, Russia’s largest oil company, said last year that it planned to return to operations at the project in 2019.

ExxonMobil’s exit from projects will not affect the Sakhalin project off the eastern coast of Russia, ExxonMobil and Rosneft spokesmen said. Sakhalin-1 operates under a production-sharing agreement struck in the mid-1990s and currently produces about 200,000 bbl/d of oil.

US Interior Panel Recommends Cutting Offshore Oil, Gas Royalties

A U.S. Department of the Interior committee voted Feb. 28 to recommend to Secretary Ryan Zinke that the agency lower royalty rates for federal offshore oil and gas drilling, to spur production.

The agency’s royalty policy committee voted unanimously to lower the rates to 12.5% through 2024. The existing rate of 18.75% was set during the administration of former President George W. Bush.

The panel, which is made up of department and state officials, tribal representatives, and energy companies, also voted to increase the amount of acreage available for offshore oil and natural gas leasing in the outer continental shelf.

The Houston meeting was aimed at updating around a dozen federal royalty rules, which guide energy and mineral production in the United States.

The committee was formed last year to advise Zinke on whether the government was getting a fair price from resources companies for their use of public land. He will take its recommendations into account.

Energean Secures More Funding For Israeli Gas Fields

Greek energy firm Energean has secured up to \$1.275 billion in funding with Morgan Stanley, Natixis, Bank Hapoalim and Societe Generale to develop the Karish gas field offshore Israel.

The agreement will help fund development of the field over the next three years, Energean said in a news release.

Energean hopes to begin production at the Karish and Tanin fields, which contain an estimated 68 Bcm (2.4 Tcf) of natural gas, in early 2021. The company is also planning to raise \$500 million in an IPO in London, according to Reuters.

“The participation of four international banks in the facility agreement is a strong vote of confidence in Energean’s flagship project,” Energean Oil & Gas CEO Mathios Rigas said in the release. “Long-term cash flow from Karish and Tanin has been secured through our previously signed gas supply agreements for approximately 4.2 Bcm [148 Bcf] per year with 12 established counterparties.”

ExxonMobil Selling Stake In Canada’s Terra Nova Oil Project

ExxonMobil Corp. is selling its entire stake in the Terra Nova oil project off the eastern coast of Canada, though the company said it was committed to remaining an investor in the region.



Suncor Energy operates the Terra Nova Field. The *Terra Nova* FPSO is one of the largest vessels ever built. (Source: Suncor Energy)

The project, located about 350 km (217 miles) off Newfoundland and Labrador, produced about 5,000 bbl/d of oil in 2016.

ExxonMobil is selling its 19% stake in the project and initial bids are due March 30, according to data and a document from Schlumberger Ltd.'s oil and gas asset sale business.

ExxonMobil confirmed the sale process, though said it does not involve other assets in the area. "We continuously review our asset portfolio to ensure it meets our strategic objectives," ExxonMobil spokeswoman Suann Guthrie said in a statement.

The Suncor Energy-operated Terra Nova project consists of an FPSO vessel produce oil. The project has pumped 400 MMbbl of oil and consists of 30 wells that pumped about 31,000 bbl/d in 2017, the document said.

PetroCanada, Husky Oil Ltd. and Murphy Oil Corp. are other partners in the project.

Kvaerner CEO Resigns, Will Become Head Of Aker Energy

Norwegian billionaire Kjell Inge Roekke on Feb. 23 moved the CEO of his platform-building company Kvaerner to the helm of his new oil company, Aker Energy, which will be developing a big oil field off Ghana.

Aker Energy said on Feb. 19 it had acquired Hess Corp.'s business in the West African country in a \$100 million deal and had plans to develop a "significant" E&P business there.

Top of the list is development of the Tano Cape Three Points block, which holds an estimated 550 MMboe, with a development plan due this year and production due to start in 2021.

Jan Arve Haugan will take the helm of Aker Energy on March 1, after leading Kvaerner since 2011.

Aker Energy is an oil firm owned 50% by Aker, Roekke's main listed investment vehicle and 50% by TRG, the businessman's privately held holding company.

UPCOMING

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