

Airborne, Total Take Deepwater TCP Jumper Plunge



Airborne Oil & Gas has started a project to qualify the TCP deepwater jumper for Total. (Source: Airborne Oil & Gas)

Finding new cost-saving, quicker subsea solutions for deepwater projects are part of the quest for most oil and gas companies.

Those behind the Thermoplastic Composite Pipe (TCP) movement believe they have just that. Offering an alternative to traditional flexibles and steel, TCP has been billed as a cost-effective, lightweight and spoolable pipe that does not corrode like steel and is suitable for HP/HT conditions and corrosive fluids.

Pilot projects already have targeted the use of TCP as flowlines in shallow water following decades of the industry's use of composites such as for onshore production piping. But prospects for composite use in the subsea arena for not only flowlines but also risers, expansion spools as well as commissioning and other types of lines have opened windows of opportunity for manufacturers, suppliers and operators alike.

Airborne Oil & Gas, a provider of TCP in the subsea sector, is going deeper to prove the effectiveness of this upcoming generation of subsea pipelines. The Nether-

lands-based company has kicked off a project to qualify the TCP deepwater jumper for Total.

"The downturn has led to a relentless focus on reducing cost and a realization that radical cost savings require new solutions. The TCP provides the solution to create such cost savings," Airborne Oil & Gas Chief Commercial Officer Martin van Onna told *SEN*. "The TCP jumper is an excellent example of this. We estimate that the cost saving on an as-installed basis is a dramatic 50% compared to conventional solutions. We see the demand not only in deep water, also shallow water, where the low cost of installation is attractive too."

Qualification Effort

As part of the nine-month project, Airborne Oil & Gas will manufacture and test full-scale 6-in. prototypes for the deepwater jumper spool application. The TCP jumper will be used to connect flowlines to subsea wells.

As part of the project with Total, Airborne Oil & Gas will work to qualify the TCP jumper in accordance to standards established by DNV GL. The project includes extensive testing on material coupons in combination with full-scale pipe testing. These include burst testing (internal pressure), collapse testing (external pressure), tensile testing and fatigue testing, van Onna said.

If all goes as planned, by summer next year the TCP jumper could be considered for use at any field that Total wishes to develop, he added.

Airborne Oil & Gas and Total have worked together in the development of TCP since 2009 when the Cost Effective Thermoplastic Composite Riser JIP began.

"The possibility with TCP to handle large deflections, the ability to cut-to-length and terminate the pipe at location and the subsequent installation with small vessels, make a compelling business case for TCP jumpers," Frédéric Garnaud, R&D deep offshore program manager

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for Total, said in a statement. “We estimate we can achieve considerable cost savings by using TCP jumpers.”

Airborne Oil & Gas anticipates delivering qualification in this project to DNV GL standard RP-F119 in second-quarter 2017.

Making The Case

Rigid steel spools are typically used for jumper spool applications today; however, they are large and difficult to install, van Onna explained.

“The TCP jumper allows large deflections and is more flexible, allowing fast and easy installation,” he said.

Another advantage when compared to traditional carbon steel is the rigid TCP spools’ ability to be fabricated locally and cut to size offshore quickly.

“Fabrication is always in the critical path, with the installation vessels and crew waiting for the spool to arrive. The TCP jumper, being more flexible and allowing large deflections, can be cut to length and terminated offshore in a few hours,” van Onna said. “The cost savings therefore are proven both on fabrication cost as well as transportation and installation—a true radical cost different.”

TCP also appears to win points when put next to conventional flexibles. The TCP is

- Cost-effective per meter;
- Lighter and can be terminated anywhere within a few hours; and
- Has simpler, smaller end fittings, he added.

“A detailed cost analysis, based on actual specifications for a West Africa deepwater project, results in a cost reduction of 60% compared to rigid steel jumpers and 30% lower cost for TCP compared with unbonded flexible jumpers,” Airborne Oil & Gas said. “The case

study considered installation of five well jumpers. The cost saving compared to steel is in excess of \$1 million for each jumper.”

Broadening Horizons

The technology has game-changing potential for the offshore and subsea offshore tubular sector.

“Recently a high-pressure TCP jumper spool has been installed by another operator, so we really see this as evidence that the market adoption of TCP technology is accelerating,” van Onna said.

In that project, a small bore, high-pressure spool was installed in the North Sea, marking the first TCP in a subsea permanent installation worldwide. In addition, the company has had 65 TCP deployments in intervention applications, with water depths as deep as 2,140 m (7,021 ft).

He called the TCP jumper a “relevant step on [Airborne Oil & Gas’] staircase approach toward deepwater risers.”

But the company is not alone.

Rival Magma Global signed an agreement with BP and Subsea 7 in 2015 to qualify its carbon fiber m-pipe, which also is high strength, lightweight, corrosion-resistant and fully bonded.

As previously reported by *SEN*, the 30-month Magma qualification program targets 6-in. to 12-in. pipes for risers and jumper systems for deepwater environments and includes laminate testing, single-load tests (tensile, burst, collapse, bending, torsion, compression and impact) and combined-load tests (axial bending, collapse bending, pressure bending and axial pressure bending). The qualification program also is expected to deliver inspection techniques to verify the long-term integrity of the systems.

—Velda Addison

DEVELOPMENT

Aker Wins Johan Sverdrup Work



The Johan Sverdrup oil pipeline will connect to storage caverns at the Mongstad terminal. (Source: Helge Hansen/Statoil)

Aker Solutions has landed a contract from Statoil to build the pipeline facilities, modifications and tie-ins needed at the Mongstad terminal to receive oil from the Johan Sverdrup Field in the Norwegian North Sea.

The contract is worth \$42.5 million and work includes engineering, procurement and the construction of a pig receiver for the oil export pipeline from Johan Sverdrup. In addition, the scope of work includes connecting the Johan Sverdrup oil pipeline to the existing storage caverns at the Mongstad terminal. The work will be completed in 2019.

The pipeline receiving facilities will be constructed in an available area at the Mongstad complex on the west coast of Norway and will be tied in to all required utilities and control and safety systems. The facilities will be connected to the six existing oil caverns through a new manifold system, which will allow Johan Sverdrup crude to be distributed to any of the caverns on the site.

The contract also includes groundwork and foundation work. The engineering work will be carried out by Aker Solutions in Bergen and prefabrication will be done at the company’s yard in Egersund.

Local companies also will be involved during the instal-

lation phase. The groundwork will be handled by Aker Solutions' partners.

On average, the project will employ about 50 people with an expected peak of nearly 100 in mid-2017. The contract will be booked as part of Aker Solutions' fourth-quarter order intake.

"Starting in early 2017 the work at Mongstad will provide opportunities for local suppliers in the Mongstad area," said Kjetel Digre, project director for Johan Sverdrup. "It also is gratifying that we can include Egersund

as a location and contributor delivering on the enormous jigsaw puzzle that the Johan Sverdrup project represents.

"In Norway all of the big yards along the entire coast are now involved in developing one of the biggest industrial projects in Norway in recent years."

Statoil said total contracts awarded for the Johan Sverdrup project are worth more than \$7.29 billion, and more than 70% of these have been handed to Norwegian suppliers.

—Steve Hamlen

DEVELOPMENT BRIEFS



Subsea wells at the Scolty/Crathes development will be tied to the Kittiwake platform. (Source: Centrica)

Kraken Stays On Track For 2017 Startup

EnQuest Plc said the Kraken subsea heavy oil development in the East Shetland Basin is on track, with the FPSO vessel set for sailaway in second-half 2016 and first oil in first-half 2017.

Coping with the downturn, the company already has cut costs for the U.K. North Sea project being developed with Cairn Energy. Better performance on drilling and subsea production systems helped to push the capex estimate down another \$100 million to about \$2.5 billion.

"The Kraken FPSO [unit] is very close to mechanical completion, with the focus now on precommissioning and commissioning activities. All four engines and boilers are mechanically complete," EnQuest said in a statement. "The latest reductions in the overall full-cycle gross capex estimates for Kraken reduce EnQuest's 2016 net cash [capex] by a further \$50 million, now down to between \$620 million and \$670 million."

Jock Lennox, chairman of EnQuest, also credited the company's recently announced restructuring deal to help-

ing deliver the development on time.

The deal is expected to bring in \$410 million of extra cash mainly for the Kraken development.

The company said it would issue 300 million new shares at 23 pence per share and that lenders had agreed to relax some debt repayment terms.

EnQuest agreed with bondholders to only pay bond interest in cash when oil prices are above \$65/bbl for a six-month period. Below \$65, bond interest payments will be capitalized instead.

Some of EnQuest's bond maturity terms and covenants also were relaxed.

In other news, EnQuest said the Scolty/Crathes subsea tieback development is ahead of schedule. First oil is expected by year-end 2016. The Scolty and Crathes discoveries are being developed as tiebacks to the Kittiwake platform.

Subsea 7 Wins Contract Offshore Egypt

Pharaonic Petroleum Co. has selected Subsea 7 to carry out the engineering, procurement, construction and installation of more than 40 km (25 miles) of rigid pipelines and associated structures for the new Atoll Field offshore Egypt, a news release said.

Subsea 7 said the engineering and procurement services have already started. The 105-km (65-mile) umbilical will also be installed, linking the field to shore. Offshore campaigns using Subsea 7 vessels—*Seven Borealis*, *Seven Eagle* and *Seven Arctic*—are scheduled to occur in second-half 2017 and early 2018, the company said in the release.

The contract is valued at between \$150 million and \$300 million.

Hurricane Snags FMC, Technip For Subsea Work

FMC Technologies and Technip, which will become TechnipFMC if their merger is approved, have been provisionally selected by Hurricane Energy to exclusively provide subsea solutions for the company's Lancaster Early Production System (EPS) and the Greater Lancaster Area development.

Technip will become the subsea umbilicals, risers and flowlines provider, while FMC will serve as the subsea

production systems provider.

The three have taken on front-end engineering studies and have worked to develop a fit-for-purpose concept for the Lancaster EPS.

“This has allowed us to reduce the scope and the cost of the development, and ensure full alignment among those driving the project forward,” Hurricane CEO Robert Trice said in a news release.

Hurricane has targeted a first-half 2017 sanction date for the West of Shetland development.

SapuraKencana Secures \$215 Million In Subsea Contracts

SapuraKencana Petroleum Berhad has landed three contracts with a combined value of about \$215 million, the company said in a news release.

Among these is an engineering and construction contract awarded by Oil and Natural Gas Corp. Ltd. for the B127 Cluster Pipeline RTR project. As part of the 20-month contract, the consortium of SapuraKencana TL Offshore Sdn. Bhd. and SapuraKencana HL Sdn. Bhd. will be responsible for the engineering, procurement, construction, installation and commissioning of 11 pipeline systems and associated topside modifications in B127 and surrounding Mumbai High fields located off the west coast of India, the release said.

In addition, Brunei Shell Petroleum Sdn. Bhd. has tapped SapuraKencana Drilling Asia Ltd. for tender assist drilling rig SKD Pelaut as a “bespoke technical solution for its development drilling campaign offshore Brunei Darussalam.” The contract, according to the news release, is for two years, but there is a two-year extension option.

The third contract, which will last about two months, was awarded by Petronas Carigali Sdn. Bhd. (PCSB) for underwater maintenance services for the Sepat mobile offshore production unit. The workscope for SapuraKencana Subsea Services Sdn. Bhd. includes inspection, maintenance, repairs, drilling support and other work for PCSB’s underwater facilities offshore Peninsular Malaysia up to 2,000 m (6,562 ft) water depth with diver intervention up to 300 m (984 ft), according to the release.

Petronas Awards Subsea Contract For Malaysia Project

Technip has been awarded a subsea contract by Petronas Carigali Sdn. Bhd. for the Samarang Redevelopment Project Phase 2 EOR in Malaysia.

Under this contract, Technip will manage the engineering, supply, construction, installation and commissioning (EPCIC) of flexible pipelines, with diameters

ranging from 4 in. to 6 in. as well as EPCIC of associated platform I-tubes.

The contract will be executed by Technip’s operating center in Kuala Lumpur, Malaysia, and is scheduled for completion in third-quarter 2017.

The flexible pipelines will be manufactured at Asiaflex Products, Technip’s manufacturing facility in Tanjung Langsat, Johor, Malaysia. Technip’s vessels will be mobilized for installation works during first-half 2017.

Technip Lines Up EPCI Work For Dvalin Development

DEA has awarded the engineering, procurement, construction and installation (EPCI) contract for the smaller structures and pipelines as well as the subsea installation work of the Dvalin development to Technip Norge AS, a news release said.

The contract includes fabrication of smaller structures, the 12/16-in. pipe-in-pipe production flowline, the 12-in. gas export pipeline and the installation of pipelines as well as all subsea structures and umbilical for the Dvalin Field in the Norwegian Sea, the release said.

Production from the Dvalin Field, which will use a four-well subsea template connected to the Heidrun platform, is expected to begin in 2020. Recoverable gas and condensate reserves are estimated at about 18.2 Bcm and 0.4 MMcm, respectively.

Greater Stella Area Work Advances

Ithaca Energy Inc. continues to make progress at its Greater Stella Area development in the central North Sea, where plans include initially starting up five subsea wells tied back to the *FPF-1* floating production unit.

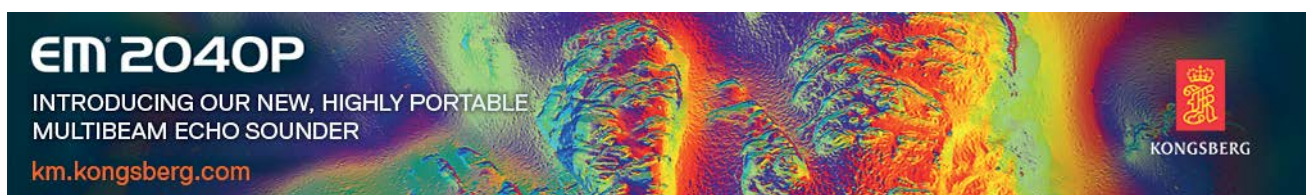
In a third-quarter operational update, the company said Technip is wrapping up the remaining subsea commissioning work and the offshore commissioning program is continuing along with work to prep the topsides processing and utility systems for hydrocarbons.

“The scheduled completion of these activities remains in line with previous guidance, with first hydrocarbons from the Stella Field anticipated in November 2016,” Ithaca said in the update.

Ithaca has checked off from its to-do list towing the *FPF-1* to the field and installing the dynamic risers and umbilical connecting the vessel to subsea infrastructure. In addition, the spurline connecting the vessel to the Norpipe system has been installed.

Remaining work includes manufacturing and installing pipeline pumps on *FPF-1*, Ithaca said.

—Staff & Reuters Reports



FLOATER BRIEFS

Sea Trucks Group Snares Ghana Project

Rotterdam, The Netherlands-based Sea Trucks Group has won a contract to build a construction support vessel to service the FPSO *Kwame Nkrumah* vessel offshore Ghana.

The award from Tullow Ghana Ltd. includes accommodation for 120 personnel and the heavy lift of two 50-ton fairlead chain stopper foundation block structures as well as a 34-ton mooring pull-in winch and smaller fits.

Sea Trucks will use *Jascon 28*, one of its DP3 accommodation hookup vessels for both scopes, demonstrating the advantage of the vessel's hybrid design configuration.

Operations are scheduled to begin in the fourth quarter for a two-month period, with options to extend the contract up to 30 days.

Analysis: Increased Demand Will Pump Up FPSO Market To \$117B

Increased demand and enhanced productivity will result in an FPSO market valued at \$117 billion by 2024, Global Market Insights Inc. said in a new report.

Conversions will see gains of 18% compared to new construction during the forecast period, the report said. These vessels are expected to be deployed widely in both shallow offshore fields and deep water.

FPSO units account for 64% of the more than 260 offshore floating vessel units. Of the rest, semisubmersible units represent 15%, tension-leg platforms are 10%, production barges are 2% and production spars represent 8%.

Global Market Insights estimates the redeployed FPSO market to have been about \$719 million in 2015 and expects it to gain more than 22.3%. This market reduces the execution timeline when compared with newly built units.

The report said that the market will be driven in the near term by increasing E&P activity in ultradeep offshore fields. The shift of E&P toward offshore fields has experienced a moderate growth rate.

Increasing exploration activities in ultradeep water of offshore fields will further compliment the industry in near terms.

Converted product accounted for more than 63% of global revenue in 2015, the report said. The deepwater segment accounted for more than 59% of global revenue share in 2015.

—Joseph Markman

Aqualis Offshore Lands Work Offshore Brazil

Aqualis Offshore has been awarded contracts to provide marine warranty services to three FPSO projects in presalt fields offshore Brazil, the company said in a news release. The values of the contracts were not disclosed.

Modec has appointed Aqualis Offshore to act as marine warranty surveyor for the integration of the *MV29* FPSO unit at BrasFELS shipyard in Rio de Janeiro, Brazil.

BrasFELS has appointed Aqualis Offshore to provide marine warranty services for the marine operations and departure of the *P-66* and *P-69* FPSO units that the BrasFELS shipyard is building for Petrobras.

Under the contracts, Aqualis Offshore said it will oversee loadouts, transportation and installation of modules and equipment, plus quayside mooring and tow to field. The work will be managed from Aqualis Offshore's office in Rio de Janeiro.

Armada Olombendo FPSO Vessel Nears Sailaway

The *Armada Olombendo* FPSO vessel is getting closer to sailing to its final destination in Block 15/06 offshore Angola, where mooring and hookup work will begin for the East Hub Development Project, Eni said in a news release.

The news was delivered Oct. 14 when the company held a naming ceremony for the vessel in Singapore. Hydrocarbons from nine subsea wells, including five producers and four water injectors in water depths ranging from 450 m to 550 m (1,476 ft to 1,804 ft), will be carried via pipeline to the FPSO vessel. First oil from the project is expected by first-half 2017.

Partners in the joint venture include Sonangol Pesquisa e Produção with a 36.84% stake and SSI Fifteen Ltd. with a 26.32% stake. Eni, which serves as operator of the block, has a 36.84% stake.

SOFEC Lines Up Work For FSO Benchamas 2

MISC Offshore Floating Terminals Ltd. has turned to SOFEC Inc. to supply an external turret for the vessel that will be used for the floating storage and offloading (FSO) Benchamas 2 Project in the Gulf of Thailand.

Houston-based SOFEC said it will be responsible for the engineering, procurement and construction of the external turret including fabrication of the rigid arm supporting the turret head. It will be built in Malaysia.

"The turret will allow the FSO vessel to weathervane and continue operations in relatively high wind and wave environments," SOFEC said in a news release. "This capability to weathervane significantly reduces vessel motions and accelerations and allows continual transfer of liquid hydrocarbons regardless of vessel heading."

Plans are for the external turret to be delivered in November 2017.



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The Chevron-led FSO Benchamas 2 project will replace the existing FSO. As described by SOFEC, the new FSO will be moored with nine anchor legs and connected to two 8-in. flexible risers for crude oil and one

6-in. flexible riser for fuel gas. Plans include reusing the existing pipeline end manifold and anchor legs, but the top chain will be replaced.

—Staff Reports

VESSELS

Swan Hunter Picks Motive Offshore For Basket Carousel Loading Tower

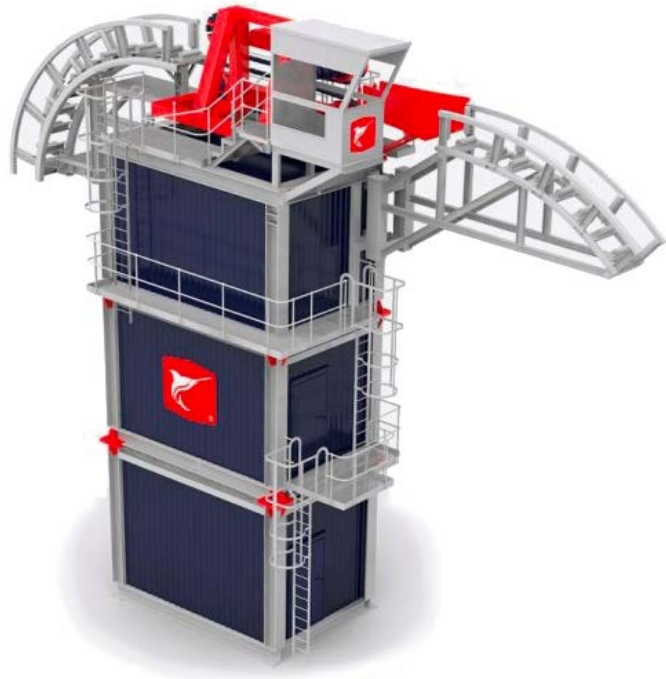
Swan Hunter has issued Motive Offshore Group a letter of intent (LOI) to design and build a basket carousel loading tower.

The agreement with Banff, U.K.-based Motive Offshore Group continues Wallsend, U.K.-based Swan Hunter’s capital investment into its flagship modular basket carousel and tower lay spread, which it expects to be available for cable, umbilical and flexible pipeline installations by summer 2017.

Alkmaar, The Netherlands-based Stemar Engineering is handling the ongoing design and engineering of the basket carousel. The loading tower will feature a modular design to allow efficient transportation and mobilization.

“Innovative machinery that is easy to use, efficient to mobilize and provides a cost-effective method of installing umbilical and flexible pipelines is needed more than ever in the offshore wind and oil and gas industries,” Motive Offshore Managing Director Dave Acton said.

Swan Hunt’s Package Manager John Young said, “This key deliverable, for a robust and capable design that can operate in both the offshore wind and oil and gas markets, will provide us with a strong offering to the market.”



Swan Hunter’s basket carousel loading tower will be designed for flexibility. (Source: Swan Hunter)

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First Oil
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Lucius First Oil
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DLV 2000 Goes To Work Offshore Australia

McDermott International Inc.'s flagship derrick lay vessel, *DLV 2000*, has engaged on its first assignment in the Ichthys Field offshore Western Australia.

The vessel will install large subsea spools, lay infield umbilicals and lift several subsea distribution units to provide hydraulic, chemical and electrical distribution to the subsea drill centers.

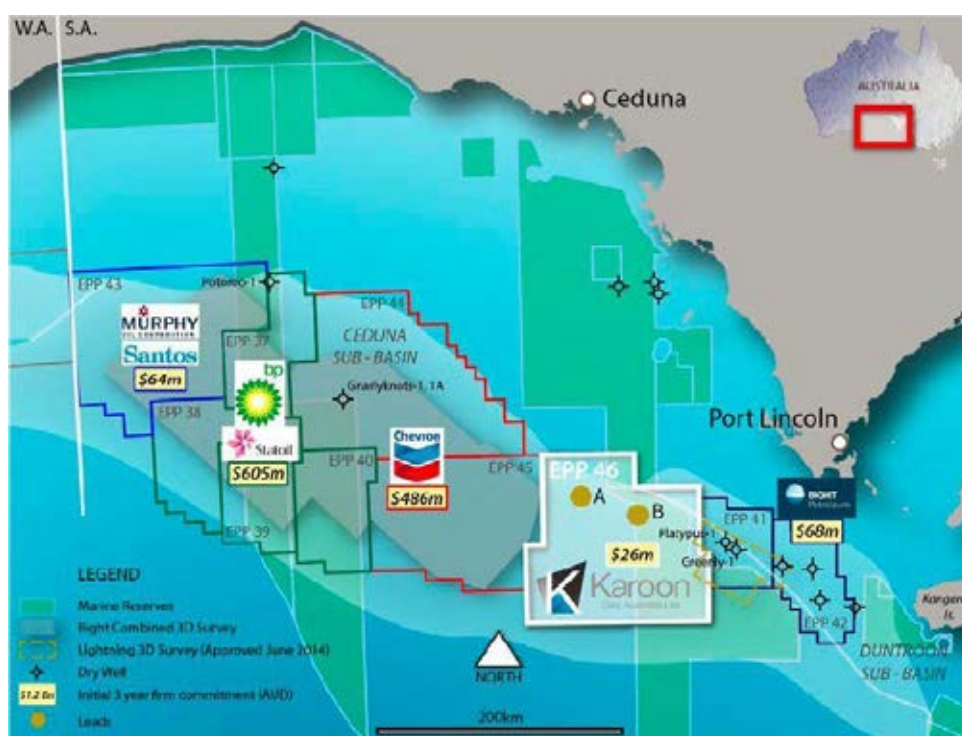
The *DLV 2000* is a combination heavy-lift and pipelay vessel that the manufacturer said is equipped with:

- A 2,200-ton crane;
- Multiple cranes for construction, pipeline and deepwater installation;
- S-Lay capability from 4.5 in. to 60 in. with high strain, deepwater stinger;
- Capability for pipelay operations in single- or double-joint configurations; and
- A DP3 compliant dynamic positioning system.

—Joseph Markman

EXPLORATION

Interest In Great Australian Bight Picks Up



(Source: Karoon Gas Australia Ltd.)

The exploration permit was awarded for acreage next door to Chevron's Bight Basin assets amid rising commodity prices that have boosted E&P companies confidence.

Further price gains could usher in more exploration spending, possibly leading to more discoveries to feed the world's growing energy needs.

Frontier ventures are still considered a gamble—one that some are willing to take.

"The geology, potential target size and surrounding significant near-term exploration activity make it a very exciting, high-impact opportunity," Karoon said.

Add Karoon Gas Australia Ltd. to the list of companies with an appetite for the Great Australian Bight.

The company is joining Bight Petroleum, Chevron Corp., Murphy Oil, Santos and Statoil ASA in the search for hydrocarbons in what is considered one of the last underexplored basins in the world. Karoon said Oct. 7 it was awarded a permit spanning 17,793 sq km (6,870 sq miles) by Australian regulators.

Citing strategy and the project's competitiveness relative to others, BP Plc has backed away from its Bight exploration drilling plans.

Karoon, which also has assets offshore Brazil and Peru, has set its sights on the Ceduna sub-basin—described as a massive Cretaceous delta system where only four wells have been drilled.

Estimates provided by the company showed that the industry already has committed to spending A\$1 billion (US\$760 million) during the next 24 months. The work will include nine exploration wells around neighboring permits, including BP's Stromlo-1 and Whinham-1. Karoon's initial three-year plan does not include drilling a well, but the company expects others' work programs will de-risk its permit.

Like its peers, Karoon is banking on seismic data to help in the hunt for hydrocarbon resources, mainly in the deeper part of the basin.

Chevron, with a permit to explore about 32,000 sq km (12,355 sq miles), participated in a two-stage multiclient seismic survey in which more than 22,000 sq km (8,494 sq miles) of 3-D seismic was acquired. Karoon plans to

acquire a 2-D and a targeted 3-D seismic survey over its permit area as well as conduct geotechnical studies.

“There is a thick sedimentary succession with multiple structural and stratigraphic stacked play types,” Karoon said in a statement. “The sediments thicken in the central to outer areas of the sub basin, which remain largely untested.”

Historical studies, surveys and exploration drilling support the presence of a working petroleum system, Karoon said. Natural oil and gas seeps from the Turonian source rocks recovered from the seafloor and seismic data indicate likely tilted fault blocks and anticlines.

Information provided by Karoon also showed that the 1993 BHP-drilled Greenly-1 well east of Karoon’s permit area, hit “good quality sandstones” with “significant shows.”

Another exploration well, drilled by Woodside about 10 years later west of Karoon’s permit area, failed to find significant amounts of hydrocarbons.

The pace of oil and gas companies’ exploration plans will likely depend on the pace of the sector’s recovery. However, commodity prices and risks that typically accompany frontier drilling are not the only concerns.

The Great Australian Bight is known for its marine life, including sea lions and endangered southern right whales. The *Guardian* reported Oct. 7 that environmentalists are calling for a moratorium on new licenses in the basin.

Acknowledging the area is a “pristine wilderness,” Karoon said it takes its “environmental responsibilities

very seriously and has a history of upholding high standards with respect to meeting its regulatory and social obligations.” It plans to monitor current drilling programs and assess environmental risks.

The National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) in Australia was in the process of reviewing BP’s plans to drill the first two wells in its Bight drilling program when the company announced on Oct. 11 that it decided not to proceed with the exploration project.

Activity logged on the agency’s website show it had requested more information after being unable to make a decision for a second time. BP said its decision was neither the result of altered views of the region’s prospectivity nor the ongoing regulatory process of the NOPSEMA.

“We have looked long and hard at our exploration plans for the Great Australian Bight but, in the current external environment, we will only pursue frontier exploration opportunities if they are competitive and aligned to our strategic goals,” Claire Fitzpatrick, BP’s managing director for E&P, Australia, said in a statement. “After extensive and careful consideration, this has proven not to be the case for our project to explore in the Bight.”

BP, which was partnering with Statoil, had planned use of the Ocean Greatwhite to drill the Stromlo-1 and Whinham-1 wells. The program is scheduled to begin in fourth-quarter 2016.

—Velda Addison

Falling Exploration Costs, Seismic Could Lead To Opportunities

Falling exploration costs on the Norwegian Continental Shelf (NCS) are creating opportunities for operators to continue and even step up activity in the region, according to Rystad Energy.

In 2015 exploration expenses on the NCS totaled about \$3.65 billion when some 200 MMboe were discovered, according to Jarand Rystad, managing partner of Rystad Energy. He noted this implied exploration costs of \$18.24/boe before tax.

So far in 2016, about the same amount of resources have been discovered but expenses are lower, coming in at about \$2.43 billion, he added.

“The current oil price level is around \$50/bbl. Exploration expenses are therefore currently one-third of the oil price, something that is obviously unsustainable. The shale oil business has minimal exploration expenses, and the cost of shale wells are declining such that the well-head breakeven cost now is below \$40/bbl,” Rystad said. “On top of this, we are challenged by the environmental movement that claims that there is no room for more oil within the carbon budgets and that the Barents Sea should never have been opened for petroleum activity.”

But the news is not all doom and gloom.

“On the bright side, we see an encouraging news flow

around the new licenses in the Barents Sea. It has recently been published that prospect size are three or four times the size of the Johan Sverdrup Field,” Rystad said. “Everything points in the direction of gradual increases in the oil price over the coming years, and at the same time, exploration costs have come down.”

Seismic work could lead to additional exploration prospects.

U.K. regulator Oil & Gas Authority (OGA) reports that two seismic surveys, which were funded by the OGA, have been completed.

UKCS Seismic Project Wraps Up

The OGA awarded contracts in July for the second U.K. government-funded \$24.6 million seismic campaign to promote underexplored areas of U.K. Continental Shelf (UKCS).

PGS and WesternGeco bagged the deals to acquire seismic data from the East Shetland Platform and Southwest Britain, respectively.

The program planned to acquire between 10,000 km and 15,000 km (6,214 miles and 9,320.5 miles) of new seismic data from underexplored frontier areas.

The seismic surveys started in July. Data are due to be released to the industry in second-quarter 2017, mir-

roring the 2015 seismic program, which saw more than 40,000 line km (24,855 miles) of new and reprocessed data successfully released to the industry earlier this year, the OGA said.

The *Nordic Explorer* PGS vessel carried out seismic surveys across the East Shetland Platform, which includes the East Orkney Basin, East Fair Isle Basin and Dutch Bank Basin.

WesternGeco vessel *WG Magellan* carried out seismic surveys around Southwest Britain, including the Celtic Sea, Western English Channel, Bristol Channel, St. George's Channel and the Irish Sea.

The seismic acquisition program forms part of a package of measures designed to support the oil and gas sector, announced by former Prime Minister David Cameron earlier this year. The areas were selected following engagement with the industry and endorsed by the MER UK Exploration Board.

Gunther Newcombe, director of E&P for OGA, called the program critical to OGA's goal of revitalizing exploration. He noted the amount of interest sparked by last year's program that covered the Rockall Trough and Mid-North Sea High areas. More than 3,000 standard seismic data packages were downloaded, he said.

"The 2016 program is focusing on underexplored frontier areas where no substantial seismic has been acquired in decades," Newcombe said. "It is expected these areas will be made available for licensing in the 31st Frontier Licensing Round, which will be held in 2018."

More than 43 Bboe have been recovered from the UKCS; however, an estimated 20 Bboe are believed to remain, he added.

"The challenge is now for the industry to increase exploration drilling in the UKCS and work with OGA to meet our shared target of 50 exploration and appraisal wells per year by 2021," Newcombe said.

—Steve Hamlen

EXPLORATION BRIEFS

Hurricane Flows Oil At Lancaster Field Offshore UK

The 205/21a-7Z horizontal sidetrack well on the Lancaster Field offshore the U.K. has achieved a sustainable flow rate using an electrical submersible pump, according to Hurricane.

The company reported a flow rate of 14,500 bbl/d of oil, constrained by test equipment, with no produced formation water.

Well 205/21a-7Z will be suspended for use as a future producer, providing a second production well ahead of the early production system phase of development, Hurricane said.

"We are highly encouraged by this flow rate, which reinforces our reservoir model and further demonstrates the production potential of the Lancaster Field," Hurricane CEO Robert Trice said in a statement.

Total Adds To Martin Linge Resources With Gas Discovery

Total E&P Norge hit gas and condensate in the Tarbert, Ness and Etive formations in the Brent group while drilling in the northeastern part of the Martin Linge Field, a Norwegian Petroleum Directorate (NPD) news release stated.

Preliminary estimations of the size of the North Sea discovery are between 2 million standard cubic meters (MMscm) and 11 MMscm of recoverable oil equivalents, NPD said.

Wildcat well 30/4-3 S, drilled with the Maersk Intrepid rig, was drilled to a vertical and measured depth of 4,134 m and 4,581 m (13,563 ft and 15,029.5 ft) below the sea

surface, respectively, at a water depth of 115 m (377 ft). The well is located in production license 043.

CGG Lines Up Multiclient Program Offshore Mozambique

CGG has been awarded an extensive multiclient program by the Instituto Nacional de Petroleo to acquire seismic data offshore Mozambique, according to a news release.

The multisurvey program is designed to improve industry insight into the region's geology and provide oil and gas companies with a greater level of understanding of the country's prospectivity, the release said.

The program includes a 2-D survey of more than 6,550 km (4,070 miles) in the offshore Rovuma Basin, including blocks R5-A, R5-B and R5-C, and a large 3-D survey over the Beira High in the Zambezi Delta. The 3-D survey is expected to be up to 40,000 sq km (15,444 sq miles), subject to precommitment, the release said. It will cover blocks Z5-C and Z5-D and surrounding open acreage in this deltaic area, which is believed to be prospective.

In addition, CGG was awarded an onshore airborne gravity and magnetic survey in the southern Mozambique Basin, the release said.

The proposed multiclient seismic program in the Mozambique Zambezi region will form part of a geoscience package. Marine gravity and magnetic data will be acquired simultaneously with the seismic to aid regional interpretation.

—Staff Reports

TECHNOLOGY

Optime Subsea, Telemark Bet On New Well Completions System

Subsea technology firm Optime Subsea Services and Telemark Technologies, a Norwegian engineering company, teamed up to push out a modular well completions system for the offshore oil and gas industry.

The companies announced their merger on Oct. 11 with Norwegian investment company Holta Invest as a “significant shareholder.”

The efforts and upfront investment of Optime Subsea Services, as the merged company is now known, come despite not having a firm customer in place and as the oil and gas industry rebounds from a profit-crushing downturn. Companies, including those that are focused on subsea developments, continue to seek cost savings and efficiencies to make projects economical. Hopes are that new technology will deliver both.

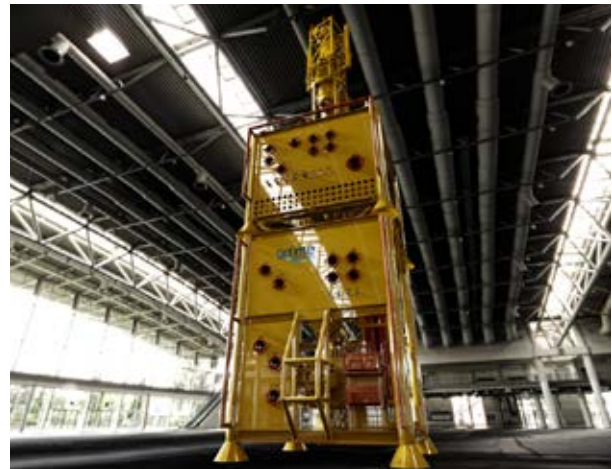
“Although we are bullish on our well stimulation services and the opportunity toward operators, we wouldn’t do this unless feedback from oil companies weren’t extremely positive though,” Optime Subsea Services COO Thor Arne Lovland told Hart Energy in an emailed statement. “So this is a way of making the system available to oil companies as soon as possible, removing any perceived risk of delivery.”

Called the multiCompletionSystem, the subsea installation solution aims to cut costs for subsea tree installation as well as plug and abandonment operations. The system contains several modules that the company believes can save between \$1 million and \$2 million per vertical subsea tree installation and between \$7 million and \$12 million for plugging and abandonment of each well.

Two of the modules include the:

- Light Completion Intervention System, which the companies said is capable of installing the subsea tree, pulling the tubing hanger plug and starting subsea well production in one single operation from a vessel, instead of a rig; and
- Remote Operated Completion System, which installs and pulls tubing hangers on subsea trees. “The ROCS has a small electrical umbilical subsea and controls the tubing hanger by communicating with a control module inside the marine riser. This eliminates the need for an umbilical in the marine riser, representing significant cost saving as well as freeing up vital space topside caused by a traditional umbilical reel, as explained in a news release.

“We agree and believe that the current model of proprietary equipment with challenging interfaces is not the model benefiting all parties—which should be the driver: how to benefit both customers and partners,” Lovland added. “With our life of field system, we believe in having one modular system, which through multiple modules sourced from off-the-shelf and field-proven technology would favor the operator.”



Optime Subsea Services has released a modular well completions system. (Source: Optime Subsea Services)

The system is suitable for both shallow-water and deepwater subsea wells as well as any type of vertical or horizontal subsea tree given the standard adapter and connection interface, Lovland said.

“The benefit of the system is that it enables one modular system through the life of field, from installation through intervention and all the way through to abandonment,” he added. “The essence is that you can run it from a light vessel instead of an expensive drilling rig, without the risk of brining hydrocarbons to deck for completions and interventions, which limits the classification requirements of the vessel and also the cost. The system is a driver for reducing cost, which we believe is necessary at any location for any subsea operator.”

The system is being assembled at Optime Subsea Services’ Notodden workshop in Norway. It is expected to be complete by year-end 2017.

Asked whether the company has been approached by an operator to supply the first facility, Lovland said the company is in ongoing dialogue with a number of operators.

“We see the oil and gas market being desperate for a more cost-effective plug-and-abandonment system, and operators thankfully recognize that we have come up with a highly interesting solution where the traditional solutions are not the right tools designed for the right operation,” he said.

The merger paved the way for additional capital needed to build the first module focused on well stimulation.

Financial details of the merger, which was completed Oct. 11, were not disclosed. However, the company said co-founders of Optime Subsea Services will retain an ownership share of about 50% of the merged company. Holta Invest will have an ownership share of about 40% with the rest retained by legacy Telemark Technologies investors.

—Velda Addison

TECHNOLOGY BRIEFS

Aker, MAN Diesel & Turbo Tackle Subsea Compression Technology

Aker Solutions and MAN Diesel & Turbo expect to reduce the size and weight of subsea compression systems by at least 50%, according to a news release.

The effort comes just a year after the first such system, delivered by Aker in collaboration with partners including MAN and Statoil, went onstream at Statoil's Åsgard Field in the Norwegian Sea. "The Åsgard system, which has been running with practically no stops or interruptions in its first year, will help recover an additional 306 million barrels of oil equivalents more cost-effectively, safely and with a smaller environmental footprint than a traditional platform," MAN said in the news release.

Compressors, typically installed on platforms above sea level, are used to maintain output as reservoir pressure at gas fields drops over time. The two units at Åsgard are the world's first compressors to be installed and put into operation on the seabed, the release said.

SKF, GE Partner To Focus On Active Magnetic Bearing Technologies

SKF and GE Oil & Gas have signed an agreement aimed at further developing the use of active magnetic bearing technologies in the oil and gas sector.

As part of the agreement, GE Oil & Gas will make use of SKF's magnetic bearing technologies from FEED to installation, testing and service to customers, according to Business Wire.

The partnership also provides the basis for future collaboration, to widen the scope of applications of active magnetic bearings into other GE Oil & Gas turbomachinery, such as steam and gas turbines.

Specialist Coating Targets Corrosion, Preventative Maintenance

HTL Worldwide Ltd. has released a specialist coating that aims to extend the life of any structure or assembly, a product announcement stated.

The company said the HTL Pro-Tect is suitable for any mechanical and electrical application that is subject to climatic corrosion. The coating, which HTL said has a lifespan of up to 25 years, is intended to protect all mechanically exposed assemblies in the harshest environmental conditions including subsea.

The high-strength nature of the product comes from its silicone base, which forms a strong, resilient and rubberized coating that averts moisture, debris, and water or oxygen ingress, the company said. Non-marine pollutant and nontoxic to the environment, the coating is described as recyclable and capable of being easily applied and removed.

Guidance Releases New Vessel Radar System

Guidance Marine has released a new Artemis Mk6 long-range radar system the company said is capable of positioning vessels up to 10,000 m (32,808 ft), a press release stated.

The system is typically used in the offshore operation of offloading and transportation of oil between shuttle tankers and FPSO units. The new system has an all-weather operating system up to 10 km (6 miles), interchangeable antennas and antenna units, a Guidance Dashboard user interface and is compatible with all existing Mk5 stations, according to the release.

—Staff Reports

BUSINESS BRIEFS

Oceaneering Expands Subsea Services With \$30 Million Acquisition

Oceaneering International Inc. acquired the assets of Blue Ocean Technologies LLC for \$30 million in cash, expanding the Houston company's subsea services into riserless light well intervention (RLWI), an Oct. 17 Oceaneering release stated.

Blue Ocean is a privately held provider of RLWI systems, which holds the current depth record for deepwater riserless intervention at 2,500 m (8,200 ft).

Oceaneering's acquisition included three RLWI systems, two of which are currently under construction and are expected to be fully functional by mid-2017. The company said it expects to invest about \$10 million to complete the construction of the two RLWI systems.

Blue Ocean's RLWI systems are capable of performing a wide variety of services for well interventions, according to the release. These include well diagnostics, damaged well remediation and workovers, and well plugging and abandonment.

Oceaneering intends to report the future financial results of Blue Ocean through its subsea products segment, under its services and rentals business unit.

Mozambique Appoints Bank Chairwoman As Energy Minister

Mozambique's President Filipe Nyusi appointed businesswoman Leticia Klemens as his new energy minister, just weeks after the capital city of Maputo and Eni signed a 20-year deal to sell LNG to BP Plc.

Mozambique's official news agency AIM said Klemens was chairwoman of Mozambique's largest commercial bank, the International Bank of Mozambique, and also headed the Association of Mozambican Businesswomen.

Her predecessor as energy minister, Pedro Couto, was removed from the job in late September and appointed as president of Mozambique's Cahora Bassa hydroelectric power company.

The southern African state discovered offshore gas reserves six years ago that amount to about 2.4 Tcm (85 Tcf). These reserves are one of the largest finds in a decade and are enough to supply Germany, Britain, France and Italy for nearly two decades.

Eni and Mozambique should reach a final investment decision by year-end 2016 on a project to build a floating offshore platform with capacity to produce 3.3 million tonnes per year of LNG from gas in the Coral South Field, which is part of the huge discovery of reserves in the Area 4 concession.

Emerson Acquires Permasense

Emerson has agreed to acquire U.K.-based Permasense Ltd., a provider of nonintrusive corrosion monitoring technologies, a news release said.

The acquisition represents another step in Emerson's strategy to invest in its core business platforms and expand in markets with significant long-term growth opportunity, U.S.-based Emerson said in the release.

Permasense monitoring systems use unique battery-powered sensor technology, wireless data delivery and advanced analytics to continuously monitor for metal loss from corrosion or erosion in pipes, pipelines or vessels, and deliver data. The Permasense product line will become part of Emerson's Rosemount portfolio of measurement and analytical technologies, according to the release.

Airborne Oil & Gas Secures Funding

Airborne Oil & Gas announced Oct. 10 that it has raised €23 million (US\$25 million) in a series C investment round from new and existing shareholders.

Saudi Aramco Energy Ventures (SAEV) joins the shareholder base with an investment of €10 million (US\$11 million). SAEV is the corporate venturing arm of the Saudi Arabian Oil Co.

The funds raised will enable Airborne Oil & Gas to further focus on growing the business, including product development, qualification, expanding its manufacturing capacity and increasing its sales force.

For its product design and manufacturing, Airborne Oil & Gas has obtained a number of DNV GL qualifications as well as product qualifications from several leading operators such as Chevron, Petronas and Shell.

Brazil Will Ease Local Content Requirements In Oil, Gas Auctions

Brazil will stop favoring companies that offer to purchase a larger amount of local goods and services when select-

ing winners in oil and gas rights auctions, newspaper *Valor Economico* reported on Oct. 17.

In previous auctions, companies that offered more in the way of local content requirements were favored over peers.

The newspaper said it was "practically certain" that this will not be the case in the 14th round of oil rights concession auctions, likely to be held in 2017.

Brazil's new center-right government also intends to loosen minimum local content rules by not specifying whether individual components, such as bolts, have to be produced in the country.

"There is a consensus that the local content policy is a part of a wider industrial policy and has been positive, but it should not be static and needs to be improved," *Valor* quoted Industry Minister Marcos Pereira as saying.

Efforts by Reuters to contact Brazil's energy and industry ministries were unsuccessful.

President Michel Temer's administration has been taking action to boost private investment in the country's oil industry, such as removing a requirement that Petrobras be the sole operator of vast offshore reserves in the costly subsalt layer.

New MSA Replaces Previous Agreements Between Global Maritime, Statoil

On Oct. 18, Global Maritime Consultancy & Engineering received a global master services agreement (MSA) from Statoil ASA for platform technology studies, safety studies, marine verification and warranty surveys.

This MSA replaces several previous frame agreements between Statoil and Global Maritime.

Global Maritime has previously provided services for Statoil's fields on the Norwegian Continental Shelf and elsewhere. Most recently, Global Maritime disconnected and towed the *Njord A* semisubmersible floating production platform from the Njord Field to an onshore maintenance facility.

Global Maritime Consultancy & Engineering is based in Stavanger, Norway.

Subsea International, Ashwood Enter Equipment Funding Arrangement

Customers of equipment sourcing company Subsea International Ltd. will be able to access financial support for purchasing equipment after Subsea International agreed to an equipment-funding arrangement with U.K.-based Ashwood Partnerships, according to an Oct. 14 press release.

Subsea International sources equipment for oil and gas, offshore renewables, decommissioning, subsea electronics and other sectors.

Subsea International's commercial director said that customers will be able to purchase equipment to develop projects safely and on time with reduced risk.

Aker Solutions Plans To Acquire Stake In Brazilian Company

Aker Solutions has agreed to buy 70% of Brazilian C.S.E. Mecânica e Instrumentação Ltda with an option to purchase the remaining stake three years after closing the transaction, according to a news release.

The acquisition, which is subject to approval by Brazilian competition authorities, is expected to close by the end of first-quarter 2017, Aker said in a news release. The purchase price was not disclosed.

C.S.E. provides maintenance, assembly, commissioning and crane operation services at offshore and onshore facilities. The company's fabrication shop in Rio das Ostras is located near Aker Solutions' subsea services facility.

"Aker Solutions has established a solid presence and reputation in Brazil's oil and gas market over the past 40 years and entry into the country's brownfield segment is an attractive growth opportunity," Aker Solutions CEO Luis Araujo said in the release. "Joining forces with a successful local player like C.S.E. fits well with the internationalization of our services business, allowing us to bring our competence, knowledge and experience within this field to this important and growing region."

C.S.E. CEO Altair Dietrich and the company's COO Luiz Joanello will stay on with the company. C.S.E. will

remain a separate legal entity with a management team consisting of personnel from each company, according to the release. Headquartered in Brazil's Parana state, C.S.E. has 2,300 employees.

Eni Talks With Potential Buyer For Mozambique's Area 4 Gas Field

Eni confirmed on Oct. 20 that it was in talks with a buyer for a stake in its Area 4 gas field offshore Mozambique but said a deal had not yet been reached.

Italian broker Equita said in a note to clients earlier on Oct. 20 that according to the chairman of Mozambique's energy company ENH, Eni had sold a majority stake and the operatorship in Area 4 to Exxon Mobil Corp.

"Talks with a potential buyer are ongoing. However, a deal has not yet been finalized," an Eni spokesman said.

State-controlled Eni, which owns 50% of Area 4, had previously said it was ready to sell up to 25% as part of a disposal program to help fund growth.

In August, sources said Eni had wrapped up talks to sell a multibillion-dollar stake in the field to Exxon Mobil, adding that the deal would not be announced for several months at Exxon Mobil's request.

—Staff & Reuters Reports

UPCOMING

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