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SUBSEA ENGINEERING NEWS

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Powering Ahead For The Subsea Factory

Jan Bugge

The subsea factory has long been the aim of E&P companies, and step by step it is becoming a reality. One of the key components is technology for the distribution, delivery and control of the subsea power system.

That is the theme of a joint industry project that ABB Oil and Gas has been running with Statoil, Total and Chevron with an aim to develop technologies for subsea power transmission, distribution and conversion at greater distances, in deeper waters and in harsher environments. The project started in 2013 and is targeting a 3,000-hour shallow-water system test in 2018, including the qualification of pressure-tolerant medium-voltage switchgear, medium-voltage drives and supporting controls and auxiliary supplies.

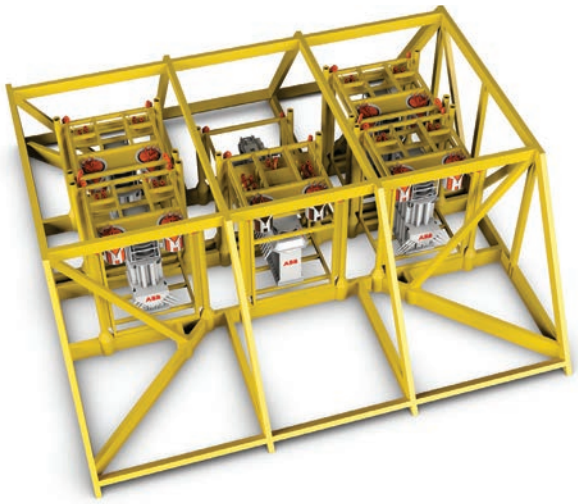
The project budget is in excess of $100 million and is funded by ABB, Statoil, Total, Chevron and The Research Council of Norway. The target environment is water depths up to 3,000 m (9,843 ft), transmission distances up to 600 km (373 miles) and power levels up to 100 MW.

According to Jan Bugge, project director, there are two main challenges with providing subsea power. One is the pressure and the second reliability. "You don't want to go down there every now and then and service the equipment," he said. "You want a fairly long intervention cycle—years rather than months. On top of that they need to operate at 300 bars pressure, so all the power electronics, all the switches, everything, has to work under those very tough conditions."

Testing Times

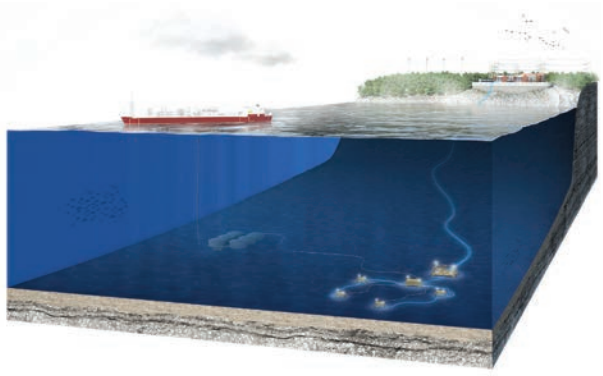
The project is reaching a key milestone later this year with the shallow-water test for the drive systems that will start in Vaasa, Finland, in November.

Bugge said two variable speed drives in a parallel configuration will be installed with subsea switchgear and controls and operated in shallow water for 3,000 hours. "The aim of this is to demonstrate full system function and interfaces under normal operation and fault conditions and to gain reliability experience and demonstrate the suitability of the full-scale prototypes, including thermal properties and marinization for a technology readiness level of 4+."



The subsea power substation is a component of the subsea factory being developed as part of a joint industry project. (Source: ABB)

WHAT'S INSIDE

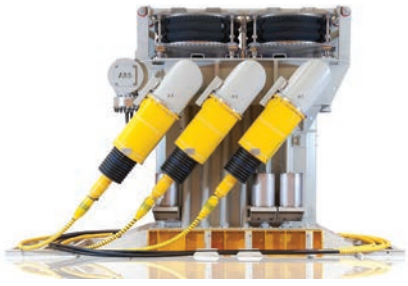


Partners involved in the subsea factory joint industry project say pressure and reliability are among the main challenges with providing subsea power. (Source: ABB)

The technology readiness level (TRL) scale was devised by NASA researcher Stan Sadin in 1974. Each TRL represents the evolution of an idea from a thought, perhaps an initial sketch to the full deployment of a product in the marketplace. Today's scale runs from TRL 1 to TRL 9. A technology that has achieved TRL 9 is one that has been incorporated fully into a larger system. To achieve TRL 4, a technology must be validated in laboratory conditions, while for TRL 5 it must be validated in its working environment.

"The requirements for TRL 4+ are the same as for TRL4 with the additional requirement of demonstrating 3,000 hours of operation in shallow water. At this readiness level the equipment may be part of a real pilot installation," Bugge added. "Naturally, the thermal performance and cooling efficiency of the subsea drives will be in focus during the test. It is essential to verify that individual material temperature limits are not violated to claim the target design life."

The subsea factory being developed by ABB Oil and Gas, Statoil, Total and Chevron includes a subsea variable speed drive (above) and a subsea transformer (below). (Source: ABB)



For the test, the units will be as close as possible in design and functionality to units that will be deployed in a future pilot installation; however, the drives will be operated in a back-to-back configuration directly with the grid without motor loads. This is a so-called "power-in-the loop" test where only power losses need to be supplied from the grid. Testing with a high-power motor load is not done in seawater but rather as part of a factory acceptance test (FAT) before leaving the factory.

The shallow-water test consists of several stages of testing in seawater in a sheltered harbor. "Before connecting the power there will be a period of system testing that will cover various redundant communication tests, black-start sequences, verification of ride-through (energy storage), protection setting adjustments, various breaker and disconnector operations, insulation monitoring system verifications, and operation of the drives with one or more cells out-of-service," Bugge said. "The topside control system is not part of the qualification but is needed for control and operation of the prototypes.

"The 3,000-hour tests are the culmination of a number of interim tests of the key equipment types. These tests include the first full-scale prototype of the variable speed drive, which will be tested in shallow water during 2017. In addition, all prototypes will be tested and verified in line with the design specifications during a routine test/FAT with all control interfaces present and confirmed suitable for the shallow-water test," he added.

Next Steps

As for bottlenecks in the process, Bugge conceded that there are a lot of them.

"I can tell you they are numerous. You need to have a very systematic approach where you really understand the physics of what is happening and to understand the limitations of the various components. To achieve this there is a very dedicated creation process," Bugge said. "We need to understand carefully where the weaknesses are and how we can mitigate those weaknesses so that you get a system that has the reliability that you need. Because at the end of the day, the oil companies need to produce with a certain probability.

"In terms of technology, numerous advances have been made. These technology developments and the project progress rely heavily on experience, know-how and an ability to deliver but are also absolutely dependent on the form of collaboration—a joint industry project," he said. "This setting gives a strong commitment, a clarity of goals and common purpose, and a strong sense and anchoring of the commercial from different perspectives of the partners. We have already seen the fruits of this partnership having passed an important decision gate milestone in April 2015, having verified the technology concept as well as passing TRL2 for a number of key components."

Once the shallow-water test hurdle has been cleared the next stage will be a pilot project, and Bugge confirmed they have several in mind but could not confirm where and with whom.

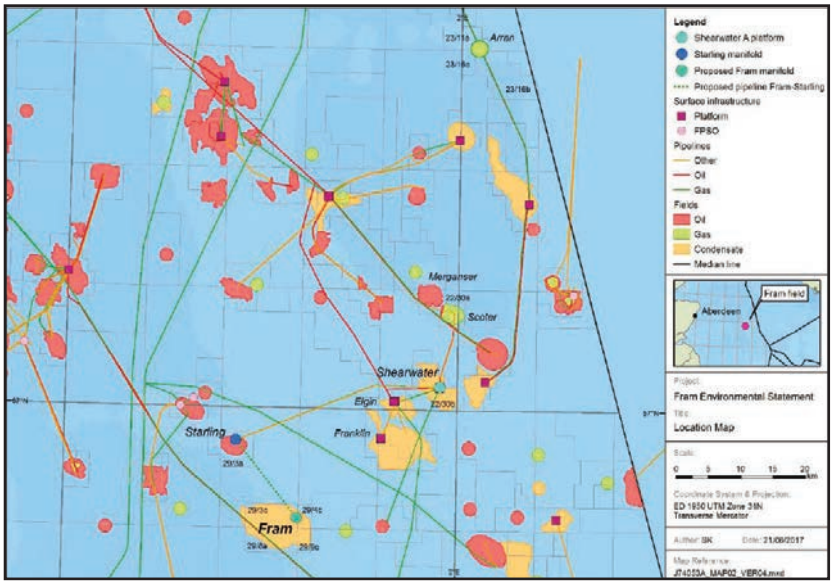
—Mark Venables

DEVELOPMENT

UK Sees Fram, Captain Movement

Two U.K. North Sea field projects have made steps toward development with big hitters Shell moving forward with the Fram Field and Chevron progressing with the Captain project.

Shell has handed in an environmental statement for its field development plan on the Fram gas and condensate field in the U.K. Central North Sea to the U.K. government. In the environmental statement, Shell said it plans to develop the Fram Field as a subsea tieback, using the existing Starling infrastructure, to the Shearwater platform. Fram is located in blocks 29/3a, 29/4c, 29/8a and 29/9c.



(Source: Shell)

The Shearwater Field is a HP/HT reservoir developed with a normally manned integrated process, utilities and quarters platform, which is bridge linked to a wellhead platform. Shell operates Shearwater with partner ExxonMobil.

A 30-day public consultation period for the Fram environmental statement ends Nov. 24.

Shell plans to develop Fram with two horizontal wells in the Drill Center East area. Produced fluids will be transported via a new flowline to the existing Starling manifold about 15 km (9 miles), comingled with Starling production fluids and transported via existing infrastructure to the Shearwater platform 33 km (21 miles) away.

Fluids from the Shearwater platform are exported through the Shearwater Elgin Area Line and Forties Pipeline System pipelines. No modifications are required to the Shearwater topsides processing equipment.

Under the development plan, drilling operations are expected to start in first-quarter 2019, and first production is expected in second-quarter 2020.

In addition, Dana Petroleum plans to develop its Arran Field as a subsea tieback to the Shearwater platform, Shell said in the environmental statement. Dana is planning to submit an environmental statement for the Arran Field in fourth-quarter 2017. Production is scheduled to start in 2021.

Chevron Makes UK Captain FID

U.S. player Chevron has made a final investment decision (FID) to push ahead with Phase 1 of the Captain EOR project in the U.K. North Sea.

Chevron North Sea operates the Captain Field, which is located about 109 km (68 miles) north of Aberdeen. The Captain EOR project is expected to increase the overall recovery rate from the field by using polymer technology, according to Chevron North Sea.

Phase 1 of the EOR project, which follows several EOR pilot programs at Captain, is an expansion within the existing Captain platform area of the field with up to six long-reach horizontal injection wells.

"Sanctioning Stage 1 EOR at Captain is an important milestone in the development of the technology, which we believe will improve the recovery rate from older fields and help extend the life of assets," said Greta Lydecker, managing director of Chevron Upstream Europe. "The application of advanced EOR technology in the North Sea supports the U.K. government's strategy of maximizing economic recovery of its offshore energy resource, and this is in direct alignment with Chevron Upstream's strategy of extracting value from our existing asset base."

Eric Marston, area manager for the U.K.'s Oil & Gas Authority, said, "Polymer EOR has the potential to increase recovery, extend field life and stimulate field redevelopments, so I'm very pleased to see the Captain EOR project move forward, helping maximize recovery from this field."

—Steve Hamlen

Indonesia Encourages Inpex To Develop Abadi Field

Investment-starved Indonesia is wooing the Inpex Corp.-led consortium to develop the delayed Abadi gas field in the offshore Masela Block with offers ranging from extension of the production-sharing contract (PSC) to compensation for changes in development of LNG facility.

During a meeting with Inpex CEO Toshiaki Kitamura recently, the country's energy and mineral resources minister offered to extend the company's contract to operate the Masela concession by an additional 20 years once it expires in 2028.

The minister also has offered the operational rights of an additional seven years as compensation for making changes in the development plan from the offshore liquefaction facility to onshore for Abadi gas.

"This Inpex-related decision ... will give a 20-year extension to Inpex because their contract is almost over, with an additional seven years as compensation for changing the refinery development scheme from floating to land-based," the minister said in a statement.

He further stated the operator would have the freedom to select the location of the onshore LNG facility.

"The Indonesian government hopes that Inpex can immediately start the gas field project," the statement said.

Discovered in 2003, the Abadi gas field remains undeveloped, despite having estimated gas reserves of about 283 Bcm (10 Tcf), due to the differences on the location of developing the associated LNG plant for the gas to be produced. The operator has proposed developing the field with a floating LNG (FLNG) facility near the producing wells, while the Indonesian government is seeking to build an onshore LNG unit in the south Mukulu province.

Yet To Respond

The Japanese company, however, has not responded to the latest proposals made by the Indonesian minister. An Inpex official told Reuters that it continued to hold discussions with the Indonesian government regarding the extension of the Masela PSC but declined to provide further details.

Indications were that a final call on development of the field would be taken after the fresh pre-FEED studies are completed.

The fresh pre-FEED is focusing on drilling 18 development wells, building an onshore LNG facility with a capacity of 9.5 million tonnes per annum (mtpa) and subsea pipeline of about 100 km (62 miles) with a capacity of 150 million standard cubic feet per day (MMscf/d) to transport the produced gas to the onshore processing facility.

Inpex is cautious on disclosing its plans for field considering doubts raised by some analysts on the viability of development of the field with an onshore LNG facility and laying about 100 km subsea gas pipeline in the prevailing lower global prices for gas.

In September 2015 the company proposed a field development plan for the Abadi gas field with 18 development wells and an FLNG facility with a capacity of 7.5 mtpa after the subsea, umbilical, riser and flowline and FLNG FEED studies.

The company said the FLNG concept would be appropriate for the Masela concession considering the limited supporting facilities available around.

However, Indonesia president Joko Widodo rejected the proposal for an FLNG facility to exploit the field, instructing the company instead to submit a new plan based on an onshore LNG plant to be located either on the remote Tanimbar or Aru islands. He said the onshore plant will help the economy of the less-developed southern Maluku province.

Development Studies

The operator has indeed prepared two development studies for the Abadi gas field—one with an offshore LNG project and another onshore.

The offshore concept envisages building a 500 by 82 m (1,640 ft by 269 ft) FLNG facility with a capacity of 7.5 mtpa near the gas producing wells. The FLNG facility will carry out the entire gas and condensate processing from purification to separation to liquefaction and load the produced condensate and LNG to the ships offshore.

The onshore concept suggests transport of gas from the subsea facilities to an onshore LNG plant via a subsea pipeline. A 330 m by 65 m (1,083 ft by 213 ft) FPSO facility is proposed to purify and separate gas condensate. The gas will be transported to the onshore LNG plant via pipeline. The gas will be liquefied onshore.

This plan includes laying a 24-in. diameter, 100-km subsea pipeline from the FPSO unit to the onshore LNG facility at Pulau Yamdena.

The field development proposes drilling 18 directional production wells from five subsea manifolds. The production rate from these wells are expected to be up to 1,200 MMscf/d and 24,460 bbl/d of condensate.

The initial development drilling plan is to focus on the northern part of the field, where most of the reserves are concentrated. Drilling will target the reservoirs in Middle Jurassic Plover Formation at depths ranging from 3,700 m to 3,900 m (12,139 ft to 12,795 ft). The reservoir contains shallow-marine, highly mature, quartzose sandstones.

The total recoverable of Masela Block is about 304 Bcm (10.73 Tcf) of gas and 209 MMbbl of condensate.

The Japan-based company said it is weighing both development options for the Abadi gas and LNG project and will select the cost-effective one after consulting with the Indonesian government.

"We will maintain our policy of aiming for the early startup of development and implementing the [Abadi] project in the most economically and technically rational way and will proceed with the project," Inpex CEO said in the company's latest annual report.

Inpex holds a 65% participating interest of the Masela concession with the rest held by Shell (35%).

—Ravi Prasad

Stampede Barrels Closer To Finish Line

Hess Corp. and partners are moving closer to first oil for their multibillion-dollar Stampede development in the U.S. Gulf of Mexico (GoM).

The project is running ahead of schedule and under budget, according to Hess President and COO Greg Hill during the company's third-quarter earnings call. Production facilities for the deepwater oil and gas field, which has a reservoir depth of about 9,144 m (30,000 ft) with a water depth of about 1,067 m (3,500 ft), consists of subsea production and injection wells tied back to a tension-leg platform.

"All pipeline precommissioning was completed during the third quarter. Three wells have been drilled and completed, and first oil is now expected to be achieved during the first quarter of 2018, which is six months ahead of schedule and well below budget," Hill said.

He later singled out the drilling side in particular, saying "We're 15-20% below AFE [authorization for expenditure] on the drilling side, so that's going extremely well."

Hill added that the industry is learning that wells need to be ramped up slowly and carefully in the GoM.

"So we don't expect to reach our peak at Stampede until 2019," he said.

The current development plans call for six producers and four water injectors.

Gross recoverable reserves for Stampede are estimated at between 300 MMboe and 350 MMboe, according to the company's website.

Hess, which serves as operator, has a 25% working interest in the project. Partners are Chevron subsidiary Union Oil Co. of California, Statoil and Nexen Petroleum Offshore U.S.A., each holding a 25% working interest.

The field, which was discovered in 2005, spans several blocks in the GoM's Green Canyon area.

—Velda Addison

Apsara Development Moves Forward Offshore Cambodia

Singapore-based KrisEnergy has pushed ahead with development offshore Cambodia, having made a final investment decision (FID) for Phase 1A of the Apsara oil field development in Block A.

Apsara lies in the Gulf of Thailand, and Phase 1A includes a single unmanned minimum facility 24-slot wellhead platform producing to a moored production barge capable of processing up to 30,000 bbl/d of fluid with gas, oil and water separation facilities on the vessel, KrisEnergy said.

Oil will be transported via a 1.5-km (0.9-mile) pipeline for storage to a permanently moored floating, storage and offloading vessel.

"FID is another step in progressing the Apsara development within the target time frame following the formal signing of the petroleum agreement in late August," said Kelvin Tang, KrisEnergy's CEO and president of Cambodian operations. "Our technical and operations teams are preparing the necessary tenders for materials, equipment and services. In parallel, consultations continue with parties interested to join this groundbreaking project to reduce our operational risk and capital expenditure exposure."

KrisEnergy operates Block A with a 95% stake, while the General Department of State Property and Non Tax Revenue of the Ministry of Economy and Finance hold the remaining 5% on behalf of the government of Cambodia.

Block A covers 3,083 sq km (1,190 sq miles) in the Khmer Basin and has water depths of 50 m to 80 m (164 ft to 262 ft).

The individual oil accumulations in Block A are small in size and spread across a large geographic area, requiring significant funds and time to fully develop the asset, KrisEnergy said. Reservoir production performance in the Khmer Basin has yet to be proven.

KrisEnergy added that, for these reasons, among others, there is "some uncertainty" regarding long-term production rates, reserves and commercial viability and therefore a phased development approach has been "prudently adopted."

Once the initial Phase 1A platform is onstream, there will be a period to monitor reservoir performance before starting Phase 1B, which includes up to three additional platforms producing to the Phase 1A facilities. Phase 1C will potentially add up to six additional platforms for the full 10-platform Apsara development plan.

—Steve Hamlen

DEVELOPMENT BRIEFS

McDermott Lands EPCI Contract For Project Offshore Middle East

Houston-based McDermott International said it has received a letter of award for a significant contract valued at between $250 million and $500 million for the engineering, procurement, construction and installation (EPCI) services for an offshore Middle East redevelopment project.

The company will fabricate and install four wellhead topsides, a manifold platform and jacket together with associated subsea pipelines and brownfield tie-in works, McDermott said in a news release. The combined total weight of the structures is about 7,000 tons and includes 75 km (47 miles) of onshore and offshore pipeline and umbilicals.

Fabrication work is expected to begin third-quarter 2018, while offshore installation is planned to begin in second-quarter 2019.

Energean Inks Deals With Israeli Companies For Karish, Tanin Gas

Energean Oil & Gas has lined up buyers for natural gas the company is producing from the Karish and Tanin fields offshore Israel, the company said.

The deals were signed with Dorad Energy Ltd. and two subsidiaries of the Edeltech Group, Ashdod Energy Ltd. and Ramat Negev Energy Ltd.

Energean's deal with Dorad is for the supply of up to about 6.75 Bcm (238.37 Bcf) of gas over at least 14 years, while Ashdod and Ramat Negev will get up to 2.65 Bcm (93.58 Bcf) together. Financial details for the deals were not disclosed.

The Karish and Tanin fields are expected to go online in 2020.

Aker BP Awards Subsea Contract To DeepOcean

Aker BP ASA has awarded a contract to DeepOcean for subsea inspection, maintenance and repair (IMR) activities, the company said.

The contract has a total market value of at least $36.9 million during the initial three years with an option to continue the activities for an additional six years.

The contract includes ROV activities related to subsea IMR on Aker BP-operated Valhall, Ula, Ivar Aasen, Alvheim and Skarv fields.

Aker BP and DeepOcean entered a combined framework agreement with a binding minimum volume per year.

ODE Wins Blythe-Vulcan Work

Offshore Design Engineering (ODE) has signed a letter of intent with Independent Oil and Gas (IOG) to undertake work on the Blythe Hub and Vulcan Satellites Hub development in the U.K. Southern North Sea.

IOG said ODE's workload would start with technical and operational support ahead of the final investment decision (FID) for the projects.

The work scope also includes the provision of technical and operational support to IOG in the pre-FID and post-FID stages to help bring the project onstream.

ODE will be responsible for the operational management of all IOG's assets, the Thames Pipeline and a network of infield pipelines, with IOG continuing to be a 100% operator of all assets in the project.

ODE would be the operations and maintenance contractor upon first gas, hosting IOG's onshore operational base at its facilities in Great Yarmouth, close to the Bacton terminal.

The pre-FID technical and operational support work is due to start immediately, while contract terms are being finalized.

ODE added that pre-FID costs would be fully deferred and pre-first gas costs would be 50% deferred until first gas, reducing IOG's funding requirements.

Faroe Petroleum Starts Drilling Operations At Tambar Field

Faroe Petroleum has begun drilling operations for the Tambar development project in the producing Tambar Field in the Norwegian North Sea.

The Tambar development project consists of two new infill wells and the installation of gas lift in three existing wells to increase overall field production.

The infill wells, which are being drilled by the *Maersk Interceptor* drilling rig, will target undrained areas of the field identified in the north and south with the potential to further increase 2P reserves. The combination of the infill wells and installation of gas lift has the potential to increase Tambar production and extend field life by up to 10 years, contributing to lower unit operating costs in the Ula hub area, Faroe said.

Gas produced by the Tambar Field will be transported to and reinjected into the Ula Field (Faroe 20%) as part of its ongoing Water Alternating Gas injection scheme, which is expected to generate additional production over the life of the Ula Field.

The Tambar and Tambar East Unit Fields are satellite fields located about 16 km (10 miles) southeast of the Ula Field. Tambar has been developed with an unmanned wellhead platform tied back to the Ula platform, with three existing wells in the Tambar reservoir and one existing well in Tambar East. The two fields are operated as one by Aker BP with the majority of the developed reserves found in the Tambar Field.

Akastor ASA Wins Contract For West White Rose Project

Akastor-owned MHWirth said it has landed a contract from Wood Group Canada Inc. for delivery of a drilling package, including equipment, engineering and services for the West White Rose project offshore Canada.

Husky Energy is developing the West White Rose project, together with its co-venture partners. This will be a fixed facility with a platform supported by a concrete gravity structure.

The platform will serve as a fixed drilling rig and is located about 350 km (217 miles) southeast of the province of Newfoundland and Labrador in Canada in the White Rose Field.

The primary function of the platform will be drilling and will include limited processing facilities and permanent accommodations.

"This is the first complex offshore drilling package awarded in the market in the past several years. We are looking forward to working closely with Husky and Wood Group on this project," said MHWirth CEO Finn Amund Norbye.

The contract covers the majority of the equipment ranges of MHWirth in addition to an engineering scope.

Aker Solutions Wins Order For World's Largest Umbilical System

Aker Solutions won an order valued at more than $200 million to deliver the largest umbilical system ever, the company said.

The contract entails delivery of 250 km (155 ft) of steel-tube umbilical linking a subsea development to an existing offshore platform.

"We are honored to have been selected to work on this project, which is groundbreaking in terms of the size and technology of the umbilical system," said Aker Solutions CEO Luis Araujo.

The work will be led by Aker Solutions in Oslo and manufacturing will take place at the company's umbilical plant in Moss, Norway. Delivery is set for the end of 2018.

The parties have agreed to not disclose the name of the project or customer at this point.

Umbilical systems are full-service connections used to transport data, power and liquids between oil and gas installations on the seafloor to onshore facilities or platforms.

—Staff & Reuters Reports

EXPLORATION

Shell Bets Big On Brazil As Oil Majors Snap Up Offshore Blocks

Oil major Royal Dutch Shell won half the blocks awarded in Brazil's deepwater oil auction Oct. 27, while rival BP took two blocks and ExxonMobil Corp. took one in a historic opening of the presalt play to foreign operators.

Brazil awarded six of the eight blocks on offer in the auction for the rights to pump oil from the country's coveted presalt region, where billions of barrels of oil are trapped below thousands of feet of salt in the country's Atlantic waters.

President Michel Temer said development of the blocks would lead to $30.84 billion in investment from the winning companies and $39.7 billion in royalties and other revenues for the cash-strapped state.

The wins bolster Shell's position as the largest foreign operator in Brazil's offshore oil sector, second only to state-run oil giant Petrobras, adding more than 1,700 sq km (656 sq miles) to its deepwater Brazil portfolio.

The Anglo-Dutch oil major won one area in a consortium with France's Total SA, another with Petrobras and Repsol-Sinopec, and a third with Qatar Petroleum International (QPI) and China's CNOOC.

(Source: Shutterstock.com)

Shell has said it is confident it can pump oil from the presalt fields at below $40/bbl.

"These winning bids were submitted after our thorough evaluation and add strategic acreage to our ... global deepwater growth options," Shell Upstream Director Andy Brown said.

BP, which is active in Brazil but not yet producing oil, took two blocks.

"We see the government of Brazil being more supportive of foreign companies entering Brazil," BP Latin America President Felipe Arbelaez said after the rounds. "There are high-quality assets. We believe that the assets here will be resilient in any price environment."

Brazil earned $1.88 billion in signing bonuses for the six fields that it awarded in the auction.

Temer's government has enacted reforms to make the energy sector more attractive to foreign investment, and for the first time international oil firms will be allowed to operate fields in the presalt.

Countries worldwide sitting on oil and gas reserves are keen to pump it before it becomes less valuable as global policies to address climate change kick in.

The opposition in Brazil has pushed back against the reforms, and the auction was delayed by three hours Oct. 27 after a federal judge issued an injunction to suspend the process at the behest of the leftist Workers Party, which opposes the privatization of oil production.

That left top executives from the world's largest oil companies milling around in the hotel that hosted the auction, in an upscale seaside neighborhood in Rio de Janeiro.

ExxonMobil

U.S. major ExxonMobil, whose 10-block win in September's Brazilian auction was seen by many as a prelude to a big play Oct. 27, took just one block as part of a consortium with Statoil and Petroleos de Portugal SA, a unit of Galp Energia SGPS SA. Two blocks got no bids.

But ExxonMobil bought a stake in a nearby block from Statoil for $1.3 billion, Statoil said, soon after the round.

"Our full intent is to get right after the Brazil acreage," Jeff Woodbury, ExxonMobil's head of investor relations, said on a conference call following the auction.

The quality of reserves and the reforms have made Brazil an important target for oil majors, even though they have had less appetite for capital-intensive megaprojects since crude prices crashed in 2014.

Peroba, which was clinched by Petrobras, BP and China National Oil & Gas Exploration and Development Corp., boasts an estimated 5.3 Bbbl of oil while Carcara, won by Statoil, ExxonMobil and Petrogal, is thought to have some 2.2 Bbbl of oil.

"Brazil's offshore is one of the last major plays out there that's in its infancy," said Brian Youngberg, an oil industry analyst at Edward Jones. "Companies that are still interested in the big elephants out there, like Exxon and Shell, are aggressively pursuing them."

Brazil has high hopes for the volume of oil the companies can pump from the blocks. Brazilian oil output could double to more than 5 MMbbl/d by 2027, compared with the 2.6 MMbbl/d produced in August, regulator ANP has said.

Two blocks on offer at the auction were not placed. But ANP general director Decio Oddone still considered the rounds a success.

"A result in which 75% of offered areas are sold is a resounding success anywhere on the planet according to any point of view," he said. "Brazil returned to the oil and gas sector with this auction."

—Reuters

Mexico Puts Offshore Acreage In Spotlight For Upcoming Tenders

(Source: Shutterstock.com)

Offshore—deepwater and shallow-water—was in the spotlight as Mexico's energy officials visited Houston recently to share details and insight on acreage being offered.

The country is offering blocks as part of its upcoming shallow-water Round 2.4 and deepwater Round 3.1. Plus, there is a farm-out opportunity with Pemex for the Nobilis-Maximino deepwater block in the attractive U.S. Gulf of Mexico (GoM) Perdido area, near the world's second-deepest oil and gas production hub on the U.S. side.

The Royal Dutch Shell-operated facility produces oil from the U.S. GoM Great White, Tobago and Silvertip fields the company operates with partners BP, Chevron, Nexen and Unocal.

The latest tenders offered mark a step change in Mexico's rounds in that the country is offering more blocks compared to earlier tenders.

"We wanted to start small and move in a very careful way to a larger scale for our biddings rounds. We needed to control the process, adapt our institutional procedures [and] improve the contractual scheme and structure for our upstream sector," said Aldo Flores, deputy secretary for Mexico's energy ministry. "Through each bidding round we have been learning, adapting and adopting some of the comments we've received from the industry. … We think we are closer to that sweet spot that works for both the Mexican government and companies in the development of an even better partnership."

The upcoming rounds are the:

Shallow-water Tender: Offers 35 blocks with 2 Bboe in prospective resources. The blocks, which cover the Burgos, Tampico-Misantla Veracruz and Southeast Basin

areas, will be awarded in late March. The resource potential is two times that of the potential resources awarded in all previous shallow-water rounds.

Deepwater Tender: Offers 29 blocks with 4.2 Bboe in prospective resources. Blocks, which include acreage in the Perdido Fold Belt area, Mexican Ridges and Salt Basin, will be awarded in January. Mexican energy officials said the resources have high oil and gas potential. The amount of acreage offered is three times that offered in Round 1 with twice the amount of prospective resources.

In addition, Pemex is seeking a partner to develop the Nobilis-Maximino Block, located 15 km (9 miles) from U.S. territory. The 1,525-sq-km (589-sq-mile) block has more than 500 MMbbl of crude oil equivalent in 3P reserves plus prospective resources of more than 700 MMbbl of crude oil equivalent, according to Pemex.

Flores pointed out that Mexico's first two rounds have already led to discoveries.

Eni has had success in shallow water of Campeche Bay offshore Mexico, having raised its estimate of resources in place at the Amoca Field to 1 Bboe after striking more oil with its Amoca-3 well.

Plus, the consortium of Talos Energy (operator), Sierra Oil and Gas and Premier Oil has celebrated an offshore oil discovery with the Zama-1 well hitting oil pay. Initial gross original oil in place estimates for the well range from 1.4 Bbbl to 2 Bbbl, according to Talos.

However, Juan Carlos Zepeda, head of Mexico's National Hydrocarbons Commission, said the Zama discovery could be the country's first unitization case given its close proximity to Pemex acreage.

"But we don't have confirmation and we haven't received any requests to provide technical assessment," he said.

—Velda Addison

EXPLORATION BRIEFS

KrisEnergy Kicks Off Campaign In Gulf Of Thailand

KrisEnergy has started drilling the East Mayura-1 exploration well with the *PV Drilling I* jackup rig in Block G10/48 in the Gulf of Thailand (GoT).

"East Mayura-1 is the first well in a potential eight-well campaign, including five firm wells plus one optional well in the existing Wassana oil field in Block G10/48 and one optional exploration well in the Wassana satellite development area north of the Wassana production area. The campaign is expected to take approximately 125 days, including the optional wells," KrisEnergy said.

The *PV Drilling I* jackup rig is being used to drill the East Mayura-1 exploration well. (Source: PV Drilling)

Block G10/48 covers 1,677 sq km (647 sq miles) over the Southern Pattani Basin at water depths of up to 60 m (197 ft). In addition to the Wassana oil field, which came onstream in August 2015, the block also holds the Niramai, Mayura and Rayrai oil finds.

"The GoT is a core operational area for KrisEnergy. The company has non-operated working interests in the B8/32, B9A and G11/48 producing blocks and is the operator of G10/48 and G6/48, which contains the Rossukon oil discovery. The company also operates Block A across the maritime border in Cambodian waters, where it is seeking to develop the Apsara oil field," KrisEnergy added.

KrisEnergy operates Block G10/48 with an 89% stake, while Palang Sophon holds the remaining 11%.

Equatorial Guinea Signs Contract With Kosmos For Offshore Blocks

Equatorial Guinea has signed three new production-sharing contracts with Kosmos Energy for offshore blocks, the first such contracts for Kosmos in the West African country, the ministry of mines and hydrocarbons said Oct. 23.

In June, Equatorial Guinea, Sub-Saharan Africa's third largest oil producer, signed a similar contract for offshore Block EG-11 with U.S. oil major ExxonMobil at the conclusion of its 2016 licensing round.

"We look forward to working with Kosmos as we continue to push the boundaries in oil and gas exploration," Gabriel Obiang Lima, the minister of mines and hydrocarbons, said in a statement.

Obiang Lima said Block EG-21 was offered for tender during last year's licensing round, while Block S and Block W, previously operated respectively by China's CNOOC and PanAtlantic Energy, were negotiated directly with Kosmos.

In each of the three blocks, Kosmos will hold an 80% stake and national oil firm GEPetrol the remaining minority.

Tullow's Wildcat Well Fails To Strike Oil Offshore Suriname

Tullow Oil has plugged and abandoned an exploration well offshore Suriname after not making a commercial discovery, the company said.

"The Araku-1 well was an ambitious wildcat exploration well that was drilled efficiently and at very low cost," said Angus McCoss, exploration director. "While we have not made a commercial discovery, we are encouraged by recovering gas condensate from the well and remain fully committed to exploration in Suriname and Guyana."

The well was drilled in a block where Tullow Oil operates with a 30% interest alongside joint-venture partners Statoil and Noble Energy, Tullow said.

Analysts at Jefferies said that while the Araku-1 exploration well has proved unsuccessful, the result "ironically" meant no additional capex demands on Tullow's balance sheet.

"The well was also being closely watched by the market with expectations in our view higher than normal given the recent successes of Exxon across the maritime border in Guyana," Investec analysts said.

Greenland Will Offer Oil, Gas Concessions Next Year

Greenland will offer oil and gas concessions off its west coast next year, its mineral resources minister said in an interview Oct. 31, as the self-ruled region of Denmark tries to get a flagging exploration program back on track.

The concessions will be in Davis Strait and Baffin Bay, said Mute Bourup Egede, speaking to Reuters during an annual Greenland Day event at the Danish embassy in Beijing. Both bodies of water are between Greenland and Canada.

Egede put the estimated resources off Greenland's west coast at about 17 Bboe, with another 32 Bboe on the east coast. It is unclear whether the resources are mostly oil or gas, he said.

Despite the vast potential, progress on exploration in Greenland has been slow, not helped by a plunge in oil prices that began in mid-2014 and has left benchmark crudes still at about 50% of their values of three years ago.

Statoil was one of several firms to cut exposure to Greenland when it announced in January 2015 that it was handing back three exploration blocks to the government.

The 2018 licensing round will be open to all and "we'll choose the best" bidders, Egede said.

US Puts Nearly 77 Million Offshore Acres Up For Development

The U.S. Interior Department is planning to make nearly 77 million acres available for oil and gas development in its largest lease sale to date.

The 14,375 blocks being offered for the proposed March 2018 sale are located in the Gulf of Mexico (GoM) offshore Texas, Louisiana, Mississippi, Alabama and Florida. The sale essentially includes all available unleased areas on the GoM's Outer Continental Shelf, excluding blocks that are subject to a Congressional moratorium, adjacent to or beyond the U.S. Exclusive Economic Zone in the area known as the Eastern Gap and some blocks where the Flower Garden Banks National Marine Sanctuary is located.

The Interior Department estimates the proposed region-wide sale could result in the development of up to 1.12 Bbbl of oil and up to 125 Bcm (4.42 Tcf) of gas with most activity centered on the GoM's most active region—the Central Planning Area.

The amount of acreage for the proposed sale is over 1 million acres more than what was offered during the last region-wide sale.

—Staff & Reuters Reports

TECHNOLOGY

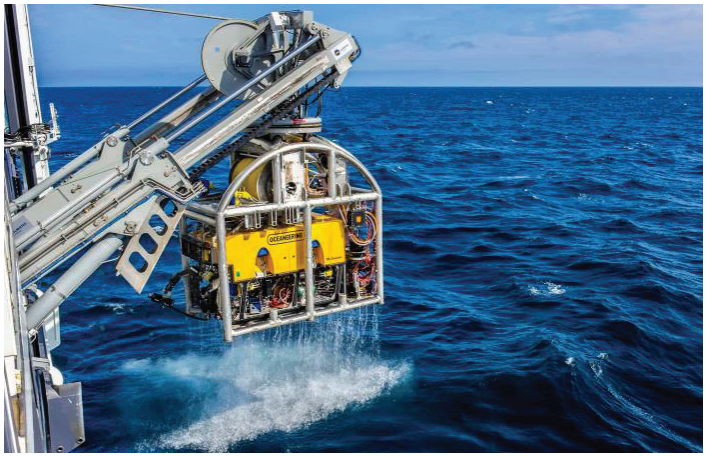
Connectivity Enhances Use Of Automated Technology Offshore

The use of automation technologies and remote operation has steadily been increasing in the offshore environment over the past few years. Of these technologies, ROVs and AUVs have become critical to the implementation of standardized operations and project management.

ROVs, AUVs

ROVs and AUVs are great tools for companies in the oil and gas field since they enable subsea monitoring of pipelines and the ocean floor. The operation of these vehicles is made possible by transferring data to the vessel or central data hub.

Video streaming provides the operator with eyes in the subsea environment without having to leave the surface. This technology has improved over



An Oceaneering ROV is lowered into the ocean for subsea surveillance. (Source: Speedcast)

the past few years to where companies can now stream high-definition video over satellite links. This video feed can be augmented with sonar data and 3-D models to piece together a near real-time picture of what the subsea environment looks like in any situation. By augmenting the video with 3-D models of the site, an ROV may have a more comprehensive understanding of its environment beyond what it can see.

ROV use is not only critical to the welfare of operations but also to the environment. The majority if not all of ROV operations are recorded and reviewed. Oftentimes the data recorded must be transferred to shore to verify that the job has been completed. In certain incidents such as the Deepwater Horizon disaster, ROV video is sent back to shore to document a disaster and keep tabs on the issues being seen on the seafloor after the event. Operational efficiencies are gained by using video during normal operations and during the post-job review. This is accomplished by providing a record of all activity to complete the installation or repair. This live and recorded data provide the documentation required to help support the equipment going forward and is critical to the regularity and business sides of how the systems are deployed and maintained. Additionally, analyzing how the previous installs were completed and supported provides further enhancements to planning teams.

AR

Augmented reality (AR) is a new technology that has emerged in the last few years that increases the viability of subsea operations. With this technology companies can take a 3-D model and overlay it into the video. AR can be incredibly valuable to the operation of subsea ROVs and AUVs, particularly in low- or even zero-visibility environments. It provides situational awareness of what is happening below the surface on a rig or subsea pipeline. Additionally, with remote operation of drones or remote factories topside, AR enables operators to feel as if they are in the environment and increases efficient and effective operations. AR technology serves as peripheral vision that operators don't have when working remotely.

However, none of this is possible without an efficient and reliable data link. With the changes in environment and movement of the ocean it is no longer feasible to rely on a single connection source. Companies have started looking at different communications solutions like LTE/4G beyond the line-of-sight technologies.

Video Streaming

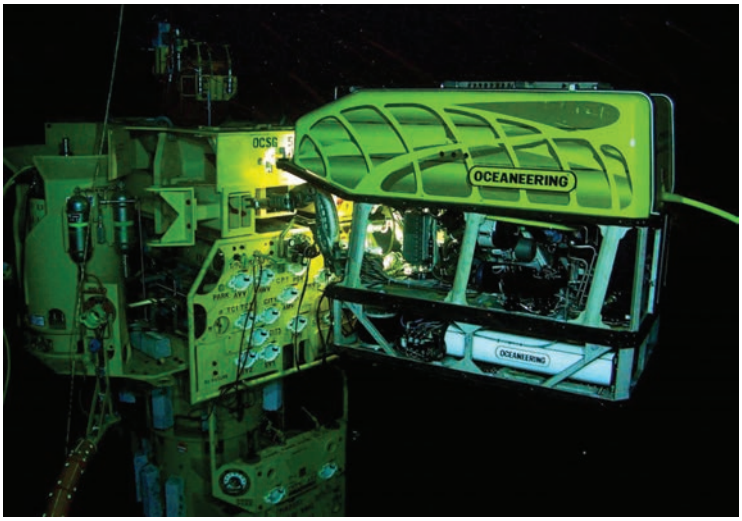
Having more than one communications option adds another level of reliability so that companies can do more mission-critical and challenging tasks as they move forward. Additionally, with the growth in the industry for automation on all levels and types of vehicles, having multiple connectivity options as well as security and reliability in those connections is paramount to operating efficiently and effectively. This might include hybrid systems that enable vessels to automatically switch to a new form of connectivity based on what is available.

Speedcast works closely with Oceaneering, a global provider of engineered products and services, to provide an offshore satellite link for the company to gather and distribute the vast amount of data it collects from various offshore assets.

What Connectivity Means

Remote connectivity has become a key growth area for Oceaneering. The company's recent acquisition of an autonomous surface vessel company paired with its unmanned underwater system and the autonomous guided vehicle, which is being used by manufacturing companies such as Porsche and numerous theme parks, makes this partnership essential as it provides critical connectivity for their operations.

Oceaneering found that by streaming video and telemetry to the AUVs and ROVs, it could enhance operations in subsea environments while also centralizing management and monitoring of those jobs.



ROVs and AUVs allow operators to navigate in and around subsea equipment in low-visibility ocean environments. (Source: Speedcast)

Increasing Employee Safety

With this type of connectivity companies are able to automate different tasks on an offshore vessel and transfer those data to a centralized hub for monitoring and management. This allows companies to pull personnel from dangerous offshore environments on vessels, which inherently improves employee safety and morale. Furthermore, as an AUV or ROV swims throughout the water column, it is not necessary to have an operator sitting in the seat during a two-hour dive to the bottom. An operator can be summoned if an issue arises.

By transferring data collected to a centralized hub or onshore control center, companies are able to employ domain experts who would previously have been required

to visit each site individually for areas like tooling and processing to monitor not just one but multiple operations from the control center, further increasing benefits and decreasing expenses for the operator and customer.

Bringing all of the data collected on vessels back to a centralized hub enables companies to create a common operating picture. This allows companies to leverage resources on land that they would not be able to leverage in an offshore environment. One very skilled individual can look at multiple projects around the world at the same time and provide that expertise in a real-time or near real-time basis through a singular interface.

For personnel this type of automation and centralized data monitoring reduces risk of harm and reduces costs for overall operation. The cost of putting someone on a helicopter, flying them out and getting them certified is typically 10 times what it costs to have that same expert onshore.

Standardization

Centralizing data management and monitoring and having a set team of professionals reviewing and making decisions on business production and implementation also increases the standardization of a company's operations. This reduces much of the cost that accumulates when different projects are run by different groups in various areas around the world.

When companies run projects out of the same control center, they can control how projects are being executed and make it easier to support and maintain the company standard. In short, if companies centralize the work that they do, it standardizes the work that gets done and becomes easier to support and maintain over the long term because the experts running these operations know how the project should be laid out to conduct the operation the same way each time.

The more data a company can bring in and monitor, the more it can drive technical growth opportunities like virtual reality and AR that can increase the reliability and efficiency of a company's ROVs and AUVs.

— Mark Stevens, Oceaneering Global Data Solutions, and Will Mudge, Speedcast

Avitas Systems, Kraken Robotics Partnership Targets Subsea Robotic Inspection

Kraken Robotics Inc. has entered a partnership with Avitas Systems, a General Electric Venture, to advance robotic inspections for the oil and gas, offshore renewable energy and shipping industries, according to a news release.

Avita Systems will integrate AUVs, acoustic and laser sensor technology and artificial intelligence-based navigation software into an autonomous subsea inspection system. The partnership expands capabilities for inspections of ship and FPSO hulls, underwater production fields, subsea pipelines, cables and offshore wind farm assets.

Kraken's SeaVision sensor, which can flexibly attach to AUVs and ROVs, combines laser scanning and optical imaging to provide data for inspectors and operators. The sensor's colorized laser imagery detects and characterizes corrosion, cracks, marine growth and other defects.

SeaVision's laser scanning process can be repeated thousands of times per second to generate coordinate values for millions of points on a surface. These points then become 3-D models of subsea infrastructure.

Avitas Systems will also use sonar technology and navigational software from Kraken to optimize robots' abilities to follow supervisory commands, track pipeline or subsea field positioning with AI-powered swim paths and identify priority areas for inspection. Kraken's AquaPix synthetic aperture sonar technology will specifically enable 3-D volumetric imaging.

The high-resolution images of assets' surface contours can be inputted into the Avitas Systems cloud-based platform, where advanced algorithms fuse multiple sensor data, perform image analytics and predict actionable outcomes in real time. The Avitas Systems platform can centralize and prioritize the inspection data by areas of interest to inspectors, which will increase efficiency, the company said.

"Integrating our technologies with Avitas Systems will significantly enhance subsea asset management and provide improved safety, reduced costs and actionable intelligence for operators." Karl Kenny, Kraken's president and CEO said. "We look forward to announcing our first contract during fourth-quarter 2017."

—Staff Reports

FLOATER & VESSEL NEWS

DSME Closes In On Castberg Win

South Korea's Daewoo Shipbuilding Marine & Engineering (DSME) is close to winning a contract to build the hull and living quarters (LQ) for Statoil's Johan Castberg FPSO vessel offshore Norway, according to reports from Asia.

Subject to the signing of a contract, DSME will build the hull and the LQ of the FPSO unit destined for deployment in the Barents Sea.

DSME has beat off stiff competition from fellow South Korean shipbuilders Samsung Heavy Industries (SHI) and Hyundai Heavy Industries (HHI). DSME has offered a

$575 million price to build the hull and the LQ, while SHI offered $595 million and HHI offered $600 million. The contract for the topside will be awarded separately in first-half 2018, according to a report in the Korean press.

The FPSO unit will be positioned on the Johan Castberg Field (formerly Skrugard), which lies about 240 km (149 miles) northwest of Hammerfest and 100 km (62 miles) north of the Snøhvit Field in the Barents Sea.

The Johan Castberg Field consists of the three discoveries: Skrugard, Havis and Drivis, which were proven in 2011 to 2013 in Lower to Middle Jurassic sandstone.

The discoveries contain between 450 MMbbl and 650 MMbbl of oil and are being developed as one project.

A final investment decision for the Johan Castberg project is due to be made toward year-end 2017.

UK Catcher FPSO Remains On Track

Premier Oil reports that the *BW Catcher* FPSO vessel on the Catcher Field in the U.K. North Sea is moving toward first oil this year.

(Source: BW Offshore)

The FPSO unit arrived at the field in the U.K. North Sea on Oct. 18. The hookup of the submerged turret production buoy mooring system was completed Oct. 19, with the vessel successfully completing a rotation test around the buoy Oct. 20.

"The final pull-in of the risers and umbilicals is now underway and commissioning activities have also commenced in parallel. Delivery of first oil remains on schedule by the end of the year," Premier said.

DOF Subsea Snags Contracts For Vessels In Atlantic, North America

DOF Subsea said on Nov. 1 it has been awarded two contracts, securing utilization for several vessels in the Subsea IMR Projects segment.

In the Atlantic region, DOF Subsea has been awarded a contract within the wind industry, securing utilization of *Skandi Neptune* for 45 days and options in the fourth quarter.

In the North America region, DOF Subsea has been awarded a contract for the provision of survey, ROV and vessel services in the Gulf of Mexico, securing 135 days of vessel utilization in two phases. The project will utilize the vessels *Harvey Deep Sea* and *Skandi Achiever* with Phase 1 commencing in fourth-quarter 2017 and Phase 2 commencing in first-quarter 2018.

FPSO Vessel Arrives At Malaysia Field

Australia's Octanex reports that the *MTC Ledang* FPSO vessel has arrived on location at the Ophir Field offshore Malaysia with commissioning activity underway.

"The FPSO [unit] is in final position, all mooring lines attached. The flowline between the FPSO [unit] and the previously installed wellhead platform [WHP] has been installed and tested," Octanex said.

The Ophir Field is located offshore Peninsular Malaysia at a water depth of about 70 m (230 ft). The field is being developed via three production wells, a WHP and an FPSO vessel.

A risk service contract was granted to Ophir Production Sdn Bhd (OPSB) in 2014 for development of the field.

Octanex holds a 50% stake in OPSB, and its joint-venture shareholders in OPSB are Scomi with 30% and Vestigo Petroleum with 20%.

—Steve Hamlen & Staff Reports

CONFERENCE REPORT

OTC Brasil 2017 Highlights Partnerships For Operational Efficiency, Lower Costs

A more realistic, safer and economically efficient industry was among the topics of discussion at the OTC Brasil 2017 Conference.

The event took place Oct. 24-26 in Rio de Janerio, part of a South American region that is gaining attention because of its offshore oil and gas potential. North of Brazil, French Guiana, Suriname and Trinidad and Tobago are opening new opportunities for the industry and attracting majors that are making huge investments.

The conference happened in Brazil amid three oil auctions, which raised $3 billion in bonus revenue.

During the opening ceremony, Decio Oddone, general director for Brazil oil regulator ANP, emphasized that

Brazil will attract roughly $264 billion by 2027, mainly because of its presalt activities.

Considering operators are expected to acquire 30 new oil platforms for the areas recently auctioned, Brazil could become one of the greatest oil-producing countries outside OPEC, according to Oddone.

"Brazil cannot miss this opportunity," he said. "Brazil must to learn how to take advantage of these opportunities."

Tackling Challenges

Although Brazil's presalt was the main topic during the conference, discussions on challenges and opportunities for the oil and gas industry in other places in South America were also highlighted. On the panel "New Developments in Ultra-Deep in South America," conference speakers debated new ultradeep development and issues related to some of the new projects on the continent.

"We are very excited about our discoveries in Guyana and our acreage acquisitions in Brazil and Suriname," said Roal Lokken, chief offshore and infrastructure engineer for ExxonMobil.

During his presentation, Lokken talked about Liza's field activities. Located offshore Guyana, Liza is considered as one of the hottest prospects for the offshore industry. Interest is also picking up given nearby finds in the North Atlantic.

To the executive, current subsea technology can successfully operate to the depth of about 3,000 m (9,843 ft), enabling record-breaking projects in the Gulf of Mexico and Brazil. Thus, he said today's challenges are essentially economic and no longer purely technical. The first phase of Liza is expected to develop 450 MMbbl of oil by 2020, five years after discovery.

Besides the enthusiasm over Liza, Lokken also mentioned the Payara discoveries made in December 2016, Snoek in March 2017 and Turbot in October 2017 as opportunities to boost technological developments offshore Guyana.

Others speakers on the panel said they believe lower prices will not change in the near future. So companies must find solutions to become more efficient to face the current price situation.

Russell McBeth, TechnipFMC FPSO account manager, said recent mergers between leading subsea hardware and subsea, umbilicals, risers and flowlines companies have created opportunities to supply lower cost solutions with improved interfaces and better scheduling certainty.

For SBM Offshore FPSO account director Carlos Mastrangelo, the current situation has some positive aspects.

"We have all seen lots of cycles before and treating this one with a sense of forever may actually help us do what needs to be done," he said.

Stronger Alliances

On the panel "New Alliances in the Subsea Market—What Operators Can Expect?," the speakers raised questions about how the subsea market can work together in terms of achieving success in global offshore E&P operations.

Aker Solutions CEO Luis Araujo, one of the speakers, spoke about the importance of digitalization to improve safety in offshore activities. "Digitalization harnesses the power of data and technology to transform life-of-field development from subsea to surface," he said.

Araujo mentioned collaboration between ABB and MAN Diesel & Turbo on technology development in subsea power and automation system expertise as an example.

According to Araujo, initial focus areas are to developing better subsea compression systems. Both companies also worked on delivery of the world's first subsea compression system for the Statoil-operated Åsgard Field offshore Norway. The collaboration will target opportunities worldwide.

Petrobras executive manager for subsea systems Cristina Pinho, the panel's keynote speaker, also stressed the importance of a good partnership between operators and suppliers.

According to Pinho, Petrobras plans to carry out early engagement and work closely with main contractors from the start of a project's conceptual phase to production, especially in the current low oil price environment.

She said that the Brazilian state-owned oil company works to achieve cost reductions of up to $5.35 billion in subsea systems to be installed by 2026 in the Santos and Campos basins.

"During Phase Phase 1 of our subsea cost reduction program from 2014 to 2015, we were able to save about $518 million from a total of 21 initiatives designed to cut unit costs and keep the availability of critical items," the manager said.

Pinho added that she is engaged in talks with Petrobras' suppliers. "Some initiatives include recent modifications we did on the subsea layout of some fields, like having the production platform closer to the wells," Pinho said.

The Petrobras manager also said that the next steps will probably include an evaluation of subsea architecture such as tiebacks and trunklines, the promotions of competitiveness between rigid and flexible risers, the development of new technologies, including electrical distribution and subsea processing, and a multidisciplinary and integrated approach in conceptual design developments.

She also mentioned the increase in productiveness of the company's flexible pipelaying support vessel fleet throughout the years as another cost reduction initiative.

—Brunno Braga

BUSINESS

Hess' Offshore Deals Haul In $2.6 Billion; Free Cash For Bakken, Guyana

A combined Aker BP ASA photo of operations and an illustration of North Sea Valhall Field development is shown. Hess Corp. agreed Oct. 24 to sell its Valhall and Hod fields to Aker BP for $2 billion. (Source: Hart Energy)

Hess Corp. recently sprang back-to-back deals to sell overseas assets, ending Oct. 24 with a two-day tally of $2.65 billion in proceeds.

Hess' sales will free up cash flow, allowing it to focus on attractive growth assets such as its Guyana position as well as its Bakken assets in the Williston Basin.

On Oct. 24, Hess said it entered an agreement to sell its oil and gas interests in Norway for $2 billion. The company will also commence a process to sell its Denmark interests.

The day before, Hess said it sold its offshore Equatorial Guinea assets to Kosmos Energy Ltd. and Trident Energy for $650 million.

So far in 2017, the company has sold or agreed to sell assets for proceeds of $3.25 billion. In August, Hess sold its Permian Basin EOR assets to Occidental Petroleum Corp. for about $600 million.

In the company's second-quarter conference call, Hess "telegraphed an enhanced willingness to monetize non-core assets, in part to mitigate looming cash shortfalls," said Guy Baber, an analyst at Piper Jaffray & Co. "The company wasn't kidding."

Hess captured an attractive price for its offshore Norway fields, compared to other North Sea transactions in the past couple of years, Baber said.

"We view these developments as positive, as the strategic rationale is sound, and as the cash consideration received is attractive, especially for Norway," Baber said in an Oct. 24 report.

On Oct. 23, company CEO John Hess said the sale of its Equatorial Guinea assets furthers its strategy to invest in higher-return assets while divesting from more costly and mature areas.

"Proceeds from asset sales, along with cash on our balance sheet, are expected to fund the development of our truly world-class investment opportunity offshore Guyana," he said. "Our investment in Guyana will position our company to deliver a decade-plus of returns-driven growth and increasing cash generation to our shareholders."

In Norway, Hess will sell its subsidiary Hess Norge, which owns interests in the Valhall and Hod fields to Norway's Aker BP ASA. Hess holds a 64.05% interest in Valhall and a 62.5% in Hod.

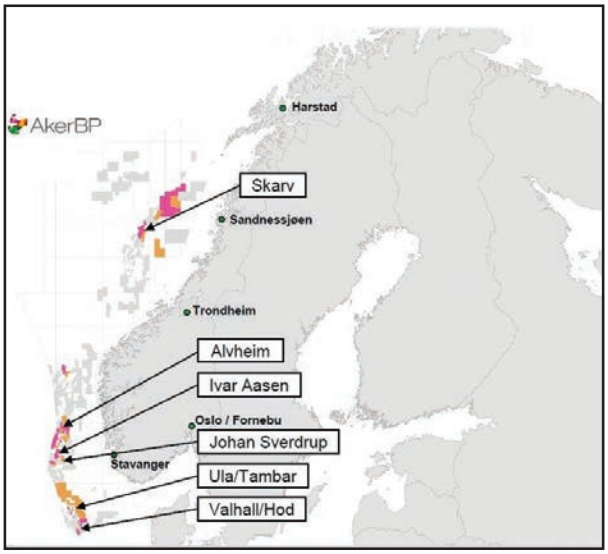
Aker BP will also assume Hess Norge's tax liabilities, including an after-tax loss, carry forward of $1.5 billion.

The Valhall and Hod fields produced an average of 26,000 boe/d net to Hess during first-half 2017.

The fields have produced 1 Bbbl as of January. Aker BP said its ambition is to produce at least another 500 MMboe from the fields.

The sale is subject to customary conditions for completion, including approval by Norway's Ministry of Oil and Energy, Ministry of Finance and relevant competition clearance. Hess expects the sale to be complete by the end of the year.

In Denmark, Hess will begin its sale of a 61.5% interest in the South Arne Field. The company said it expects to complete a transaction in 2018. The South Arne produced an average of 11,000 boe/d net to Hess in first-half 2017.



(Source: Aker BP)

Meeting Halfway

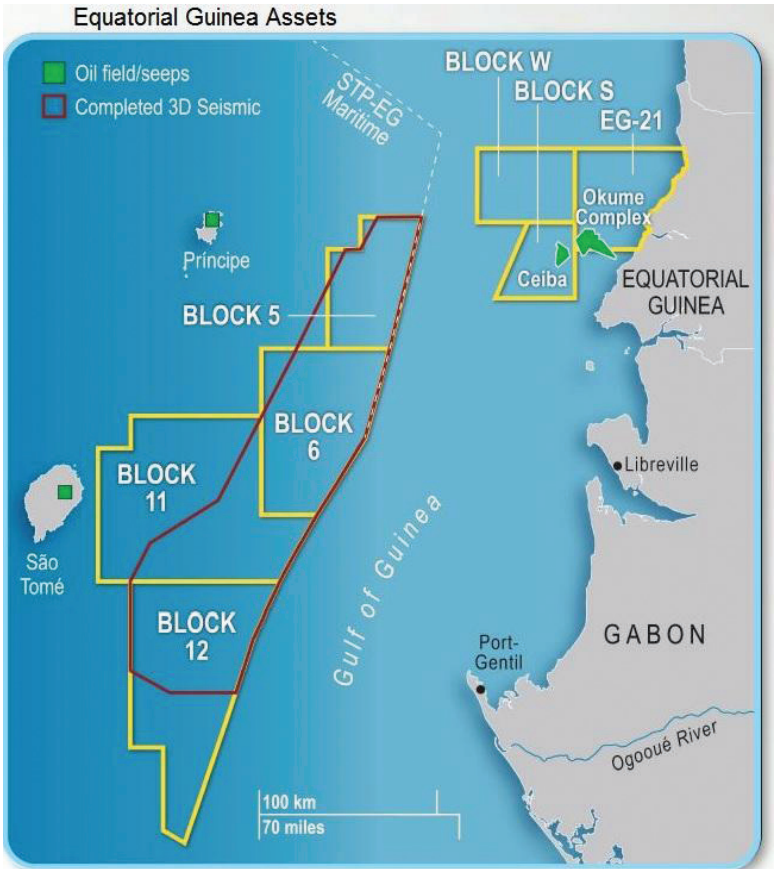
Kosmos Energy and Trident's deal for three blocks offshore Equatorial Guinea adds about 6,000 sq km (3,728 sq miles) to its portfolio and renewed interest in an asset that Hess had neglected.

Baber said Hess has not been actively investing capital in the assets, causing production declines. Hess sold its 85% interest in the Ceiba and Okume assets for a net price of $480 million.

"Overall, while the value extracted here is not optically impressive, it is reflective of the reality of a limited pool of buyers and that it was not going to compete for capital in

the Hess portfolio," Baber said. "The strategic rationale to exit Equatorial Guinea is sound."

Kosmos said that, after adjustments, its net cost for the interests will total about $240 million. Trident Energy, backed by Warburg Pincus, will act as production operator while Kosmos will conduct exploration operations. The companies entered the agreement in a 50:50 joint venture.



(Source: Kosmos)

Kosmos will gain about 13,500 bbl/d of net oil production, said Richard Tullis, a Capital One analyst.

"Deal metrics work out to an attractive $18,000 per flowing bbl/d and $5.35/bbl on company-estimated 2P remaining recoverable resource," he said.

The transaction provides entry into Equatorial Guinea with both exploration and existing production components," Tullis said. Kosmos plans to fund the acquisition with cash on hand and its reserve-based lending facility.

Gap Closing

When all divestitures are complete, Hess expects to remove about $3.2 billion in future abandonment liabilities. A portion of the proceeds will also reduce the company's debt, excluding midstream, by $500 million in 2018.

Combined with cost reductions, Hess said it expects to reduce its cash unit production costs by about 30%—to less than $10 per boe by 2020.

Phillips Johnston, an analyst at Capital One Securities, said that the sale help bridge a sizable funding gap for Hess over the next few years.

"These assets have not been competing for capital, so by monetizing them, Hess will prefund part of the development of its major Guyana discoveries and will reduce its cash cost structure in the process," Johnston said.

Adjusting Hess' estimated 2017 cash flow for an effective date of Jan. 1, 2017, the asset sales will generate about $2.2 billion in cash proceeds.

The deals represent about 11% of Hess' enterprise value. Hess will also scratch off 16% of its production and 22% of its EBITDA.

"We estimate the properties generate net 12-month EBITDA of about $415 million at $50 Brent," Johnston said.

—Darren Barbee

BUSINESS BRIEFS

Mark Jones

InterMoor Appoints New Global CEO

InterMoor has tapped Mark Jones, vice president at Acteon, to serve as global CEO for the company.

Jones will be responsible for building more structure and greater collaboration among business units, focusing on areas of growth and mobilizing new services across the regions, InterMoor said in a news release.

Jones has significant experience within the oil industry, having been managing director for a division of EXPRO and head of strategy and business development for Siemens Subsea.

In addition, InterMoor announced Blair Wilson will take on the role of global director of operations, reporting directly to the CEO.

WorleyParsons Enters UK North Sea Market

Australia-based WorleyParsons has joined the U.K. North Sea market now that the company has completed its acquisition of AFW Oil and Gas UK Ltd., which provides engineering, construction, operation, maintenance and hookup services.

With offices in the U.K. and the Middle East and more than 3,000 employees, AFW has been operating in the North Sea for more than 45 years, according to a news release.

The acquisition, which was announced in October, is valued at about $232 million.

DeepOcean Names Ottar Maeland As CEO

DeepOcean's board of directors has appointed COO Ottar Mæland as acting CEO, the company said Oct. 30.

After leading DeepOcean through a successful ownership change, the current CEO of DeepOcean Bart Heijermans has will step down from his position effective Nov. 18, but he has agreed to remain on the board as a nonexecutive director.

"We are confident that, thanks to his expertise and knowledge of the company and the markets we are operating in, we will continue to drive the positive future development of DeepOcean," said Terje Askvig, chairman of the board.

Fugro's Revenue Plunges, Sending Shares Lower

Dutch deep-sea energy prospector Fugro reported a steeper than expected drop in third-quarter revenue Oct. 30 and said it expects negative cash flow for the full year, sending its shares down more than 10%.

Fugro is still suffering the impact of a rout in oil prices that have fallen by more than 50% from mid-2014 highs, affecting its business as makes it uneconomic to prospect for the hard-to-reach subsea deposits in which it specializes.

The company reported a 19.5% drop in third-quarter revenue to $422.71 million. Fugro said it expects cash flow from operating activities after investments to be negative for the full year, due to the later than expected start of one of its projects.

In August the company, which reported a 14.5% decrease in first-half revenue, said it expected the decrease in revenue for the full year to be less severe than in the first half and that it expected positive cash flow from operating activities after investments for the full year.

"This quarter results were unfortunately impacted by technical downtime of some vessels and hurricanes," CEO Paul van Riel said in a statement.

TechnipFMC To Acquire Plexus' Exploration Wellhead Business

TechnipFMC reached an agreement with Plexus Holding Plc to acquire its wellhead exploration equipment and services business for jackup applications, the company said.

In conjunction with TechnipFMC's global footprint and market presence, the company said it expects the acquisition to expand its portfolio in the mud line and HP/HT arena, boosting its products and services to the global jackup exploration-drilling market. Terms of the transaction weren't disclosed.

The business will be integrated into the TechnipFMC's surface technologies segment and will include the transfer of key personnel from Plexus, with their specialized know-how, to ensure continuity and ongoing customer support. The business will continue to operate from the existing location in Dyce, Aberdeen in the U.K.

Richard Alabaster, president of TechnipFMC's surface technologies business, said in a statement, "I am very pleased that we have reached this agreement, which fits within TechnipFMC surface technologies' strategy to extend and strengthen our position in exploration-drilling products and services while leveraging our global field presence. It also enhances TechnipFMC's capability in HP/HT applications."

Completion of the transaction is subject to the satisfaction of certain closing conditions.

—Staff & Wire Reports

UPCOMING

The next issue of *Subsea Engineering News* will be distributed Nov. 16. Until then, visit *epmag.com*.

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