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Offshore Oil Experts Address Challenges, Opportunities Facing Industry

Offshore is making a comeback as companies step up investments after years of cost-cutting.

More private-equity-back companies are joining the majors in regions such as the Gulf of Mexico (GoM) and activity levels offshore are picking up globally, according to analysts. This comes as companies continue to cut costs, making offshore developments competitive with unconventional ones onshore in some cases.

Safety, flow assurance and digitalization are among the challenges and opportunities facing the offshore oil and gas sector, according to a group of panelists. (Source: Shutterstock.com)

But there are still plenty of challenges ahead for the offshore sector. Safety, flow assurance issues and taking advantage of data were some of the obstacles mentioned by panelists speaking on offshore challenges and opportunities during a recent event at Rice University. Digitalization was a recurring topic.

"Digitalization has disrupted several deeply rooted industries and dramatically accelerated technology adoption," according to a presentation by Hani Elshahawi, deepwater digitalization lead for Shell, who said today it's either disrupt or be disrupted. "Change is the new constant."

However, gaining value from the abundance of data generated from oil and gas fields requires getting beyond the hype, he said. "It's about value at the end of the day," Elshahawi said. "Insights are useful, but if you don't translate them into doing something fundamentally different, faster, better…you don't actually gain anything."

He pointed out the importance of better aligning risks and rewards, and moving from a theory-driven approach to a data-driven approach. This involves collecting data, then analyzing it, deciding on a plan and reflecting on the outcomes before making adjustments. Fundamental to the process is breaking silos, both within companies and among industry players, and having a digital twin—a digital representation of a physical asset—helps, according to Elshahawi.

Shell, which has more than 100 petabytes of data, is carrying out digital initiatives across its portfolio. These include the company's Nyhamna gas facility in Norway, where a digital twin is being used to better understand the facility, operations and maintenance needs.

Shell also teamed up with eDrilling, a Norway-based drilling and well performance solutions provider, at the Tyttebaer prospect. In May, eDrilling said it would drill exploration well 34/5-2S in a simulator using a digital twin before Shell used the Saipem semisubmersible Scarabeo 8 to drill the Tyttebaer prospect in the North Sea. The Norwegian Petroleum Directorate reported months later the well, which was drilled 10 km (6 miles) southwest of the Knarr Field, was dry.

WHAT'S INSIDE

In addition to digital technologies, panelists discussed flow assurance, including how it relates to unplanned downtime and cost.

"A problem like a hydrate blockage in a subsea jumper can take days, even weeks, to remediate and that's all time when you are not producing," said Brendon Keinath, flow assurance team lead for materials, corrosion and flow assurance for ExxonMobil Upstream Research, before turning to how even a 5% uplift can add significant value for producers.

Companies tackle flow assurance issues by either managing them or avoiding them altogether, but both require spending money—either capex or opex, according to Keinath. Flow assurance problems like hydrates are extremely expensive, he added. It remains a focus as the number of subsea tieback developments grows and others are decommissioned, heightening the search for innovative, effective technologies.

Offshore safety also remains a concern.

"Despite a relentless effort of trying to achieve zero incidents every day—we all struggle with that—we still are very concerned with all of our safety critical activities when it comes to hot work, confined space, dropped objects," Jessica Jackson, HSE global services, crisis management and security manager for Murphy Oil, said of the offshore industry. "We still haven't gotten to a place where we are incident-free in the offshore business."

But technology can be leveraged in the area of safety as well, she said.

Jackson spoke of using artificial intelligence, virtual assistants and robotics; unmanned platforms, smart facilities and platforms; and machine learning for data modeling and interpretation as well as for detection of abnormal operations to help improve safety offshore and reduce human error.

Safety is an area where companies can collaborate and share data to improve industrywide. Murphy Oil is among the participants in a new Bureau of Safety and Environmental Enforcement-led group that is studying GoM performance data from a safety perspective, Jackson said.

"It's all confidential, but it helps us as a group to get together and look at the trends, forecasts, because at the end of the day if it's hurting someone at your company, it potentially could hurt someone at our company," she said. "So we need to maintain those relationships and be willing to share with one another. It doesn't help us if we keep it [safety data] within the confines of our own companies."

—Velda Addison

DEVELOPMENT

Woodside Weighs Development Plans For Myanmar Discoveries

After discovering a large gas column in an appraisal well, a Woodside Energy Ltd.-led consortium is looking to develop gas fields in the A-6 Block offshore Myanmar as tieback to the neighboring Yadana or Shwe production unit or new independent production facility by 2023.

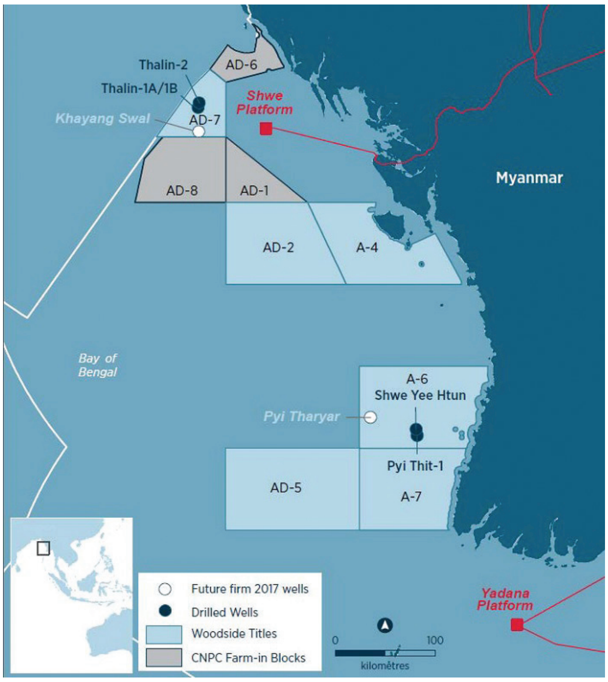
Woodside, the operator, said that the successful appraisal of the Shwe Yee Htun-2 well confirmed the presence of a reservoir with "high quality, permeability and well production deliverability" in the A-6 concession, validating the prospects for commercial development.

During a recent investors meeting, Woodside Energy CEO Peter Coleman said the company aims to bring the A-6 assets online by 2023.

The consortium's partner, Total, said the successful appraisal of Shwe Yee Htun-2 discovery, made in late September, is a major step toward unlocking new gas reserves in an area near fast-growing regional markets. "Total's track record of Myanmar's Yadana gas field exploitation is a key asset to lead these discoveries to commercial development," Total president (E&P) Arnaud Breuillac said in a statement.

The Shwe Yee Htun-2 well, drilled to a total depth of 4,850 m (15,912 ft) in water depth of 2,325 m (7,628 ft), encountered 131 ft (40 m) of net gas pay in a high-quality reservoir.

The French major claims that cumulated gas resources in the five discoveries made so far in the A-6 Block, including Shwe Yee Htun-1 (2016) and Pyi Thit-1 (2017), are estimated to be in the range of 57 Bcm to 85 Bcm (2 Tcf to 3 Tcf).



The A-6 Block is about 35 km off the coast of Myanmar. (Source: Woodside Energy)

Development Options

Woodside is evaluating three options for development of gas discoveries in the offshore A-6 concession, which is south of the producing Shwe asset and north of the Yadana asset.

The first option proposes a development concept comprising an offshore production platform in A-6 as a tieback to the nearby existing Yadana offshore production facility through a 226-km (140-mile) subsea pipeline. The aging Yadana Field, operated by Total, has an onshore gas terminal at Daminseik with offshore/onshore pipelines of over 690 km (596 miles) linked to Yangon and Pilok near the Thailand border. The tie-in could provide an opportunity to supply gas from the A-6 fields to consumers in Myanmar and Thailand.

The second option is an offshore production platform in A-6 as a tieback to the Shwe gas field's existing onshore gas terminal at Kyauk Phyu on Ramree Island through a more than 230-km (143-mile) pipeline. POSCO Daewoo Corp. currently operates the Kyauk Phyu onshore terminal to transport gas produced from the offshore Shwe gas fields to the southwest part of China via a 2,100-km (1,304-mile) onshore Myanmar-China pipeline. The tie-in could help transport gas supplies from the A-6 fields to central and northeast Myanmar and western China.

Option three entails development an offshore production facility for A-6 as an independent unit with an onshore gas terminal on the cost near Pathein town and pipelines linked to the Pathein, Yangon and Mawlamyine areas in the Irrawaddy Delta region, one of the fast developing areas in Myanmar.

A final investment decision for the A-6 fields will be taken after a FEED study, which is expected to be completed by early next year.

Favorable Plan

Woodside favors developing the gas fields as a tieback to the Yadana offshore facility, over the Shwe terminal, as the company wants to have an option to tie in its upcoming fields in the AD-7 concession, which sits close to the Shwe offshore production unit.

Woodside has a stake in eight other blocks in the Rakhine and Ayeyarwady offshore areas.

The Myanmar government favors developing the fields as an independent unit with an onshore terminal near Pathein to promote the industrial and economic development in the Irrawaddy Delta and neighboring areas.

Considering most of the produced gas from the Yadana, Yetagun and Shwe fields are exported to the neighboring countries, the electricity and energy ministry has demanded the allocation of gas supplies from A-6 fields for the domestic use. The ministry is keen to see the A-6 gas fields developed at the earliest as production from two (Yadana and Yetagun) of the four major producing fields is declining.

The A-6 Block lies in shallow to deepwater with water depths ranging from 10 m (32 ft) to about 2,400 m (7,870 ft) in the southern part of Rakhine coast. The block is about 35 km (22 miles) off the Myanmar coast.

—Ravi Prasad

DEVELOPMENT BRIEFS

BHGE, McDermott, L&T Land Contract For ONGC's DWN-98/2 Block

India's Oil & Natural Gas Corp. (ONGC) has chosen Baker Hughes, a GE company (BHGE), McDermott International and Larsen & Toubro subsidiary L&T Hydrocarbon Engineering (LTHE) to provide an integrated subsea package for the DWN-98/2 Block development in the Krishna Godavari Basin.

The project is ONGC's largest deepwater project, and the subsea award represents the largest single contract awarded by the company, BHGE said in a news release Oct. 3.

As part of the contract, the service companies will supply all subsea production systems (SPS), including 34 deepwater trees, and install subsea umbilicals, risers and flowlines (SURF) at a water depth of between 300 m (984 ft) and 3,200 m (10,500 ft).

BHGE's scope will include subsea hardware including trees, manifolds, controls, connection systems, SPS installation tools and services, as well as flexible risers and flowlines, umbilical and topside controls, the release said. The company will also provide precommissioning services for additional phases of the project.

McDermott will handle transportation and installation of SURF and SPS facilities using its engineering and other key resources in Kuala Lumpur, Malaysia and Chennai, India as well as its installation assets *Derrick Barge 30*, *Lay Vessel North Ocean 105* and *Lay Vessel 108*, according to the release.

Delivery is scheduled for 2020 for the gas system and 2021 for the oil system.

Subsea 7, OneSubsea Win Integrated Contract Offshore GoM

Fieldwood Energy has awarded an integrated contract to the Subsea Integration Alliance, a partnership between Subsea 7 and OneSubsea, a Schlumberger company, according to a news release.

The award, valued at between $50 million and $150 million, is for the deepwater Katmai Field development in the U.S. Gulf of Mexico's (GoM) Green Canyon 40. The integrated subsea development solution combines OneSubsea's subsea production systems and Subsea 7's subsea umbilicals, riser and flowline systems expertise, Subsea 7 said in the release.

Subsea 7's scope includes project management, engineering, procurement, construction and installation of 40 km (24 miles) of pipe-in-pipe production flowline (12-in. outer pipe and 8-in. inner pipe) with subsea structures, tie-ins to the Tarantula platform and precommissioning expertise. OneSubsea's scope includes provision of three trees (with options for two additional trees), connectors, valves, topside controls, flying leads and umbilical termination assemblies.

Co-located teams from both companies will support project management and engineering in Houston. Offshore installation activities are scheduled for 2019.

Norway Approves Plan For Wintershall Norge-led Nova

The plan for development and operation for the Wintershall Norge-operated Nova Field has been approved by Norwegian authorities, Wintershall said in a news release.

The field, located in the North Sea, will be developed as a subsea tieback connecting two templates to the Gjøa platform for processing and export, the company said. Lift gas, water injection and power also will be provided by the Gjøa platform.

Several contracts for the development, estimated to cost about $1.2 billion, have already been awarded. Among these were contracts awarded to Aker Solutions for the subsea production system, Subsea 7 for pipeline and subsea construction and Seadrill for a rig.

Recoverable reserves for Nova are estimated at about 80 MMboe, mostly oil, according to Wintershall. Startup is scheduled for 2021.

Wintershall is the operator and holds 35%. Partners are Cairn Energy subsidiary Capricorn Norge (20%), Spirit Energy (20%), Edison Norge (15%) and DEA Norge (10%).

Equinor Acquires 40% Stake In Rosebank Project In North Sea

Equinor has signed an agreement to acquire Chevron's 40% operated interest in the Rosebank project on the U.K. Continental Shelf, according to a news release.

The commercial terms of the agreement, which is subject to customary conditions that include partner and authority approval, were not disclosed.

"Today's agreement allows us to buy back into an asset in which we previously had a participating interest, demonstrating our strategy of creating value through oil price cycles," Al Cook, Equinor's executive vice president for global strategy and business development and U.K. country manager, said in the Oct. 1 release.

Discovered in 2014, the Rosebank Field is located about 130 km (81 miles) northwest of the Shetland Islands in water depths of about 1,110 m (3,642 ft).

Other partners in the field are Suncor Energy (40%) and Siccar Point Energy (20%).

UK Approves BP's Vorlich Development In North Sea

The U.K. government has given BP approval to proceed with the Vorlich development in the central North Sea, BP said in a news release.

The $262 million development is targeting 30 MMboe and expected to produce 20,000 bbl/d gross at its peak, the company said. The two-well subsea development will be tied back to the Ithaca Energy-operated FPF-1 floating production facility in Greater Stella Area production hub, BP said.

"Ithaca is delivering both the subsea and topside facilities for the Vorlich project as an extension of a larger development program they already have in train for the

Greater Stella Area," BP project manager Stuart Johnstone said in the release. "As a result, we are benefitting from mature, existing Ithaca contracts, an established high-performing project team and lessons learned from other parts of their Stella program.

"BP is bringing efficiencies from our global wells organization and our depth of reservoir development expertise," Johnstone added. "We have also merged traditionally separate stage-gates in our project development cycle to speed up delivery."

Offshore construction for Vorlich is expected to start in 2019 with the field coming onstream in 2020. Ithaca has a 34% interest in Vorlich.

Shell Sees Peak Output For Brazil's Lula Field In 2020, 2021

Brazil's most productive field, the Lula, located in the offshore Santos Basin, should hit peak production in 2020 or 2021, after reaching 1 MMboe/d next year, an executive at Royal Dutch Shell said on Sept. 26.

The increase in production next year will be helped by the launch of platforms *P-67* and *P-69*, which should go online in 2018, according to Cristiano Pinto da Costa, Shell's general manager for the Lula, Sapinhoa, Iracema and Lapa fields.

The Lula Field averaged 879,000 bbl/d as of July. It is operated by Brazilian state oil company Petrobras in a consortium with Shell and Portugal's Galp.

Rising oil prices and shrinking reserves have boosted appetite among oil majors for placing big bets on Brazil's prolific offshore presalt layer, where billions of barrels of oil lie under a thick layer of salt beneath the ocean floor.

Speaking on the sidelines of an oil conference in Rio de Janeiro, Pinto da Costa also said that a third phase of development for the Lapa Field was still in a very early stage. "We are studying the viability of drilling more wells to bring future production" to a part of the field where no wells are currently located, he said.

However, any decision about investment or the specific number of wells would not be made for another 18 to 24 months, he added.

Delmar Lands Contract For Exxon Mobil Offshore Equatorial Guinea

Houston-based Delmar Systems Inc. has been selected to provide engineering design services, project management, mooring equipment and mooring installation services for the Transocean-owned *Development Driller III* at Exxon Mobil's locations offshore Equatorial Guinea, according to a news release.

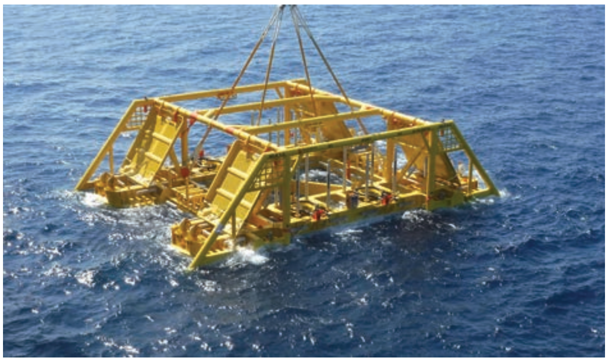
"The *Development Driller III* is planned to be on 8-point OMNI-Max preset mooring systems for the duration of the drilling campaign," Delmar said.

The project is set to start first-quarter 2019.

Ashtead Wraps Up Utgard Development Monitoring Project For Subsea 7

Ashtead Technology said it has completed a subsea installation monitoring project for Subsea 7 in support of Equinor's Utgard development in the central North Sea.

As part of the contract, which was awarded by i-Tech Services on behalf of Subsea 7, Ashtead used its Deflection Monitoring System (DMS) to obtain data required to deploy a subsea template in water depths of 110 m (361 ft) from Subsea 7's *Seven Arctic* vessel, according to a news release.



Ashtead used its DMS to obtain data required to deploy a subsea template. (Source: Ashtead Technology)

The DMS monitors in real-time structure deflection, heading, pitch, roll, depth and suction at differential pressures to minimize the risk of structural damage, Ashtead said.

Once installed on the structure, the system ran autonomously and was controlled remotely via radio frequency communications, an acoustic data link and a ROV electrical hot stab, removing the need for direct ROV or diver intervention," the company said.

—Staff & Reuters Reports

EXPLORATION

Lundin Petroleum Says Arctic Oil Test Points To Bigger Reservoir

Swedish oil firm Lundin Petroleum expects to increase its resource estimate for the Alta discovery in Norway's Arctic region following a successful two-month production test, the company said.

Finding significant oil reserves in the Norwegian Arctic has been challenging for oil firms, but Alta is among the exceptions along with Eni's Goliat Field and Equinor's Johan Castberg discovery.

Lundin and its partners are considering developing the discovery as a subsea field connected to a floating production and storage vessel, and may also tie in the smaller Gohta find, which is located nearby.

Prior to the production test the combined gross resource range for the Alta and Gohta discoveries was estimated at between 115 MMboe and 390 MMboe, and Lundin said it would update its forecast in early 2019.

"These positive results are expected to increase the Alta resource estimate and reduce the uncertainty range," the company said on Sept. 25.

"We have significantly advanced our understanding of this complex carbonate reservoir, the development of which would be a first for Norway. We will now concentrate our efforts on further defining the route to commercialization and progressing development concept studies," the company added.

During the two months of tests, Lundin produced up to 18,000 bbl/d of oil, and analysts said the results could give a boost to the outlook for the wider region.

"It increases the market's confidence in the Barents Sea as a growth area," Pareto Securities analyst Johan Spetz said.

Brokers Sparebank 1 Markets said it now expected Alta and Gohta to hold some 200 MMboe to 390 MMboe combined, significantly lifting the lower end of the forecast compared to Lundin's 115 MMboe to 390 MMboe prediction.

The Norwegian Petroleum Directorate estimates that the Barents Sea holds more than half of all undiscovered petroleum resources on the Norwegian Continental Shelf.

Lundin holds a 40% stake in Alta, while Idemitsu Petroleum and DEA hold 30% each. Lundin also holds 40% at the nearby Gohta, while Aker BP holds 60%.

—Reuters

EXPLORATION BRIEFS

Eco Atlantic Gets Green Light For Drilling Offshore Namibia

Eco Atlantic has received the environmental clearance it needs from the Namibia Ministry of Environment and Tourism to drill an exploration well on the Cooper Block offshore Namibia, the company said in a news release.

The company described the block, also known as PEL 30, as "highly prospective." The Toronto-headquartered company said it and partners have identified a prospect, called Osprey, on the block that is believed to hold up to 882 MMboe.

"With the final environmental certificates now in place we anticipate moving shortly to selection of drilling location, rig contract discussions and engineering planning for a well in Q3 2019 or Q1 2020," Eco COO Colin Kinley said. "The company's strategy in Namibia has been to maintain a careful and cautious pace, to fully and completely understand the region and to de-risk each asset by using industry learnings, successes and experience."

The company's exploration work on the block has included regional geological studies, fracture analysis, slick studies, the review and interpretation of 5,000 sq km (1,931 sq miles) of 2-D and an 1,100-sq-km (454-sq-mile) 3-D survey, the release said.

In addition, Eco said it has contracted independent studies from Petroleum Geo-Services, Azinam Ltd., Tullow Oil and Gustavson Associates.

Maersk Drilling Wins Deepwater Contract Offshore Ghana

Maersk Drilling has signed a contract with Aker Energy for *Maersk Viking*, an ultradeepwater drillship, to drill the Pecan-4A appraisal well offshore Ghana, the company said.

The contract covers one firm well with an expected duration of 30 to 35 days, with options for additional wells. The contract is expected to commence fourth-quarter 2018. Maersk Viking is currently warm-stacked in the Gulf of Mexico and will imminently begin its voyage to Ghana.

Maersk Viking, which was built in 2014, will perform the drilling at an ultradeepwater depth of 2,674 m (8,772 ft) in the Deepwater Tano Cape Three Points (DWT/CTP) Block.

The contract was awarded by Aker Energy on behalf of the license group and as the operator of the block. Aker Energy holds a 50% participating interest. Partners are Lukoil (38%), Ghana National Petroleum Corp. (10%) and Fueltrade (2%).

BW Offshore Encounters Oil At Dussafu Offshore Gabon

The Ruche North East (DRNEM-1) well and an appraisal sidetrack drilled offshore Gabon by BW Offshore encountered oil as the company ended its drilling operations in the Dussafu license for the year, the company said.

The well hit 40 m (131 ft) of pay in the Gamba and Dentale formations in the original wellbore. An appraisal sidetrack was drilled about 800 m (2,625 ft) northwest of the original wellbore and encountered 34 m (112 ft) of pay in the Gamba and Dentale formations, BW Offshore said. An evaluation of the potential development of these resources followed.

"The positive results of the Ruche North East well further confirm the upside potential for the Dussafu License," BW Offshore CEO Carl K. Arnet said in the release. "By combining our deep knowledge of the area, our resources and a well-suited FPSO, we are about to transform the Dussafu license into a significant producing asset with considerable upside."

In other news, BW Offshore said the company is evaluating the Tortue Phase 2 development project with a final investment decision scheduled for fourth-quarter 2018. The internal estimate of 2P gross reserves for the Tortue Field Phase 1 (two wells) and Phase 2 (four wells) are between 30 MMbbl and 40 MMbbl, excluding contingent reserves.

Oil Major Total Makes Major Gas Discovery Offshore UK

Total said on Sept. 24 it had made a major gas discovery on the Glendronach prospect, located off the coast of the Shetland Islands in the North Sea.

Total said preliminary tests on the new gas discovery confirmed good reservoir quality, permeability and well production deliverability, with recoverable resources estimated at about 28 Bcm (1 Tcf).

The company said Glendronach, located near its Edradour Field, will be tied back to the existing infrastructure and developed quickly and at low cost. The discovery will extend the life of the West of Shetland infrastructure and production hub, which includes the Laggan, Tormore, Edradour and Glenlivet fields, as well as the Shetland Gas plant, all of which contribute to about 7% of the U.K. gas consumption.

"Glendronach is a significant discovery for Total which gives us access to additional gas resources in one of our core areas and validates our exploration strategy," Arnaud Breuillac, president of Total's Exploration & Production division, said in a statement.

Total added that the well was drilled to a final depth of 4,312 m (14,146 ft) and encountered a gas column of 42 m (137 ft) of net pay in a high-quality Lower Cretaceous reservoir.

Total has a 60% stake in Glendronach, while Ineos E&P UK Ltd. and SSE E&P UK Ltd. each hold 20% stakes.

Tullow Oil Abandons First Namibian Well, Keeps Options Open

Africa-focused Tullow Oil will abandon its first well offshore Namibia, but data gathered in the project indicated it might strike lucky in another attempt, the company said Sept. 24.

"The Cormorant-1 exploration well in the PEL-37 license, offshore Namibia, encountered noncommercial hydrocarbons and the well is being plugged and abandoned," Tullow said in a statement.

Angus McCoss, Tullow's exploration director, said, "Gas readings while drilling continue to support the concept that there is a working oil system in the area. ... We will analyze the data gathered before deciding on any future activity."

Tullow also has a 10% stake in the PEL-30 license in Namibia, alongside Eco Oil and Gas, Azinam, ONGC Videsha and Namcor.

—Staff & Reuters Reports

TECHNOLOGY

Automation Puts Aasta Hansteen On Fast Track

Anchoring operations for the Aasta Hansteen spar platform were performed in April. (Source: Henning Selstad, courtesy of Equinor)

Norwegian operator Equinor is on track to deliver what could be the world's fastest upstream project startup at its Aasta Hansteen development in the Norwegian North Sea later this year, thanks to a drive toward automation and running virtual startups.

The project, which is Norway's first spar development and the country's deepest water development to date, is due onstream in the fourth quarter this year, following tow-out of the 70,000-tonne, South Korean-built facility to the Norwegian Sea in April.

The project is a year behind its original 2017 startup date due to delays in construction. But Swedish power and automation group ABB said by using its ABB Ability digital solutions to review the plant's operability and then run a virtual startup, using a dynamic model, to find and resolve any issues before the actual startup, an estimated 40 days—or 2,700 man-hours—could be saved.

The time-saving was found by automating more of the startup procedures—some 1,000 manual interventions were reduced by 98% to 20—and finding and resolving some 57 issues ahead of the startup procedure, according to ABB.

"We believe this will be the world's fastest startup," Marius Aarset, vice president of advanced services and products for the Norwegian hub of oil, gas and chemicals at ABB, told Hart Energy in an interview before the company's announcement at ONS 2018 in Stavanger, Norway.

Reducing Delays

Delays in commissioning typically take 12 to 18 months, according to Aarset. He said they are a regular industry problem and have been exacerbated in some of the boom periods when access to experience has been slim. Even now, there are regular issues with commissioning, despite the industry's relative maturity.

"There are common issues at a basic level," he said. Part of the issue is a lack of focus on operability and a lack of effective feedback, according to Aarset. "So, what you see is that, even though a plant is built to specification, there are still a lot of issues, like a valve going a different way to what the operator thinks it should or control structures around one or more compressors, which probably work, but are more or less impossible for the operator to understand," he said.

The challenge is that these issues go unnoticed until startup and then cause costly delays.

On Aasta Hansteen, which is in 1,300 m (4,265 ft) water depth in the Vøring area 300 km (186 miles) offshore, ABB is deploying its ABB Ability platform and its in-house domain expertise. This includes identifying logical sequences that take place during startup, such as having a valve in the right position, activating a control sequence and then piecing them together. They can be activated with one intervention, instead of multiple, so that it is a more automated process, according to Aarset.

ABB also used a dynamic model to test the design. "In the past, dynamic models were used for training the operators," said Borghild Lunde, senior vice president for the Norwegian hub of oil, gas and chemicals at ABB. "Now we're using them to test if there are flaws in the design."

ABB Ability 800xA contains a replica of the control loops and allows processes to be simulated so the system can be tested—what some would call a digital twin.

"Our teams went through the startup steps, identified and defined obstacles that needed to be improved, then used our ABB Ability System 800xA simulator to do a virtual startup of the plant," said Per Erik Holsten, managing director for ABB oil, gas and chemicals. "At this stage, we made a lot of improvements for starting up and operating the plant. Through automating much of the process, we managed to reduce a complex set of manual interventions to just 20, which means we are all set to deliver what we believe to be the world's fastest startup at first gas."

Optimizing Faster

In addition to reducing the time to first oil or gas, these systems have benefits during operations, according to Lunde. That includes helping to achieve optimum production faster by being able to tune facilities more easily with more automated processes.

"When you have to shut in a well for maintenance and want to start up again, you also get the benefit from this," Lunde said. "It's faster. We have cut the time it takes back to hours when it used to be almost days."

It has taken the upstream industry a long time to adopt these ideas. Lunde started work on this area when her son was born, and he's now 20.

"We have gained a lot of experience from various applications on various sites, but it's not until recently [upstream] customers have been interested in the whole spectra, from commissioning through to startup and production as part of daily operations," Lunde said. "In downstream this has been more accepted, because they have had to make money [and] they have to be performing. It's now clearly on the table. For some of the smaller players, this can offer more value. For some operators, the ultimate goal is a more autonomous asset."

Indeed, Aarset said Equinor would like to take its automation of the startup procedure even further, to have just one button, like you start a car. "This means operators can then put their focus on monitoring how the startup goes instead," he said. "Like cars, we've gone from keeping a set speed to keeping a set distance from the car in front so the driver can focus on the overall picture in the traffic."

Aarset said ABB already is working on what could be called "auto-pilot" systems for ramping up wells.

"There's a way to go [to full automation], but there are elements that can be implemented," Lunde said. "This is part of a bigger picture; there is a movement. In the last couple of years, we have seen a change. Digital is now more on the agenda, and there's more acceptance that you can do more with software. These are additional skills, and there's been a willingness to investigate and use them."

At Aasta Hansteen, which was discovered in 1997 by BP and comprises three separate discoveries: Luva, Haklang and Snefrid South, ABB also is providing a condition monitoring system to monitor more than 100,000 maintenance conditions from more than 4,000 pieces of equipment, tools for alarm management and alarm rationalization, several safety critical applications, data storage solutions and third-party system integration of essential data traffic.

Equinor had engaged ABB early on in the Aasta Hansteen project development, valued at $3.84 billion when it was submitted for government approval and now estimated to cost about $4.4 billion, for which ABB also has delivered full automation and safety systems and telecommunications.

—Elaine Maslin

TECHNOLOGY BRIEFS

I-Tech Services Adds Mini-ROV Capability To Inspection Fleet

I-Tech Services, a Subsea 7 company, has strengthened its underwater inspection and maintenance capability with the provision of new mini-ROVs for performing subsea operations in challenging environments.

A cost-effective solution for smaller scopes of work, the mini-ROVs are quick to deploy and can be transported easily to site via helicopter or airline carrier for faster transportation.

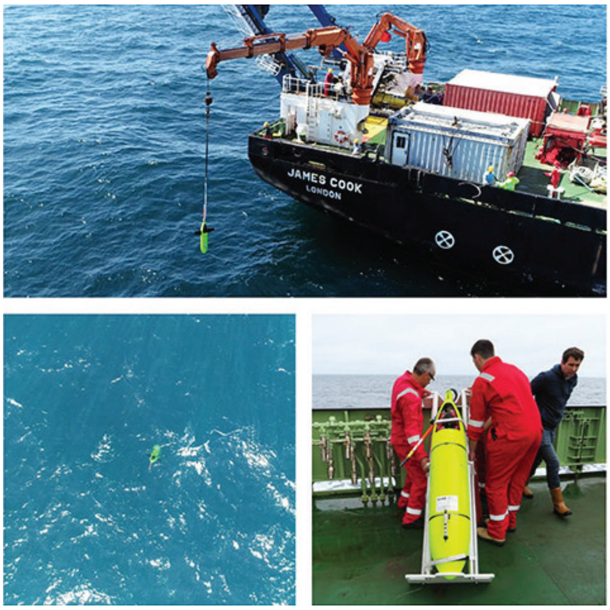
Despite their compact size, the mini-ROVs have high maneuverability and power-to-weight ratio allowing them to carry small tools and manipulators for operating effectively in strong currents. They are well suited for rapid mobilization and manual deployment from any platform, FPSO, barge or vessel of opportunity.

New 'Darth Glider' Marine Robot Collects Deepwater Data

The National Oceanograph Centre's new marine robot, called a Deepglider, will join the NMF-MARS glider fleet. It will allow the U.K. science community to collect water column data at depths of up to 6,000 m (19,685 ft).

The new Deepglider is similar in design to the existing Seaglider, which is already operated by NMF-MARS and can dive to 1,000 m (3,281 ft). However, the new vehicle is built to withstand the 600 atmospheres of pressure found in the deepest parts of the ocean, and has an endurance of six months or more, depending on payload.

As with other submarine gliders, the Deepglider carries a range of scientific sensors that enable it to measure temperature, salinity, phytoplankton abundance and other



The NOC deployed its new Deepglider from the *RRS James Cook.* (Source: National Oceanography Centre)

parameters. The data can be transferred back to shore via Iridium satellite link when the glider surfaces, and the pilots can then adjust the glider's flight and sampling regime and make course adjustments.

Called Unit DG042 or 'Darth Glider', it was tested during NMF-MARS equipment trials on *RRS James Cook* in June 2018. The vehicle was launched near the head of Whittard Canyon, at about 200 m (656 ft) water depth, before diving to 4,300 m (14,107 ft) depth over the abyssal plain. Each deep dive covered more than 20 m (66 ft) horizontally, more than 4,000 m (13,123 ft) vertically and took about 20 hours to complete.

The Deepglider also showed it can operate in much shallower waters with little reduction in endurance. As well as the deep dives, it carried out a series of relatively shallow 1,000 m dives during the trial, and the results suggest it will be an excellent platform for studying ocean processes from the shelf edge down to the deep ocean.

The Deepglider was integrated into the NMF-MARS glider command-and-control infrastructure, which is being developed as part of the Oceanids capital program.

FMGC Trials Ballast System For Subsea Cables At SEM-REV Site

FMGC developed and installed SEM-REV, the cast iron shells (IBOCS) developed to ballast underwater electrical cables, at 30 m (98 ft) deep on the site of the Centrale Nantes.

These tests are part of the FORESEA project, which aims to support marine renewable energy technology by providing access to the northern European network of marine test sites.

The shells stabilize and limit the curvature of submarine electrical cables. The objective of the tests is to demonstrate the stability of the weighted cables with these cast iron shells, including during heavy swell conditions.

The shells will remain several months on the site and will have to undergo the extreme conditions of winter. These tests will also be the occasion of comparisons, since sections of test cables, two equipped with shells of different linear density and a third naked, were installed next to each other. Through regular onsite measurements, current measurements and cable movements, the effect of cast iron shells can be easily evaluated.

The teams of FMGC and SEM-REV will observe the evolution of the shells themselves in order to gain a unique feedback in an environment representative of the conditions of a field of wind turbines at sea.

Innosea, spin-off company of Centrale Nantes, worked with FMGC on shell design methods to calculate the optimal mass ensuring the stability of the cable at the bottom. FMGC also equipped the Floatgen foundation, the first offshore wind turbine in France with clump weights, weights fixed on the anchor lines, which allow the stability of the floats.

The FMGC tests constitute the third installation on the site at the Centrale Nantes sea, since they succeed the NEREIS Environments acoustic sensor and the Floatgen floating wind turbine, a European research project carried by Idéol, Bouygues TP and Centrale Nantes.

The shells stabilize and limit the curvature of submarine electrical cables. (Source: FMGC)

VESSEL BRIEFS

Production, Financial Losses Continue For Jubilee Field FPSO

More than 30 months after a fault to a bearing on the turret shut down *Kwame Nkrumah FPSO* offshore Ghana, the vessel has been plagued by a series of shutdowns, cutting output from the Jubilee oil field by about 15% and creating a financial impact of $1.5 billion and counting.

The incident in March 2016 initially triggered an insurance policy claim as well as a business interruption in the need to reduce production. That established *Kwame Nkrumah* as one of the largest industrial insurance or reinsurance losses of 2016, but those losses have continued.

Through mid-2017, the estimated loss from the insurance and reinsurance markets totaled about $1.5 billion. In second-half 2017, operator Tullow Oil filed for another $108 million in business interruption claims, followed by an additional $129 million in first-half 2018.

Another shutdown was planned for second-half 2018 to reposition the FPSO, so the total through year-end 2018 is expected to be around $1.75 billion.

FPSO Orders Reflect Rebound In Industry

Eight FPSOs have been ordered so far in 2018, making this the best year since the start of the global oil and gas down cycle that began in 2014.

Singapore-based Energy Maritime Associates reported that the 2018 tally includes six newbuilds and two redeployments of idle units. Of the newbuilds, five of the orders were placed in China and one in Singapore.

More orders are anticipated this year, the firm said, and 31 projects are considered likely to be sanctioned in the next 12 months. Among them: 17 FPSOs, five FSRUs, two production semisubmersibles, two mobile offshore production units, and one FLNG.

Most of these deals will be awarded by year-end 2018, Energy Maritime Associates said.

Hurricane's FPSO Nears 'Sailaway' From Dubai

U.K.-based Hurricane Energy PLC eyes first production in first-half 2019 from its Lancaster Field offshore Scotland as the *Aoka Mizu FPSO* enters its final stage of upgrades in Dubai.

Hurricane is awaiting the completion of sea trials for the vessel, which follows the developer's offshore installation program that involved putting into place key subsea infrastructure this year.

"During the first half of 2018, Hurricane has been focused on the Lancaster early production system development," Hurricane CEO Robert Trice said on Sept. 20. "I am delighted to report that operations have progressed to plan and within budget, allowing us to reiterate our first oil guidance of H1 2019."

Trice said that subsea infrastructure in place included the turret mooring system, subsea umbilical, risers and flowlines.

Operating expenses for the six months ended June 30 amounted to $4.7million.

At the end of the half, Hurricane had $210 million of cash, equivalents and liquid investments.

BUSINESS

Brazil's Presalt Oil Auction Achieved 100% Of Blocks Acquired

Brazil's 5th presalt production-sharing round results were beyond the government's expectations, with all the blocks offered acquired by world's major oil companies, such as Exxon Mobil Corp., BP Plc, Chevron Corp. and Royal Dutch Shell Plc.

The auction, which was held on Sept. 28, raised roughly US$1.705 billion in signing bonuses and a commitment of US$250 million in planned investments in the exploratory phase. The areas offered by Brazil's government were located in Santos Basin (Saturno, Titã and Pau-Brasil) and Campos Basin (Tartaruga Verde). Those areas are expected to hold roughly 12 billion barrels of oil equivalent.

"Since the beginning of the [production] sharing bidding rounds [started in 2013], 96% of the blocks were acquired," said Décio Oddone, head of Brazil's oil and gas regulator ANP. "I don't know any area in the world that could have achieved such success."

During the press conference after the round, Brazil's Deputy Mining and Energy Minister Márcio Félix said "Brazil is experiencing a new reality in the sector."

An oil platform operates in the Guanabara Bay of Rio de Janeiro offshore Brazil. (Source: Shutterstock.com)

Félix attributed the success of the bidding round to efforts to create a more business-friendly environment and the law that removes the obligation of Petrobras to be a single operator in the presalt.

"We need diversification for the benefit of the industry as a whole," he said. Six oil majors are now responsible for operations in Brazil's presalt areas: Petrobras, Shell, Equinor ASA, Exxon Mobil and BP.

The average of the goodwill of the profit oil was 171%. In the production-sharing bidding rounds, winning companies are those that offer the Brazilian State the highest profit oil (that is, the largest portion of the exceeding oil), starting from a minimum percentage established in the tender protocol. The signing bonuses, also established in the tender protocol, are fixed.

Saturno presalt area, located in the Santos Basin, received the highest goodwill of the profit oil (300.23%). In a consortium formed by Royal Dutch Shell Brazil (50%) and Chevron Brasil Óleo (50%), the group spent roughly $781 million in signing bonus and offered 70.2% in profit oil. Shell will be the operator of the area.

Titã presalt field was acquired by the consortium formed by Exxon Mobil Brasil (64%) and Qatar Petroleum International, offering 23.49% in profit oil, which represents a rate of 146.48% of goodwill of the profit oil previously established in the tender protocol. The consortium will spend $781 million in signing bonus. The area received two offers. Exxon Mobil will be the operator of the Titã presalt field. Pau Brasil area was acquired by the consortium formed by BP Energy (50%); CNOOC Ltd. (30%); and Ecopetrol (20%). The consortium will spend $125 million in signing bonus and offered 63.79% in profit oil. The goodwill of the profit oil is 157.01%. With this acquisition, BP debuted as the operator in Brazil's presalt area.

Tartaruga Verde presalt field, the only block offered located in the Campos Basin, received only one offer and was acquired by the Brazilian state-owned Petrobras alone. The Brazilian major will spend $17.5 million in signing bonuses and offered 10.01% in profit oil

Brazil's Presidential Elections

The auction was held 10 days before the upcoming presidential elections. According to recent polls, two candidates with strong opposing views have chances to win.

Jair Bolsonaro, who leads the polls, is a former army captain who has been a congressman since 1991. He has advocated for a major state interventionism in the energy market for a long time. But he recently changed this position and embraced a more business-oriented profile. Paulo Guedes, a conservative economist and Bolsonaro's top economic adviser, is famous for defending deregulation of Brazil's economy, including the energy market. Bolsonaro is running as a candidate for the small Social Liberty Party.

Fernando Haddad, from the leftist Workers Party, comes in the second place, according to the polls. He is the political heir of Brazil's popular former president, Luiz Inácio Lula da Silva, who was ordered to serve a 12-year jail sentence after being convicted of corruption in the Petrobras scandal. His political views include the comeback of a certain state interventionism in Petrobras, although he has recently stated he is against the fuel prices control, a policy that was adopted when the Workers Party was in office.

Márcio Félix said he believes that most of the changes made to the regulation of the oil industry will be maintained by the next government.

"I believe that common sense will prevail because the oil industry's latest results are strong and the country needs this," Félix said.

—Brunno Braga

UPCOMING

The next issue of *Subsea Engineering News* will be distributed Oct. 18. Until then, visit *epmag.com*.

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