

Technology Drives Viper Innovations' Diversification Push



V-Supply incorporates the V-LIM, line integrity monitoring, functionality and the proprietary insulation resistance recovery technique of V-Life, which can be activated via a software license. (Source: Viper Innovations)

For Viper Innovations, collaboration, diversification and innovation go hand-in-hand when it comes to maintaining the electrical integrity of equipment.

The U.K.-based company, which recently changed its name from Viper Subsea, has added to its technology arsenal a topsides electrical power module with remote subsea system testing and monitoring capabilities. The technology, called V-Supply, was the result of an in-house brainstorming session that aimed to find ways to help operators cut costs and improve efficiency.

“The driving benefit to the operators is that it eliminates the need to send an additional technician offshore to perform the tests,” Neil Douglas, managing director for Viper Innovations, told *SEN*. “We also saw the benefit of including a number of additional Viper technologies into the V-Supply to provide a very cost effective solution that offers substantially more over and above that of a traditional electrical power module.”

The technology, which can be used for brownfield and greenfield developments, is being released as the oil and gas industry continues to rebound from a downturn that forced many to rethink traditional ways of doing business. As focus has increasingly shifted to technology to improve operations, many have adjusted their business strategies, formed partnerships or made acquisitions to beef up their offerings in hopes of boosting bottom lines.

Viper Innovations is no exception as it looks to enter other markets while maintaining its subsea footing. V-Supply is the subsea application of a platform, CableGuardian, which is being tailored for use in other industries.

New Technology

The company’s latest offering combines some of the technology made available through its August 2016 acquisition of a 33% stake in LiveWire Innovation Inc., a Utah-based company known for its spread-spectrum time domain reflectometry (SSTDR) technology. SSTDR essentially gives operators the ability to detect electrical faults in copper conductors in umbilicals without stopping operations.

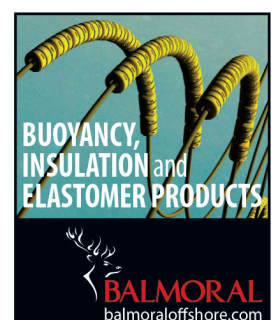
Viper, which specializes in subsea distribution technology, saw the SSTDR technology as a good fit with its own integrity monitoring solutions, including technology that monitors the insulation material around copper in cables.

“The combination of the two means we can measure and monitor the integrity of any electrical cable,” Douglas said. “We have integrated that technology into V-Supply” as well as a couple of other Viper technologies.

The company described V-Supply’s remote testing capability as a novel technology proprietary to Viper. It’s

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unique in that it “allows the subsea system to be tested *in situ* without the need to make wire disconnections in the topside rack,” Douglas said. “It also means that specialized personnel do not need to be mobilized offshore to the power module to perform testing. Testing can be undertaken remotely and then the test results can be analyzed by specialists at Viper Innovations.”

An array of measurement parameters, such as for transient faults and harmonic distortion, can also be monitored with data “stored for trending and prognostics to give early warning of faults and to provide the operators with the best information regarding their electrical assets,” Douglas added.

Viper also has tapped into the artificial intelligence and data analytics arena to predict subsea equipment failures before they occur with V-Sentinel. The machine learning software also enables operators to conduct maintenance when it’s needed—conditioned-based, rather than on a preset timeline.

“What we’re looking to do is take costs down for the operator,” Douglas said.

Diversification Efforts

Although the software—a collaboration between Viper, oil companies and universities—is being applied to subsea equipment, it is capable of being put to use in other industries.



Viper Innovations Managing Director Neil Douglas and Business Development Director Max Nodder hold the V-Life electrical insulation resistance improvement system, a 2016 recipient of a Queen’s Award for Enterprise in Innovation. (Source: Viper Innovations)

Viper is targeting the railway, defense, airport and nuclear industries, the impetus behind the company’s name change in November 2016. Its investment in LiveWire could open doors.

“Part of that investment was to consolidate their technology with our own to provide a product that has applications in a wide range of industrial markets,” Douglas said.

CableGuardian was one of the first technologies that combined Live-

Wire’s SSTDR technology with Viper’s integrity monitoring product. CableGuardian locates insulation and conductor faults. Although the product was developed for the oil and gas sector, plans are to move that technology into other industries, he said.

For the railway industry, the technology’s remote electrical monitoring capabilities have the potential to reduce delays related to electrical cable failures.

“Clearly, it will be further improved; hopefully, if we get the volumes up, the price will come down for the oil and gas industry,” Douglas said. The diversification push was partly driven in response to the downturn. “Both our industry and other industries will benefit with diversification of our technology into different industries,” he said.

Viper has about 18 patents and directs about 35% of its engineering efforts to R&D, according to Douglas.

—Velda Addison

DEVELOPMENT

Operators Draw Up UK Drilling Plans

The U.K. North Sea has seen some encouraging contracts and potential deals over the last week—with one player looking for partners and another launching a tender for site survey work. The industry hopes it is a sign of better things to come.

Cluff Natural Resources is looking to farm out equity to a potential partner(s) to help cover the costs of drilling wells on its Southern North Sea blocks.

In 2016 Cluff decided to focus its investment on its two most prospective assets, which are 100% owned licenses P2252 and P2248. Cluff also has received a one-year extension until November 2017 for these areas.

Last year Cluff firmed up significant rises in the licenses prospective (P50). This increased Cluff’s total combined P50 resources from 23.98 Bcm (845 Bcf) of gas to 67.14 Bcm (2.37 Tcf), equivalent to 410 MMboe.

On the back of this boost, Cluff launched a farm-out process to find partners to help fund the drilling of “one or more wells” on the Southern North Sea licenses. A data room has been opened.

While early on in the process, Cluff said it has had an “encouraging response from a number of potential farm-in partners”

Cluff also is looking to quantify and de-risk known leads and prospects on both of the licenses.

In addition, Cluff wants to build its assets and has applied for a license in the U.K.’s 29th licensing round. It also plans to bid in the 30th licensing round, which is expected to be launched in first-half 2017.

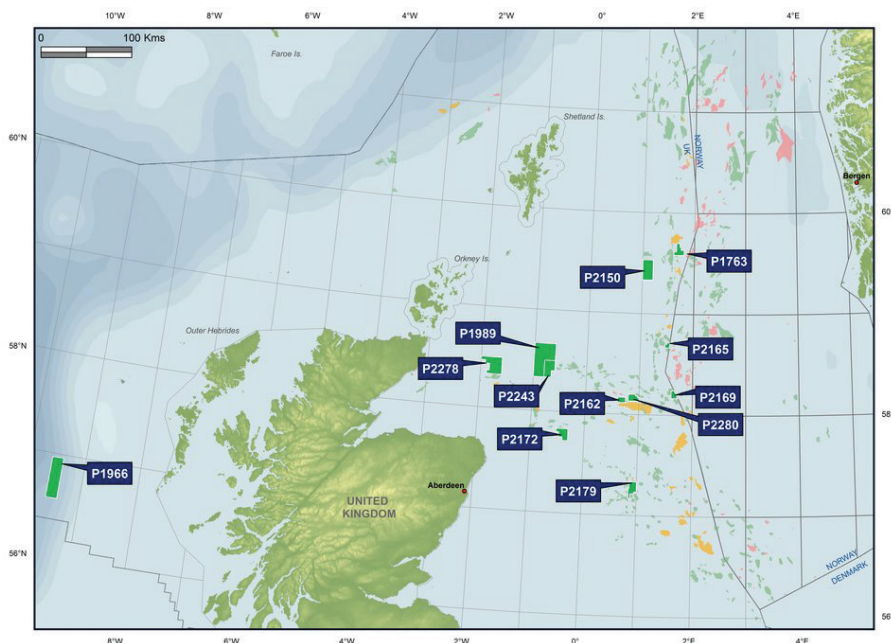
“We anticipate expanding our portfolio in 2017 and are confident that our enhanced understanding of our existing licenses will facilitate the process of attracting

farm-out partners with the ultimate aim of drilling one or more wells on these highly prospective assets,” said Algy Cluff, chairman and CEO for Cluff.

Azinor’s UK Partridge Tender

Another company planning E&P work off the U.K. is Azinor Catalyst, which has launched a tendering process to carry out a site survey on the Partridge prospect in preparation for drilling later this year.

Azinor secured a 100% operated interest in blocks 14/11, 14/12 and 14/16, which contain the Partridge prospect, in December 2015.



Azinor’s Partridge prospect is part of license P1989. (Source: Azinor Catalyst)

Partridge is located in the Jura Sub-basin of the Outer Moray Firth and is adjacent to the Scapa, Claymore and Athena oil fields.

“The Partridge prospect is a large structurally controlled stratigraphic trap comprising deepwater mass flow sands of the Lower Cretaceous Scapa Formation and has an associated direct hydrocarbon indicator,” Azinor said. “This seismic signature is directly analogous to the one observed in the Lower Cretaceous sands at the producing Scapa and Claymore fields.”

The Partridge prospect’s pre-drill recoverable volumes have been estimated at 119 MMboe in the mid case, with an upside case of 260 MMboe. The prospect has a relatively shallow and normally pressured reservoir with an

estimated gross well cost of between \$8 million and \$9 million, the company said.

“We are delighted to be in a position to move the Partridge prospect forward into the drilling phase,” said Nick Terrell, managing director of Azinor. “The prospect has the potential to significantly change the industry’s perception of this underexplored part of the basin, and we look forward to testing this exciting opportunity with the drillbit later in the year.

“In addition, we are in a position to capitalize on the significant reductions in drilling costs that we have seen in the U.K. North Sea market, with a reduction of over 50% in overall well cost since the beginning of the downturn in 2014.”

Xodus Bags Nevis, Skene Work

Meanwhile, development activity received a boost when Xodus Group landed a contract from Apache to deliver subsea engineering services for two new infill well developments at the Nevis and Skene fields in the U.K. Northern North Sea.

“The project includes a novel idea of designing and fabricating spools with no requirement for metrology focusing on time and effort savings,” Xodus said. “The latest win follows a number of successful projects delivered for the operator over the last

18 months, including the concept, front-end engineering design and detailed design studies for the Beryl Field’s Far North Triassic subsea tieback, which was 4 km [2.48 miles] in length.”

Andrew Wylie, Scotland subsea & pipelines manager at Xodus, said, “We are looking forward to supporting the Nevis and Skene developments. The new approach to the design of spools is one example of how we are challenging the norm and doing things differently. We are involved with Apache in the very early stages of a project, and they give us the freedom to think about the challenge so that we can focus on finding the best and most efficient solution.”

—Steve Hamlen



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BP Cranks Up Thunder Horse Expansion In GoM

Output from one of the largest deepwater fields in the U.S. Gulf of Mexico (GoM) is set to grow now that BP has brought its Thunder Horse expansion project online.

The project, which involved adding to the seafloor a subsea production system hooked to two 3,353-m (11,000-ft) flowlines, is expected to increase production at the field by an estimated 50,000 boe/d, BP said in a Jan. 23 news release.

The expansion project was brought online Dec. 8, 2016, nearly a year ahead of schedule and about \$150 million, or 15%, under budget. The feat demonstrates that deepwater oil and gas development can be cost-effective, said Richard Morrison, regional president of BP's GoM business unit.

"It also shows the effectiveness of our strategy in the [GoM], which is all about increasing production from within our existing asset base and large portfolio of undeveloped resources," Morrison said in a Jan. 23 news release about the project.

BP attributed its ability to complete the project early and below budget to its use of proven standardized equipment and technology, rather than building customized components.

The system's first well pumped from what BP called "the highest amount of hydrocarbon-bearing sand seen to date" at the field. The well hit 152 m (500 ft) of net pay.

The new subsea drill center is about 3.2 km (2 miles) from the Thunder Horse Platform, and three more wells will be tied onto the new system, according to BP.

The project followed the May 2016 startup of a water injection project at Thunder Horse. This project aimed to increase pressure at the field in an effort to recover another 65 MMboe.

The startup also followed BP's decision, announced in December 2016, to spend \$9 billion for the Mad Dog Phase 2 project. Plans for Mad Dog include a new floating production platform moored about 9.7 km (6 miles) southwest of the existing platform, with production set to begin in late 2021.

"Thunder Horse South Expansion—along with our recent approval of the \$9 billion Mad Dog Phase 2 Platform—demonstrates that the U.S. GoM remains a key part of our global portfolio today and for many years to come," BP's CEO Bob Dudley said.

BP, with a 75% interest, is the operator of Thunder Horse Field, which began production in 2008. Partner ExxonMobil Corp. holds the rest.

The expansion project marked the first of several major startups BP anticipates this year as it tries to increase production and capacity. Dudley called the project "a



The BP-operated Thunder Horse platform is located in the Mississippi Canyon area of the U.S. GoM. (Source: BP)


major step toward our goal of adding 800,000 barrels of new production by 2020." The figure also includes 500 Mboe/d of new capacity online by year-end 2017.

Other planned 2017 startups, in which BP is operator or partner, include the:

- Juniper unmanned production platform and subsea system offshore Trinidad;
- Clair Ridge development, located west of Shetland in the U.K. North Sea. The development includes two bridge-linked platforms and subsea pipelines;
- Quad 204 project that features an FPSO vessel and extension of an existing subsea system;
- Taurus and Libra development of nine subsea wells offshore Egypt;
- 200-well Khazzan Field development onshore Oman; and
- Two-well subsea tieback Persephone project offshore Australia.

"More than 90% of the 800 Mboe/d is related to projects that have passed through the final investment decision and are complete or well under construction," BP said on its website. "The remainder of the 800 Mboe/d is in the design stage and expected to progress into construction by early 2018."

—Velda Addison



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DEVELOPMENT BRIEFS

Aker Solutions Wins Hookup Contract For Johan Sverdrup

Statoil has tapped Aker Solutions for the hookup of the riser platform for the Johan Sverdrup Field.

Aker Solutions said it will work closely with subcontractor Kvaerner to join the platform's seven modules, which will be transported to Norway in second-quarter 2018. The scope also covers planning, management and prefabrication, the company said in a news release. In addition, the agreement contains hookup options for the field's processing and living quarter platforms, which are scheduled for installation in 2019.

The contract value is about \$109 million and will be split about equally between Aker Solutions and Kvaerner, the release said. Work is scheduled to begin in February, initially involving about 100 people from Aker Solutions, Kvaerner and Statoil. That number is expected to rise to as many as 1,000 people at the project's peak in 2018.

TechnipFMC Lines Up Well Intervention Work For Inpex

TechnipFMC said it plans to deploy its deepwater riserless light well intervention (RLWI) stack and two Schilling Robotics ROVs for work involving up to 20 subsea wells in the Ichthys Field this year.

The work will be delivered as part of an agreement with Inpex Operations Australia for RWLI services in the offshore Western Australia field for the Ichthys LNG Project, according to a news release.

"This project represents the next step in TechnipFMC's strategy for geographic expansion of RLWI services," Barry Glickman, president of subsea services for TechnipFMC, said in the release. "Our RLWI stacks have been used to complete more than 400 RLWI operations over the last 10 years. RLWI helps operators

improve well productivity and equipment uptime, and reduce cost by shifting intervention work from rigs to lower cost vessels."

McDermott Lands Offshore EPCI Contract From Saudi Aramco

McDermott International Inc. said it has been awarded a substantial contract from Saudi Aramco for engineering, procurement, construction and installation (EPCI) services in the Safaniya and Zuluf fields offshore Saudi Arabia.

The brownfield project is part of a wider program to replace aging facilities with electrified platforms to enhance the potential of the fields. The contract includes the design, procurement, fabrication, transportation, installation, testing and precommissioning of nine slipover jackets and decks, subsea pipelines and cables as well as the associated demolition of certain facilities, in the Safaniya Field, McDermott said in a news release. A single well observation platform in the Zuluf Field is also part of the contract.

Recently McDermott was awarded a contract to provide a fast-track EPCI solution for four jackets and three gas observation platforms for Saudi Aramco. Work was scheduled to begin immediately.

The Safaniya oil field, the world's largest offshore oil field, is located in the Arabian Gulf.

Norway Clears Songa Encourage For Well Activities

Statoil has received permission to use the *Songa Encourage* semisubmersible drilling facility for well activities at Norne, Norne satellites and the Alve Field, according to Norway's Petroleum Safety Authority (PSA).

The mobile drilling facility will be used to perform well activities at the fields. Those activities include drilling wells

Tubular Bells
First Oil
November
2014



Lucius First Oil
January 2015





Jack/St. Malo
First Oil
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2014



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for production or injection, well overhaul, other intervention work and plugging.

At a water depth of 380 m (1,247 ft), the Norwegian Sea field uses a floating production and storage unit tied to well templates on the seabed. Oil is transported from the Norne facility by tanker, while the gas is piped to Kårstø in Rogaland county and on to Germany, PSA said. Production at Norne began in 1997. Located southwest of Norne, the Alve Field, and other satellite fields, are tied back to the Norne facility.

IKM Secures SURF Contract For Culzean Field

IKM recently secured a subsea, umbilical, riser and flowline (SURF) contract from Maersk Oil through Subsea 7, according to a news release.

IKM will construct and install underwater equipment for the new Culzean gas field in the Central North Sea. This is one of the largest gas discoveries offshore U.K., and Block 22/25 of the Central North Sea is in about 90 m of water.

Engineering work has begun on the Maersk Oil Culzean project. The first phase of offshore operations will begin in second-quarter 2017. This is a sizeable pre-commissioning SURF project and a significant win for IKM in an extremely competitive environment.

The Culzean gas condensate field is expected to produce enough gas to meet 5% of total U.K. demand at peak production in 2020-2021.

BP's Juniper Platform En Route To Trinidadian Waters

BP Trinidad and Tobago (bpTT) marked a milestone in January with the sailaway of the Juniper offshore platform, which is destined for the southeast coast of Trinidad.

The \$2 billion Juniper project, which will take gas from the Corallita and Lantana fields offshore Trinidad to the Mahogany B hub via a new 10-km (6-mile) infield flowline, includes the platform—along with its jacket, piles and topsides—plus related subsea infrastructure. The development represents the first subsea field development for bpTT and one of BP's largest projects slated for startup in 2017.

The Juniper topsides were fabricated at the TOFCO fabrication yard in Trinidad, while the jacket and piles were fabricated at Gulf Marine Fabricators in Texas, BP said. Heerema Marine Contractor's largest deepwater construction vessel, the *Thialf*, is handling the platform installation.

Brazil Court Allows Petrobras To Sell Sergipe, Ceará Fields

A Brazilian court has ruled that Petrobras can continue a process to sell several offshore oil fields in the country's northeastern region.

In securities filing on Jan. 23, Petrobras said the Federal Regional Tribunal of the Fifth Region's decision allows the company to proceed with the sale of fields in the states of Ceará and Sergipe, although a final decision lies on a federal auditing court. The auditing court known

as TCU suspended on Dec. 7 part of Petrobras' asset sale program to improve transparency in the process.

Danos Lands Job For Hess Stampede Platform Work

Danos has secured a contract to perform mechanical hookup and commissioning support services for the Hess Corp.'s Stampede tension-leg platform in the U.S. Gulf of Mexico (GoM), according to a news release.



The Stampede Field is located in the U.S. GoM's Green Canyon area. (Source: Hess Corp.)

Stampede is in the integration and commissioning phase. When the platform is complete, it will be towed to its final destination where Danos said it will support the hookup and commissioning phases of the project. The company will provide support service lines that include project management, construction, scaffolding and coatings services. As part of the contract, more than 100 Danos employees will work on the project in multiple locations during the next 12 months, the company said.

The company performed similar work for another deepwater platform in the GoM and has partnered with Hess on other offshore projects, the release said.

OneSubsea Lands Production System Contract With Statoil's Utgard

Statoil has awarded OneSubsea, a Schlumberger company, an engineering, procurement and construction contract for the subsea production system for the Utgard gas and condensate discovery in the North Sea, according to a news release.

The scope of the contract includes a subsea template manifold system, two subsea wellheads and vertical monobore subsea trees, production control system, and associated intervention and workover tooling, the release said.

The award, announced Jan. 19 by Schlumberger, follows the execution of a master service agreement between OneSubsea and Statoil in January 2016.

The companies worked together to qualify a vertical monobore subsea tree as a standardized solution for Statoil's subsea developments, Schlumberger said in the release.

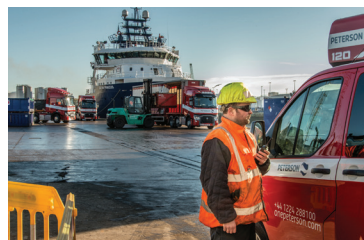
Ithaca Picks Peterson For Harrier Field Work In North Sea

Ithaca Energy UK Ltd. has selected Peterson to provide integrated logistics for the Harrier Field development,

part of the Ithaca-operated Greater Stella Area, in the central North Sea.

The logistics provider said the contract, which will be managed from its quayside and warehouse facilities in Aberdeen, is scheduled to begin in second-quarter 2017 and last for about six months, a news release said.

—*Staff & Reuters Reports*



Peterson will provide logistics services for Ithaca Energy's Harriet Field development. (Source: Peterson)

FLOATER BRIEFS

Report Sees \$50 Billion In Units Coming Onstream In Next Five Years

The Douglas-Westwood *World Floating Production Report's* analysis of 130 potential future deployments forecasts \$50 billion of units coming onstream between 2017 and 2021.

The company acknowledged that many projects have fallen behind but noted that the Mad Dog Phase 2 production platform order broke the hiatus this year.

Major conclusions from the report include:

- A 40% decline compared to the hindcast and -6% CAGR between 2017 and 2021 as a result of the downturn;
- A record \$50 billion in units coming onstream, albeit many of those commissioned in 2017-2018 were ordered when prices were at record levels; and
- FPSO units will continue to rule the segment both in number (45) and forecast capex (84%) over the 2017-2021 period.

The report's regional analysis highlights how Latin America will account for 31% of units and 33% of capex, both surpassing any other region. Asia's proportion of expenditure compared to installations will be 10% and Western Europe's will be 14%. However, Africa's 25% of capex from its nine installations demonstrates the high value of units in that region.

GE's Latest MV7-5L Drive Goes To Work At Greater Enfield

GE Energy Connections' MV7Series 5 Level (MV7-5L) drive was selected to sit topside on an FPSO unit for the Greater Enfield project offshore Exmouth in Western Australia. The project aggregates production from the Laverda Canyon, Norton over Laverda and Cimatti oil accumulations.

The drive is equipped with ultimate waveform configuration supplied by GE's Power Conversion, a sub-business from GE Energy Connections. It will help start and control two multiphase pumps operating in parallel 32 km (20 miles) away from the FPSO unit.

The drive's five-level topology enables it to provide increased voltage. The 12-kilovolt, high-voltage output eliminates the need for a step-up transformer, saving space onboard the vessel and requiring lower installation costs. The smaller, lighter drive allows an additional 15 to 20 tons worth of equipment on the FPSO unit.

"Less weight from the ultimate waveform drive solution installed on the FPSO unit means less structure support is required," said Gilles Chene, senior sales manager of GE

Energy Connections' Power Conversion. "In addition to the obvious cost-saving advantage, it also enables certain projects that were not feasible in the past, as the new solution allows more equipment to be installed before reaching the maximum capability of the supporting structure."

Removing the step-up transformer simplifies the overall solution, which ensures higher reliability. Other features of the MV7-5L drive include its ability to produce cleaner power with fewer harmonics, which can help increase equipment life expectancy.

"The high voltage and smaller footprint characteristics of this MV7-5L drive make it ideal for applications in the demanding offshore support industry," said Luca Polezzi, oil and gas segment leader, GE's Power Conversion. "The ultimate waveform configuration is based on proven technology, and its predecessor has an impressive 10-gigawatt installed base worldwide. Customers can be assured that they are receiving the latest technology, primed to support all endeavors."

Wood Group Secures New Contract With Hess In Malaysia

Wood Group will support Hess' newbuild fixed and floating offshore facilities offshore Malaysia as part of a five-year contract.

The operations are in the North Malay Basin development area located about 150 km (93 miles) northeast of Peninsular Malaysia. The deal is with Hess Exploration & Production Malaysia.

The contract includes a one-year extension option and will support as many as 130 new full-time positions in Malaysia.

Wood Group will provide integrated operations and maintenance services including core offshore personnel, onshore technical support, training and competency assurance services. The contract also includes technical services covering brownfield engineering, risk-based inspection, integrity management and computerized maintenance management system support.

The contract builds on Wood Group's 15-year global relationship with Hess, which includes ongoing contracts in Equatorial Guinea and the Gulf of Mexico.

"This contract to support Hess' significant greenfield facilities in Malaysia demonstrates the proven success of our integrated approach on this key client's projects worldwide and their confidence in our technical services, which optimize production and enhance efficiency," said Dave Stewart, CEO for Wood Group's Asset Life Cycle Solutions business in the Eastern Hemisphere.

“Our commitment to creating strong local employment and supply chain opportunities in the areas where we work will be reinforced by this contract, which will

focus on the recruitment and opportunity development for the national workforce in Malaysia,” he added.

—Joseph Markman

VESSEL BRIEFS

Ocean Installer Lands Its First Australian Job

As a subcontractor to McDermott International Inc., Ocean Installer has been awarded a contract for riser installation work in Australia, the company said Jan. 26.

The job involves installing flexible risers and flowlines as well as options for additional support work. The company will use the *Normand Vision* construction support vessel for offshore operations beginning in second-quarter 2017.

“This is Ocean Installer’s first job in a region where we aim to establish ourselves. This is also the first job we have been awarded by McDermott,” Ocean Installer CEO Steinar Riise said in a news release. “Ocean Installer and McDermott complement each other’s capabilities in a very good way, and we believe this type of cooperation will be important going forward in what is still a challenging market.”

VesselsValue Provides Daily Valuations For MODUs

VesselsValue, an online valuation provider, is releasing daily valuations for mobile offshore drilling units (MODUs), a press release stated.

This new vessel type is part of VesselsValue recent push into the offshore space. In May 2016 VesselsValue released daily updated market and demolition values for 6,500-plus offshore support vessels. The new vessel types, which are available on the VesselsValue website, comprise 1,020 individual MODUs (including drillships, semisubmersible units and jackups) and can be presented via company fleets and portfolios.

To arrive at daily valuations, VesselsValue uses a complex algorithm, which considers the full specifications of the vessel (age, size, ship type and features) as well as the recent spot rates, secondhand sales, newbuilding prices, oil pricing and other market indicators. These data are made available for VesselsValue clients through the VesselsValue Deals database.

Charter Extension To Keep *Bibby Topaz* In North Sea

Dive-support vessel *Bibby Topaz* will continue work in the North Sea DSV market following announcement of a long-term extension to its charter through 2019.

Bibby Offshore, a subsea installation and services provider to the offshore oil and gas industry, said that it had adjusted terms and conditions of the charter arrangement with owner Volstad Maritime to reflect the current market environment, with both parties taking on a more mutual sharing of risk and reward.

Bibby Offshore plans to maintain and grow its market share in the North Sea DSV market, where *Bibby Topaz*

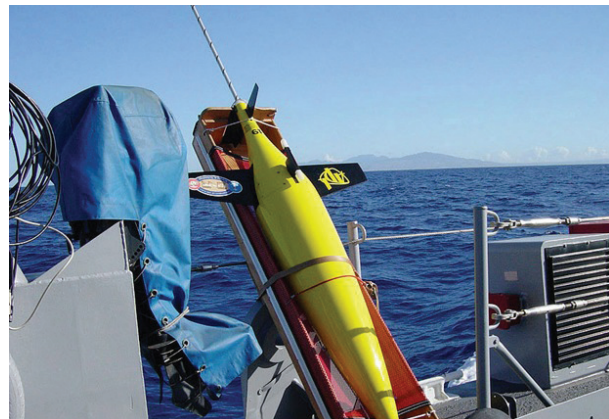


Bibby Offshore and Volstad Maritime agreed to a charter extension for the *Bibby Topaz*. (Source: Bibby Offshore)

has been a core part of its fleet since its delivery in 2008. The vessel has been identified as the best technical and commercial option for the group, and the charter has flexible options to be extended to year-end 2024.

Kongsberg Puts Seaglider In Spotlight

Kongsberg has hopes that its Seaglider autonomous vehicle will emerge as a star of Subsea Expo 2017 at the Aberdeen Exhibition and Conference Center on Feb. 1-3.



Seaglider is among the technology being displayed this week at Subsea Expo. (Source: Kongsberg)

Seaglider will be joined by a host of Kongsberg’s established subsea technology designed to meet the needs of research and commercial users during the annual event.

Seaglider recently joined the company’s rental pool that includes other autonomous underwater vehicles (AUVs), including Remus and Munin.

Seaglider is an AUV developed for continuous, long-term measurement of oceanographic parameters. The vehicle uses small changes in buoyancy and wings to achieve forward

motion rather than an electrically driven propeller. The system's pitch and roll are controlled using adjustable ballast.

"Seaglider is well known for its work in ocean science but the system is also relevant to a range of commercial operations including environmental monitoring for offshore fields, oil spill detection and supporting decommissioning projects," said Keith Thomson, rental manager, Kongsberg Maritime Ltd.

The company will also be running a one-day AUV Operations Introduction Course at its Aberdeen-based training center on Feb 3. The training center saw high interest for this in-depth introductory course in 2016 and expects this year's course to attract similar numbers, especially considering the influx of industry visitors to Aberdeen for Subsea Expo.

—Staff Reports

EXPLORATION BRIEFS

Eni Drills, Tests Merakes Discovery Offshore Indonesia

Eni successfully drilled and tested Merakes 2, the first appraisal well of the Merakes discovery under the production-sharing contract (PSC) in East Sepinggan offshore Indonesia, according to a news release.

The block is in the prolific offshore Kutei Basin, and the Merakes discovery is 35 km (22 miles) from the Eni-operated Jangkrik Field, which is expected to start producing through a floating production unit in second-quarter 2017.

The well, drilled to a depth of 2,732 m (8,963 ft) in 1,269 m (4,163 ft) of water, encountered 17 m (56 ft) of clean Pliocene sands, confirming the extension in this new area of the 2014 discovery by the Merakes 1 well, Eni said.

The production test recorded the Merakes reservoir's gas deliverability. Merakes could have 57 Bcm (2 Tcf) of gas in place.

Eni is the operator of East Sepinggan PSC, with its affiliate Eni East Sepinggan Ltd. holding 85% participating interest and Pertamina Hulu Energy holding the remaining 15%.

TGS Undertakes Norwegian Sea Atlantic Margin 3-D Multiclient Project

TGS said Jan. 19 that its first new multiclient acquisition

project in 2017 will be a 3-D survey of AM17 Atlantic Margin in the Norwegian Sea.

AM17 is a 40,000-sq-km (15,444-sq-mile) project in the central-southern Norwegian Sea, and the single largest 3-D survey done by any company in Northern Europe, covering open blocks in an underexplored area with limited drilling to date.

Play models include rotated Jurassic and Cretaceous fault blocks and stratigraphic and structural traps in Paleocene and Cretaceous turbidite/fan deposits.

Acquisition will likely begin in May 2017 and will continue over multiple seasons. TGS will use its Clari-Fi broadband technology and advanced denoise and demultiple techniques for data processing.

This survey is supported by industry funding, TGS said.

In a separate press release on Jan. 20 from EMGS, it was reported that EMGS and TGS will expand their Barents Sea cooperation agreement, with TGS investing in a 3-D controlled-source electromagnetic data acquisition project related to the 24th licensing round in Norway.

TGS' contribution will be booked as a reduction of the carrying value of EMGS' multiclient library.

The above agreements total \$2 million and will be recognized during first-quarter 2017, EMGS said.

—Staff Reports

TECHNOLOGY

Expanding The Envelope

The oil and gas exploration industry continually searches for untapped hydrocarbon reserves. Over time, the reserves that are easiest to access have been developed and consumed, requiring operators to extend their search for fresh reserves into areas that are more technically challenging. Such challenges can include complex geological structures, thin or poor-quality pay zones, tight rock or marginal pressure envelopes in which to drill. Many of these challenges can be addressed by development of specialized downhole tools designed to evaluate the rock formations and help position wellbores optimally within

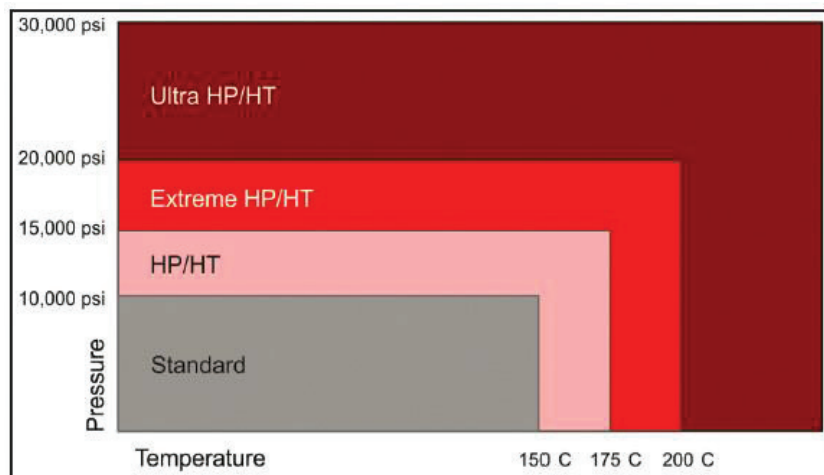


FIGURE 1. Halliburton's definitions of pressure and temperature ranges for downhole tools include various grades of HP/HT environments. (Source: Halliburton)

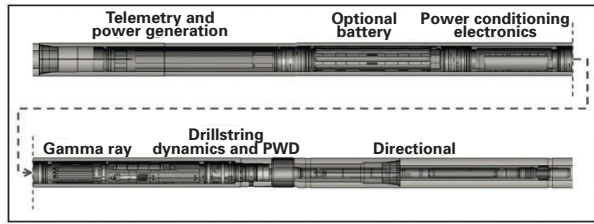


FIGURE 2. This schematic of the Quasar Pulse integrated base-services collar is shown split for clarity. (Source: Halliburton)



FIGURE 3. The Quasar Trio system is the first MWD/LWD system to offer comprehensive formation evaluation at 200 C. (Source: Halliburton)

the reservoir. However, all such tools depend on electronics, and a challenge is to produce tools that are able to function at high temperatures.

Demand for high-temperature tools is increasing, as is the temperature at which they are required to operate. As the trend toward higher temperatures and pressures continues, it is necessary to define further categories to distinguish “ordinary” high-pressure or high-temperature wells from those requiring more advanced tools.

Halliburton’s Quasar system is a new MWD and LWD (MWD/LWD) system capable of operating at temperatures up to 200 C (392 F) and 25,000 psi, placing it firmly in the ultra-HP/HT category (Figure 1).

The key challenges in high-temperature environments revolve around the electronic components of the system and the need to ensure they work reliably, are not damaged by the operating environment and provide measurements equivalent in accuracy to those provided by conventional systems. Techniques such as flasking and the use of eutectic materials for sacrificial melting are widely used in the wireline industry. However, these techniques are not appropriate for the drilling environment because of the much longer run lengths. Instead, the development of the Quasar system used a variety of other techniques to build reliable electronics for a 200 C environment. These included simplification of circuit designs to minimize the number of components required, screening of components to identify those most capable of operating at high temperature, careful modeling of heat flow patterns to eliminate hot spots in the electronics and removal of potentially corrosive elements from the atmosphere inside the tools. Rigorous testing at every level of the tool build process helps ensure the system performs as intended across its entire operating range.

The new system is built around the Quasar Pulse tool (Figure 2), which is an integrated base-services collar that provides all of the basic functions necessary for any MWD/LWD service. These include telemetry, directional survey, natural gamma ray, drillstring dynamics and pressure-while-drilling modules as well as power regulation and data storage functions.

The system is expanded further by the addition of the Quasar Trio suite of formation-evaluation sensors (Figure 3), providing multispace resistivity, azimuthal density and neutron-porosity measurements. Accurate evaluation of gas zones, which are common in high-temperature environments, is only possible if all three measurements are available. A great deal of care was taken to help ensure the performance of these sensors in terms of their measurement range and accuracy is at least as good as their lower temperature counterparts. The system is the first in the industry to offer such a comprehensive suite of measurements at 200 C, allowing operators to evaluate high-temperature reservoirs while drilling without the need for subsequent wireline runs.

Southeast Asia

An operator in Southeast Asia wanted to reduce costs and achieve logging objectives in a batch of high-temperature offshore wells in which the anticipated bottomhole static temperature was 195 C (383 F). The past drilling practice for similar wells was to drill until reaching the maximum temperature rating of the MWD/LWD tools and then pick up a “dumb iron” assembly to drill to total depth (TD). This method resulted in uncertainty in the borehole position and loss of formation logging data. Another common practice was to use temperature mitigation techniques such as reducing rotary speed and circulating to cool the tools, but this significantly increased the amount of rig time required to drill the reservoir section.

The operator ran the Quasar Pulse service on five wells from the platform. Across the five wells the operator reported that the Quasar Pulse service saved about \$1 million and more than 100 hours of rig time. This was accomplished by reducing the number of wireline runs, eliminating trips for tools that had reached their operating temperature limit and not having to use time-consuming temperature mitigation practices to reach TD.

Another operator was developing a gas field in which multiple wells had a bottomhole temperature that exceeded 200 C. With conventional equipment it is only possible to drill these wells using extensive temperature-mitigation procedures, including time spent circulating to cool the tools below their operating limit of 175 C. Even then it is sometimes impossible to drill to final TD without exceeding the tool specifications. Therefore, the operator was forced to complete the section without MWD/LWD tools in the drilling assembly. Additional time then had to be spent acquiring essential formation evaluation data with wireline tools.

To reduce the overall time spent on drilling and evaluating the well, the operator chose to run the Quasar Trio MWD/LWD triple-combo system to acquire all of the necessary formation evaluation data while simultaneously avoiding the need for temperature-mitigation procedures. The result was a comprehensive set of formation-evaluation data that included gamma ray, multispace resistivity, azimuthal density

and neutron-porosity measurements as well as measurements of downhole pressure for well control and directional surveys for well placement. The tools were exposed to a maximum temperature of 197 C (387 F), making this the first MWD/LWD triple-combo run to operate successfully at this temperature.

—**Tim Parker, Halliburton**

TECHNOLOGY BRIEFS

New Subsea Lighting Technology Surfaces

Scotland's PhotoSynergy Ltd. teamed up with WFS Technologies Ltd. to create an on-demand wireless ribbon lighting system that aims to improve diver safety and efficiency subsea, according to a news release.

The technology, called Seatooth Lightpath, combines WFS' Seatooth subsea wireless communication system that is capable of remotely downloading and storing data from subsea installations and PhotoSynergy's Lightpath. The latter is described as a "side-emitting flexible fiber that projects a continuous line of light that carries no electrical power."

The developers said the new technology works at depths of up to 3,000 m (9,843 ft) by divers and ROV operators.

"The light is engaged automatically when the diver or the ROV comes within 5 m [16 ft] of a structure, and provides instant illumination of subsea architecture and delineating features such as control valves, docking bays and even the outline of the structure itself against the natural darkness of the underwater environment," PhotoSynergy said in the release. "It switches off automatically when the diver or the ROV departs the scene and has the ability to act as a proximity warning system when approaching installations, other divers, ROVs or danger areas."

So far, only laboratory tests have been conducted. Plans are to test the technology in subsea conditions in early 2017, PhotoSynergy said.

Webtool Releases Subsea Resettable Emergency Disconnect Cutter

Webtool has released a resettable emergency disconnect cutter for light and medium subsea well intervention.

The company said the Webtool guillotine cutter can be reset subsea by ROV, a feature that eliminates the need to return the cutter to the surface vessel for resetting.

"Within a well intervention emergency disconnect package, the bundles are securely positioned in the mouth of the cutter. Multiple fluid transfer lines and hydraulic flying leads, steel tension member, fiber rope, reinforced hoses, electrical conductors, cables and electrical flying leads are all cut in single guillotine action taking just a few seconds," the company said.

In addition, Webtool said it offers, as an alternative to rechargeable accumulators, a solution that requires no external power source, automatically activating when the emergency disconnect package separates.

Acknowledgment

This article is based on the Society of Petroleum Engineers (SPE) paper 180592, "Taking the Heat: Logging While Drilling at Extreme Temperatures" by T. Parker and P. Cooper, presented on August 22-24, 2016, at the IADC/SPE Asia-Pacific Drilling Technology Conference and Exhibition in Singapore. This article appeared in the January 2017 issue of Hart Energy's E&P magazine.

Buoy Swivel Technology Aims To Reduce Maintenance Downtime

Flexible Engineered Solutions International (FES) has developed new technology for a major manufacturer of marine equipment based in China, a press release stated.

The CALM Buoy Swivel, which is fully certified by DNV GL, includes new swivel technology that allows the buoy to rotate while maintaining a leak-free joint between the subsea pipelines and vessel during the transfer of fluid.

Because it enables the replacement of seals onboard without the requirement to bring the main buoy into a repair yard, the new swivel will significantly reduce maintenance downtime for the CALM Buoy, avoiding it being offline for long periods of time.



The new patented technology was scheduled to be delivered in January to China as part of a contract awarded to FES 12 months previously. (Source: FES International)

ExxonMobil Develops Technology To Dehydrate Natural Gas

The drive to improve efficiency and lower costs with new technology continues with ExxonMobil Corp. being among the latest to launch solutions.

The oil and gas giant's cMIST technology removes water vapor from natural gas using an absorption system inside pipes during production. The dehydration technology was described as an alternative to the larger expensive dehydration towers that are typically used. The benefits, according to ExxonMobil, are less corrosion and equipment interference.

Key to the technology is a proprietary droplet generator that breaks up "conventional solvent into tiny droplets that become well dispersed in the gas flow, thereby increasing the surface area for the absorption of water from the gas," the company explained in a Jan. 5 news release. An inline separator then brings the droplets

together and moves the droplets to the outside wall of the pipe.

“The water-rich glycol is regenerated using a conventional system and is sent back to the droplet generator to be used again,” the company said.

Tom Schuessler, president of ExxonMobil Upstream Research Co., said the technology represents “a step

change in operational efficiency and a significant reduction in footprint.”

The Sulzer engineering and manufacturing firm landed the exclusive license for commercial application of the technology, which ExxonMobil said has been “extensively field tested.”

—*Staff Reports*

POLICY

Proposed Local Content Changes Brew Concerns In Brazil



Moves by Brazilian authorities to create new rules to ease existing local content policy have pleased oil companies that perform E&P activities in the country. To them, the largest Latin American country still lacks a skilled workforce and high-technology performance in the offshore industry, which make investments more expensive and inefficient. For that, a new regulatory framework welcomes acquisition of equipment overseas to give E&P activities more efficiency.

However, the locals aren't too happy.

Created to protect the local offshore industry in Brazil, the federal law establishes the minimum percentage of equipment, vessels and services that can be purchased by oil companies operating in Brazil's oil fields. In some cases, the minimum local content percentage can be 40%.

“We are working to have more realistic and balanced rules for the next auctions,” Brazil's Oil and Gas Secretary Marcio Felix said. “We are [in discussions] with the local industry and major oil companies, and I believe that we have advanced in many points, though we still have some adjustments to make before the official announcement of the changes in the local content policy.”

Yet those likely changes are making the local offshore industry unhappy. During 2017, a year when Brazil will auction roughly 300 exploratory fields, discussions about creating flexible rules for investments have sparked controversies within the segment. In that context, local suppliers have declared a war against this government proposal.

On Jan. 16, Brazilian Federal Judge Francisco Alexandre Ribeiro issued an injunction that suspended Petrobras' bid for acquiring an FPSO unit for the presalt Libra Field in the Santos Basin. For this bid process, Petrobras asked the Brazilian National Agency of Petroleum, Natural Gas and Biofuels (ANP) for a waiver to have more efficiency.

The waiver is valid only for charter agreements of foreign offshore vessels and cannot be extended to labor force services, according to the local content rules.

The Brazilian Shipbuilding Syndicate (SINAVAL), which requested the injunction, claimed that the state-owned oil company's waiver for the FPSO bidding process disrespects the local policy.



SINAVAL President Ariovaldo Rocha (Source: SINAVAL)

“Petrobras has only talked to foreign companies and none of the Brazilian industry was contacted. This is against the regulatory framework,” SINAVAL President Ariovaldo Rocha said in an official statement Jan. 23. He also said the government's proposal to change the current local content rules could destroy the country's shipbuilding industry if it is approved.

Petrobras, on the other hand, justified its intention of inviting foreign companies, stating that building an FPSO unit overseas is 40% cheaper than building one in Brazilian shipyards.

“The local content policy obliges us to divide the whole process in several contracts in order to ensure the participation of local shipbuilders,” the company said in a press statement. “This causes higher prices, technical risks and problems with several contracts, a situation that is contrary to the necessity of making new investments available to the country.”

Petrobras' FPSO unit for operations in the Libra presalt layer is scheduled to be installed in 2020. The unit will be able to produce 180,000 bbl/d of oil. The state-owned oil company, however, has not set a new date for a new bidding process.

Libra was the first presalt field to be auctioned in Brazil in 2013. The area was acquired by the consortium

of Petrobras, Royal Dutch Shell Plc, Total, CNPC and CNOOC. The consortium estimates that the field has between 8 Bbbl and 12 Bbbl of recoverable oil across a 1,500-sq-km (579-sq-mile) area.

Petrobras said it will file an appeal in Brazilian court to reverse the federal judge's decision to block the waiver for the Libra FPSO unit. Also, despite the controversy, Petrobras still plans to ask the ANP for more waivers to acquire FPSO units and other equipment outside Brazil for the company's future E&P activities.

"The country's economic recovery depends on the resuming of investments and jobs creation. We welcome discussions about the best policies for the local offshore industry," Petrobras press staff said. "Nevertheless, simplistic views about nonexistent preferences for foreign companies vs. Brazilian companies do not contribute to the discussion. Also, those views are very disrespectful to millions of Brazilians who are looking for a job at this moment."

—Brunno Braga

BUSINESS

After Shell Deal, Chrysaor Eyes More North Sea Assets

Chrysaor, which has just bought much of Shell's U.K. North Sea assets for up to \$3.8 billion, is in the market for more North Sea deals to expand its newly acquired position as one of the basin's biggest independent producers.

Overnight, Chrysaor became one of the largest oil and gas producers in Britain with output of 115,000 boe/d, snapping up more than half of Shell's British production capacity, including the Buzzard Field, which helps to set the global Brent oil benchmark.

Chrysaor, backed by private-equity fund EIG Partners and Noble Group investment firm Harbour Energy, said it will not stop there.

"Our focus will be in the North Sea on assets that add synergies or help us broaden or deepen our portfolio," said Linda Cook, who has taken over as chairman of Chrysaor. She has previously been managing director at EIG and CEO of Shell's gas and power business.

Cook said the company was considering acquisitions in the British region and other parts of the North Sea.

The independent producer's break into the mature North Sea market mirrors a trend whereby traditional operators such as Shell and BP are slowly withdrawing

from old basins to focus on new areas where prospects for new big-ticket oil and gas finds are higher.

Chrysaor, named after one of Medusa's sons in Greek mythology, said operating costs across the new assets are below \$15/bbl. Brent crude oil prices are currently trading above \$55/bbl.

About one-quarter of its portfolio is operated assets, meaning Chrysaor is the main manager of the fields.

"We do have a medium-term plan to build operatorships closer to 50%," said Chrysaor CEO Phil Kirk.

As oil prices have fallen over the past two and a half years, many large operators have cut costs to the bone, letting staff go and investing much less in finding new fields.

"We see our philosophy as radically different to that. We see the best way to reducing unit costs is to drive up volumes of hydrocarbons processed," Kirk said.

He already has earmarked six or eight new wells, which Chrysaor will likely approve for investment but also would have been unlikely to get approval under Shell, he said.

The new owner also plans to withdraw an application for cessation of production at the Armada hub of gas fields and to invest in extending production instead.

—Reuters

Scottish Enterprise Unveils Subsea Action Plan

Economic development agency Scottish Enterprise is making a push to keep Scotland at the top of the global subsea market, despite the challenges offered by competition from other regions around the world and the harsh realities of the severe industry downturn.

As a nondepartmental public body of the Scottish government, Scottish Enterprise has set up an action plan for the country's important subsea sector—with grants on offer to promote invention and development of new technology that will push the sector forward.

Scotland's 370 subsea companies already generate annual turnover of \$9.4 billion, with the global market currently valued at about \$62.7 billion per year.

"To realize our subsea engineering ambitions, we need to make sure the investments are made to keep our supply chain competitive, ensure our infrastructure offers

appropriate research and testing facilities [and] offer the technology required for the oil and gas industry and other subsea sectors," added Scottish Enterprise.

"Our action plan has been designed on Scotland's existing strengths in subsea engineering, helping our oil and gas companies find new opportunities at home and abroad," said Scottish Enterprise. "In fact, with almost half of all the world's subsea installations in the North Sea, Scotland is a global leader in the sector. These strengths mean Scotland is in a strong position to find new opportunities for growth in international markets and to diversify existing skills into other sectors."

Enpro Subsea Gets R&D Grant

A key part of Scottish Enterprise's action plan is supporting innovation, and Aberdeen-based Enpro Subsea has

landed funding for a new R&D project designed to maximize economic recovery from subsea wells and reduce costs for operating companies.

“We’ve supported Enpro with a £755,000 [US\$947,256] R&D grant to help the company design, develop and test the new technology it plans to introduce to the subsea sector. This is the first time we have supported Enpro Subsea. This funding has given Enpro the confidence to continue our product development for local and export markets,” said Ian Donald, Enpro’s managing director. “This assistance from Scottish Enterprise will enable Enpro to develop the next generation of subsea enhanced production intervention equipment to increase oil recovery and address emerging markets in deeper waters.”

David Rennie, international sector head for oil and gas at Scottish Enterprise, said Enpro is “no stranger to innovation.”

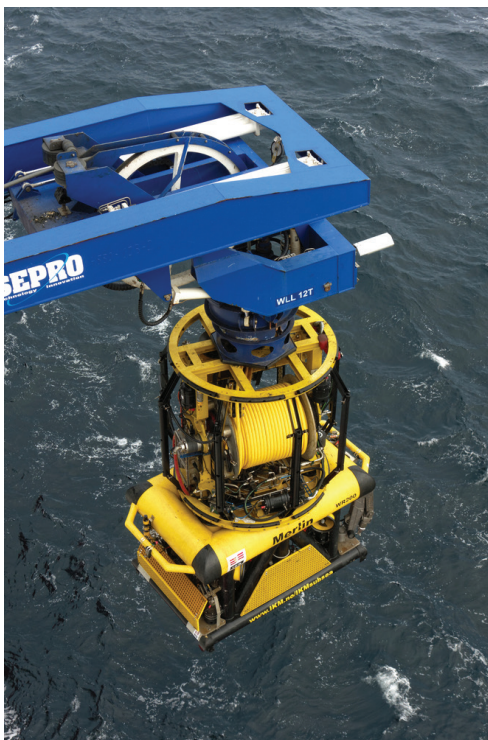
“However, faced by the impact of the current downturn in the sector, our support means the company can deliver this nine-month project on schedule, helping strengthen the company’s market position for when the sector recovers and safeguard existing high value oil and gas jobs,” he said. “Many technologies developed in Scotland have revolutionized the worldwide oil and gas industry. It is this experience and reputation that is the basis for this action plan. We want to build and maintain what we already have, develop new opportunities and ensure we have the infrastructure we need to remain a world leader.”

Neil Gordon, CEO of industry body Subsea UK, added, “Scotland has the largest concentration of subsea engineering in the world, with Aberdeen recognized globally as a center of subsea excellence. A stronger supply chain will generate jobs, opportunities and wealth for Scotland as well as securing our world-leading position in subsea.”

Subsea Focus Areas

Scottish Enterprise’s action plan has identified three key areas where it believes its support can help the subsea sector: position Scotland as a global leader in subsea engineering; increase investment in innovation to grow Scotland’s market share in oil and gas and support diversification into other sectors; and develop Scotland’s subsea innovation infrastructure.

Scottish Enterprise believes the country’s long-term future success also will be built on certain capabilities that can be readily exported:



An ROV is launched from the side of an offshore support vessel to perform a subsea inspection offshore Scotland. (Source: Shutterstock.com)

- Specialist services throughout the Life of Field including feasibility studies (e.g., survey and analysis for oil fields or offshore wind sites); FEED of proposed new developments; equipment procurement, investment and construction; enterprise asset management; inspection, repair and maintenance; decommissioning; training, testing and consultancy;
- Subsea umbilicals, risers and flowlines; and
- Specialist tooling, sensor, control and communication products for use in ROVs, AUVs and submarines.

“Many technologies developed in the North Sea are now in worldwide usage. For example, the subsea xmas tree system, commercially pioneered in the North Sea has revolutionized the oil and gas industry worldwide. Of the 5,000 subsea wells globally, almost 2,000 are in

the North Sea, yielding a huge amount of technology development knowledge and expertise,” Scottish Enterprise said.

“Scotland is also a hub of cutting-edge research and development, with the expertise residing within the Scottish workforce exported around the world,” the agency added. All the major global oil and gas engineering companies have significant operations in Scotland, including FMC, GE, OneSubsea, Aker, Subsea 7, Technip and Bibby Offshore.”



(Source: Shutterstock.com)

Innovation Ecosystem

To support these operations Scotland has developed an “extensive innovation ecosystem.”

“The Underwater Centre in Fort William, National Hyperbaric Center in Aberdeen and the Centre of Excellence

for Flow Measurement and Fluid Mechanics in East Kilbride are key assets at both a Scottish and U.K. level. There is a variety of academic and research institutes with capability in this area," Scottish Enterprise said.

"If we make the right decisions and continue to attract investment from both indigenous and overseas companies, we can help this sector grow from strength to

strength. Such growth will be achieved through a mix of strategic investments in enabling infrastructure, supporting the Scottish supply chain break into and grow in international markets and investigating diversification opportunities while maintaining support for the substantial core oil and gas and decommissioning opportunities."

—*Steve Hamlen*

BUSINESS BRIEFS

Subsea 7 Makes Seaway Offer

Subsea 7 has made an offer to acquire the remaining 50% stake in Seaway Heavy Lifting from K&S Baltic Offshore.

Subsea 7 is offering an initial consideration of \$279 million on completion and deferred consideration of up to \$40 million to be paid by the end of first-quarter 2021 on the condition that certain performance targets are met. The considerations will be funded from Subsea 7's existing cash resources.

"The terms of the offer are binding on Subsea 7 until July 1. During this period the Works Council representing the employees of Seaway Heavy Lifting in the Netherlands will be consulted in compliance with Dutch law," Subsea 7 said.

Subsea 7 CEO Jean Cahuzac said, "Subsea 7's strong market position in offshore energy services is complemented by Seaway Heavy Lifting's expertise in three areas of offshore activity: renewables, heavy-lifting operations and decommissioning of oil and gas assets. We believe that this acquisition will allow us to strengthen Subsea 7's position in businesses where we expect increased activity and opportunities for long-term growth."

Seaway Heavy Lifting is a specialist offshore contractor and operates two heavy-lift vessels. It employs about 550 people and is based in the Netherlands.

Seaway Heavy Lifting is a joint venture in which Subsea 7 currently holds a 50% stake. If the offer to acquire the remaining 50% is accepted, Seaway Heavy Lifting would become a wholly owned subsidiary of Subsea 7.

Shell's Exploration Boss To Step Down

Royal Dutch Shell Plc's head of exploration Ceri Powell will step down this month, capping seven years in the role marked by sharp cutbacks in the company's search for new oil and gas reserves amid the industry's deep downturn since mid-2014.

Powell, a geologist who joined Shell in 1990 and a vocal supporter for strengthening female involvement in the sector, will depart on Feb. 13 and become managing director of Brunei Shell Petroleum the following month, a Shell spokeswoman told Reuters Jan. 23.

Her departure is part of a broad reshuffle of senior positions following the completion of Shell's \$54 billion acquisition of BG Group in February 2016.

Those include the appointment of Jessica Uhl as CFO, who will replace Simon Henry in March as well as the

appointment of Gerard Paulides, who oversaw the BG merger, as head of investor relations.

Powell will be replaced by current upstream strategy vice president Marc Gerrits, who started his career in Shell in 1986 as an exploration geologist in Australia.

ExxonMobil Names Environmentalist To Board

ExxonMobil Corp. named an environmentalist to its board of directors on Jan. 25.

The Irving, Texas-based company named Susan Avery, the former head of the Woods Hole Oceanographic Institution and a former professor at the University of Colorado, Boulder, to its board, effective Feb. 1.

ExxonMobil has come under repeated attack in the past year from environmental groups who claim the company hid research on climate change from the public.

Chevron Appoints Vice Chairman

On Jan. 25 Chevron Corp. appointed Michael K. Wirth as the vice chairman. Wirth, currently the executive vice president of midstream and development, will join the board and take responsibility for policy, government and public affairs. The appointment becomes effective Feb. 1.

Wirth joined Chevron in 1982 as a design engineer. Before assuming his current role, Wirth was executive vice president of downstream and chemicals. Prior to that, he was president of global supply and trading, leading Chevron's worldwide supply and trading operations and its aviation, marine and asphalt businesses. Prior to that, Wirth had been president of marketing for Chevron's Asia/Middle East/Africa marketing business, based in Singapore.

He also served on the board of directors for Caltex Australia Ltd. and GS Caltex in South Korea.

US Senate Confirms Tillerson As Secretary Of State

The U.S. Senate confirmed Rex Tillerson as President Donald Trump's secretary of state on Feb. 1, filling a key spot on the Republican's national security team despite concerns about the former ExxonMobil Corp. CEO's ties to Russia.

In the vote, 56 senators backed Tillerson, and 43 voted no. The tally was largely along party lines, with every Repub-

lican favoring Tillerson. Senate Democrats had tried, but failed, to delay the vote because of Trump's executive order banning immigration from seven mostly Muslim countries and temporarily halting the entry of refugees. They said they wanted to ask Tillerson more questions about the issue after Trump signed the order on Jan. 27.

Senators had also expressed concerns over Tillerson's ties to Russia after the executive spent years there working for the oil company. Some faulted him for failing to promise to recuse himself from matters related to Exxon-Mobil businesses for his entire term as secretary of state rather than only the one year required by law.

Republicans said they thought Tillerson would be a strong leader as the country's top diplomat. They also said it was important to fill key slots on Trump's national security team quickly.

North Sea Energy CEO, CFO Resign

Toronto-based North Sea Energy Inc. reported on Jan. 20 that J. Craig Anderson, chairman and CEO, will leave the company, effective immediately, to pursue other interests.

CFO Petya Popova also will leave, effective immediately, to pursue other interests.

Anderson and Popova will assist NSE during the transition, the company said.

Anderson has been the CEO of NSE for the last 10 years since founding the company and was chairman for the past two and a half years. He oversaw the exploration, appraisal and development of the Jacky Field, the discovery of the Polly Field and recently the drilling of the Bagpuss well in the U.K. North Sea, NSE said.

Popova has been CFO for the past six and a half years.

Ian Lambert, who is a director of NSE and former CEO of Trade Winds Ventures, will become interim CEO and CFO, the company said.

As a result of the management changes, C. Brent Austin and Larry Leblanc, both company directors, also resigned, effective immediately.

NSE said it plans to continue the Bagpuss and Blofeld prospects and work together with its joint venture partners to attract farm-in partners.

—Staff & Reuters Reports

UPCOMING

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

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CONTACT INFORMATION

LEN VERMILLION Group Managing Editor,
Digital News Group
lvermillion@hartenergy.com

VELDA ADDISON Senior Editor
vaddison@hartenergy.com
(713) 260-6400

CONTRIBUTORS:
Ariana Benavidez (Houston) Joseph Markman (Houston)
Brunno Braga (Brazil) Erin Pedigo (Houston)
Steve Hamlen (UK)

GUEST CONTRIBUTOR: Tim Parker, Halliburton

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