ION™ 3D cutter technology
5 million feet drilled and counting
We Are Committed to Helping Our Clients
Throughtout the Entire Fluid Lifecycle.

OF CITRUS OIL FROM ORANGE PEELS TO IMPROVE WELL PERFORMANCE & PRODUCTIVITY.

Deploying d-Limonene, an industry-proven bio-based solvent extracted from oranges, and various surfactant platforms, we develop prescriptive chemistry solutions unique to every reservoir, field and well. This transformative portfolio of chemistries consistently increases a client’s estimated ultimate recovery (EUR), leveraging the power of nature.

FLOTEK

We Are Committed to Helping Our Clients
ENABLE & PROTECT THEIR RESERVOIR℠ Throughtout the Entire Fluid Lifecycle.
Contents

June 2017

Vol 10 Issue 06

03 Comment

05 World news

10 Taking a look at Latin America

Oilfield Technology correspondent, Gordon Cope, provides an overview of state of the upstream oil and gas industry in Latin America.

15 Ready to rock


19 Software solutions

Julien Carlos, Varel, explains how using an integrated software solution during the bit design process can optimise drilling performance.

23 Crafting cutters for complex wells

Tom Roberts, NOV, explains how improved cutter and bit technology achieves success in complex wells.

27 MWD/LWD Q&A

Oilfield Technology invited Halliburton and Baker Hughes to share their insights on MWD/LWD operations. Their feedback covered areas including: geosteering, formation evaluation, and drilling mechanics.

33 Putting cement to the test

Jessica A. McDaniel, Chris McDaniel, and Travis Baughman, CSI Technologies, USA, discuss the importance of third-party testing of cement blends.

37 Patching holes in harsh environments

Greg Galloway and James D. Wheeler, Weatherford, discuss how a novel coiled tubing-deployed cased hole liner helped an operator in Alaska resume its re-completion plans for a shut-in well.

40 Getting wise to well abandonment

Bill Inglis, Expro, UK, reviews the challenges and opportunities posed by the growth of decommissioning sector.

45 Tackling production challenges at Troll

Martin Halvorsen, Martin Madsen, and Mathias Vikeren Mo, Statoil, with Ismail Isma Mohd and Annabel Green, Tendeka, explain how AICDs aid enhanced oil recovery on Norway’s Troll field.
Fusion

Fusion is a new multi- and wide-azimuth (M-WAZ) multi-client reimaging program that uses the latest TGS data and processing technologies as input to create a continuous, seamless volume utilizing one velocity model. The reprocessing project comprises data covering more than 1,000 Outer Continental Shelf (OCS) blocks (~23,000 km2) from 3D WAZ programs, previously acquired by TGS, and covers the Mississippi Canyon, Atwater Valley and Ewing Bank areas. This area is a highly prospective salt province and has multiple discoveries with recent leasing activity. The final deliverables from the first phase of the Fusion reprocessing will be available from the end of Q4 2017.

Otos

The Otos Multibeam and Seep program will cover 289,000 sq km (111,584 sq mi) of the US GoM, all water depth of over 750m (2,461 feet) and include 250 cores with geochemical analysis. Following the success of the Gigante Multibeam and Seep study in the Mexican Gulf of Mexico, Otos will complete the picture with the same acquisition techniques and approach to sampling.
The upstream industry still faces hard times, but the extension of the OPEC output deal has provided some respite. Indeed, with prices supported at around US$50/bbl, the upstream industry has had a better time so far this year than it did in 2016.

A recent report by Rystad Energy found that more delayed projects were sanctioned in the first half of 2017 than in the entirety of 2016. Rystad, which has been tracking FID delays since H2 2014, found that 17 previously delayed projects had now been launched, accounting for approximately US$78 billion worth of development spending. One unexpected success of recent months has been the partial recovery of the deepwater sector; Angus Rodger, Director of upstream Asia-Pacific research at Wood Mackenzie in Singapore, was quoted as saying, “There is life in deepwater yet […]” When oil prices fell, many projects were deferred, but the ones that were deferred first were deepwater because the overall break-evens were highest. Now in 2017, we’re seeing signs that the best ones are coming back.1 A presentation given in March by Transocean predicted that as many as eight offshore projects will be approved in the next three years with break-even prices of less than US$50 – considering that just 3 years ago, the average break-even for such projects was US$75, that’s a significant development.2

This positive momentum, however, doesn’t change the fact that the total number of projects with FID delays has continued to grow: “the list has grown in almost all themes, except oil sands, which is not surprising since oil sands projects are largely confined to one province in Canada, while all other themes have a global candidate pool. The ongoing results of the oil price pain is clear to see – still over 100 projects delayed, accounting for nearly 35 billion boe and US$300 billion spend,” says Readul Islam, Research Analyst at Rystad Energy.

Some further relief, at least for the US energy sector, could come from President Trump’s decision to withdraw the United States from the landmark UN climate change deal, known as the Paris Accord. Even though the deal was popular with Americans overall – a recent poll showed that a majority of Americans in every state were in favour of the deal3 – the Trump administration argues that the move will be good for business. According to a statement on the White House website, the Paris Accord would have cost the US economy nearly US$3 trillion in reduced output, over 6 million industrial jobs, and 3 million manufacturing jobs.4 President Trump promised during his election campaign that he would cut red tape surrounding environmental issues and seek to spur the growth of fossil fuel industries. Even though such changes will do nothing to alter the fundamentals of the oil market, they have the potential to ease the burden, if only slightly, on US producers.

Despite the difficult times, there continue to be predictions of an imminent, sharp rise in oil prices. Thomas Lee, Head of Research at Fundstrat, has predicted an oil rally that could wipe out all other themes have a global candidate pool. The ongoing results of the oil price pain is clear to see – still over 100 projects delayed, accounting for nearly 35 billion boe and US$300 billion spend,” says Readul Islam, Research Analyst at Rystad Energy.

Some further relief, at least for the US energy sector, could come from President Trump’s decision to withdraw the United States from the landmark UN climate change deal, known as the Paris Accord. Even though the deal was popular with Americans overall – a recent poll showed that a majority of Americans in every state were in favour of the deal3 – the Trump administration argues that the move will be good for business. According to a statement on the White House website, the Paris Accord would have cost the US economy nearly US$3 trillion in reduced output, over 6 million industrial jobs, and 3 million manufacturing jobs.4 President Trump promised during his election campaign that he would cut red tape surrounding environmental issues and seek to spur the growth of fossil fuel industries. Even though such changes will do nothing to alter the fundamentals of the oil market, they have the potential to ease the burden, if only slightly, on US producers.

Despite the difficult times, there continue to be predictions of an imminent, sharp rise in oil prices. Thomas Lee, Head of Research at Fundstrat, has predicted an oil rally that could wipe out losses from the current downturn. Lee cites growing “consumption and demand” and believes that “investors and clients are overly pessimistic on oil”. The meat of the prediction is that oil futures are of 2017’s more positive environment.

References
2. Ibid.
3. “Trump is leaving Paris climate agreement even though majority of Americans in every state supported it” – http://www.cnbc.com/2017/06/01/trump-leaves-paris-climate-agreement-though-americans-supported-it.html
5. “Last four times oil did this, huge rallies occurred, and it’s very close to doing it again: Tom Lee” – http://www.cnbc.com/2017/05/31/last-4-times-oil-did-this-huge-rallies-occurred.html
6. Ibid.
Looks Like Magic
Inspiring IOR / EOR Visualisation
Using a Rock-on-a-Chip Approach
**Rystad Energy: more delayed projects sanctioned H1 2017 than the entirety of 2016**

Yesterday's announced sanction of Eni's Mozambican Coral South FLNG project moves yet another development off Rystad Energy's delayed FIDs tracker. So far, more delayed projects have been sanctioned to date in 2017 than during the entirety of 2016.

Rystad Energy is tracking FID delays since the second half of 2014 to post-appraisal pre-sanctioned upstream projects. 17 of these delayed projects have since been launched, accounting for an estimated US$78 billion of development spending. Tengizchevroil's 2016 Tengiz FGP/WPMP expansion in Kazakhstan accounts for about 40% of this spend.

Earlier this week (May 29), Husky Energy announced the sanction of its deepwater White Rose West project off Newfoundland. This was 2017's second double-drop week, after week 8 saw BP's Mad Dog 2 (deepwater Gulf of Mexico) and Noble Energy's Leviathan phase 1 (deepwater Israel) projects exit the FID delay tracker. In addition, projects in China, Iraq, and Vietnam, as well as an oil sands scheme, finally reached FID during 2017.

"In spite of this apparent positive momentum, the FID delay list has continued to grow. Since we last published in January 2016, the list has grown in almost all themes, except oil sands, which is not surprising since oil sands projects are largely confined to one province in Canada, while all other themes have a global candidate pool. The ongoing results of the oil sands, which is not surprising since oil sands projects are largely confined to one province in Canada, while all other themes have a global candidate pool. The ongoing results of the oil price pain is clear to see – still over 100 projects delayed, accounting for nearly 35 billion boe and US$300 billion spend estimate at delay,” says Readul Islam, Research Analyst at Rystad Energy.

**Amec Foster Wheeler wins Aramco contract**

Amec Foster Wheeler has announced that it has been awarded a contract by Saudi Aramco, for facilities required as part of the integrated oil and gas expansion of the Marjan offshore and onshore oilfield in the Eastern province of Saudi Arabia.

Under the five-year contract, the company will deliver the pre-FEED, FEED, overall programme management, and other support services for an additional 300 000 bpd gas/oil separation train, a world scale greenfield gas processing plant, a cogeneration facility and modifications to an existing facility to add natural gas liquids fractionation capacity.

Nick Shorten, President, Upstream Capital Projects, Amec Foster Wheeler, said: "This latest award for this major oilfield expansion programme is a real vote of confidence in our technical expertise and our ability to deliver large and complex projects, plus our long-term commitment to local development.”

**Transocean sells jackup fleet to Borr Drilling**

Transocean Ltd. has announced that it has completed the previously disclosed transaction to sell its jackup fleet to Borr Drilling Limited for a total consideration of approximately US$1.35 billion.

The sale included the company’s 10 high-specification jackups and five jackups under construction at Keppel FELS Limited’s shipyard in Singapore.

The company received cash of approximately US$320 million associated with the sale.

"The sale of our jackup fleet is consistent with our strategic goal of remaining the industry’s undisputed leader in the ultra-deepwater and harsh environment markets, where our high quality assets, unmatched operational experience and trusted customer relationships provide us with a competitive advantage,” said Jeremy Thigpen, President and Chief Executive Officer of Transocean.

---

**In brief**

**Australia**

AWE Limited, the operator of production licences L1/L2 in the northern Perth Basin, Western Australia, has advised that the Waitsia-3 appraisal well was at 2782 m Measured Depth below Rotary Table (MDRT) and preparing to drill ahead in an 8 ½ in. (216 mm) hole to the primary target, following the successful installation of 9 ¾ in. (244 mm) intermediate casing at 2779 m MDRT.

The well will be logged and core samples will be collected and sent for analysis. Waitsia-3 is the first of a two well appraisal drilling programme planned for the Waitsia field in 2017. If the results are positive, the well will be completed as a production well and a flow test may be performed.

Waitsia-3 is located approximately 19.8 km east-south-east of Dongara, Western Australia, and 10.8 km south of Waitsia-1. The approved work programme for the Waitsia-3 appraisal well does not include hydraulic fracture stimulation.

**Namibia**

Chariot, in conjunction with its partners Azinam, NAMCOR, and Ignitus, has completed acquisition of a 3D seismic survey of approximately 2600 km² in February 2016 targeting leads identified in the north-western area of the Central Blocks from approximately 1700 km of 2D seismic data acquired by the partnership in 2015. The 2016 3D survey has been processed in conjunction with 3500 km² of legacy 3D seismic with both depth migration and inversion products calibrated using the nearby Wingat-1 and Murombe-1 wells.

Chariot has initiated the process to prepare for drilling by undertaking an EIA over the new prospects identified from the 2016 seismic campaign.
BP makes Trinidad gas discoveries

BP Trinidad & Tobago (bpTT) has announced that it has made two significant gas discoveries with the Savannah and Macadamia exploration wells, offshore Trinidad. The results of these wells have unlocked approximately 2 trillion ft³ of gas in place to underpin new developments in these areas.

The Savannah exploration well was drilled into an untested fault block east of the Juniper field in water depths of over 500 ft, approximately 80 km off the south-east coast of Trinidad. The well was drilled using a semi-submersible rig and penetrated hydrocarbon-bearing reservoirs in two main intervals with approximately 650 ft net pay. Based on the success of the Savannah well, bpTT expects to develop these reservoirs via future tieback to the Juniper platform that is due to come online mid-2017.

The Macadamia well was drilled to test exploration and appraisal segments below the existing SEQB discovery which sits 10 km south of the producing Cashima field. The well penetrated hydrocarbon-bearing reservoirs in seven intervals with approximately 600 ft net pay. Combined with the shallow SEQB gas reservoirs, the Macadamia discovery is expected to support a new platform within the post-2020 timeframe.

“This is exciting news for both bpTT and the industry, as these discoveries are the start of a rejuvenated exploration program on the Trinidad shelf,” said Norman Christie, Regional President for bpTT. “We are starting to see the benefits of the significant investment we have made in seismic processing and Ocean Bottom Seismic acquisition. Savannah and Macadamia demonstrate that with the right technology we can continue to uncover the full potential of the Columbus Basin. This is a testament to bpTT’s ongoing commitment to the development of our Trinidad and Tobago operations and the wider industry, and we look forward to the future portfolio drill-out.”

BP Trinidad and Tobago has a 100% working interest in Savannah and Macadamia.

Saipem: New offshore drilling contracts in Mozambique, Mediterranean and Black Sea

Saipem and Eni have signed a contract for offshore drilling activity in Mozambique, utilising the drillship Saipem 12000. The contract is of 15 months’ duration commencing mid-2019. It includes options up to a maximum of 45 months, not comprised in the contract value.

In addition to this contract, which will allow the company to participate in the development of the Coral field, Saipem has been awarded other offshore drilling contracts. The activities related to the other acquisitions will be executed in the Mediterranean and the Black Sea and will utilise cutting-edge vessels from the company’s fleet.

The total value of these new contracts is US$230 million. Significantly, Eni has awarded Saipem a contract for the drilling of two wells offshore Cyprus. Work will once again be carried out by the Saipem 12000 and commence in the fourth quarter of 2017. The vessel will be subsequently deployed in Portugal for operations previously announced in 2016 and postponed at the request of the client. These awards attest to Saipem’s consolidation in the area of the Mediterranean where the drillship Saipem 10000 is already active. They also reinforce the company’s presence in a market of particular interest where important discoveries have recently been made.

Finally, the semisubmersible rig Scarabeo 9 will be utilised for the drilling of one well, plus an optional one, in the Black Sea. In service since 2011, the Scarabeo 9 is undergoing innovative upgrades, whose expenses are included in the contract. These upgrades will enable it to pass through the Bosphorus. This is a particularly important development in view of the interesting opportunities for offshore drilling in ultra-deep water in the Black Sea area.
With the MAXIMUS MMX cameras, a new world of cost effective solutions is available for monitoring tasks in the most challenging conditions in onshore, offshore, marine and heavy industrial environments.

- Extra-competitive
- Extra-light
- Extra-compact
- Extra-flexible
Drilformance introduces new lateral bit series

Drilformance’s new Cheetah series of drill bits relies on four key design tenets: Clear Path™, Fast Forward™, Cryo Structure™ and True Track™. These design features work synergistically to take advantage of the bolstered parameters seen in today’s oilfields.

According to Casey Kitagawa, Global Applications Engineering Manager, standard cutter shapes result in performance compromises for high ROP applications, making the operator choose between acceleration or top end ROP. Traditional bits can achieve rapid acceleration by using aggressive back rakes, but sacrifice top-end ROP by limiting total available depth of cut. “With Clear Path you get both, where cutter geometry utilises cut shape and cut path analysis paired with a precision manufacturing process to achieve rapid acceleration through more efficient and responsive translation of weight on bit to instantaneous ROP.” With full in-house manufacturing capabilities, Drilformance is able to precisely shape the substrate behind the diamond table, ensuring it does not impede the penetration of the cutter into the formation, resulting in a bit capable of higher top end-ROP, while maintaining aggressive back-rakes that drive acceleration.

The Fast Forward concept is a hyper-ROP enabling technology that is designed to work with Clear Path to push the ROP envelope further. While Clear Path reduces ROP arresting bit components from the point at which the cutter emerges from the blade top, Fast Forward uses advanced blade top geometry to eliminate bit body contact.

“When a bit is engaged to the maximum depth of cut allowed by the formation and the design cutting structure, both the blade material between and behind cutters will arrest ROP by serving as load bearing surfaces,” said Kitagawa.

Fast Forward slopes the back of the bit away from the cutter pocket, which Kitagawa says achieves a synergistic harmony of design and manufacturing objectives by both increasing the max engagement capability while simultaneously improving consistency and uniformity of hard metal application.

As velocity increased both in ROP and rotation, the company found a need to reduce heat checking and prevent premature trips due to reduced penetration rate. This is where their Cryo Structure layout was developed to minimise the bearing surfaces created by abrasive wear and thermal degradation according to Kitagawa, “Cryo Structure instead seeks to expose more diamond with as little substrate as possible to create load bearing surfaces as the bit wears.”

The last new development took into account the application oriented profile and cutting structure combination with a goal of offering operators higher rotating percentages, less painful slides, and better wellbore quality. “The extended gauge length coupled with the proprietary structure modelling results in a bit that requires less corrective slides, less micro-dogleg creation, more efficient slides, and longer intervals of rotating between corrections, which is why we called the design True Track,” said Kitagawa.

The four improvements to the Drilformance lineup are being implemented across the fleet in 2017, and company CEO, Rusty Petree expects to see continued success with the Cheetah Series, “We are pleased with the results thus far and as we continue to tune designs, we should continue to see even higher performance.”

Airswift in 3 year global mobility services contract

Airswift, a global workforce solutions provider for the energy, process and infrastructure sectors, announced that it has been appointed by a major EPC company to deliver global mobility services worldwide.

The contract is set to run for three years, with the option to extend for two further one-year terms. Under the terms of the partnership agreement, Airswift will assist with compliance, security and assignment requirements that need to be considered to guarantee that personnel arrive safely on-site wherever and whenever they are needed.

Work will fall into the following four key areas: assignment and mobilisation services, global employment and payroll services, immigration, and finance.

With 800 employees across its 52 global offices, Airswift will deliver the entire contract without the need to outsource to third parties.

CGG GeoConsulting awarded OGA contract

CGG GeoConsulting has announced that it has been awarded a contract to supply digital well products to the Oil & Gas Authority (OGA), the UK Government industry regulator, as part of a wider tender for comprehensive subsurface databases and information sources to encourage further exploration in underexplored areas of the UK Continental Shelf (UKCS).

The data sets will help to support the OGA’s work across the exploration and production (E&P) lifecycle including the promotion of future licensing rounds and undeveloped discoveries, regional exploration projects, area strategies and asset stewardship.

Mark Weber, Senior Vice President, CGG GeoConsulting, said: “We are delighted that GeoConsulting’s digital geoscience data was selected by the OGA for the breadth of coverage our well products provide over the UKCS region. We expect they will offer significant aid to E&P companies during future licensing rounds.”
Take Control of Your Drilling Performance

WITH CRUZER™ DEPTH-OF-CUT ROLLING ELEMENTS

Maintain a controlled and constant depth of cut, even in the most challenging environments, with the latest drill bit technology from Halliburton. The Cruzer™ element’s unique roller design is diamond reinforced for smooth control and consistent engagement with minimal friction and element wear. Find out how this new enhancement and a local DatCI™ (Design at the Customer Interface) team can help you maximize your drilling efficiency and performance.

halliburton.com/cruzer
The mood, according to Moody’s Corp., looks grim for Latin American O&G producers. According to the rating agency, 2016 crude output in Venezuela, Ecuador, Brazil, Mexico, Argentina and Colombia fell almost 5%, to 9.13 million bpd, from a year ago. Across the region, producers are slashing costs, selling assets and trying to find ways to keep their credit ratings from pitching headlong into junk status. “In the coming two years these companies might be unable to invest money enough to revert the production decline,” it noted.

While upstream sectors around the world are all suffering from low commodity prices, Latin America has its own unique challenges. While some countries suffer, others prosper; the differences depend largely on the vision and determination of each country and its citizens.

For many years, Argentina was a textbook example of how to do everything wrong. Under the Kirchner
regimes, the O&G sector was partly re-nationalised and generally mismanaged, to the point where production fell from over 900 000 bpd in the late 1990s to current levels of 523 000 bpd, and gas from 4.5 billion ft³/d in 2007 to 3.5 billion ft³/d. Rolling brownouts became a fact of life.

There is light at the end of the tunnel, however. The EIA estimates that the country could contain up to 774 trillion ft³ of recoverable shale gas and 21 billion bbls of shale oil, mostly in the Vaca Muerta formation in the Neuquen basin in western-central Argentina.

Chevron and its JV partner YPF have been drilling exploratory wells in the Vaca Muerta in order to assay its production potential. Longer laterals, more fracture stages and increased wells in the Vaca Muerta in order to assay its production.

Longer laterals, more fracture stages and increased wells in the Vaca Muerta in order to assay its production.

In addition, efforts have been underway to reduce costs per well. By early 2017, the price tag had fallen from US$17 million to US$8 million, and the time to complete a well from 40 days to 8 days.

While there is room for optimism, the threat of energy shortages still hangs over the country. The Argentine government estimates that it would take a total of US$200 billion in shale gas investments to reverse the country’s need for costly imports.

International players are eager to step up to the plate, however. After Royal Dutch Shell CEO Ben van Beurden met with new Argentine President Mauricio Macri in late 2016, the company announced plans to invest US$300 million in the country over the next three years on exploration, refining, distribution and marketing.

Brazil

Brazil is both blessed with natural resources and guilty of turning them into an own-goal. According to the EIA, the country has over 15 billion bbls of proved reserves, and 1 trillion ft³ of gas. Output stands at 2.5 million bpd and 2 billion ft³/d of gas.

And it is growing. In mid-2016, Petrobras began production at the Cidade de Saquarema FPSO unit in the Lula Central pre-salt field. The FPSO can handle up to 150 000 bpd. It is the sixth FPSO in the area to enter service. The company reports that production now exceeds 1 million bpd from the Lula prospect.

But Petrobras, the flagship of Brazil’s O&G industry, has been foundering for a decade on a huge corruption scandal known as Lava Jato (Car Wash). In 2007, police arrested 13 people for corruption relating to an organised scheme to take bribes in exchange for public partnership tenders from Petrobras. Since then, scores of people, including two former Petrobras directors, have been formally accused of offering and accepting approximately US$800 million in bribes and other inducements by inflating Petrobras contracts and funneling part of the money back, including to the ruling Workers’ Party.

The scandal also generated significant political fallout. Public sentiment turned against President Dilma Rousseff when allegations surfaced that she had been part of the board of directors when the graft was occurring. Although no direct evidence of her involvement emerged, calls for her impeachment led to the Senate charging her with breaking budget laws and voting to remove her from office. She was replaced by Vice President Michel Temer. In turn, Temer brought Pedro Parente, the former Chief of Staff to President Henrique Cardoso, out of retirement in order to lead Petrobras.

Since then, Petrobras has been overhauling its governance and management. It is also moving aggressively to lower debt and costs. In late 2016, it sold its stake in ethanol producer Guarani SA and two petrochemical facilities in northeastern Brazil for a total of US$587 million, capping off over US$13 billion in divestitures. The company has plans to sell assets and develop partnerships worth US$21 billion over the next two years.

The government is also making regulatory changes. In 2010, Brazil proclaimed its pre-salt rules, calling for huge signing bonuses, a 30% Petrobras stake in all projects, and having Petrobras as operator of all fields. In addition, the government mandated onerous national content rules. As a result, when the first tender for the Libra field was posted, only one group bid. Brazil has since scrapped the rules that called for Petrobras to be operator in all its fields and control at least a 30% stake.

Brazil’s beleaguered offshore sector has also been helped by several recent discoveries. In mid-2016, Petrobras and its Libra consortium partners (Royal Dutch Shell, Total and CNPC), encountered over 400 m of good quality, API 27 gravity oil in the northwest portion of the block. An earlier well encountered a 310 m column of oil. A Repsol-led consortium encountered 175 m column of hydrocarbons while drilling a final appraisal well on its Gavea license in the Campos basin. The well tested 16 million ft³/d of gas and 4000 bpd of oil on a 32/64 in. choke.

Colombia

All eyes in Latin America turn to Colombia when they seek ways to successfully reform their O&G sectors. Two decades ago, a civil war with FARC guerrillas had cut the country’s 990 000 bpd output in half. In 2003, however, under the Uribe government, a series of fiscal and regulatory changes opened up the sector to privatisation. Since then, international investments exceeding US$5 billion annually have resulted in a rise in production to almost 1 million bpd.

Although former state monopoly EcoPetrol has been a significant contributor to the renaissance, international companies have also whole-heartedly entered the jurisdiction. Geopark is a leading independent Latin America O&G company with extensive holdings in Colombia, Chile, Brazil, Argentina and Peru. It has had great success in Colombia, growing its net production in the country to 17 500 boe/d (out of a total of 23 600 boe/d for all operations).

Specifically, Geopark has been pursuing a significant find in the Jacana prospect, located in its Llanos block 34 (down-strike of the large Tigana field). Its most recent appraisal well, Jacana 11, flowed 2100 bpd of 18.7 API crude. As of Q1 2017, Geopark reported it has proven reserves of over 66 million boe/d in Colombia. The company intends to drill up to 20 new appraisal wells in order to substantially increase production and reserves.

Independent Gran Tierra holds assets in Colombia, Peru and Brazil, and has several major Colombian fields under expansion. In the company’s Costayaco field, a recent production well tested 2023 bpd of 30 API crude. A 2016 well in its Acordiono Field flowed 144 bpd of 24 API crude. In all, the company averaged 27 000 boe/d net in Q4 2016. Gran Tierra expects 2017 average production before royalties to be 34 000 to 38 000 boe/d from the company’s assets in Colombia and Brazil.

Peace has also largely returned to Colombia’s hinterland. In an historic step in 2016, the government of President Juan Manuel Santos reached a disarmament agreement with FARC, the main rebel group in Colombia.

June 2017
Master Your Terrain

ReedHycalog™ Tektonic™ drill bits are tailored for your specific challenges.

One bit. 600 unique designs.

Our bits are engineered for your application. Whether you want to improve performance in a highly interbedded, directionally challenging drilling operation or you need a bit to increase ROP in shale formations, we have the bit for you.

nov.com/reedhycalog
The half-century guerrilla war, which left 250 000 dead and millions displaced, officially ended after successful negotiations in Cuba.

Other resistance groups remain a problem for the nation’s O&G sector, however. The Canon-Limon pipeline, running from the interior to the Caribbean port of Covenas, has a nameplate capacity of 210 000 bpd. Ecopetrol estimates that rebel attacks on the line by the ELN Army have resulted in almost 900 000 bbl of lost production in the first three months of 2017 alone. Until all rebel groups negotiate cease-fires, bombings, kidnappings and disruptions will remain a risk for the foreseeable future.

**Mexico**

When Mexico’s President Enrique Peña Nieto cancelled the state monopoly in O&G, few could have predicted the rapid pace at which the sector would evolve. Once the sole domain for state oil company Pemex, the landscape has been transformed as open bidding on leases, joint ventures (JVs) and farm-outs blossom like flowers in the desert after a rainstorm.

In December, the National Hydrocarbon Commission (Comisión Nacional de Hidrocarburos or CNH), held a successful auction of deep Gulf of Mexico blocks. CNOOC bid on two Perdido blocks, and Exxon Mobil partnered with Total for another Perdido block. Over the course of the next 12 months, Mexico intends to offer a total of 168 offshore blocks containing billions of barrels of oil and trillions of cubic feet of natural gas.

At the same time, Pemex and Australia’s BHP Billiton created a JV to develop the offshore Trion block in the Gulf of Mexico. The latter was picked through an open auction process managed by the CNH. The prospect is located adjacent to the US-Mexico marine border in the Perdido Fold Belt. It is estimated to contain reserves of 485 million bbls of oil. Initial delineation drilling is expected to commence in 2017, and the prospect is expected to reach peak production of 120 000 bpd by 2025. In all, Trion is expected to require over US$410 billion in investments over the course of its life.

In early 2016, Renaissance Oil became the first private sector producer to operate in the country in 80 years when it snapped up three Pemex blocks located in the southern state of Chiapas in the highly-prospective Tampico-Misantla basin, close to the immense Chicontepec field (an unconventional reservoir containing 139 million bbls of reserves).

As part of the deal, Renaissance took over operation of three mature Pemex fields with a total production of approximately 700 bpd of crude and 6 million ft³/d of gas. The company is partnering with Halliburton in order to beef-up output. “We believe we can increase production fivefold,” said Kevin Smith, Vice-President of business development. Renaissance has since used advanced interpretation of 3D seismic data to identify numerous new prospects within the blocks.

Thanks to the massive growth in power demand in Mexico, import natural gas pipeline capacity from the US has expanded at a tremendous rate, to current levels of 7.3 billion ft³/d. A further 3 billion ft³/d is expected to enter service in 2017, and there are plans to bump capacity another 3 billion ft³/d in 2018.

Pemex, which averaged 2.1 million bpd production in 2016, expects output to fall to 1.9 million bpd in 2017. The company has had some exploration successes, however; in September, it announced its offshore drilling programme discovered six new deposits. Two of the discoveries were in the deep water Perdido Belt, with 40 API deposits capable of flowing up to 15 000 bpd from 160 million bbls of reserves. The other four discoveries were light crude from shallow water deposits estimated to hold up to 60 million boe.

Most observers agree that Mexico has taken many positive steps to modernise and grow its O&G infrastructure. While no one doubts there are many challenges ahead, the country can be lauded for the immense reforms that have already been successfully achieved.

**Venezuela**

No matter how bad things can get in other countries, Latin America always has Venezuela as its enfant terrible. Blessed with the largest proven oil reserves in the world (some 298 billion bbls, mostly heavy crude), it has still managed to blunder from one catastrophe to the next; since the ascendency of Hugo Chavez and his Socialist Party, production has plunged from 3.5 million bpd to approximately 2.1 million bpd in 2016.

The impact on the country has been profound. Venezuela relies on oil for over 90% of its export currencies; according to Thomson Reuters, PDVSA’s crude exports fell from 1.82 million bpd in late 2015, to 1.59 million bpd in late 2016.

Part of this drop is due to tardy payments for the mundane task of hull cleaning. Intermittent crude leaks around the port of Bajo Grande have soiled hulls of PDVSA tankers and maritime law does not permit them to sail in international waters until they are cleaned. Several million barrels of Venezuelan crude have been delayed – in some cases for months – while they await cleaning.

The reader could be forgiven for assuming that things could not get much worse. However, in October, a congressional report found that PDVSA’s former President, Rafael Ramirez, was responsible for taking part in a US$1 billion bribery scheme. Further prosecutions are expected.

Because much of the alleged ill-gotten gains passed through the US financial system, several federal agencies, including Homeland Security and the FBI, are investigating activities that date back to 2005. Roberto Rincon-Fernandez, a Venezuelan national living in Houston, was successfully prosecuted for taking part in a US$1 billion bribery scheme. Further prosecutions are expected.

Nonetheless, Venezuela’s huge deposits of heavy crude are still drawing international investors. In September, PDVSA announced the launch of a US$3.2 billion drilling project in the Orinoco heavy crude belt. The programme will see 480 wells drilled over thirty months in order to increase production by 250 000 bpd. PDVSA is operating the project in conjunction with Lukoil, Schlumberger, Horizontal Drillers, Halliburton and Baker Hughes. The announcement comes after PDVSA began to issue over US$1 billion in three-year promissory notes to service companies.

**Summary**

In conclusion, while no country in Latin America is immune from the extended commodity slump that has gripped global markets, some have prospered in the face of adversity. While Venezuela is expected to be in the throes of economic mismanagement and political chaos for the foreseeable future, Mexico, Colombia and Argentina have taken regulatory and fiscal steps to make international investment attractive, and Brazil has moved decisively to deal with a massive scandal. On the whole, the future for the region looks bright.
You will need to register to read the full edition. Please log in to www.oilfieldtechnology.com or alternatively click here to register for free!

DON’T WANT TO MISS OUT?

For more information about Oilfield Technology subscription package, please contact us:

E: subscriptions@oilfieldtechnology.com
T: +44 (0)1252 718999