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Global Upstream Projects Development Summary - October 2018

Stratas Advisors

Global Upstream Summary

In October, 18 featured upstream projects that were tracked announced either new or updated statuses. Key projects on the Stratas radar include the Kingfisher and Tortue projects in the Africa; Greater Western Flank Phase 2, Beryl and Lingshui 17-2 projects in Asia Pacific; Columbus, Ana and Diana, Finlaggan, Mariner, Martin Linge, Cape Vulture and Arran projects in Europe; West White Rose and Bay du Nord projects in North America; and the Lula Extreme Sul project in Latin America. On the exploration side, it is worth mentioning that Savannah Petroleum made the fifth consecutive oil discovery on the Agadem Rift basin in Niger. Meanwhile, 24 major companies involved in operating assets were involved with acquisition and divestiture activities in October. Total deals could amount up to \$6 billion in combined value.

Regional Highlights

Africa

Following the Eridal-1, Amdigh-1, Bushiya-1 and Kunama-1 discoveries in the R3/R4 production sharing contract (PSC) area on the Agadem Rift basin in Niger, Savannah Petroleum hit its fifth consecutive discovery with the Zomo-1 exploration well. The exploration well was drilled at the depth of around 8,200 feet and add an additional oil pay of about 5.4 meters in net oil-bearing reservoir sandstones. Further technical evaluation and testing will be needed to confirm the additional pay. Stratas Advisors expects further announcements on Savannah's R3/R4 PSC area to be forthcoming in next few months.

Elsewhere, Kosmos Energy awarded front-end engineering and design (FEED) contract of Tortue gas development project offshore Mauritania and Senegal. The Tortue gas project is the first phase of the Greater Tortue complex sitting offshore Mauritania and Senegal. The FEED work is scheduled to be performed through the end of 2018. The final investment decision is expected toward the end of this year. The Tortue field is estimated to contain more than 15 trillion cubic feet of recoverable gas and is planned to be developed through an LNG plant, with cargoes ultimately headed to Senegal and Mauritania. Stratas expects first gas to start up in 2021.

Asia Pacific

In this region, two featured offshore gas projects started first production in October. One of the key projects is Woodside operated Greater Western Flank Phase 2 (GWF-2) gas development, which located at block WA 024L of North Carnarvon basin offshore Australia. Within the development area, there are six gas fields including Keast, Dockrell, Sculptor, Rankin, Lady Nora and Pemberton, which together contain estimated recoverable reserves of around 1.6 trillion cubic feet of natural gas and 43 million barrels of condensate. Stratas projects peak production could reach approximately 590 million cubic feet per day within first three years. The gas production from this project will be transported to an LNG plant and also add to domestic gas supplies.

Another gas project brought onstream in October was JX Nippon Oil & Gas operated Beryl gas field, located

in block SK10 offshore Sarawak, Malaysia. This project is estimated to hold recoverable reserves of gas totaling 500 billion cubic feet. Stratas expects it could reach a production plateau of 140 million cubic feet per day of gas in 2020. Beryl gas field is using the existing infrastructure at the nearby Helang gas field, with gas to be shipped through subsea pipeline to MLNG Tiga LNG plant, located onshore Bintulu, Sarawak.

Europe

In October, two projects in the Black Sea of Romania delayed final investment decisions (FID) due to new offshore legislation and continuous changes. Black Sea Oil & Gas postponed the FID for the Ana and Doina gas project which holds estimated recoverable reserves of approximately 320 billion cubic feet of gas. The original schedule of FID was planned by the end of this year; however, the FID is pushed back until next year.

The second project that suffered FID postponement was Neptune Deep project in the Black Sea. The FID for this project is expected at around \$1.1 billion. Previously, it was scheduled to be sanctioned in the fourth quarter of this year, but partner OMV and operator ExxonMobil need to review offshore laws and evaluate new legislation to understand how this will affect the offshore business. Therefore, the FID is potentially pushed back until next year.

In the North Sea UK, Shell took over the operatorship of Arran gas condensate field from Zennor Petroleum and made final investment decision on this project. Contrary to Marathon Oil, Chevron and ExxonMobil's recent decisions to exit the North Sea assets and instead focus on onshore US shale. Shell continues to commit to UK North Sea assets. Peak production from Arran field is estimated to be 100 million cubic feet per day of gas and 4,000 barrels of condensate. Four new development wells are planned for this field and plans call for development to be done with subsea tie-backs to the Shearwater hub facilities.

What's more, Equinor delayed two projects' first production start-up schedule in October. The Mariner heavy oil project in the East Shetland was planned to launch first production by the end of 2018. Now first production will be pushed back to first half of next year. The reason is mainly due to challenging weather conditions and partially related to expanded hook-up and commissioning work scope. The estimated recoverable reserves was boosted to around 300 million barrels by 20% increase, but the cost of this project was unchanged and under control.

The other postponed project was Martin Linge located in North Sea. This project was originally scheduled to come on stream in 2016, but due to cost overruns and a fatal accident. This project had been pushed back twice. After Equinor took over the operatorship of this field from Total early this year, issues with costs and fabrication of topsides modules became apparent. Therefore, delays arose again on this project, shifting it from 2019 to 2020 and lifting estimated costs to \$5.7 billion, a 12% increase over last year's estimate.

Americas

In North America, Equinor started conceptual study on the Bay du Nord project offshore Newfoundland, Canada. The project is planned to be developed through an FPSO at an estimated total cost of \$8.35 billion. At the same time, Equinor is planning to issue an invitation for tenders for topsides FEED work. The contract package also includes an EPC option. Preferred FEED contractors will be selected in the second half of 2019. The Bay du Nord field is estimated to hold around 300 million barrels of oil. Stratas Advisors expects first production could come on stream in 2025.

In South America, Petrobras started up first production of Lula Extreme South project, in the pre-salt province of Santos Basin offshore Brazil. The field is developed through the P-69 FPSO, which is the eighth facility installed in Lula field. The P-69 FPSO has a production capacity of 150,000 barrels per day of oil and 212 million cubic feet per day of gas, and it will produce via eight production wells and seven injection wells. This is an important milestone in the development on pre-salt for Petrobras. Stratas expects more developments and achievements will be accomplished by international consortium partners in the next few years from the recent fifth pre-salt licensing round result. Crude production from the pre-salt region is

expected to increase and could contribute significantly in Brazil's country level oil production through 2025.

Middle East

In Oman, Petronas decided to acquire a 10% stake of the giant Khazzan gas field located onshore Oman from Oman Oil Company at a current estimated payment of \$1.3 billion. The Khazzan Tight Gas & Condensate project is operated by BP on 60% working interest with the state-owned Oman Oil Company which has 40% working interest. This project has been developed in two phases: phase 1 started in 2017 and phase 2 is planned to start-up in 2021. So far the project has produced around 1 billion cubic feet of gas and approximately 35,000 barrels per day of condensate. An estimated of recoverable reserves of this field is about 10.5 trillion of natural gas and 350 million barrels of condensate. Stratas Advisors' production forecast shows that the phase 1 is going to develop 7 trillion cubic feet of gas, the plateau production can achieve 1 billion cubic feet of gas per day and 25,000 barrels of condensate a day. The second phase is planned to produce additional 0.5 billion cubic feet of gas per day and 15,000 barrels of condensate per day.

Featured Developments

Licensing Round

Date	Country	Licensing Round	Licenses/Blocks	Status	Basin	Winning Consortium
10/18/2018	Ghana	First Ever Competitive Bid Round	Nine blocks	blocks 2, 3 and 4 offered; Block 1 is reserved for GNPC	Central Basin, Accra and Keta basins	expected to announce successful tenders in mid-August 2019

Exploration & Discoveries

Discovery Date	New Discovery	Region	Country	Primary Hydrocarbon	Operator	Water Depth (ft)	Location	Basin	Block	Well Depth (ft)
10/5/2018	Zomo-1	Africa	Niger	oil	Savannah Petroleum	0	Onshore	Agadem Rift	R3/R4	8,199

Status Updates

Projects Name	Field Name	Region	Country	Primary Hydrocarbon	Location	Operator	Basin
Greater Western Flank Phase 2	Keast, Dockrell, Sculptor, Rankin, Lady Nora and Pemberton	Asia Pacific	Australia	gas	Shallow	Woodside	North Carnarvon
West White Rose Extension	West White Rose	Canada	Canada	oil	Shallow	Husky	Jeanne D'Arc
Columbus	Columbus	NW Europe	UK	gas	Deep	Serica	North Sea

Ana and Doina	Ana and Diana	Black Sea	Romania	gas	Shallow	BSOG	Black Sea
Finlaggan	Finlaggan	NW Europe	UK	gas	Shallow	Zennor Petroleum	North Sea
Khazzan Tight Gas & Condensate	Khazzan	Middle East	Oman	gas	Onshore	BP	Ad Dhahirah Governorate
Neptun Deep	Domino and Pelican South	Black Sea	Romania	gas	Deep	ExxonMobil	Black Sea
Mariner	Mariner	NW Europe	UK	oil	Shallow	Statoil	East Shetland
Lula Ext. Sul	Lula	Latin America	Brazil	oil	Ultra Deep	PETROBRAS	Santos
Beryl	Beryl	Asia Pacific	Malaysia	gas	Shallow	Nippon	Sarawak
Lingshui 17-2	Lingshui 17-2	Asia Pacific	China	gas	Deep	CNOOC	Qiongdongnan
Bay du Nord	Bay du Nord	North America	Canada	oil	Deep	Statoil	Flemish Pass
Tortue Phase 1	Tortue	Africa	Mauritania	Oil	Ultra Deep	Kosmos	Offshore Mauritania-Senegal
Rossukon	Rossukon	Asia Pacific	Thailand	oil	Shallow	Krisenergy	Karawake
Cape Vulture	Cape Vulture	Europe	Norway	oil	Deep	Statoil	Norwegian Sea
Arran	Arran	Europe	UK	gas	Shallow	Shell	North Sea
Martin Linge	Martin Linge	NW Europe	Norway	oil	Shallow	Statoil	Northern North Sea
Kingfisher	Kingfisher	Africa	Uganda	oil	Shallow	Shell	Lake Albert

A&D Activities

Company	Country	Location	A&D	Assets	Sale and Purchase Agreement	Partner	Deal Amount
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PetroRio	Brazil	Campos basin	acquisition	Frade field	18%	Chevron	not disclosed
Vitol	Nigeria	Oil Mining Lease 127	acquisition	Agbami field, Akpo field and the Egina project	50%	Petrobras	\$1.407 billion
Petronas	Oman	Block 61	acquisition	Khazzan gas field	10%	Oman Oil Company	\$1.3 billion
Whitebark Energy	Australia	TP/15	divesture	Xanadu	15%	Triangle Energy	\$3.5 million
Aker BP	Norway	licences 146	acquisition	King Lear	78%	Equinor	\$250 million
Shell	Denmark	North Sea	divesture	Halfdan, Gorm and Dan, as well as Tyra	100%	Noreco	\$ 1.9 billion
Equinor	Norway	North Sea	divesture	Tommeliten discovery and PL 044	100%	Polish group PGNiG	\$220 million
Hibiscus Petroleum	UK	North Sea	acquisition	blocks 15/13a and 15/13b	50%	Caldera Petroleum	\$37.5 million
Chevron	Norway	Barent Sea	divesture	Korpffjell licence	20%	DNO	not disclosed
Rex International	Trinidad & Tobago	offshore	divesture	Steeldrum Oil	26%	Columbus Energy	\$1.54 million
ENI	Libya	Ghadames basin and Sirt basin	acquisition	Contract area A, B and C	43%	BP	not disclosed
OMV	Romania	Moldova area	divesture	nine fields	100%	Mazarine Energy	not disclosed
Timor-Leste Government	Australia	PSC 03-19 and 03-20 Leases NT/RL2 and NT/RL4	acquisition	Greater Sunrise	30%	ConocoPhillips	\$ 350 million

Picture 1: Location Map of Global Upstream Projects Developments in October 2018



Global Upstream Project Analytics (GUPA) provides worldwide coverage of onshore and offshore projects, with a focus on recent and future developments. Stratas provides thorough and detailed coverage on multiple measures. Please reach out to us with questions or additional requests.