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ROBUST CYBER RESILIENCE IN THE UPSTREAM SECTOR

WEST BAKR'S OPTING FOR SPOOLABLE COMPOSITE PIPE

AN INTERVIEW WITH **EHAB RAGAEE,** Chairman and Managing Director, Petrodara and West Bakr Companies

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EDITOR'S **LETTER**

Back on Track.

Despite the fact that COVID-19 is not over yet, most of the economic activities are back on track again. The Egyptian government is proceeding with mega projects including the expansion plans in the oil and gas industry in cooperation with international oil companies (IOCs). Egypt's President Abdel Fattah El-Sisi has lately expressed support for the expansion of investment by Italy's Eni in the oil exploration and production (E&P) fields during his meeting with the CEO of the Italian company, Claudio Descalzi.

Moreover, Prime Minister Mostafa Madbouly had a meeting in August with Petroleum and Mineral Resources Minister Tarek El Molla to follow up on a number of files and make sure that the strategic stocks of petroleum products are within safe levels.

In this issue, we discuss different topics that indirectly tackle reopening the economy and how this will reflect on the Egyptian oil and gas industry.

Our industry insights section analyzes the post-COVID-19 narrative. Another article highlights the increasing dependency on cyber security in the upstream sector, especially after the changes that happened in this sector and the boom we witnessed in remote operations. A third article provides the readers with an insightful analysis about the country's strategy to depend more on natural gas, specifically the car conversions initiatives under the patronage of El-Sisi.

In the research and analysis section, we provide our readers with an analytical report about the Gulf of Suez and the Eastern Desert as the main crude oil production areas in Egypt. Our paper review section also covers the Gulf of Suez in a paper about petroleum system modelling in this promising area.

Our interview with Ehab Ragee Chairman and Managing Director of Petrodara and West Bakr companies sheds light on the benefits of shifting to spoolable composite pipes.

Finally, our politics section analyzes the fluctuating security situation in Libya and how it is affecting the oil industry in the north African country.

Wish you an informative reading.

MAHINAZ EL BAZ Acting Editor-In-Chief - Research & Analysis Manager

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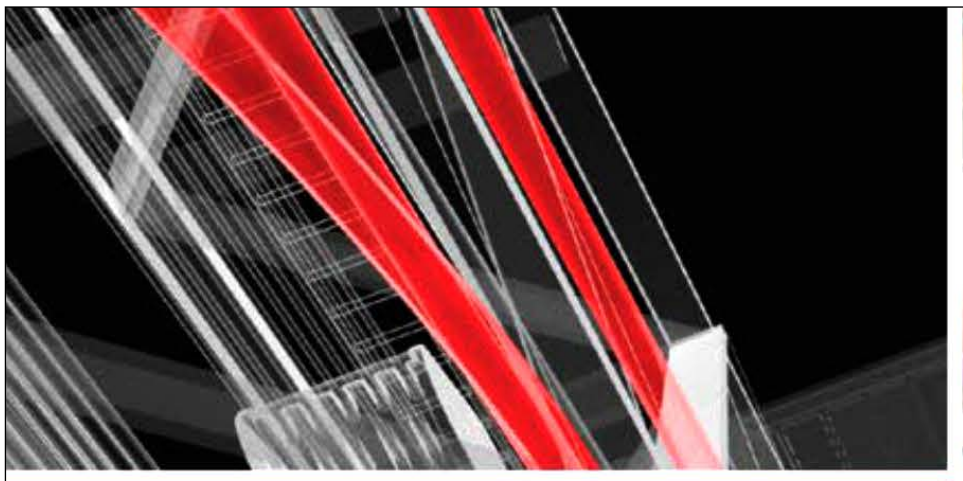

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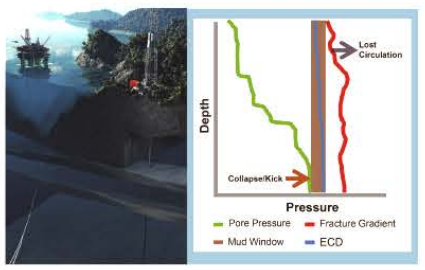

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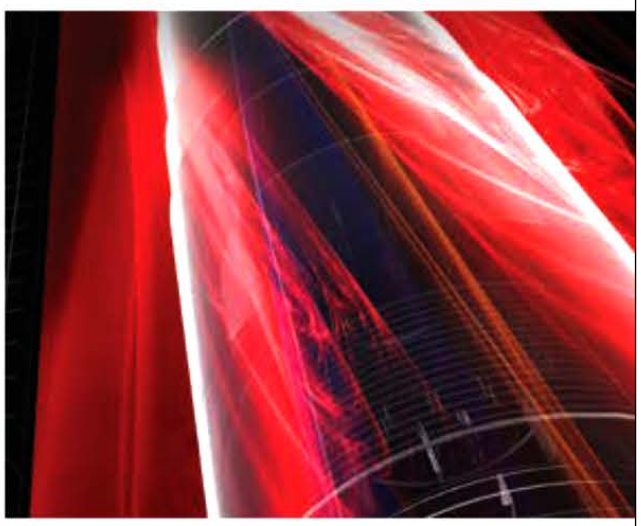

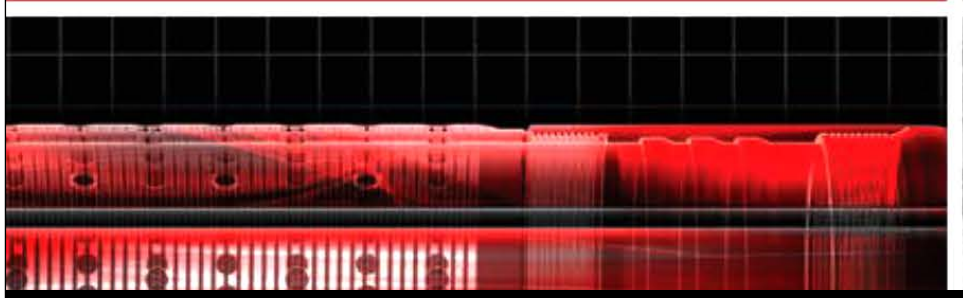

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EXPLORATION & PRODUCTION

NEW DISCOVERY OF NORTH HAMMAD TO PRODUCE 32 MMCF/D OF NATURAL GAS

The Minister of Petroleum and Mineral Resources, Tarek El Molla, announced that the new discovery of North Hammad concession in Delta is going to initially produce natural gas at a rate of 32 million cubic feet per day (mmcf/d).

El Molla elaborated that Eni, the operator of this concession, alongside BP and Total will make a plan to link the well to the production line in cooperation with the Egyptian Natural Gas Holding Company (EGAS).

On the other side, the production rate of South West Meleiha concession in the Western Desert increased to 12,000 barrels per day (bbl/d) of crude oil since its start of production in 2019. This has resulted from the successful drilling of new well SWM-A-6X in the Faghour Field at a depth of 15,800 feet.

GPC MAKES NEW NATURAL GAS DISCOVERY IN ABU SENNAN

The General Petroleum Company (GPC) has made a new natural gas discovery in Abu Sennan concession producing 28 million cubic feet per day (mmcf/d) in addition to 1,180 barrels of condensates per day (bbl/d) of API 64° when it is opened one inch.

Moreover, the well is producing about 15 mmcf/d and about 1,100 bbl/d of condensates when it is opened 0.75 inch. The well was drilled in a record time of 15 days and was supplemented by using GPC's well repair device and thus saving a large portion of the drilling rig time and the total cost of the well.

The initial evaluation for the well storage reached 8 billion cubic feet equivalent (bcfe) to five billion exploitable reserves after conducting subsurface tests and compression measurements. Plans are currently prepared to develop and exploit the new discovery.

GPC ACHIEVES PRODUCTION RECORD OF 62,000 BBL/D

General Petroleum Company (GPC) has achieved a production record of 62,000 barrels per day (bbl/d) for the first time ever since its establishment in 1957.

The work program targeted new exploration operations and development of existing fields, in addition to putting new wells to production and developing the infrastructure to sustain the production.

This success aligns with the company's production plans which includes the development of the HF36/5 exploration area in Abu Sennan in the Western Desert, in addition to accelerating production from well HH 83/2 in the Gulf of Suez and South Al-Hamad. GPC also has a pipeline project in the Bahar region with the Egyptian Bahraini Gas Derivative Company which aims to maximize the added value of natural gas production.

GPC has taken advantage of Schlumberger's Pulsar Multifunction Spectroscopy (PNX) technology in two offshore wells in a production field that has been operating since 2004, but was closed for producing water only. After taking the needed prosecutions, the wells are now fully operational and producing crude oil.

AGREEMENTS

ANOPC INKS A $2.8 B EPC CONTRACT

Assiut National Oil Processing Company (ANOPC) has inked an Engineering, Procurement, and Construction (EPC) contract with TechnipFMC valued at $2.8 billion.

TechnipFMC will construct a new hydrocracking complex for the Assiut refinery in Egypt. The new complex will utilize the nearby Assiut Oil Refining Company's (ASORC) refinery by transforming its lower-value petroleum products into higher-value petroleum products that meet European standards.

Such products include; diesel, high octane gasoline, and butane.

The mazut hydrocracking complex will have a production capacity of about 2.8 million tons per year (mmt/y) of diesel of European standard. It also has a production capacity of 400,000 tons per year (t/y) of high-octane gasoline produced from naphtha and 100,000 t/y of butane, in addition to a production capacity of 300,000 t/y of coal and 66,000 t/y of sulfur.

KORRA ENERGI WINS TWO CONTRACTS TO SUPPLY NATURAL GAS TECHNOLOGIES

Korra Energi has won two contracts valued at over $1 million to supply natural gas equipment and technologies for two fuel stations including one affiliated with Natural Gas Vehicles Company (Cargas).

Mohamed Medhat, Korra's Energy Solutions Division Manager, stated that the contract has already been signed with Cargas and they plan to start testing and supplying equipment by the end of August or early September. Medhat added that currently, the company is waiting for another bidding results for five other fuel stations with Total and Arabia Gaz.

Korra Energi was one of the companies bidding for supplying compressed natural gas (CNG) equipment and technologies to 12 fuel stations. Cargas and the Egyptian International Gas Technology (Gastec) launched the bid round in September 2019 with a total investment value of $10 million.

DOWNSTREAM

EGYPT, CYPRUS CONFER ESTABLISHMENT OF MARINE PIPELINE

The Minister of Petroleum and Mineral Resources Tarek El Molla, alongside Natasa Pilides, the newly appointed Cypriot Energy Minister, discussed preparations for the establishment of a direct marine pipeline between the two countries.

The pipeline deal entailed the transfer of natural gas from Aphrodite field in Cyprus and re-exportation through Egypt. Both ministers affirmed that the deal is underway and currently coordination is underway between officials from both parties before implementing the project.

El Molla stated that Egypt aims to maximize the economic exploitation of its natural gas infrastructure through pipelines and liquefaction complexes. The two ministers reviewed the procedures for turning the East Mediterranean Gas Forum (EMGF) to an intergovernmental organization to reap the benefit from the abundant natural gas available in the Eastern Mediterranean region.

NATURAL GAS DELIVERY PROJECT TO BE FINALIZED A YEAR EARLIER

The Minister of Petroleum and Mineral Resources Tarek El Molla announced that the natural gas delivery project will be completed a year earlier than expected, connecting about 3.4 million housing units with natural gas by the end of the current fiscal year (FY) 2020/21.

The project is currently underway to connect 1.1 million units with natural gas across Egypt. In line with Egypt Vision 2030, the ministry is surveying various regions in Egypt to target the suitable areas for natural gas delivery, in addition to examining new methods of connecting remote areas to the natural gas grid through technologically advanced tankers. Such areas include El Wadi El Gedid, which is located 230 kilometers (km) away from the nearest natural gas grid.

On another note, El Molla added that the expansion of prepaid gas meters is currently underway. About 20,000 prepaid gas meters have been implemented in Al-Asmarat areas (1-2) and Bashayer El Khair (1-2-3). Moreover, in cooperation with the Ministry of Military Production, the ministry will have 1.2 million prepaid meters ready to launch in FY 2020/21; whereas 600,000 meters are expected to be installed this FY, and the rest to be installed during the coming years.


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SDX H1 2020 PRODUCTION SURGE BY 97% YOY

SDX's South Disouq and West Gharib production in H1 2020 exceeded the company's 2020 guidance with a 97% increase compared to H1 2019, recording entitlement production of 6,980 barrels of oil equivalent per day (bbloe/d).

The full-year guidance was set between 6,000 – 6,250 bbloe/d down from 6,750 – 7,000 bbloe/d to reflect the disposal of the non-core North West Gemsa concession which SDX sold in July. Prior to its sale, the concession's gross production until March 31 reached 3,076 bbloe/d.

The South Disouq concession has exceeded expectations during H1 2020, with all four wells flowing ahead of expected rates. The company's plans include reducing production from SD-4X during H2 2020 until it reduces water production during Q1 2021.

Additionally, SD-6X well was drilled in Q1 2020 at a depth of 3,167 meters and encountered 1.7 meters and one meter of net gas-bearing sand in Kafr El-Sheik formation and the AbuMadi formation, respectively. The well also encountered 143 meters and 258 meters of high-quality net reservoir in the Abu Madi formation and the Qawasim formation. The gas sands in both the Kafr El Sheikh and Abu Madi were deemed to be sub-economic and the Qawasim's had low gas saturation.

SD-12X exploration well was drilled at a depth of 2,415 meters, encountering 36 meters net of high-quality gas-bearing sands. The well has encountered approximately 24 billion cubic feet (bcf) of recoverable gas resources. SDX conducted a drill stem test (DST) in April 2020 and recorded a maximum rate of 25 million cubic feet per day (mmscf/d) on a 54/64 choke during the main flowing period. After several tests, the company stated that the well is expected to produce 10-12 mmscf/d of mostly dry gas.

As for the West Gharib concession, in H1 2020 Rabul-3 was successfully drilled, completed, and tied into the field production system at a rate of approximately 300 bbl/d.

The company also began production from South Ramadan concession offshore in the Gulf of Suez in Q2 2020 at approximately gross 350 bbl/d. The concession's production is expected to reach 400-500 bbl/d in H2 2020 after SDX performs an acid stimulation operation. It should be noted that SDX has 12.75% of working interest in the concession.

EGYPT'S TRANSGLOBE PRODUCTION RECORDS 11,990 BBL/D IN Q2 2020

TransGlobe Egypt production averaged at 11,990 barrels of oil per day (bbl/d) in Q2 2020.

The company's production from its concessions in the Eastern Desert decreased by 5%, recording 11,757 bbl/d down from 12,343 bbl/d in Q1 2020. Per the statement, concessions at West Gharib, West Bakr, and North West Gharib produced 3,453 bbl/d, 7,935 bbl/d, and 369 bbl/d respectively.

Transglobe remained consistent with its revised 2020 budget by excluding drilling activity at the Eastern Desert for Q2 2020. Approximately 304.6 million barrels (mmbbl) of inventoried entitlement crude oil were sold to the Egyptian General Petroleum Corporation (EGPC) during the quarter.

As for the Western Desert operations, the South Ghazalat concession witnessed a production increase by 15% than the previous quarter, with 233 bbl/d. The company also changed its 2020 production guidance for the South Ghazalat concession and narrowed it to 11,200 to 11,600 bbl/d. Additionally, the company sold 8 mmbbl of its entitlement crude oil production from the Western Desert to EGPC. The company sold 312.6 mbbl of crude oil to EGPC in Q22020 for net proceeds of $7.2 million.

The company noted that it remains in talks with EGPC to amend, extend, and consolidate the company's Eastern Desert concession agreements.

ZAROU TO INVEST $1 B IN EGYPT'S ENERGY INFRASTRUCTURE

Zarou, a MENA-focused energy development company, plans to invest $1 billion in Egypt's energy infrastructure in 2020.

Sameh Shenouda, Zarou's CEO, affirmed the company's plan to invest in several projects in various fields in Egypt. He added that the company aims to pump $1 billion worth of investments in water, electricity, and petroleum pipelines.

This came during a meeting with Prime Minister Moustafa Madbouly, who welcomed all new investments in developing Egypt's infrastructure, especially in the fields of electricity and energy. The prime minister noted that several obstacles facing investors were eliminated and that the state is taking new measures to facilitate investing mechanisms in various development projects.

B INVESTMENTS NEGOTIATES SELLING TOTAL EGYPT STAKES

B Investments has started preliminary negotiations regarding selling 20% of its share in Total Egypt.

The company currently owns 7.97% of Total Egypt. Total Egypt is considered to be one of the French company's largest subsidiaries outside Europe, in addition to being the second-largest private downstream operator in Egypt. B Investments and its affiliates work with Total Egypt in various areas of retail service stations, lubricants, commercial and industrial operations, aviation, and logistics.

CENTAMIN REVENUES SOAR BY 56% IN H1 2020

Centamin's revenues reached $449 million in H1 2020 compared to $288 million in H1 2019, increasing by 56% year-on-year (YoY).

Per the statement, Centamin's production increased by 9%, producing 256,084 ounces (oz) of gold in H1 2020 compared to 234,096 oz in 2019. The company's gold sales amounted to 270,529 oz at an average realized gold price of $1,657/oz against 224,129 oz sold in H1 2019, denoting a 21% increase.

The company generated $102 million free cash flow from its operations, denoting a 186% YoY improvement driven by increased gold sales and a stronger gold price. Moreover, the state has earned $13 million in royalty payments and the company paid $101 million in profit shares to the Egyptian Mineral Resources Authority (EMRA).

Centamin affirmed that its 2020 outlook of producing 510,000-525,000 oz of gold has not changed. The capital expenditure (CAPEX) program remains unchanged as well at $150-170 million.

PHAROS' EGYPT PRODUCTION RECORD 5,979 BBL/D IN H1 2020

Pharos' production recorded 5,979 barrels of oil per day (bbl/d) during H1 2020 in Egypt.

After implementing three drilling-rig programs in Q1 2020, production averaged around 6,396 bbl/d in April and recorded an all-time high on April 23 with 7,009 bbl/d. In this regard, the price of El Fayum oil and refinery handling charges were cut by $1/bbl and $0.80/bbl, respectively. However, the company has left its Egypt's 2020 guidance as it is at 5,000-6,000 bbl/d.

Pharos' main activities in Egypt centered around well intervention and water-flood enhancement with minimal drilling activities. Per the statement, Pharos will assess the results of recent waterflood pilot projects in the Greater Silah area, in addition to assessing the drilling program as oil prices fluctuate.

U. A. E

The Abu Dhabi National Oil Company (ADNOC) has agreed to transfer the rights of Lower Zakum, Umm Shaif, and Nasr offshore from the China National Petroleum Corporation (CNPC) to China National Offshore Oil Corporation's(CNOOC) subsidiary CNOOC Limited. The transfer consists of CNOOC acquiring a 40% interest in CNPC's majority-owned subsidiary PetroChina. This is the first time that a Chinese offshore oil and gas company joins ADNOC's concessions. Previously, PetroChina held a 10% interest in the Lower Zakum concession and a further 10% interest in the Umm Shaif and Nasr concession. As a consequence of the transfer, however, CNOOC will now hold a 4% interest in the Lower Zakum concession and 4% in the Umm Shaif and Nasr concession.

ADNOC has confirmed significant progress has been made on its "Crude Flexibility Project" (CFP), with 73% project delivery of ADNOC's ongoing upgrade of refining capabilities in Ruwais. The CFP permits for the Upper Zakum grade, extracted from Abu Dhabi's offshore oil fields, to be processed along with over 50 other types of different crudes. Once completed, the CFP will permit up to 420,000 barrels per stream day of heavier and sourer grades of crude oil, as part of the 840,000 barrels per stream day refinery in Ruwais. Two new fractionators and 24 atmospheric residue desulfurizer reactors have been installed at the site over the past two months.

Hamriyah Free Zone has inked an agreement with Orient Source Hong Kong Group (OSHK), International Commodity Trader and Project Investor, to inaugurate a multi-functional offshore and repair facility at the Port of Hamriyah in Sharjah in the United Arab Emirates (UAE) along with a Trading Platform with Hamriyah Free Zone. This new facility will operate in the oil and gas and marine sector and will establish and manage a Petroleum Trading Platform for all majors. This facility is the first phase of the four-year structured project plan and a whole range of repair and maintenance work is scheduled to take place.

IRAN

Iran's largest gas field, South Pars, has increased its capacity by 200 million cubic feet (mcf) after phase 22's three new wells became operational. The last platform of phases 22-24 of South Pars' development project started transferring sour gas to onshore refineries back in March. Phases 22-24 are reported to produce 75,000 barrels of gas condensate, and 400 tons of sulphur per day, in addition to 50 million cubic meters (mcm) of methane, 2,900 tons of liquefied petroleum gas (LPG) and 2,750 tons of ethane.

The Iranian oil industry has signed 13 contracts worth roughly EUR 1.5 billion with 14 local firms to enhance and maintain oil production. The deals were signed on July 17 in Tehran between the Iranian Offshore Oil Company (IOOC) and the National Iranian South Oil Company (NISOC). With the implementation of these contracts, it is expected that 185,000 barrels of oil will be added to the country's crude oil production capacity. The contracts pertain to the provinces of Khuzestan, Fars, Kohgiluyeh and Boyer-Ahmad, Bushehr, and Hormozgan.

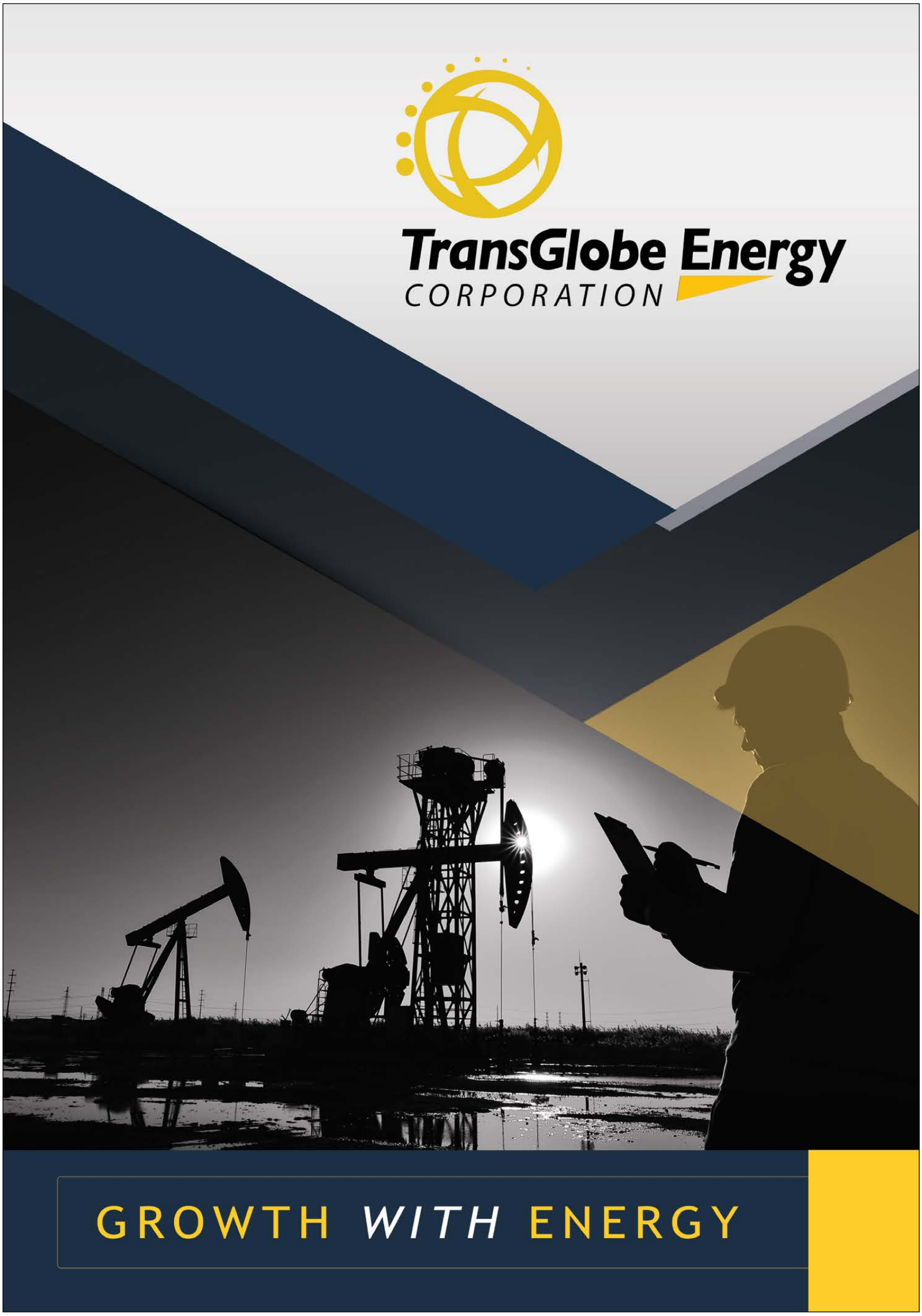
Iran plans to launch 27 petrochemical projects worth $17 billion by March 21, 2021 expecting petrochemical revenues will reach $25 billion in 2021 and $37 billion by 2024. By the end of the year, 13 other projects will be put to operation which will increase the production capacity by $25 million tons per year. Regarding methanol production,the country's output reached 6.7 million tons by the end of 2019 and it will reach 17.5 million tons by the end of the second leap and 24 million at the end of the third leap.

BRAZIL

Brazil's state-run oil company, Petrobras, has published its Q2 2020 results, indicating a slowdown in production compared to Q1. The slowdown in production can be attributed to complications caused by the coronavirus whereby 62 shallow water platforms were closed down and half of the workforce was non-operational. In terms of production figures, the average production of oil, liquefied natural gas (LNG) and natural gas in Q2 2020 was 2.802 million barrels of oil equivalent per day (mmbbloe/d). This is still 6.4% higher than the same period last year but represents a 3.7% decrease from Q1 2020.

Brazil has increased crude exports to Asia in H1 2020 as many oil-producing nations cut production to match record low demand. This sudden rise in exports to Asia can be explained by the opening of new offshore platforms and Petrobras offering Asian refiners competitive deals on relatively high-quality oil just as Asian countries reopened their economies. On average, Asia imported from Brazil an average of 1.07 million barrels of oil per day (mmbbl/d) in the first half of the year, however, average imports have risen to a record 1.62 mmbbl/d in Asian ports in June, almost triple the volume in June 2019. China is responsible for the purchase of 70% of the country's exports.

China's State Power Investment Corporation (SPIC) will acquire a 33% stake in two Brazilian plants in the largest power project fueled by super-chilled liquefied natural gas (LNG) in Latin America from Gas Natural Acu (GNA). The deal between SPIC Brasil, a wholly owned subsidiary of SPIC, and GNA, BP'sjoint venture, is scheduled to take place in Q4 of 2020. The two plants will have 3 gigawatts of installed capacity after the installation of GNA I and GNA II in 2021 and 2023, respectively. The deal also includes an LNG terminal with a capacity of 21 million cubic meters per day (mcm/d). Under the terms of this deal, SPIC Brasil will also obtain the development rights for plant projects GNA III and GNA IV.


TransGlobe Energy
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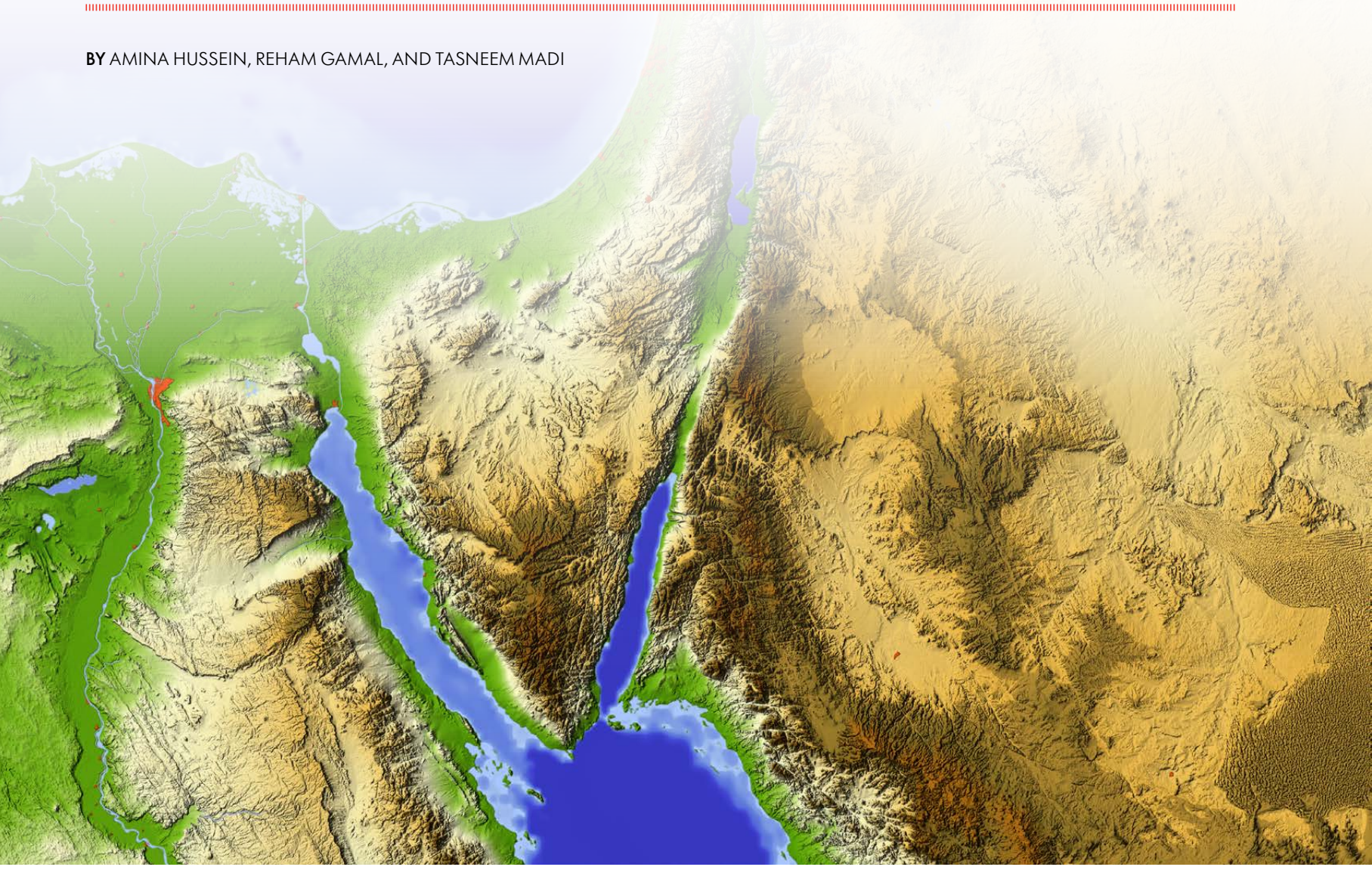
GULF OF SUEZ, EASTERN DESERT AND SINAI: EGYPT'S CRUDE OIL SQUAD

BY AMINA HUSSEIN, REHAM GAMAL, AND TASNEEM MADI



The Gulf of Suez and its surrounding areas are among the oldest known hydrocarbon provinces in the world in which crude oil was first discovered in 1868, according to Hamdy El Banby's book entitled "The Egyptian Crude Oil: Past Experience and Future Insights". The Gulf of Suez, along with the Eastern Desert and Sinai, are among Egypt's main crude oil producing areas. The Gulf of Suez, the Eastern Desert, and Sinai produced a total of 87.7 million barrels (mmbbl) and 87.16 mmbbl of crude oil in the Fiscal Years (FYs) 2018/19 and 2019/20 respectively, according to the Egyptian General Petroleum Corporation (EGPC) data.

On the other hand, these three areas are not actively producing equivalent gas, as on average their production represents approximately 2% of Egypt's total equivalent gas production, according to the Egyptian Natural Gas Holding Company's (EGAS) data.

BID ROUNDS

In May 2018, the EGPC launched an international bid round which offered different opportunities to International Oil Companies (IOCs) to explore and exploit crude oil and natural gas fields in different concessions. The bid round included 11 blocks; four of which are located in the Eastern Desert and the Gulf of Suez, according to the EGPC's official Website.

The bid round results were announced in February 2019, on the sidelines of the Egypt Petroleum Show (EGYPS). The Egyptian General Petroleum Company (GPC) was awarded a block in the Eastern Desert while Neptune Energy was awarded a block in the Gulf of Suez. The signature bonus of the two offered concessions totaled $16 million. Furthermore, the total financial commitments recorded $54.5 million to drill 13 exploratory wells, according to the Ministry of Petroleum and Mineral Resources' (MoP) official website.

2 Awarded Blocks in the Gulf of Suez & the Eastern Desert in 2019

Company	Concession	Signature Bonus ($ million)	Minimum Financial Commitment ($ million)	Exploratory Wells	Area (km²)
GPC	West Amer	5	20	10	875.48
Neptune	North West El Amal	11	34.5	3	365

ACTIVE AGREEMENTS

1. THE GULF OF SUEZ

Since the 1970's, over 10 petroleum companies have signed 34 agreements to exploit different concessions in the Gulf of Suez until June 2019. Dragon Oil, the operator of 12 concessions in the Gulf of Suez, represents the most active operating company in the region with a 35% share of signed agreements, as explained by the EGPC. As of June 2020, the signed agreements increased to 40, representing 23%

of the total active agreements. For instance, in early 2019, Winershell Dea signed an Exploration and Production (E&P) agreement in the Ras Budran and El Zeit Bay oil fields. While, in early 2020, Neptune Energy signed an agreement to drill three exploration wells in the North West El Amal concession.

2. THE EASTERN DESERT & SINAI

Until June 2020, the Eastern Desert witnessed the signing of 14 active agreements with both IOCs and National Oil Companies (NOCs) representing a total share of 8% of the country's active petroleum agreements. All the active agreements in the region were development agreements. The most active company is TransGlobe, according to the EGPC's data.

As for Sinai, until June 2020, the area had a small share in petroleum active agreements with only two agreements representing only 1.2% of the total active agreements in Egypt, according to the EGPC's data.

DRILLING ACTIVITIES

The average number of drilling rigs all together in the Gulf of Suez, the Eastern Desert, and Sinai fields in both FYs 2018/19 and 2019/20 amounted to 11 rigs, contributing about 11% of total drilling rigs, according to the EGPC data.

Over the two FYs, Sinai represented the region with the highest average number of drilling rigs. In fact, Sinai possessed 13 rigs, followed by the Gulf of Suez, which included 10 rigs. Over the referred period, the Eastern Desert accounted for 9 drilling rigs (on average), representing the lowest average number of drilling rigs among all areas, stated by the EGPC.

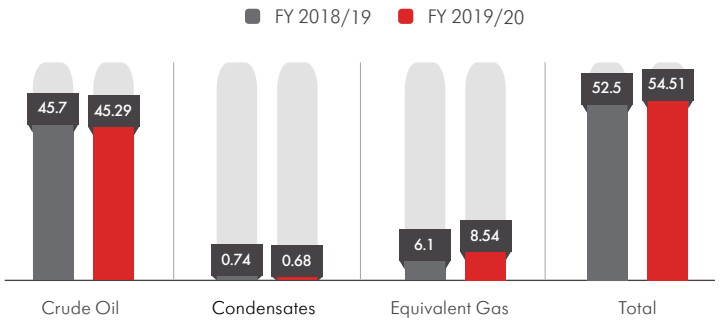
PETROLEUM PRODUCTION

1. THE GULF OF SUEZ

The total petroleum production in the Gulf of Suez slightly decreased by 3.8% between FYs 2018/19 to 2019/20. This mainly happened as the region's crude oil production slightly declined over the same period. The decrease in crude oil production was natural as the fields are becoming more mature. Furthermore, the share of crude oil share in the Gulf of Suez's petroleum production declined from 87% in FY 2018/19 to 83% in FY 2019/20.

The condensates' share in the area's total petroleum production declined from 1.4% in FY 2018/19 to 1.2% in FY 2019/20. On the contrary, equivalent gas share increased from 11.6% in FY 2018/19 to 15.7% in FY 2019/20.

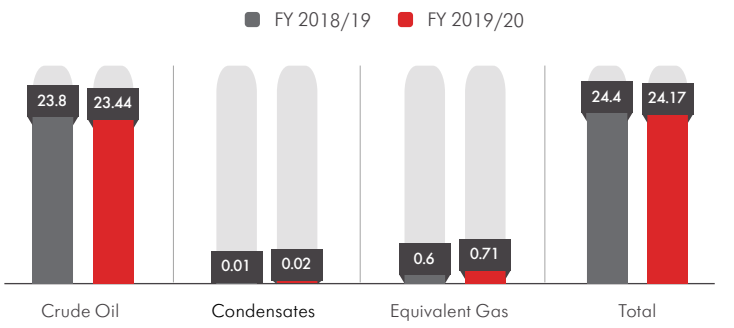
Petroleum Production in the Gulf of Suez (mmboe)



2. THE EASTERN DESERT

As for the Eastern Desert, the total petroleum production declined by 0.9% between FY 2018/19 and FY 2019/20. This decrease was mainly driven by the reduction in crude oil production as it recorded an annual decline of 2% between the aforementioned years. However, the equivalent gas production increased to represent 3% of the region's total petroleum production in FY 2019/20 compared to the 2.5% in FY 2018/19.

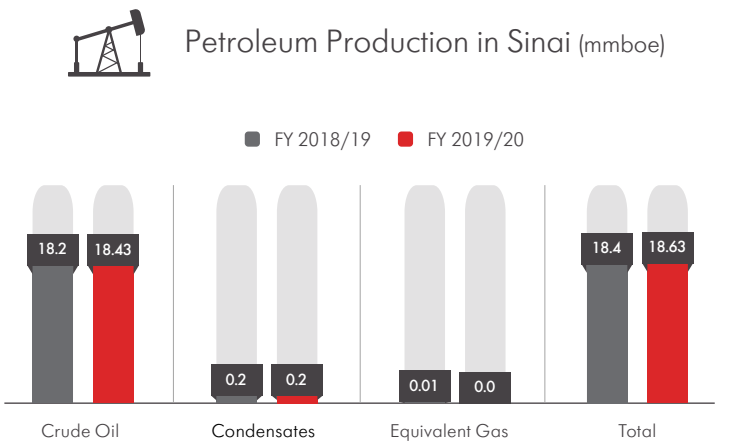
Petroleum Production in the Eastern Desert (mmboe)



3. SINAI

Unlike the Gulf of Suez and the Eastern Desert, the total petroleum production of Sinai increased by 1.3% between FYs 2018/19 and 2019/20. This increase was mainly due to a slight increase in the production level of crude oil, as the produced crude also increased by 1.3% between FYs 2018/19 and 2019/20. On the other hand, condensates' production remained constant at 0.2 mmbbl, while the equivalent gas shares in Sinai's total petroleum production recorded 0.05% in FY 2019/20 compared to 0% in FY 2018/19.

Petroleum Production in Sinai (mmboe)



MAIN OPERATORS

1. DRAGON OIL

Dragon Oil is a privately owned subsidiary of Emirates National Oil Company (ENOC). Dragon Oil participated in the Ganope International 2012 Bid Round which offered 20 exploration blocks in the Western Desert, the Eastern Desert, the Red Sea and the Gulf of Suez.

In late 2013, the company was awarded the East Zeit Bay concession in the Gulf of Suez with 100% interest. The concession is adjacent to a number of producing crude oil fields named East Zeit, Hilal, Ashrafi, Southwest Ashrafi and Zeit Bay fields, according to Dragon Oil's website.

Furthermore, in late 2019, the company acquired the stake of BP at the Gulf of Suez Oil Company (GUPCO) at a value of $850 million. The company has then become the contractor with the EGPC, as stated by Dragon Oil's CEO, Ali Rashed Al Jarwan in an interview with Al Arabiya in January 2020.

Accordingly, the company holds interest in 12 concessions, namely: East Tanka, Integrated, South Belayim, South Gharah, East Shukeir, LL 87 (1,2), East Morgan, North Gharah, West Morgan, Northeast Ramadan, North October and South Ghareb. The company is aiming to increase its production from GUPCO'S concessions from 60,000 barrels per day (bbl/d) to reach 75,000 bbl/d by 2021, with investments of $1 billion.

2. WINTERSHALL DEA

Wintershall Dea has been active in Egypt for over 40 years, through Dea, and currently has a stake in six onshore and offshore concessions.

Successfully, the company has been producing crude oil in the Gulf of Suez for more than 30 years from the concession of the Ras Budran and Zeit Bay fields. The two concessions are operated by the Suez Oil Company (SUCO), Wintershall Dea's Joint Venture (JV) with the EGPC. Since 1983, the two concessions have been developed to produce over 650 mmbbl of crude oil, explained in Wintershall Dea's official website.

During 2017 and 2018, Wintershall Dea pumped about $800 million in its fields in the Gulf of Suez, Disouq and North Alexandria. The company also plans to invest around $700 million over the upcoming three years, $225 million of which is determined to be invested in the Gulf of Suez alone, according to a statement by the company.

In early 2019, Wintershall Dea signed an agreement, with the MoP and the EGPC, to extend the concession of the Ras Budran and Zeit Bay fields for five years ending mid-2022. The agreement contains an optional extension of extra five years until 2027, as stated by the company's Managing Director of Egypt, Sameh Sabry, during the signing of the agreement in March 2019.

2. CHEIRON

Cheiron (formerly known as PICO International Petroleum) was established in the late 1980s. Since then, the company has been engaged in the upstream activities in Egypt as one of the largest independent E&P companies.

In 1990, the company achieved production rates of 5,000 bbl/d of crude oil after acquiring Total's rights in the Amal, Shukher Bay, South Ramadan and Gamma fields in the Gulf of Suez. In 1995, Cheiron extended its activities in the Gulf of Suez by acquiring Shell's 100% equity share. In 1998, Cheiron bought Kuwait Foreign Petroleum Exploration Co.'s (KUFPEC) 73.5% equity share in the Amal field. Furthermore, in 1999, Cheiron purchased BP's share in North Zaafarana, according to Cheiron's Website.

In 2015, Cheiron succeeded in completing the first phase of the Amal field. In addition, the company was awarded 100% of the North Magawish concession, through the Ganope International Bid Round, with financial commitment of $23.5 million, and a $1 million signing bonus.

In 2018, the Geisum and Tawila West concession, where Cheiron holds 65% working interest, was successfully extended until June 2027. The Concession is located at the Gulf of Suez and Its current average production reaches 4,900 bbl/d of crude oil, it covers the North Geisum, South Geisum, Northeast Geisum and Tawila West fields. In mid 2019, the company made a discovery in the Nukhul formation north west of the main Geisum field, according to Cheiron's Website.

3. TRANSGLOBE

TransGlobe has been operating in the Egyptian Eastern Desert since July 2004, when the company entered a farm-out agreement and received 50% interest in the Nuqra Concession.

In December 2011, TransGlobe further acquired a 100% working interest in the West Bakr Concession. Then, in November 2013, the company fully acquired interest in the North West (NW) Gharib and South West (SW) Gharib Concessions. However, in 2016, the company relinquished the SW Gharib concession. In May 2017, the company also relinquished NW Gharib's exploration area in May 2017, and retained four development areas, one in production and three pending approval. TransGlobe is also the operator of West Gharib concession jointly with SDX Energy (50% working interest), according to TransGlobe's website.

4. SDX ENERGY

Since 2008, SDX Energy has been engaged in exploration and development activities in Egypt's Eastern Desert and Gulf of Suez basins.

The company has 50% working interest in the West Gharib concession in the Gulf of Suez where its production is from the Mesada and Rabul fields. The company's cumulative production from the concession reaches 11.1 million barrels of oil equivalent (mmboe) from 16 producing wells. In late 2019, the company announced a new crude oil discovery in the concession, producing an average of 315 bbl/d, according to a company's statement released in September 2019.

For the Eastern Desert, the company has 50% non-operating interest where its activities lie in Geyad and Al Amir field. The cumulative production from the two fields reaches about 30 mmboe. According to the company's Operations, Financial and Guidance for 2020, SDX Energy targets production of 1,000 to 1,500 barrels of oil equivalent per day (boe/d) from North West Gemsa concession.

However, recently, the company announced selling its 50% working interest in the North West Gemsa licence. The purchaser, Gulf Energy, has paid $3.0 million for the Company's interest, of which $1.4 million has been used to discharge the Company's remaining liabilities on the licence.

MAIN FIELDS

1. THE GULF OF SUEZ

In 1869, Gemsa field was discovered, in the Gulf of Suez, and was the first crude oil discovery in Egypt. This discovery was followed by discovering a number of fields, namely: Morgan, Belayim, Abu Rudeis/Sidri, October and Ras Shukeir fields, according to a baseline study titled by "The Geology and Mineral Resources in South Sinai".

Recently, on June 18, a new discovery (GNN-4) was announced in Geisum Concession at the south of Gulf of Suez, with an initial crude oil production rate of 2,000 bbl/d , according to the MoP's press release.

GEMSA

In 1910, Gemsa started its production. The first drilled well in the field was producing 25 bbl/d of crude oil. Gemsa and Zaafarana fields' production reached 4.9 mmbbl/d in 2019, according to the EGPC.

RAS SHUKEIR

Ras Shukheir is one of the most significant fields in the Gulf of Suez and is operated by GUPCO. In FY 2018/19, the field's production reached about 61,700 bbl/d of crude oil, as stated by the Geologist Khaled Hamdan, Chairperson of GUPCO during his meeting with the Minister of Petroleum and Mineral Resources, Eng. Tarek El-Molla, announced in a ministerial press release, in August 2019.

2. THE EASTERN DESERT

Three main concessions are located in West Bakr, West Gharib and North West Gharib concessions in the Eastern Desert; adjacent to the West Gharib concession, 20 kilometers west of the Gulf of Suez coast. The West Bakr concession is composed of three oil fields, which are West Bakr H, K and M, operated by TransGlobe Energy Corporation.

On the other hand, the West Gharib concession is also operated by TransGlobe. The concession includes five fields, which are Arta, East Arta, Hana, Hushia, and West Hushia fields. Furthermore, in the North West Gharib concession, on the west coast of the Gulf of Suez, most of the explorations have consisted of wells in Arta and East Arta fields, according to TransGlobe's website.

In 2019, Transglobe extended its drilling operations at the H field and K field. Additionally, Transglobe converted undeveloped reserves at Northwest Gharib and M and H fields, which led to addition of 3.4 MMbbl of crude oil and natural gas liquids, according to Transglobe's announced 2020 capital budget and 2019 year-end reserves.

The company also allowed technical revisions at West Bakr, and West Gharib and other concessions revisions, where 3.8 MMbbl and 0.6 MMbbl of crude oil and natural gas liquids were added, respectively, due to better performance resulting from production optimization projects.

3. SINAI

Sinai has three of the oldest discovered crude oil fields namely: Sudr (discovered in 1945), Asl (discovered in 1947) and Matarma (discovered in 1948), according to a baseline study titled by " The Geology and Mineral Resources in South Sinai". Such fields were discovered by GPC. In 2017, Mediterra Energy Corporation (MEC) raised production rates at the three fields to 1,400 barrels of boe/d, up from 1,200 boe/d, according to a MoP's statement. In January 2020, MEC made a new drilling in the Asl field with investments of $1.3 million.

Furthermore, the Nour-1 New Field Wildcat (NFW), a new natural gas discovery, located in Noor North Sinai concession was discovered by Eni. The field was drilled by the Scarabeo-9 semi-sub in a water depth of 295 meters and reached a total depth of 5,914 meters, according to Eni's press release in March 2019.

INFRASTRUCTURE

1. CRUDE OIL INFRASTRUCTURE

The Gulf of Suez and Sinai have mainly eight crude oil pipelines. One of the most well-known pipelines is Suez-Mediterranean Pipeline (SUMED), which is located in the West Bank of the Gulf of Suez. The SUMED has the biggest length (320 km), diameter (42 inches) and capacity (2.4 mmbbl/d) among other crude oil pipelines, operated by the Petroleum Pipeline Company (PPC). SUMED transported oil from the Ain Sokhna terminal to the Sidi Kerir terminal on the Mediterranean coast through the Dashour pumping station. On the other hand, two of the total eight pipelines, Al Hafair-Suez and Al Hafair-Mostorod, transport crude oil from Al Hafair to Suez and Mostorod Refinery.

Crude Oil Infrastructure in the Gulf of Suez/Sinai

Pipeline	From	To	Length (Km)	Diameter (Inches)	Capacity (bbl/d)
SUMED (Ain Sukhna-Sidi Kerir)	Ain Sukhna	Sidi Kerir	320	42	2,400,000
Zeit Bay Facilities-Ras Gharib	Zeit Bay Facilities	Ras Gharib	83	18	-
Ras Shukheir-Asyut	Ras Shukheir	Assiut Refinery	280	20/22	-
Ras Shukheir-Al Hafair	Ras Shukheir	Al Hafair	215	26	140,000
Al Hafair-Suez	Al Hafair	Suez	35	18	50,000
Al Hafair-Mostorod	Al Hafair	Mostorod Refinery	135	18/20	85,000
Al Hafair-Mostorod	Al Hafair	Mostorod Refinery	115	24	85,000

2. NATURAL GAS INFRASTRUCTURE

The Gulf of Suez and Sinai have seven natural gas pipelines. Two of the seven pipelines (i.e. Trans Gulf Gas and Zaafarana-Korimat pipelines) transport natural gas to be pumped in two stations: Ras Bakr Transmission Station and Korimat Power Station.

The Gulf of Suez along with the Eastern Desert and Sinai are pioneering areas of hydrocarbons production in Egypt. Furthermore, the three regions combined are major crude oil producers. In fact, in FYs 2018/19 & 2019/20 the regions represented 42% and 44.37% of Egypt's total crude oil production, respectively, according to the EGPC's data. Most of the fields in the three areas are becoming as mature as the fields of Morgan, Ramadan and Zeit Bay. However, the areas have the potential for further exploitation and exploration. Based on this, the MoP, along with its domestic and international partners, seek to compensate for the natural decline in production rates through developing the regions to achieve more discoveries and attract more investors.

Natural Gas Infrastructure in the Gulf of Suez/Sinai

Pipeline	From	To	Length (Km)	Diameter (Inches)	Capacity (mmcf/d)
Trans Gulf Gas	Petreco Plant	Ras Bakr Transmission Station	75	12	110
Zaafarana-Korimat	Zaafarana	Korimat Power Station	163	18	105
Zeit Bay-Ras Shukheir	Zeit Bay (Pre-2017)	Ras Shukheir	40	16	140
Ras Shukheir-Suez Gas Trunkline	Ras Shukheir	Suez	245	16	160
Suez-Cairo Ring	Suez	Cairo Ring	150	10	-
Suez-Port Said	Suez	Port Said	160	16	-
El Arish Gas Pipeline	Port Said	El Arish	185	36/42	-

WEST BAKR'S OPTING FOR SPOOLABLE COMPOSITE PIPE

AN INTERVIEW WITH **EHAB RAGAEE,** CHAIRMAN AND MANAGING DIRECTOR, PETRODARA AND WEST BAKR COMPANIES

The project led to reducing the number of spills of the carbon steel corroded flowlines, in addition to saving the operating cost of the corrosion inhibitor, frequent lines inspection, and repair. The total length of installed pipes was 26,000 meters as a first phase.

WHAT ARE THE CHALLENGES IN THE EXISTING PIPELINE INFRASTRUCTURE THAT YOU WISH TO OVERCOME?

The original oil gathering network had all internally bare carbon steel which was poorly protected by corrosion inhibitor chemicals. The flowlines consisted of bare carbon steel pipes that suffered from frequent corrosion failures in recent years due to increasing water cuts.

The consequences of failures are spills and lost production for pipe repairs. Due to increasing corrosion failures, a full failure analysis was done using corroded samples by the Mining Studies and Research Center (MSRC) and Central Metallurgical Research and Development Institute (CMRDI) of Cairo University.

The results showed that the corrosion potential of the produced fluid in the field is high due to a considerable amount of carbon dioxide (CO2) and oxygen (O2) combined with high quantities of water. The high water cut)WC) ensures the continuous presence of a water phase in contact with the bare internal carbon steel pipe surface.

An internal review was done and a decision was made to replace and install new flowlines with pipe having an internal corrosion barrier(Spoolable Flexpipe).

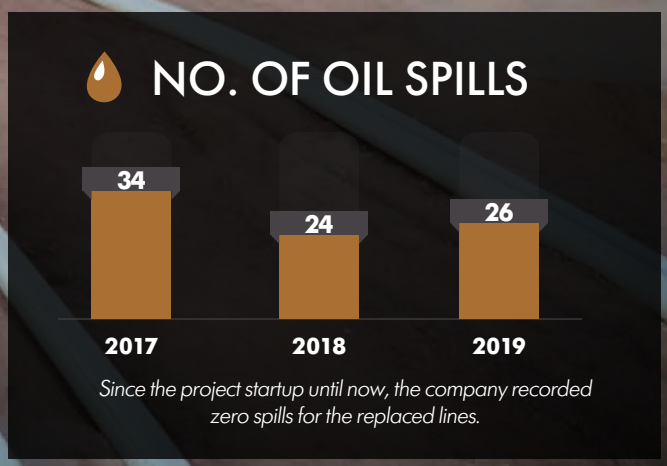
WHAT ARE THE ADVANTAGES OF SPOOLABLE FLEXPIPE OVER CARBON STEEL?

Spoolable flexpipe is easy, quick and safe to install; saving30-40% of total installation cost and duration.It is nonmetallic so it is corrosion-free; hence, there is no need to corrosion inhibitor program, pumps and monitoring system. Its smooth bore ensures much lower flow resistance and improves flow capacity. Overall, it is a better solution for sour environment.

HOW DO YOU EVALUATE THE PERFORMANCE OF A PROJECT'S EXECUTION?

We can evaluate the execution of a project as follows: safe installation, with zero lost time incident (LTI) recorded; professional execution team and supervision; installation schedule and procedure commitment; proper installation equipment and tools; excellent installation progress reporting; and a high-level managerial follow up and collaboration.

> *"IN LINE OF THE MINISTRY OF PETROLEUM AND MINERAL RESOURCES' STRATEGY FOR ASSET INTEGRITY AND ENVIRONMENT PROTECTION, WEST BAKR AND PETRODARA TOOK THE LEAD IN APPLYING ONE OF THE NEWEST TECHNOLOGIES FOR THE FIRST TIME IN EGYPT BY USING SPOOLABLE COMPOSITE PIPES AS PRODUCTION LINES."*



Since the project startup until now, the company recorded zero spills for the replaced lines.

SPOOLABLE COMPOSITE **FLEXPIPE**

For the first time in Egypt, Shawcor introduces the spoolable composite Flexpipe, which is specifically designed to withstand high pressure and corrosion. The Flexpipe models come with over 40,000 kilometers of pipe and 150,000 fittings that have been installed worldwide since 2003. Through utilizing composite production systems (CPS), the spoolable composite Flexpipe is corrosion-resistant, cost-effective, and an improved alternative to steel pipes.

INSIDE THE PROJECT'S DESIGN

The spoolable composite Flexpipe comes in various sizes at 2, 3, 4, and 6 inches and is designed and manufactured to withstand high pressure as well as corrosion. Flexpipe is constructed from a winning combination of high-density polyethylene (HDPE), helically wound epoxy-free dry fiberglass to eliminate micro-cracking and a protective outer jacket. FlexCord Linepipe also has galvanized steel cord to improve pressure rating. The pipeline comes in long lengths of pipe starting from 570–1,100 meters per reel, and it is both very flexible and easily handled. All the pipeline models are available in nickel-coated and stainless steel.

PRODUCT RELIABILITY & SAFETY

Shawcor takes the pipeline business to the next level at a great withstanding pressure point that varies from 1,500 pounds per square inch (psi)/ 103 bar to 2,250 psi /155 bar at a maximum operating temperature at 82°C depending on the size of the pipeline. Flexpipe which comes in four models: Flexpipe, Flexpipe High Temperature (HT), FlexCord, and FlexCord AB have 20 years of ultraviolet (UV) protection, high abrasion resistance, and fire-resistant properties

The Epoxy-free dry fiberglass provides outstanding wear resistance and impact toughness in addition to reducing potential microcracking or over-straining. Flexpipes also provide resistance to aromatic and cycloalkane hydrocarbons up to 50% by volume. All Flexpipe models are compatible with corrosion inhibitors, biocides, scale inhibitors, paraffin dispersants, as well as batch treatment.

Specifications of FlexPipe & FlexPipe High Temperature

Maximum Continuous Operating Temperature	**60° - 82°C** (140°- 180°F)
Maximum Operating Pressure	**1,500 psi** (ANSI 600)
Applications	Oil | Gas | Water | H_2S | CO_2
ID Size	**2-6 inches**
Length Per Reel	**570–1,100 m** (1,870–3,610 feet)
Installation	Trenching | Plowing | Chain Ditching Surface Lines | Liner Pulls (remediation) Horizontal Directional Drilling (HDD)

FlexPipe & FlexPipe High Temperature

Cost Saving Compared to Steel Pipeline

FlexPipe Linepipe Installed Costs

- **44%** Coated Trenched Steel Pipe Costs
- **16%** Uncoated Trenched Steel Pipe Costs
- **48%** Coated Non- Trenched Steel Pipe Costs
- **21%** Uncoated Non-Trenched Steel Pipe Costs

The pipelines have proved to exceed the industry requirements of the Canadian Standards Association (CSA), the American Petroleum Institute (API) and the American Society for Testing and Materials (ASTM) standards. On top of that, the product guarantees higher flow rates, robust leak-free fitting connections, and corrosive resistance superior to other composite products on the market.

FLEXPIPE HT SERIES

The FlexPipe HT Series, the superlative model, is the largest spoolable of Flexpipe models and manufactured at 6 inches and a weight of 11.8 kg/m. It can withstand hot oiling at 93°C for 500 hours across the product life and has a pressure point of 1,500 psi. It is suitable for many installation methods including trenching, plowing, chain ditching, surface lines, horizontal directional drilling (HDD), and liner pulls (remediation).

FLEXPIPEVS. STEEL PIPES

The Flexpipe is considerably safer and quicker to install than coated steel pipes. Installation involves fewer people, and less equipment than steel pipe installation. The weight of Flexpipes is also significantly less than steel with a maximum weight of 6.9 kilograms/meter. Flexpipes also offer a competitive selling price ($/m) at 44%, and 48% less than trenched and non-trenched steel pipes.

WHY SHAWCOR?

Shawcor goes the extra mile and provides in-house engineers dedicated to ensure that the product is suitable for your needs to maximize service life. In addition to providing project planning, technical and field services support, the company offers contractor installation training which allows clients to have better control over project timing, costs, and completion.

Shawcor is the leading manufacturer of Flexpipes in North America. The company has delivered over 40,000 kilometers of pipeline in service, with more than 500 clients served in 25 countries.

FlexPipe Linepipe Comes in Easy to Install Reels

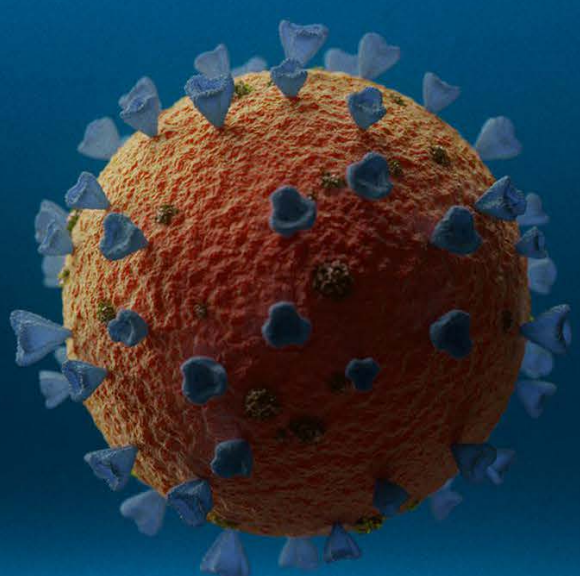
	Lengths per reel (m)		Minimum bending radius (m)
FlexPipe & FlexPipe HT	2,000 570	→	1.2 2.1
FlexCord	750 485	→	1.8 2.1
FlexCord AB	750	→	1.2

Specifications of Flexpipe Products

	FP150	FP301/FP301 HT	FP601/FP601 HT
Maximum Operating Pressure at 60°C or 140°F	2,068 KPA / 300 PSI	5,171 KPA / 750 PSI	10,342 KPA / 1,500 PSI
Nominal Size (inches)	3 - 4	2 - 4	2 - 4
Weight (lbs/ft)	1.7 - 2.7	1.1 - 3.3	1.6 - 4.6
Reel Diameter (ft)	12	12	12
Reel Width	4 - 8	4 - 8	4 - 8
Reel Weight – Full (lbs)	5,855 - 9,150	5,620 - 10,475	7,320 - 11,210
Reel Weight – Empty (lbs)	1,500 - 2,530	1,500 - 2,530	1,500 - 2,530

Why Shawcor?

BUSINESS-AS-USUAL: THE POST-CORONAVIRUS DEFINITION



BY RANA AL KADY

As employees worldwide begin to slowly transition into 'business-as-usual' operations, certain Health, Safety and Environmental (HSE) measures must be applied to prevent the fear of a potential second wave of the COVID-19 pandemic. In addition to adequate measures, employees must be aware and educated on the basic principles of proper use of Personal Protection Equipment (PPE), both inside and outside the work area.

According to Hazem Hegab, HSE advisor at Shell, "In the beginning of the COVID-19 situation, companies focused on developing or updating their pandemic plans in alignment with business continuity plans to ensure smooth running of the operation during such emergency and limitation of on-board personnel." Hegab also added that, "the focus was to identify the business-critical personnel and take necessary measures to facilitate working from home process. In parallel there were development of new instructions and guidance covering social distance, hygiene, work location access checks in addition to plans of emergency response in case of positive cases. After three months there were plans of RTO (Return to Office) and reviews of office location to meet the new work structure under COVID situation."

RISK ASSESSMENTS AND HSE MEASURES DURING COVID-19

Before returning to 'business-as-usual' operations, two essential steps must be taken: carrying out a risk assessment and implementing HSE measures. Essentially, there are four key elements that constitute a risk assessment. Carrying out a risk assessment will not only help to identify the workplace's problem areas, but will also narrow down the potential solutions that could be implemented to minimize any and all health risks.

The first element is that the risk assessment will recognize work activities that could help in transmitting the virus (e.g. using equipment handled by multiple engineers on oil rigs or even in office spaces). The second element to consider is to properly identify employees with the greatest risk and exposure to confined spaces and other employees. Furthermore, the third element is assessing the level of exposure within the work space. Finally, the fourth element is to assess how the risk of contamination could be controlled. Once risk assessments have been completed, operations can commence with the relevant HSE measures.

For instance, there are three essential HSE measures. Specifically, these measures are social distancing, maintaining adequate sanitation precautions, and personal hygiene standards. As for social distancing, the main ways in which take place is to mark spaces on the floor for employees to stand on, add posters around the workplace to remind others to maintain a distance, let office-based employees work side-by-side rather than face-to-face, limit rotations on use of equipment and machinery, etc. As for sanitation precautions, this includes cleaning work areas, equipment and machinery between rotations, implementing hand sanitizer and hand washing facilities for employees, etc. Finally, in relation to sanitation precautions, the relevant PPE and/or Respiratory Protective Equipment (RPE) is necessary; this is inclusive of face masks, rubber gloves, as well as the conventional PPE for on-site employees such as hard hats, safety goggles, etc. These are the mandatory precautions necessary for workspaces to implement.

BUSINESS-AS-USUAL PRE- VS. POST-CORONAVIRUS

Over the course of the pandemic, 42% of countries worldwide shutdown most workplaces and offices, with the exception of essential workplaces; this is inclusive of Egypt. According to the International Labour Organization (ILO), as a result of lack of physical presence in the workplace, work hours declined by nearly 14% for employees with full-time jobs.

During the early stages of the COVID-19 pandemic (circa March to April 2020), employees were asked to either work from home (where possible), or continue working on-site under strict HSE measures. As per the given data, most employees, both full-time and part-time, worked in shared spaces and took the necessary precautions as advised by entities such as the World Health Organization (WHO), UK Government HSE, etc.

During the peak of the pandemic, before slowly shifting to 'business-as-usual' operations, as per regulations suggested by various HSE entities, it is essential for every organization to carry out a tailored risk assessment before continuing operations. The next step would be to conduct trainings and workshops via online platforms to make employees self-aware about precautions and ways in which health risks could be minimized while also optimizing operational efficiency. Then, the next step would be to bring back employees at 25% intervals based on the importance of each employee's physical attendance. Upon successful transitioning, employees are encouraged to maintain implementing HSE measures and using PPE and/or RPE to avoid the potential risk of a second wave of the pandemic.

Towards the end of the pandemic, post COVID-19, WHO standards recommend that the HSE and PPE/RPE measures are to remain intact. This is not only to prevent a second wave of the pandemic, but to reduce risk and circulation of viruses and contaminations at all times. This suggestion is expected to also increase productivity of employees as their immunity systems are at low risk (i.e. less sick leave days are taken). Hegab also added by saying, "I believe it is not the HSE policies but the care value and leadership commitment to protect the health of the employees are the main core motives to affect the future operations. With time passing, the economic effect due to the reduction of demand became the key factor in setting strategic operations plans."

CASE STUDY

There are several brilliant examples of organizations in the oil and gas industry that have embraced the pandemic and taken the necessary precautions. For example, Schlumberger has created an "Outbreak Management Plan", with the aim of providing a detailed management plan to deal with the consequences of COVID-19 depending on the national risk level. Additionally, a series of "COVID-19 Management Standards" has been developed as a baseline for workplace operational standards.

As a matter of fact, each COVID-19 management standard document provides details on hygiene at work, personal hygiene, social distancing precautions, cleaning and disinfecting, and, most importantly, how to handle a positive COVID-19 case in the workplace. These standards are applicable in each country in which Stumberger is present. In fact, these standards are universal and the concepts can be applied in any oil and gas organization, especially in Egypt.

Schlumberger stressed that it considers their employees' safety one of the most important aspects of the organization's prime concerns. This is demonstrated as the organization has implemented a practical approach to minimize exposure to health risks. Exposure is minimized through travel limitations, smaller office capacities as well as decontamination procedures (e.g. sanitization of spaces). These are some of the ways in which a practical and efficient plan could be implemented to reduce exposure and health risks.

To conclude, there are several ways in which oil and gas organizations are now better prepared for emergency lockdowns and pandemics. Additionally, HSE policies and measures will continue to be implemented despite the pandemic's route in the future. Before employees conduct 'business-as-usual' operations, a proper risk assessment must be carried out. The crucial key element in this transition is to ensure that organizations follow suit and transition slowly, based on the success of operations. Following international standards is one way to develop better guidelines that could be applied universally so as to ensure that all employees have the same understanding of COVID-19 precautions. Finally, and most importantly, employees must be aware of the necessary precautions through trainings, workshops or even marketing campaigns.

ROBUST CYBER RESILIENCE IN THE UPSTREAM SECTOR

BY MAI EL GHANDOUR

With the world shifting towards remote working, increasing volumes of sensitive data in the oil and gas industry may be at risk.The digitization of the sector is becoming a double-edged sword, providing exciting opportunities but simultaneously posing a security threat. A cyberattack on the energy sector can, in fact, extend far beyond oil and gas production to hit the political and economic spectrum. Increasingly sophisticated cybercrime, often driven by nation-state actors with geo-political goals in mind, has become a national security threat and serves as an alarm bell for oil and gas companies to take action.

UNDERSTANDING THE SCOPE OF SENSITIVE DATA

In a paper published this year by Tyler Chase; Managing Director Energy and Utilities Industry Global Leader, and Justin Turner; Associate Director Oil and Gas Cybersecurity and Data Privacy, the authors emphasize that oil and gas companies deal with a wide range of sensitive business data on a daily basis. However, these companies do not tend to consider just how valuable their data actually is.

Whether upstream, midstream or downstream, the authors further explain that oil and gas sensitive data comprise plant maps, production trends, revenue forecasts, geophysical data and much more. Another type of sensitive data to protect, which oil and gas companies often overlook, is their employees' personal information. From social security numbers, to bank account numbers, home addresses and much more, these types of data can induce identity theft and fraud.

Adel Mekkawy, HR Operations Executive and Managing HR Cloud at ProServ Egypt, remarked to Egypt Oil & Gas that "what is perceived as sensitive in oil and gas companies could be everything. Every tiny detail matters to competitors and to the field itself; starting from the project preparation to proceeding with the actual steps forward from budgeting, hiring, and relying on third parties. Any kind of service needs to be so accurate."

Faced with the substantial ongoing threat of cyber-attack, organizations ought to protect their intellectual property, including information on pending lease bids, knowledge about upcoming mergers and acquisitions, geoseismic and engineering data, technology research, chemical formulae and telemetry data from wells in operation.

"Security is all about who to trust to get the job done perfectly with secured data. That is why whenever there is an oil and gas project in Egypt, you would find lots of tenders going around but clients already know who they would choose as business partners," Mekkawy pointed out.

DATA BREACHES AND SAFETY CULTURE

A report titled "Drilling Deep: A Look at Cyberattacks on the Oil and Gas Industry" by Trend Micro, draws on insights into almost a decade's worth of cyberattacks against the sector, revealing that the industry face increased risk from building out digitally connected infrastructure.

The report sheds light on how the remote monitoring for performance, quality control and safety are essential for oil and gas companies, especially that their communications are often left unencrypted. Consequently, cyberattacks can lead to a plant or production shutdown, utilities interruptions, equipment damage or loss of quality, undetected spills and of course safety measure violations.

Advenica, a firm that provides expertise and world-class high assurance cybersecurity solutions for critical data to Top Secret classification, lists IT vulnerabilities as one of the major drawbacks of the sector. In addition, attention to security and building a security culture are a top priority.

"A major challenge with all security is awareness and training among employees – to have a security culture. Malicious codes are usually spread due to human error through attachments in emails that are opened, memory sticks that are inserted, laptops that are connected to unknown networks etc.," the report further details.

DATA PROTECTION VS. DATA GOVERNANCE

Dale Waterman, a partner at White Label Consultancy (WLC), a boutique data protection and privacy consultancy, noted that "although data protection is about personal data and oil and gas companies have historically been far more focused on data governance, what we have seen recently is the convergence of data governance and data protection."

As oil and gas companies increasingly use accurate information to help their governing bodies with strategic decision-making, Waterman clarified that "data governance is about managing data and improving the quality of that data. Traditional data protection, on the other hand, was very much about safeguarding who had access to corporate data and making sure you protect it against access by bad actors. However, the lines between these two fields are arguably converging."

Waterman further noted that "if an Egyptian oil and gas company has a mature data governance program in place already, which would include policies and processes, roles and responsibilities, and appropriate monitoring practices, it should be very well positioned to begin a journey towards compliance with the new Data Protection Law."

NEW LEGISLATION OF THE DATA PROTECTION LAW

On July 17, President Abdel Fattah El Sisi ratified the long-awaited data protection law no. 151 of 2020 (the DP Law). The DP is essentially Egypt's version of the EU's General Data Protection Regulation (GDPR), laying out the ground rules for how businesses use personal information collected online. Egypt's new DP law mirrors several key elements of the GDPR, such as the concepts of lawfulness, fairness, and transparency; purpose limitation; data minimization; accuracy; storage limitation; integrity and confidentiality; and accountability.

Dr. Heba Anwar Raslan, Managing Associate at Sharkawy&Sarhan Law Firm, told Egypt Oil & Gas that "Egypt's data protection law No. 151 of 2020, is the first to regulate personal data privacy. It will touch most businesses albeit with varying impact depending on how intensive each business/sector is utilizing personal data and sensitive personal data."

The legislation also encourages users to take legal action against parties exploiting private information and will impose a prison sentence of at least six months or an EGP 200,000 to EGP 2 million fine on individuals responsible for data breaches.

Raslan clarified that the Law will require appointing a data protection officer. "So far it is not clear if such officer must be located in Egypt and the ER is expected to clear that point," she said, adding that "data controllers will be required to obtain a relevant license from the data protection center that will be established. If your company exports data then consider that it must be to countries of comparable protection levels and will require a license from the center. The center is not established yet and the ER is again expected to clarify several points on the licensing mechanism."

Commenting on the new law, Waterman said: "When it comes to the new DP Law, decisionmakers in the oil and gas industry who are not privacy professionals or lawyers, must first appreciate that data protection and privacy regulations are all about the management of personal data, which is any data relating to an identified natural person, or data which could be used to identify a person."

It is important to note that the DP Law also imposes licensing requirements for data processing, data control, dealing in sensitive data, electronic marketing, and cross-border transfer of data.

"The aim of regulations like the new DP Law is typically to give control to individuals over their personal data. The new law is therefore not about all company data. That said, companies often have large numbers of employees, and this HR data is clearly personal data. In addition, the industry is increasingly using new technologies to enhance safety and security. This surveillance technology involves the collection and processing of personal data, making the new data protection law directly applicable," said Waterman.

TRICKLING DOWN INTO THE OIL AND GAS INDUSTRY

Raslan laid out some practical considerations for oil and gas companies to help them utilize the DP Law. "Consider, plan and eventually introduce internal policies and mechanisms for compliance with the law. Start early on. It is true there is still at least 21 months to go but you may need to bring considerable changes. For companies already compliant with GDPR we do not expect the changes to be significant. On that, track data cycles internally from the time the data is collected until it is deleted including processing, storage, exportation," she recommended.

To deal with cybersecurity risks including technical measures, Raslan advised to "consider, identify and introduce measures such as controlled access for particular information, secure document disposal process, securing access to locations/ premises with the devices containing access to personal data, and disposal of IT equipment. So you may wish to check the agreements and processes you have in place with for example third party providers of cloud services to check if any particular additions need to be introduced."

The Managing Associate also urged "not to forget to train your employees on the changes and new regulations that will be in place to comply with the law and to constantly update and freshen employees knowledge and practices on the matter."

"Cyber-attacks must be reported within 72 hours from the time of your knowledge of the attack. If the attack threatens national security this must be reported immediately (a comparable obligation exists under the Cybercrimes Law). There is no definition to what would be considered as of national security but in our view personal data pertaining to national energy and natural resources projects will be most likely considered as of national security nature. So, ensure you have adequate technological measures in place to enable detection of and timely reporting of cyber-attacks," Raslan noted.

A FOUNDATIONAL STEP TO IMPROVING SECURITY

With that being said, it is obvious that what is defined as a national security threat is still ambiguous. And therefore, the law is still imperfect. However, as mentioned before, a cyberattack that specifically targets sectors such as energy would clearly threaten national security.

But Egypt can learn from Europe's GDPR. GDPR and energy cyber security expert, Dan Mosca, endorsed how oil and gas companies can get ahead of the curve in terms of security. According to Mosca, companies need to understand the full extent of their responsibilities. In order to do so, oil companies should practice data mapping to assess the types of data they hold. This will help them prioritize their activities, which larger operators especially need in order to be efficient. Key stakeholders should begin appreciating the change in law as it will directly impact their day to day activities, Mosca explained.

Thus, it is necessary that data protection laws are not seen as a burden as they are merely an opportunity to review and reinforce companies' cyber resilience.

BREAKING THE STIGMA: MENTAL HEALTH IN O&G INDUSTRY

BY JASMINE SHAHEEN

For quite a long time now, it seems like there has been no talk in the world except about the coronavirus (COVID-19) pandemic. This remains true to date. Without a vaccine, life cannot fully return to its former way; the oil and gas industry is no exception. There is no doubt that almost all companies have prioritized health and safety as a result of the pandemic. However, one aspect of health and safety that is often ignored is mental health and the role it can play in challenging productivity.

LONE WOLVES OF THE INDUSTRY

In the whirlwind of COVID-19, the workforce dramatically shifted and moved to work from home. However, field engineers (i.e. the driving force behind the oil and gas industry) remained a vital constant in the workplace. One Human Resources (HR) Expert told Egypt Oil & Gas (EOG) that "field engineers were subject to longer shifts and work cycles in order to mitigate their risk of exposure to infections." Mohamed Elshawaf, Field Engineer at Khalda Petroleum Company, noted that working amid the pandemic differs from a pre-pandemic workplace as contact and teamwork became very limited. Elshawaf described the situation stating that "[We were like] birds and COVID-19 like a gun that shoots one of us each day... so the workforce decreased to its lowest level."

The Center for Disease and Control Center (CDC) denoted that the pandemic has not only hindered people's lifestyle and routines, but it came carrying the emotional baggage of anxiety, stress, and depression. Such mental illnesses leave anyone vulnerable to mood swings, change in behavior, and without a doubt, create a pattern change in productivity. Elshawaf shared his experience when it comes to the mental toll of the pandemic. "During any job in the field, we [have] two responsibilities, one of them [is] to perform a successful job," the other was to avoid any sort of infection. However, such responsibilities amid an abnormal work environment have resulted in pandemic-induced stress.

The question remains: has the pandemic, with all that it comes with, changed productivity? Elshawaf disagreed by stating that crude production levels remained stable and the workforce decreased, "our productivity increased as we [started] working twice the period of work, [and doubled] the load of work."

When asked about managing the toll of the stress, Elshawaf responded that it became more comfortable after utilizing technology and having online meetings. It did not rely on that solely, adding that through "different precautions taken in Khalda and after a special motivational speech from Abed Ezz El Regal, CEO of the Egyptian General Petroleum Company (EGPC), and our Chairman Said Abdelmoenm," managing stress became a little easier. This brings us to another point, which is admitting that the pandemic creates an abnormal, challenging work environment, and management's role is to be a guiding light, not another obstacle.

AHEAD OF THE CURVE

While the coronavirus may have been like a hiccup for the oil and gas industry, its effect liaised in every crook and nook of the industry. For instance, management styles have shifted as more people began working from home, and the old methods of monitoring are not reliable at this time. An HR Expert told EOG that working from home "was a great challenge to force the change to digital transformation." Management at any level and position has shifted as well, making safety practices at the heart of their mechanism. Our source, who asked for anonymity, added that one of the new challenges COVID-19 exposed management to is maintaining the safety of personnel in every step alongside "maintaining the planned levels of production to cope with the falling prices of oil which led to major cost-cutting strategies."

Management needed to expand its scope of work during this unprecedented time. Tom Welchman, Partner and Leader of McKinsey's Digital and Analytics Assets in EMEA, weighed on the management's role towards their employees when it comes to mental health. As fostering productivity and morale is essential at the moment, Welchman commented that during this stressful time, empathy is pivotal to maintain a sustainable workflow; "sustaining and creating a caring culture is perhaps more important than ever. And [employees] need leaders to lead rather than micromanage from afar." Mckinsey has also planned a five-series management method to handle the COVID-19 crisis at work; these include organizing via a network of teams; displaying deliberate calm and bounded optimism; making decisions amid uncertainty; demonstrating empathy, and communicating effectively.

Honesty and straightforwardness go a long way, according to our HR source. He believes that "[mangement] have to inspire their teams by how they lead, how they adapt to change, and by building a trusting environment." Echoing Welchman sentiments, the HR source noted that managers should foster empathy, care for their teams and their families, and to shape a culture of growth mindset, care, and safety."

Elshawaf expressed his pride in the efforts his company has taken in terms of occupational and mental health by stating that "[The company's] management is always in contact with their men in [the] fields and organizes virtual meetings and also motivational speeches for employees...Khalda Petroleum Company is a role model for any company in Egypt's oil sector."

ROAD TO RECOVERY

The World Economic Forum has called the pandemic "the largest psychological experiment ever" and expects to see an increase in absenteeism and burnout when it comes to working. The pandemic has undoubtedly shifted the way things work; it has changed the way we operate. Perhaps one of the benefits of the pandemic is that it put a spotlight on mental health and slightly broke the stigma surrounding it. Acknowledging a crisis is one thing, acting upon it is the way to recovery.

There is no playbook for managing a pandemic crisis, but it should be made evident that the human aspect of any job is the most crucial aspect to tend. A leader's role is not to fix the damages that were done by the pandemic, but to make a positive difference in employees' lives.

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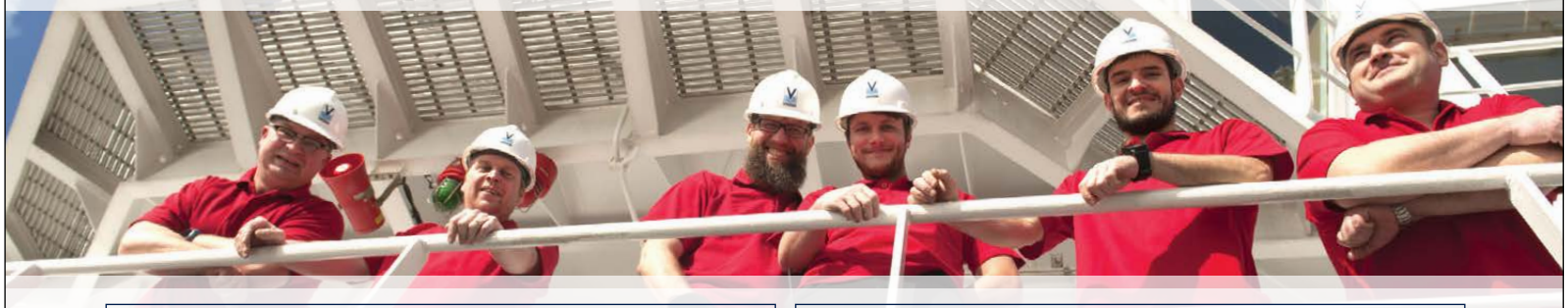

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EGYPT NATURAL GAS BOOM MAKING WAVES

BY FATMA AHMED

The latest data issued by the Natural Gas Vehicles (NGV) Global website showed that the number of vehicles running on natural gas in Africa reached nearly 295,000 vehicles in 2019. In North America the number jumped to 224,500 while Europe surpassed expectations by reaching nearly two million cars.

This growing appetite for natural gas can be explained by the new big discoveries and the relatively low costs of using it besides its environmental advantage.

THE EGYPTIAN STRATEGY

Egypt witnessed new discoveries of natural gas over the past few years, which enable it to become one of the leading countries in producing natural gas (thanks to Zohr field). This discovery allowed Egypt to achieve self-sufficiency of natural gas and put Egypt on track to become a regional hub for natural gas trading.

These achievements enabled the Egyptian government to expand natural gas usage especially in the transportation sector. However, the idea of converting vehicles to run on natural gas is not new for Egypt, as it was on the table since 2009.

However, the new strategy of the Egyptian Government aims to link the licensing of vehicles to the conversion of vehicles to run on a dual-fuel system.

PRESIDENTIAL INITIATIVE

President Abdel Fattah Al Sisi announced, in June 2020, an ambitious and unprecedented initiative to replace the obsolete vehicles and convert them to run on natural gas instead of gasoline and diesel. He explained that this strategy will help in alleviating the burden on citizens through reducing the costs of fuel by nearly 50% for them.

Al Sisi also insisted on speeding up the procedures and plans of establishing the needed infrastructure to cope up with the targeted number of vehicles. He even gave instructions to the Ministry of Finance to provide facilitated loans with small interests to help implementing the ambitious initiative.

The Minister of Trade and Industry, Neveen Gamea, elaborated that the initiative is even targeting microbuses and taxis.

She noted that the Ministry of Commerce and Industry had agreed with the Ministry of Petroleum and Mineral Resources (MoP) that the conversion process cost should range between EGP 8,000 to EGP 12,000 per car which will be done through Cargas and Gastec companies.

Gamea pointed that the government has allocated EGP 1.2 billion to convert 147,000 cars to run on natural gas in three years, noting that they contacted the Central Bank of Egypt, number of banks and Micro, Small and Medium Enterprises (MSME) to place a unified conditions and incentives for car conversion loans. She added that they are also in discussions with the Ministry of Finance to put a mechanism for scrapping old cars and those which run on diesel.

STRATEGY'S REFLECTION ON THE ECONOMIC SITUATION

The Minister of Finance, Mohamed Maait, stated that this will achieve high benefits for Egypt by reducing the amount of imported diesel and gasoline, which costs EGP 150 billion per year. It will also activate the industry and provide job opportunities.

Mohamed Hanafy, Director of Oil and Gas at Arab Engineering and Distribution Company, said to EOG that he advocates this initiative which" achieves a win-win situation from all sides "including its economic benefits in addition of being a "more environmentally friendly fuel with a smaller carbon footprint on our environment".

For his part, Mohamed Ahmed Ashour, Senior Economist at Ministry of Finance stated that "this will lead to a more balanced petroleum trade balance and less pressure on the Net International Reserves"

However, both of experts saw that there is a possible challenge while implementing this strategy represented in the urgent need of infrastructure expansion.

MOP EFFORTS TO FACILITATE THE PROCESS

The Minister of Petroleum and Mineral Resources, Tarek El Molla, announced that the total number of converted vehicles reached 320,000 cars since the start of the ministerial program for conversion. He elaborated that despite coronavirus pandemic outbreak, the number of cars that were converted in fiscal year (FY) 2019/2020 reached 42,000 cars, an increase of 25% in comparison with the previous year.

Regarding gas stations and infrastructure, El Molla presented the idea of establishing new 19 gas stations in the governorates of Qena, Assiut, Al Minya, Red Sea, Beni Suef, Qalyoubia, Alsharqeya, Port Said, Giza and Cairo. The total number of gas fuel stations compassed nearly 206 stations in 23 governorates, in addition to the 74 conversion centers scattered across the country.

According to the Ministry's program, it is planned to expand establishing gas stations as several agreements were signed with operator companies for gas stations.

> "I THINK THE BIGGEST IMPACT THAT WILL BE FELT IS THE REDUCTION IN POLLUTION ASSOCIATED WITH THE CONVERSION, ESPECIALLY IF DIESEL ENGINE TRANSPORTATION IS TARGETED FOR CONVERSION FIRST. THERE IS NO DOUBT THAT STREETS OF A CITY LIKE CAIRO WILL RUN SMOOTHER AND MORE EFFICIENT ONCE OLD CARS ARE RETIRED AND THE REMAINING ONES ARE RUNNING ON A MORE EFFICIENT FUEL"
>
> ***Mohamed Hanafy*** *Director of Oil and Gas at Arab Engineering and Distribution Company*

El Molla said that his ministry is participating in the national initiative to put strategy for settling cars industrialization in Egypt and achieving the highest exploitation of state's resources.

For gas stations' operator companies, Abdel Fattah Farahat, the Head of Gastec company, said that his company is providing facilities to the clients in paying conversion fees through several payment programs. He noted that the conversion process done under highest standards of safety.

FUTURE SIGHT

Hanafy said that "this decision is expected to have a significant positive impact on the Egyptian Market in general. After the transition phase, transportation will become a more standardized and stable sector with a consistent local supply, guaranteeing continuity and sustainability."

On another note, he predicted a slight increase in transportation fares as transportation service providers will seek to recover the costs of conversion. "However on the long run, operating these vehicles will be cheaper and should reflect in a decrease (or at the least a long term freeze) in transportation fare", Hanafy elaborated.

Furthermore, Ashour expects a growing demand for Vehicles running on natural gas.

Regarding the situation of gasoline and diesel usage and fuel stations operation, Hanafy said that they will continue being used for private cars, so the demand will continue but it depends on the number of private vehicles.

Ashour agreed with that opinion, explaining that the future of fuel stations will depend on the scale of the implementation, whether it will be implemented only on the transportation vehicles or will involve private cars as well. The transportation fares will be cheaper as long as the price of natural gas is cheaper than gasoline and diesel.

> *"CONVERTING CARS TO USE NATURAL GAS WILL DECREASE THE DEMAND ON PETROLEUM PRODUCTS HENCE IT WILL ALLEVIATE THE PRESSURE ON THE STATE BUDGET"*
>
> ***Mohamed Ahmed Ashour,***
> *Senior Economist at Ministry of Finance*

OIL POLITICS FUELING LIBYA'S CONFLICT

BY **IHAB SHAARAWY**

After a year of escalating violence, Libya's rival authorities have announced an immediate ceasefire on August 21. The long-awaited truce calls for elections in March 2021 and for talks to demilitarize Sirte, which could avert Turkish-Egyptian clash over the strategic city.

Tripoli-based, internationally-recognized Government of National Accord (GNA) announced the truce, which was welcomed by the United Nations (UN), the United States (US) and other Western countries. The truce was also agreed by Aguila Saleh, speaker of the eastern-based parliament, which supports the head of the Libyan National Army (LNA) Gen Khalifa Haftar, who controls large parts of the east and south of Libya.

Despite the uncertainty that still lingers over the truce, it can be seen as a step to end the violence that dominated the North African country since Col Muammar Gaddafi was deposed by Nato-backed forces in 2011.

However, one of the most important gains of the truce could be the new high prospects to restart the country's oil production and exports.

Provoking an Oil Turmoil Since the overthrow of Gaddafi, oil has been at the core of unrest in the oil-rich country, where the oil and gas industry accounts for more than 60% of the country's gross domestic product (GDP), according to Organization of the Petroleum Exporting Countries (OPEC)'s website

Different factions have used oil facilities as bargaining chips to press their demands. Fields and ports in Libya's east were blocked between 2013 and 2016.

While the sitting government retains stewardship of the Libya's ational Oil Corporation (NOC) and the Libyan central bank, Haftar has mobilized his forces and tribal allies to shut down production sites and shipping facilities around the country.

The conflict between the LNA and the GNA has intensified over the past year, as each faction seeks to assert control over the capital Tripoli.

In the beginning of 2020, eastern tribes, supported by the LNA, halted exports from key oil terminals, to slash production from more than 1.1 million barrels per day (mmbbl/d) before the blockade to around 70,000-110,000 barrels per day (bbl/d) in the past few months. Before the 2011 revolution, Libyan oil production used to stand at 1.6 mmbbl/d.

The blockade has now left the country on the brink of a financial crisis with oil production in the country falling more than 80%. Now it seems that the oil sector, that was the epicenter of the conflict, may be the key for peace.

While declaring the truce, the head of the GNA, Fayez al-Sarraj, called for an end to an oil blockade imposed by rival forces.

The ceasefire also comes days after the LNA's Petroleum Facilities Guard of Libya's eastern oil terminals said it would reopen key oil ports to allow exports of some barrels from storage.

MAKING WAVES IN OIL MARKETS

NOC welcomed proposals from rival authorities to lift a seven-month oil blockade and place revenues in an independent bank until reaching a political settlement. In August, NOC announced that the total losses resulting from the closure of oil ports, during the period between January 18 and August 12, had reached $8.22 billion.

The conflict also had a negative effect on the revenues of international oil companies (IOCs) working in Libya including Eni, OMV, Total, Repsol, ConocoPhillips and Hess. It also offset NOC's expansion plans which targets to raise production to 2.1 mmbbl/d by 2022, for which it needs to attract $60 billion in investments.

NOC's announcement that it could restart oil exports after the declaration of the ceasefire put further pressure on world oil prices. The return of Libya's production as the world oil demand still affected by the coronavirus pandemic may also put more pressure on the next OPEC+ ministerial panel in September 17.

The fall in Libya's oil production throughout the year was a bliss in disguise for other OPEC members who grappled with production cuts to readjust oil prices amid the pandemic.

Some analysts even doubted that backers of Haftar, which include Saudi Arabia and Russia, leaders of the Opec+ alliance, were not exerting enough efforts for reaching an agreement, which will see Libya's crude oil flooding the market at a time when they are making their own supply cutbacks.

However, the fact that Libya's oil industry is crumbling after more than nine years of neglect amid the civil war can assure that Libya's full capacity cannot return anytime soon even if the civil war had come to an end.

NO MORE PROXY WARS, PLEASE

As the conflict goes on, the North African nation that owns one of the largest oil reserves in the world (48.4 billion barrels of proven oil reserves, according to OPEC)has become the venue for a proxy war with a number of foreign powers joining in to defend economic and ideological interests.

The Turkish move to enter the Libyan conflict can be seen as the most dangerous in this proxy war. Turkey has deployed its military forces and Syrian militias to Libya. It also broke the United Nations' arms embargo on Libya and supplied drones and air defense to the GNA. The Turkish interference was a game changer in the conflict that it helped the GNA to push Haftar forces back.

Besides securing lucrative opportunities for Turkish companies in the Libyan market, the gas-thirsty Turkey succeeded to sign a deal on the delimitation of the maritime jurisdiction areas in the Mediterranean with the GNA. The deal has further added to the anger of Turkey's neighbors, primarily Greece and Cyprus, that contest Turkey's drilling rights in the waters.

The Turkish interference in the Libyan conflict also has its ideological aspect as most of Haftar's support comes from Saudi Arabia, the United Arab Emirates (UAE) and Egypt. All three countries are united in their bitter opposition to the Muslim Brotherhood, which is supported by Turkey.

The Turkish interference also prompted Saudi Arabia, Egypt and the UAE to maximize their help to Haftar who they considered as an ally against the spread of political Islam and in particular the Muslim Brotherhood.

The Turkish advances recently prompted Egypt's threat to intervene in neighboring Libya with the intention of protecting its western border with Libya, and to bring stability, including establishing conditions for a cease-fire.

Egypt and Greece have recently signed a maritime deal that sets the sea boundary between the two countries and demarcates an exclusive economic zone for oil and gas drilling rights. The new Egyptian-Greek agreement came in response to the Libyan-Turkish deal which is considered by Egypt to be null and void.

The Libyan conflict scene is also witnessing the existence of Russia on the side of Haftar as it seeks to expand its influence in the region in the absence of a unified Western engagement.

We can also see the fingerprints of Italy, the former colonial power in Libya, which bets on Sarraj government to bring stability to the country, which Italians consider as a matter of national security and where illegal migrants can find easy access to Europe.

Meanwhile, France, which also has oil interests in Libya, is thought to provide Haftar with military assistance. It also has lent support to Greece in its maritime dispute with Turkey.

The complex Libyan situation even prompted the UN Secretary-General Antonio Guterres to recently declare that the conflict in Libya has entered a new phase, with foreign interference reaching unprecedented levels, including in the delivery of sophisticated equipment and the number of mercenaries involved in the fighting. He explained that almost 30,000 people have been forced to flee their homes due to continuous fighting in Tripoli's southern suburbs and Tarhouna, bringing the total of internally displaced persons in Libya to more than 400,000.

Guterres added that the UN is working to mediate and end the blockade on oil imports that aims "to alleviate economic hardship compounded by the conflict and COVID-19."

BEING PART OF THE SOLUTION RATHER THAN THE PROBLEM

Many see the conflict in Libya as a clear example of civil wars fueled by big oil reserves. Similar conflicts can be seen in other places such as Venezuela and Nigeria.

However, a study published by The Journal of Development Studies under the title "Oil abundance and violent political conflict: A critical assessment" found that it is unlikely that the statistical relationship between oil and civil war is likely to be convincing.

However, the research suggests that there is some evidence that once a conflict is under way, some types of natural resources may facilitate the prolongation of war. The evidence thus suggests that factor endowments do not determine politics. The indeterminacy of oil wealth and violence suggests that the nature of conflicts in mineral-dominant economies does not exist prior to politics.

In Libya's case, we can realize that there are many factors in the Libyan war rather than oil. The tribal and ideological structure of the country that was ruled by Gaddafi for 40 years cannot be ignored when analyzing the Libyan conflict.

However, oil should be part of any solution to help rebuild the country once the rival factions decide to do so one day.

(This article was written two days after the declaration of the ceasefire. Many developments might have happened until the date of publishing.)

PORT OF BEIRUT INCIDENT: CAN IT TAKE A CENTURY TO LEARN FROM MISTAKES?

On August 4, a major fire broke out in a Port of Beirut warehouse and spread to 2,750 tonnes of stored ammonium nitrate. In the past, many incidents have occurred with ammonium nitrate: quite a few of them with disastrous consequences, often developing in a similar pattern to what we saw in Beirut. How could this happen? Was it an unlucky chain of events, or the result of a deliberate malicious act? Can we consider this as an incidental 'freak' accident?

The explosion caused at least 200 deaths with many thousand injured. An estimated 300,000 people have been left homeless and large parts of the Lebanese capital are now flattened. Some reports say the shock wave was so intense that it was felt in Cyprus, an island about 250 kilometers north-west of Lebanon. A giant orange cloud of combustibles was seen following the detonation, suggesting the vast release of nitrogen dioxides.

It is too early to draw conclusions as to the immediate causes of the accident and an independent investigation will need to be conducted. But one thing is already sure: this accident is not a one-off.

The ammonium nitrate that caused the explosion appears to have been impounded and stored for six years after it was seized from a cargo vessel in 2014. Ammonium nitrate is a white crystalline solid consisting of ions of ammonium and nitrate. It is highly soluble in water and hygroscopic (i.e. tending to absorb moisture) as a solid. It is predominantly used in agriculture as a high-nitrogen fertilizer, with an estimated global production of more than 20 million tonnes. Thus, it is hardly an exotic material, rather than a household product.

If ammonium nitrate's primary use is as a fertilizer, how can it cause so much mayhem? Ammonium nitrate can decompose - non-explosively and non-violently - in temperatures above 210 °C into nitrous oxide gas and water vapor when heated. However, under certain conditions it can be induced to decompose explosively. Explosions are not uncommon. Many relatively minor incidents are recorded every year, and several large and devastating explosions have occurred. Historical data reveals that industrial accidents involving ammonium nitrate explosions have killed hundreds of people since the early twentieth century. Accordingly, the explosion hazards of ammonium nitrate are well understood. It is also known that large stockpiles of the material can be a major fire risk as ammonium nitrate acts as oxidizer.

'Learning from events' is a key element of Process Safety Management (PSM) to achieve continual improvement; it is important to realize that this extends to incidents that happen in the entire industry, away from your plant or operations.

CAN ACCIDENTS WITH AMMONIUM NITRATE BE PREVENTED OR THEIR CONSEQUENCES BE MITIGATED? OR MORE HOLISTICALLY: HOW CAN THE WORLDWIDE RISK ASSOCIATED WITH USE OF AMMONIUM NITRATE BE CONTROLLED?

The five principles of inherent safety, originally developed by Trevor Kletz, can be applied to address these questions in a systematic manner.

The first principle of inherent safety is elimination. In this context the elimination would imply, first, removing the need for agricultural fertilizers and avoiding ammonium nitrate for producing industrial explosives, which is called nitrate-dependent anaerobic ferrous oxidation (NAFO). This is somewhat difficult to imagine; probably more relevant is the question of whether the use of fertilizers can be minimized (second principle). Also, under the principle of minimization the amount of ammonium fertilizer processed, handled and stored should be reviewed. The Beirut accident involved a large quantity of fertilizer, however, other fatal accidents like West, Texas (2011) in which 15 people perished, involved far smaller quantities (only 30 tonnes). So, the second principle of inherent safety – minimize – may not be very helpful in reducing the risk.

The third principle – substitute – looks more promising. Many countries are phasing out their use of ammonium nitrate in consumer applications due to concerns over its hazardous properties and potential for misuse. Urea has become more widely used as a nitrogen source for forage production, although it does suffer from a high degree of nitrogen volatilization, undermining its effectiveness as fertilizer. Also, the release of nitrogen in the atmosphere is becoming a hot political topic in some parts of the world (e.g. the Netherlands) because of its environmental impact, so urea as a substitute for ammonium nitrate is contentious. Other alternatives like the application of non-

volatilizing nitrogen products like ammonium sulphate or treating the urea fertilizer with a volatilization inhibitor can alleviate these issues.

The fourth principle of inherent safety is 'moderate'. This principle is related to minimizing the consequences and impact of an incident. Considering the disastrous consequences, mitigation (i.e. limiting the negative effects of an ammonium nitrate explosion) seems difficult: once the detonation has occurred, there is little we can do to limit its effects.

The fifth principle of inherent safety of 'simplify' is related to simplifying the production, storage and handling of ammonium nitrate so that it is less likely for an incident to occur. Considering that most disasters occurred during storage rather than production or handling, it is hard to see how this principle could significantly lower the risk.

THE MOST EFFECTIVE WAY TO LIMIT THE RISK ASSOCIATED WITH AMMONIUM NITRATE ACCIDENTS IS TO AVOID THESE INCIDENTS IN THE FIRST CASE, BY MINIMIZING THE USE OF FERTILIZERS AND FINDING ALTERNATIVES TO AMMONIUM NITRATE.

The application of the principles of inherent safety as demonstrated above are central in managing process safety. These should be embedded in your PSM system, specifically in the design and engineering of new developments (capital projects). But also, when changes are made to existing facilities or plant operations; the seeds for a safely operating plant are planted in its design phases by implementing inherent safety measures.

The recent accident in Beirut is not unique, with the first industrial accident with ammonium nitrate dating back more than a century ago. Learning from these incidents is crucial to prevent them from occurring, and a systematic 'learning from events' process should be part of a PSM system. Also, the Beirut accident highlights that applying the principles of inherent safety (eliminate – minimize – substitute – moderate – simplify) in plant design and modifications as well as plant operations are essential to manage process safety incidents.

DNV GL's technical experts can advise you on the best approach to manage your process safety risks.

CONTACT US TO LEARN MORE:

HISHAM EL GRAWANY
Vice President & Area Manager North Africa, DNV GL - Oil & Gas

Email: hisham.el-grawany@dnvgl.com

تحت رعاية فخامة الرئيس عبد الفتاح السيسي رئيس جمهورية مصر العربية
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PETROLEUM SYSTEM MODELLING: IDENTIFICATION OF PROMISING OIL AND GAS BEARINGS IN THE GULF OF SUEZ

PREPARED BY JACK BECKFORD

One of the most vital tasks in the oil and gas industry is to minimize the failure of exploration by means of accumulating accurate and reliable data. This can be achieved by amassing comprehensive information about the types and volumes of the pre-existing hydrocarbons before embarking on drilling operations. Coming up dry can have huge financial implications and, in a time where strong profit margins are imperative, this data has never been so important.

The research paper "Petroleum system modelling and identification of promising oil and gas bearing objects in the eastern part of the Gulf of Suez, Egypt" is written by Ahmad Tarshan, a member of the Nuclear Materials Authority, Cairo, and Sergey Shimanskiy, an academic at St Petersburg State University. The paper offers a comprehensive approach to identify promising oil and gas bearing objects in the eastern part of the Gulf of Suez by implementing state of the art modelling systems such as 3D modelling, Petrel software, and petroleum system modelling (PetroMod).

STUDY AREA

The research was carried out East of the Gulf of Suez. The Gulf of Suez is considered to have an excellent hydrocarbon potential, with the prospective sedimentary basin area, and is considered the most prolific oil province rift basin in Africa and the Middle East. Specifically, the geology of the Eastern rift of the Gulf of Suez displays strong interrelationships between rift-border fault systems and sedimentation patterns.

MODEL BUILDING

The building of a model helps to generate the accumulations of hydrocarbons in a specific area and is a prerequisite for further modelling. For the PetroMod system, used in this study, it provides information about the sedimentary succession of layers, organic matter, fluids, ages and the necessary heat flow for its creation.

Building the model for this research, however, required two stages: the construction of the basement layer and Petrel software.

The Basement Layer was created by using the GM-SYS-3D inversion code, whereby the inverted basement relief images calculated a 3D response fit of ±50.0 nanotesla (nT). Furthermore, the characteristics of the basement relief showed three major basin structures.

Petrel is a software platform used in the exploration and production sector of the petroleum industry. It allows the user to interpret seismic data, perform well correlation, and build reservoir models to maximize reservoir exploitation. In this study, the sedimentary succession was generated using interpreted seismic sections and well data, and then the data was localized and digitized using Petrel Software to be used in the building of the model.

FORWARD MODELLING

After the boundary conditions, ages, and properties of all the layers are defined, the simulation can be run. This starts with sedimentation of the oldest layer and progressing to the present. The modelling software implemented in this study is the PetroMod software:

The PetroMod software estimates the depositional formations and layers that are created on the top surface. Secondly, it calculates the pressure and compaction to determine changes in density elasticity and porosity. Finally, the software performs heat flow analysis, which can calculate geological temperatures. This is vital as the surrounding geology can determine geochemical reaction rates.

The data generated by the PetroMod software was then analyzed using a hybrid method of the Darcy flow and the flow path. The Darcy flow method is based on flow through porous media, a phenomenon that is determined by permeability and fluid velocity. The flow path method is based on the geometric analysis of source-carrier-reservoir rock systems. This essentially calculates the petroleum generated in the source rock that escapes upwards into a carrier bed where fluid migrates by buoyancy to a geometric high below a seal rock.

PRE-RIFT RESERVOIRS RESULTS

In the Nubia sandstone reservoirs, one of the major reserves in the Gulf of Suez, the Paleozoic sandstone has a good porosity and permeability.

Accumulations of oil and gas were modelled in the Nubia B formation using PetroMod software. The study showed the Nubia B reservoir contains 9 modelled oil and gas accumulations. The locations of the oil fields in the study area and places of modelled hydrocarbon accumulations were plotted together in a 2D view to compare the PetroMod results and the proven accumulations to help predict undiscovered accumulations. The total mass of oil and total volume of gas accumulations was equal to 23.6 million barrels of oil (mmbbl) and 31815.9 million cubic meters (mcm) respectively. Along with the already proven reserves, the results of PetroMod 3D modelling signalled the probability of oil and gas existence in new areas of the Nubia B formation.

The cumulative remainder of oil and gas reserves from the Nubia formations A-P1,2, and 3 totalled 426.58 mmbbl and 62,190.63 mcm, respectively.

SYNRIFT RESERVOIR RESULTS

The Synrift reservoirs are composed mainly of Miocene sandstones and possess greater potential in the Gulf of Suez than the pre-rift formations.

There are three formations which were mapped in the study: The Nukhul Formation contains 16 generated accumulations of oil and gas with a total mass accumulation of 1951.72 mmbbl of oil and 56,945 mcm of gas.

As for the Rudeis reservoir, it is by far the most productive of the formations as it accounting for 20% of production potential in the Gulf of Suez. From the six accumulations of oil and gas, accumulations are equal to 2449.77 mmbbl and 315,649 mcm, respectively.

Finally, the Belayim formation, which has about 10.5% of the oil produced in the Gulf of Suez, contains a total mass of oil and total volume of gas accumulations are equal to 454.98 mmbbl and 2708.97 mcm, respectively.

FURTHER RESEARCH

The results from the PetroMod software unearthed undiscovered modelled accumulations within the area under study. However, significant further exploration is required. The study flags up a serious lack of exploration in the south-easternarea, and according to the study, there is a high probability of further hydrocarbons in reservoirs there. Furthermore, the study also concludes that extending the drilling of wells to east and west of the Belayim land field, is probable to yield more hydrocarbons.

There is currently extraction of oil and gas from these reservoirs in the oil fields in the study area, however, more detailed 2D and 3D seismic prospecting is required to try and maximize the full potential of an area with huge hydrocarbon production.

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WAS THE RED SEA BID ROUND A SUCCESS?

This question may sound like a closed-ended question which can be answered by a simple yes or no, yet this question requires more than a yes or no answer as the main success variable that should be measured here is: did this bid round meet its original goals and realize the benefits it strived for? However, before answering this question, we shall take a quick look at the history of the petroleum industry in Egypt to understand the goals behind launching the Red Sea bidround.

Several decades ago, the petroleum industry in Egypt had started in the Gulf of Suez region.The industry has grown and continued to expand gradually until we experienced the first oil boom during the 60s and 70s of the last century, and indeed this boom came with many significant oil discoveries across the Gulf of Suez region, pushing exploration companies to expand their activities in the south i.e. the Red Sea. Unfortunately, the companies used the same traditional approaches to explore the Red Sea, which have yielded only disappointing outcomes. However, these inappropriate results were concurrent with the achievement of important new discoveries but this time in the Western Desert. Subsequently, the expansion of oil activities were restricted in the Gulf of Suez and the Western Desertup to the end of the twentieth century.

At the dawn of the third millennium, a new era in the Egyptian petroleum industry began, as a result of some major gas discoveries in the Nile Delta and Mediterranean. The exploration activities continued to achieve more gas discoveries and to significantly increase the total natural gas reserves. At the end of 2016, Egypt was considered to possess the fourth-largest amount of proven natural gas reserves in Africa by approximately 65.2 trillion cubic feet (tcf). Despite all those achievements, the Red Sea has not witnessed any oil activities or achieved any discoveries.

With political stability and sound economic and social planning, the Egyptian economy have gradually started to progress and develop. The Egyptian government successfully implemented several macro-economic and structural reforms addressing a number of deep-seated issues that helped to stabilize the economy, sustain growth and lay the groundwork for more dynamic private sector participation in the economy.

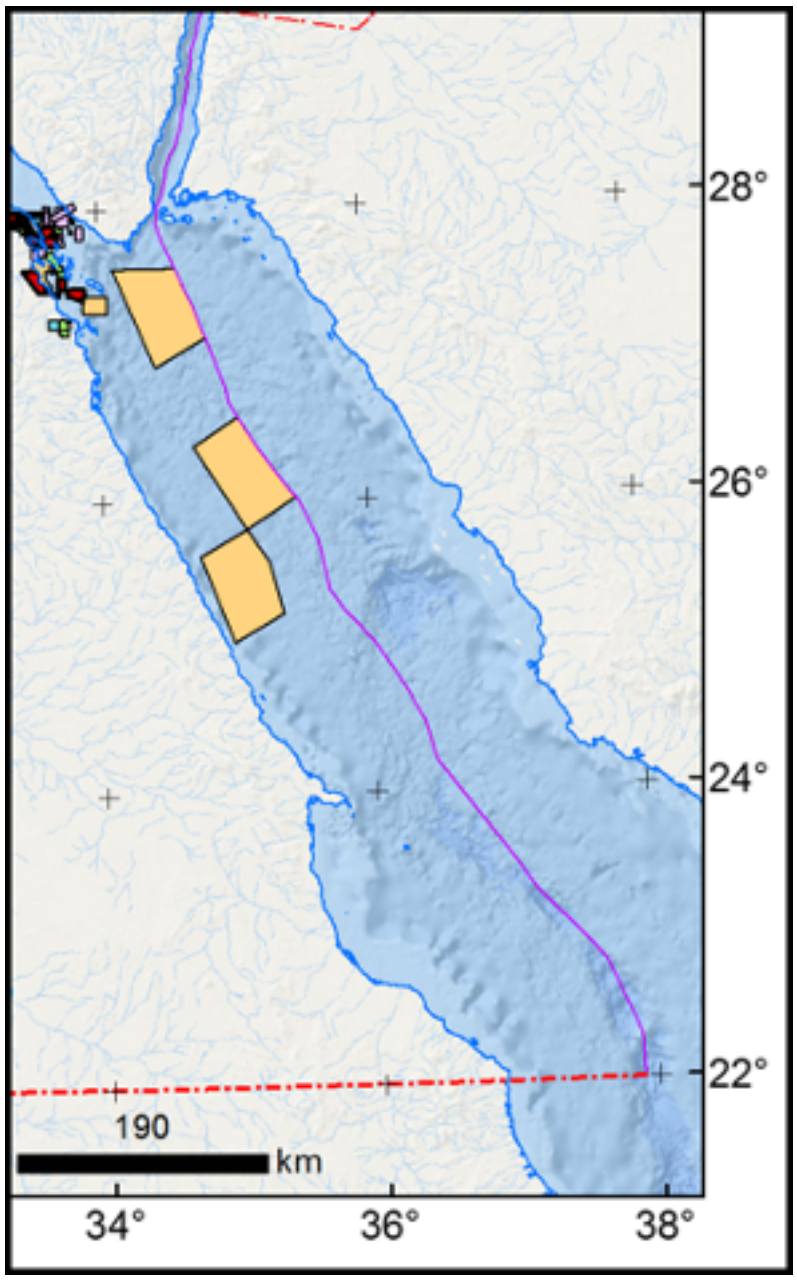
Of course, the Ministry of Petroleum and Mineral Resources has a major and principle role in such economic programs by adopting a new strategy to develop the petroleum sector. Capitalizing on the major political events and in particular the Egyptian-Saudi Maritime Demarcation Agreement, the petroleum sector's Modernization Program has managed a long-term roadmap to attract exploration investments in the Red Sea.

The main reason behind the lack of oil discoveries in the Red Sea was the unclear subsurface image due to poor-quality seismic data acquired a long time ago. Moreover, the Red Sea as a frontier basin has many geological challenges compared to the Gulf of Suez so, it is highly important to find new acquisition and processing techniques to get better imaging and understanding of the subsurface structures. Leveraging new acquisition and imaging technologies will lead to an unprecedented subsurface illumination which will eliminate exploration risk, increase success rate and finally accelerate petroleum discoveries.

All of the above have resulted in the offshore Red Sea multi-client project between South Valley Egyptian Petroleum Holding Company and WesternGeco with the goal of data reimaging and acquisition to meet subsurface challenges. The first phase of the project has been successfully implemented by acquiring more than 10,400 km of long offset broadband 2D seismic in addition to shipbornegravity & magnetic data. One of the main keys to the project's success was the good alignment between the Ministry of Petroleum and international oil companies (IOCs), where compatibility was achieved earlier through consultation and a nomination process.

The major objective of the Red Sea bid round lies in attracting investments, particularly of the major companies with technical and financial capabilities in dealing with advanced exploration programs to achieve successful and significant discoveries.

The result of the Red Sea bid round was the awarding of three concessions to three major companies: Chevron, Shell and Mubadala; who started real exploration activities for their concessions while applying the most advanced technical programs with estimated investments of millions of dollars. This outcome confirmed, beyond any doubt, that the Red Sea bidround has successfully accomplished its objectives and met its goals.



Now the Red Sea is on the global oil exploration map, yet it is important to emphasize that here are extra steps to be taken to ensure the continuation of this success. One of the most important steps is the continuation of the Red Sea multi-client project in order to ensure an advanced acquisition design and modelling to identify the right technology to understand key elements in the Red Sea basin. Another important step is the capacity of the ministry to coordinate and collaborate between contractors and operators which is necessary to secure investments to achieve the required results and to maximize the impact of their efforts. It is worth noting that these achievements would not have been possible without the commitment of the Egyptian authorities at all levels. If one were to judge such achievements, one should appreciate all those who have contributed enormous efforts to meet that success.

Mostafa AbdulGhaffar
Asst General Manager For Exploration Studies, south
South Valley Egyptian Holding Petroleum Co

EGYPT OIL&GAS
RESEARCH & ANALYSIS

Annual Inflation Headline CPI (%)

JUNE 2020	JULY 2020
5.6	4.2

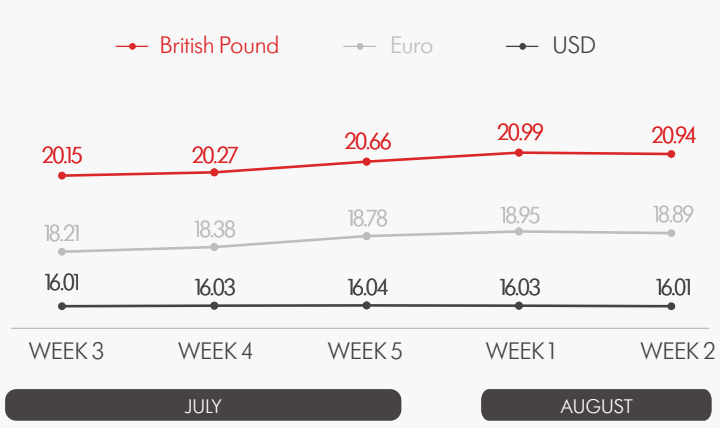
Net International Reserves ($ billion)

JUNE 2020	JULY 2020
38.20	38.31

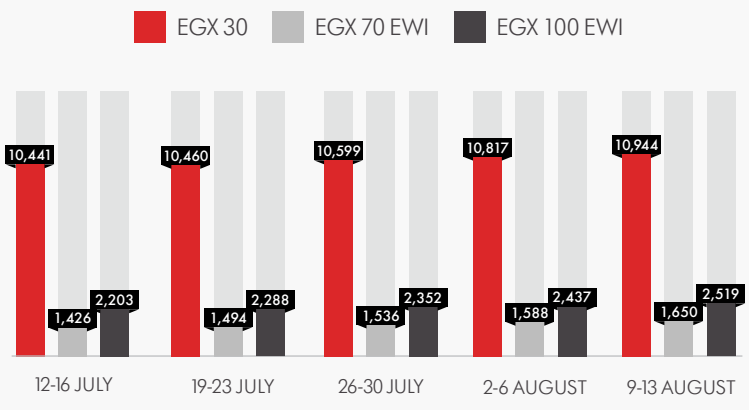
Non-Oil Private Sector PMI (Points)

JUNE 2020	JULY 2020
44.6	49.6

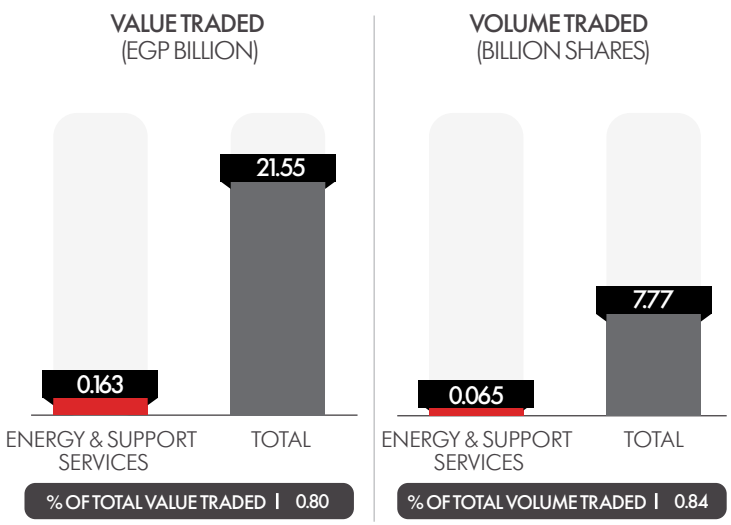
Exchange Rates



Capital Market Indicators



Performance of Petroleum Companies in the Egyptian Exchange in July 2020



National Drilling

CURRENCY	CLOSE PRICE	YTD PRICE CHANGE (%)
USD	4.96	0

Alexandria Mineral Oils Co.

CURRENCY	CLOSE PRICE	YTD PRICE CHANGE (%)
EGP	2.41	▼ 33.61

Egypt Gas

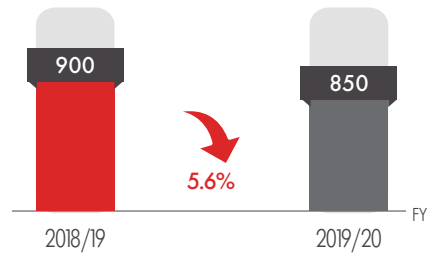
CURRENCY	CLOSE PRICE	YTD PRICE CHANGE (%)
EGP	58.53	▲ 5.46

Sidi Kerir Petrochemicals

CURRENCY	CLOSE PRICE	YTD PRICE CHANGE (%)
EGP	6.33	▼ 29.51

Source of Raw Data: CBE, CAPMAS, Egyptian Exchange, HIS Markit

ARREARS TO IOCS
($ MILLION)



NEW NATURAL GAS DISCOVERY IN ABU SENNAN BY GPC

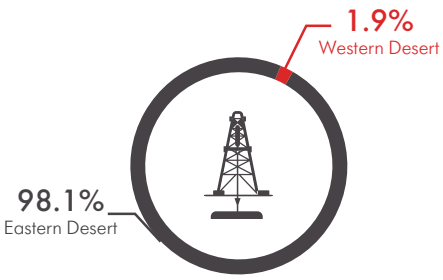
Production Hole (Inches)	Natural gas (mmcf/d)	Condensates (bbl/d)
1	28	1,180
0.75	15	1,100

Estimated Natural Gas Reserves
8 bcf

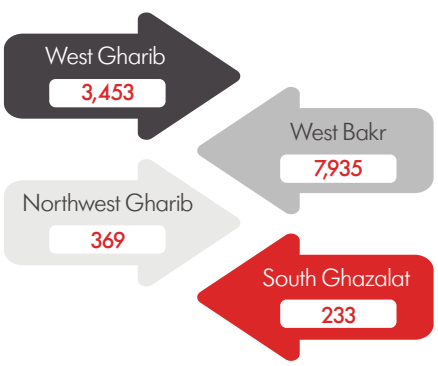
EGYPT'S TRANSGLOBE PRODUCTION IN Q2 2020

Total Production **(bbl/d)**
11,990

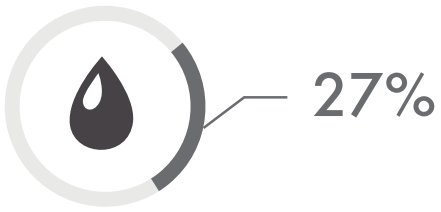
PRODUCTION PER AREA



PRODUCTION PER CONCESSION (BBL/D)

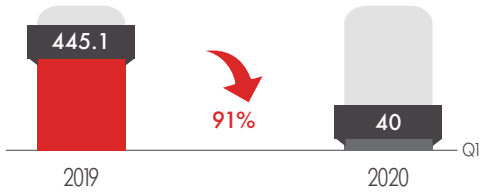


PETROLEUM SECTOR'S CONTRIBUTION TO GDP (FEB-JULY) 2020

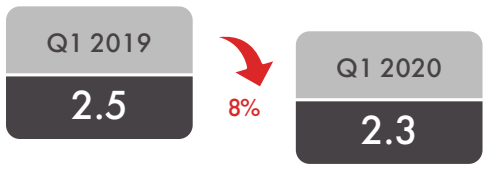


PETROLEUM TRADE BALANCE IN Q1 2020

PETROLEUM TRADE DEFICIT ($ MILLION)



PETROLEUM EXPORTS ($ BILLION)



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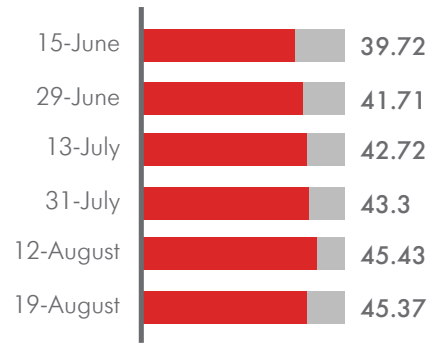
COMPANY'S TARGETS FOR **FY 2020/21**

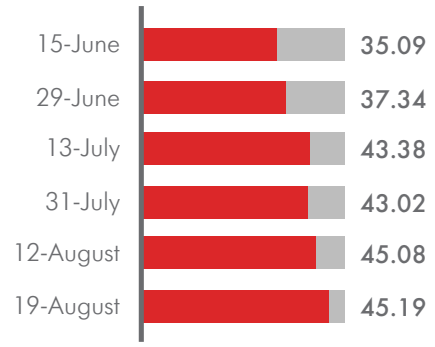
Profit	EGP 72 million
Total Sales	8.8 mmt
Jet Fuel Sales	1.1 mmt
Ships Fuel Sales	190,000 tons
Investments	EGP 755 million
Fuel Stations	Add 25 / Develop 100

INTERNATIONAL OIL PRICES

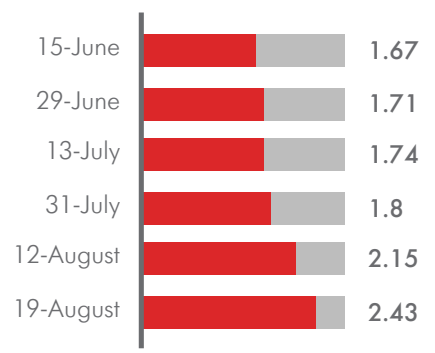
BRENT PRICES ($/bbl)



OPEC BASKET PRICES ($/bbl)



NATURAL GAS PRICES ($/mmBtu)



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- Production Associated Water Waste Management Considerations.

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- AI & Machine Learning for Predictive Maintenance.
- Automate Data Collection.
- Mitigate negative impact of machine failure & shutdown.

SETTING THE PLATFORM OF PRIORITIES:

- Explore or Re-intervene Brownfields.
- Key Economic Parameters.
  - Net Present Value "NPV"
  - Discounted profit to investment ratio
  - Rate of Return interval
- Human capital build up (Training & Train the trainer)

OPERATIONAL EXCELLENCE, COST EFFICIENCY & OPTIMIZATION:

- Bypassed Oil, Stranded Oil.
- Talk to your reservoir, Oil in place & Recovery factors.
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- New technology adaption.
- Novel approaches and case studies for cost optimization.

ABSTRACT **CONTENT:**

Description of the proposed paper summarizing the scope of business upon which the paper will be based

ABSTRACT **CONDITIONS:**

- Must be technically factual and includes lessons learned
- Should avoid commercialisation
- Must be written in English
- Should be submitted in electronic format and be a maximum of **500** words

ABSTRACTS **DEADLINES:**

September **15, 2020** – ABSTRACT SUBMISSION
September **30, 2020** – NOTIFICATION OF ACCEPTANCE
October **30, 2020** – PRESENTATION SUBMISSION

Please send your Abstracts to:
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