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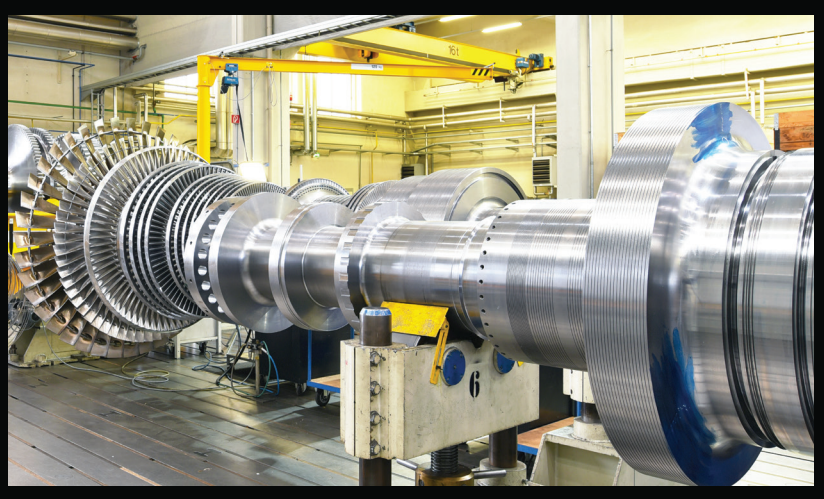
OIL & GAS NEWS



KUWAIT REVIEW 2021

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The country has embarked on several oil and gas projects, which aim to drastically increase production capacity, bring revenues and help reduce a growing fiscal deficit that is leaving many anxious

KUWAIT AIMS TO MEET AMBITIOUS GOALS

By ABDULAZIZ KHATTAK

IT will be an arduous task for Kuwait to reach its targeted production goal of 4 million barrels per day (mbpd) up from the 2.43 million bpd it currently pumps by 2040.

As a country that relies heavily on oil to meet its expenses, it will have to expedite projects considerably if it is to meet this target, and offset its growing fiscal imbalances.

Kuwait is already underway with major projects to increase production and processing.

Last month, it revealed investment plans worth $6.1 billion for exploration over the next five years. This includes drilling 700 wells.

Kuwait's budget deficit is widening, having increased by 175 per cent in 2020-21 to KD10.8 billion ($35.8 billion). This is while revenues dropped by 38.9 per cent and expenditure increased by 0.7 per cent. Of its expenses, salaries and subsidies account for a whopping 71 per cent. In 2020, Kuwait sold oil worth $36 billion, which was not enough.

It's incredible to see one of the richest countries facing an unprecedented financial crunch, all of which is because of the market vulnerability of oil.

Kuwait holds nearly 7 per cent of global oil reserves. Oil accounts for nearly half of Kuwait's GDP, around 95 per cent of exports, and 90 per cent of government revenue.

In 2018, under an Opec pact, Kuwait agreed to reduce its production from a little over 3 mbpd to 2.809 mbpd. This will be raised to 2.959 mbpd from May2022.

Kuwait Petroleum Corp (KPC), the national oil company, is in a bit of a fix itself. In March, the company said it required $20 billion over the next five years to maintain crude-production levels, when it fell short of money after transferring nearly $25 billion to the state coffers.

This has led KPC to slash capex projections by more than 30 per cent for the period, and plans to merge eight subsidiaries into four to streamline operations.

To cover the any leftover shortfall, KPC said it would issue debt, including on global markets.

The situation is dire and threatens the country's ability to fulfill its financial and international obligations.

But relying on a single income source (oil) has consequences, and the fallout of this was even more evident in the ongoing pandemic that saw oil prices plummet leaving economies heavily dependent on oil, like Kuwait, to look for other funding sources including borrowing from the international markets.

Kuwait has been talking of diversification for long but nothing concrete has been done in this regard yet. The country needs radical economic and financial reforms to reduce expenditures and increase non-oil revenues.

The Liquefied Natural Gas Import Facility ... meeting Kuwait's need for clean fuel to generate electricity

The country is also hoping oil prices would improve, and although they have, that doesn't much help Kuwait, which requires a breakeven price of $90 per barrel, the Minister of Finance and Minister of State for Economic Affairs and Investment, Khalifa Hamadeh, said.

DISCOVERIES & PROJECTS

In January, Kuwait announced three oil discoveries by Kuwait Oil Company (KOC). Two were for light oil: one in the Houma oilfield in northwestern Kuwait, with production capacity of 1,452 bpd; and the second in the Al-Qashaniya Field in north Kuwait for 1,819 bpd and 2.78 million cu ft of associated gas.

A new conventional oil field was also discovered in the north of the Great Burgan field — Kuwait's largest oilfield — with a daily production of over more than 2,000 barrels.

A promising turn of events was when Kuwait and Saudi Arabia signed a memorandum of understanding (MOU) over the disputed Neutral Zone on December 24, 2019.

Covering an area of 5,770 sq km, the zone hold 0.5 per cent of global oil output, and can produce 500,000 bpd from the two jointly run fields of Khafji and Wafra – and hold 5 billion barrels in reserve capacity.

Separately, the construction of the heavy oil plant project in the South Ratqa field is also progressing with around 93 per cent of the construction completed. The field currently has an output of 60,000 bpd

Additionally, three new fields are being developed in the western region, namely Umm Rass, Kara'a Al Marw, and Kabd.

• **Refinery projects:** Kuwait is expanding two main refineries in Mina Al-Ahmadi and Mina Abdullah for over $15 billion under the Clean Fuel Project (CFP). Once complete, their combined output will increase by 264,000 bpd to a total of 800,000 bpd.

Kuwait National Petroleum Company (KNPC), KPC's downstream arm, said products produced at these refineries would meet global-environmental standards Euro-4 and Euro-5 for reducing emissions.

Work is also underway the 615,000-bpd Al Zour refinery in Southern Kuwait. Late last year, it started test runs. More units will go into operation around Q4 and production of a full range of products by the year end.

The project is due for completion in 2023, with start-up expected in 2024.

Once complete, the mega-sized Al-Zour Refinery project will be one of the largest in the world.

All these projects will boost Kuwait's total refining production to nearly 1.6 mbpd in 2025.

Additionally, KOC has added a new gathering centre. The GC-31 will process 100,000 bpd of crude along with 62.5 million cu ft per day of gas and 240,000 bpd of treated water.

The GC-31 is the last of three similar centres built at a cost of $2.3 billion. The other two centers, GC-29 and GC-30, have already been completed.

These units are part of KOC's long-term plan to develop and integrate output from Kuwait's northern oil fields.

KOC is currently planning three more gathering centers.

Separately, the GC-32 project is the first sour crude gathering center to be developed at Burgan and will process 120,000 bpd of crude and associated gas from the Arifjan, Marat, Minagish Oolite and Burgan Wara high hydrogen sulphide fields.

• **Gas:** The rising gas demand in the region has prompted national oil companies to focus on gas field development. Kuwait is set to see gas demand rise 5.0 per cent this year.

Gas production is expected to average 5.2 per cent growth year-on-year to reach 28.9 bcm in 2030, from an estimated 18.9 bcm in 2020.

KOC is planning to build and operate two new Jurassic production units, which will enable Kuwait to reach a free gas production capacity of 850 million cu ft per day, and the production of approximately 250,000 bpd of light crude.

Bids for the projects known as JPF-4 and JPF-5 were submitted by five contractors in April, with Kuwaiti contractor Spetco being confirmed as the lowest bidder.

The two main contracts for the JPF-4 and JPF-5 projects are estimated to have a total value of more than $1 billion.

JPF-4 will be located close to the Sabriyah field in the north of Kuwait and JPF-5 will be located less than 10 km east of JPF-4.

KOC has also started operations of the Khafji 100 km gas pipeline, which has is currently operating with a capacity of 11 million cu ft of gas per day, 29 million cu ft of acid gas and 6,000 barrels per day of condensate.

A tender was also floated in Q1 2021 for Khafji New Gas Transit pipeline (phase 2) from KJO to MAA Refinery.

Separately, the Kuwait Gulf Oil Company is said to be working in full swing to deliver the existing gas from the Wafra Operations, estimated at 40 million cu ft to Kuwait, by linking it with the Kuwait Oil Company's operations area in the West.

Work is also in progress in to build the Middle East's largest LNG terminal in Kuwait at a cost of $2.9 billion. The project, which fell a year behind schedule due to the pandemic, is expected to be completed by March 2022.

The 22 million tonnes per annum (mtpa) terminal has eight storage tanks with a capacity of about 225,000 cu m — making it one of the world's largest by storage capacity — and a regasification facility with a capacity of 3 billion cu m of gas per day.

Tracer technology can help E&P operators lower carbon footprint through the use of risk-free methods to optimise production through better understanding of the producing asset, Gunnar Hviding, CEO, Resman, tells ***OGN***

Intelligent tracers can help build a sustainable energy system

THE exploration and production (E&P) industry is under continuous scrutiny as demands for a more sustainable energy system are growing in strength.

The response from the industry has been to evaluate its operating practices to reduce emissions in production and to develop the technology for carbon capture and storage (CCS).

One immediate goal for the industry must be to improve its own carbon footprint from hydrocarbon extraction by more energy-efficient and less wasteful production practices.

Central to this strategy is enhanced recovery, accelerated production, digitisation, waste reduction and reduced movement of people and equipment.

Tracer technology can help operators achieve all these objectives.

WHAT IS TRACER TECHNOLOGY?

The underlying principle of chemical tracers is the release of specific molecules, which follow the liquid or gas flow in the well or reservoir. As such, if a tracer is detected then there is flow.

The tracers can either be installed in the well completion or pumped into an injector well or producing well, dependent on which data the operator seeks.

Such data can be zonal productivity, location of water breakthrough or gas coning, optimal draw-down of the well, well monitoring, pressure support, oil saturation and a host of other information.

The tracer data are even more powerful when analysed together with other available information from the reservoir.

ZONAL SPECIFIC INFORMATION

A non-intervention system of intelligent tracers are integrated with the completion equipment to monitor segments of the reservoir.

At well start-up or in continuous production, oil samples are analysed for tracer parts-per-trillion concentrations which can give information of zonal productivity, water breakthrough and gas coning.

By optimising the drawdown of the well, the operator can operate the well at maximum capacity whilst limiting production of water or gas.

The production information also gives useful insights into the reservoir which helps the placement and construction of additional wells.

Tracers follow the liquids and data can be collected frequently and even continuously.

If the tracer data indicate flow, then there is flow, and the quantification of the flow has acceptable accuracy for most purposes.

A word of caution is that zonal cross flow and severe multiphase conditions may make quantification more challenging, but it is still possible to verify if a zone is producing and if it is a little or lot.

RESMAN conscious of integrating with operator's workflows, and as such we are working with industry suppliers to integrate tracer data in existing modelling and simulation software, to enhance availability of data and improve reservoir understanding.

Hviding ... focus on improving carbon footprint

RESERVOIR SPECIFIC INFORMATION

Traditional interwell tracers are pumped into an injection well and will migrate to the producing wells.

By analysing the concentration of tracers in the producing well, the operator can get a good overview of the reservoir's drainage pattern, sweep volumes and channels as well as an understanding of the pressure support mechanisms and aquifer ingress.

INCREASED PROFITABILITY FROM INFORMATION

A simple example of value creation by use of tracer information can be seen in a recent well with early water breakthrough, where the operator did a tracer test at varying well drawdown.

The tracer data confirmed the full wellbore contribution, identified the water producing zone and outlined the optimal choke setting.

As a result, water production was reduced by 90 per cent, the lifetime of the well was extended, and the NPV of the asset increased as wells were drilled further away from the aquifer and the pay zone increased.

OIL SATURATION & RELATIVE PERMEABILITY

RESMAN's Partitioning Interwell Tracer Test (PITT) can provide information on oil saturation in producing reservoirs.

The area between an injector and producer is an area where the operator has limited information, and often relies on models or expensive 4D seismic data to estimate remaining oil saturation.

By applying the PITT technology, the operator can get a quantifiable measure of the average oil saturation between an injector and producer.

RESMAN's patented tracers also have the potential to give information about fractional flow and relative permeability.

The Single Well Chemical Tracer Test (SWCTT) is used to estimate near bore oil saturation in production wells through a cyclic injection and production procedure of the partitioning tracers in the production wells.

ROAD TO A SUSTAINABLE FUTURE

Following a tracer installation or injection, the operator can receive actionable data in excess of 5-10 years, simply by taking samples and have these analysed in the laboratory.

The data and its interpretation will be sent electronically and can also be uploaded in the reservoir model and accessed there.

Compare this to transporting a PLT and crew to the platform, the CO2 saving on one data set is 99 per cent.

NON-TOXIC & NON-RADIOACTIVE

Tracer concentration is analysed in parts-per-trillion concentrations, and as such, very little organic compounds are used with a small carbon footprint.

RESMAN tracers do not contain poisonous substances which pollute the end product, like cadmium or radioactive isotopes.

TRACER TECHNOLOGY IN CCS

Tracer technology is an important element in safely storing CO2. Small amounts of RESMAN tracers will bond to and follow the injected CO2, a behaviour which have been qualified in industrial CCS projects.

In a CCS project the tracer data give many insights, including the traditional ones of estimating sweep volumes, flow direction and so on. Since the tracer is bonded to the injected CO2 it will alert an operator if the injected CO2 breaks through to the producing well. As such, tracers are also vital for accounting and verification of correct Carbon Offset Quotas.

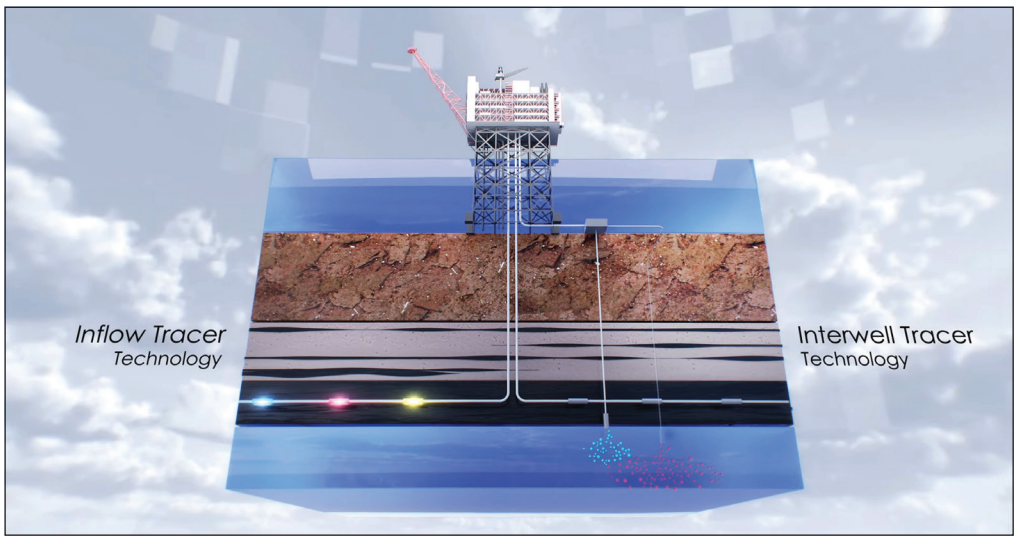
Furthermore, there has been experienced leakage of CO2 in CCS projects. Such leakage will most often come from old or not properly constructed wells. RESMAN tracer data has allowed early detection and early remedy by the operator in such cases. As such, the tracer technology plays an important function in stakeholder management for a CCS project.

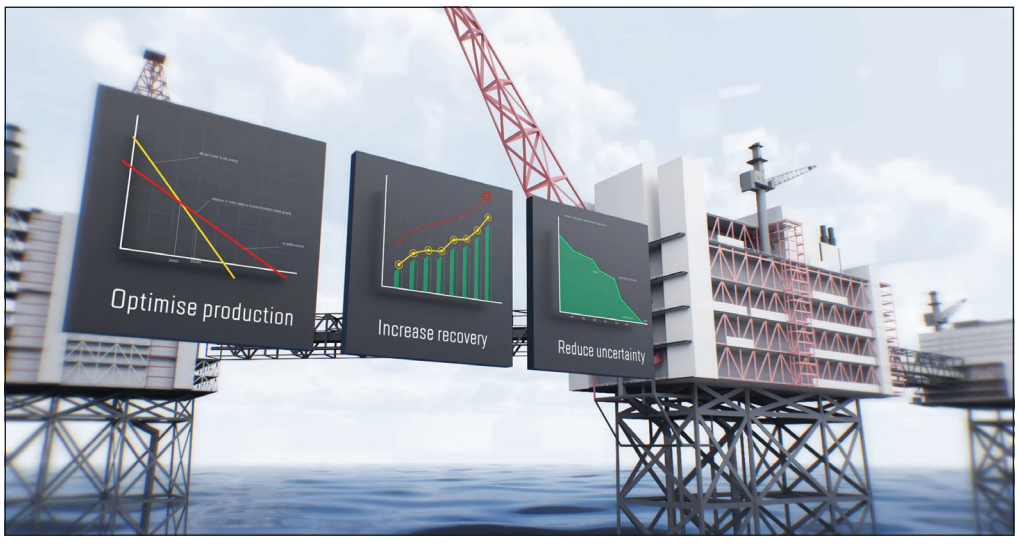
CONCLUSION

Tracer data is a cost-efficient and versatile way to better understand well and reservoir for better production returns and lower operating and capital cost.

The tracer data is always available, over the entire field life, and helps operators to optimise the value from existing assets whilst reducing CO2 emissions from operations and logistics.

Tracer technology will also be an important component in future CCS projects, both from a standpoint of reservoir management, accounting and stakeholder management, thereby contributing to a sustainable future for the hydrocarbon-based energy system.





Tracer data ... a cost-efficient and versatile way to understand well and reservoir for better production returns and lower operating and capital cost

AUK takes preventive measures to safeguard students, visitors

The university is working diligently to be on par with international standards for safety and security to ensure the wellbeing of its community and in compliance with the guidelines provided by the Kuwait Ministry of Health

THE American University of Kuwait (AUK), a leading independent liberal arts institution in the region, has laid out an exceptional course of action in the ongoing pandemic including conducting a full upgrade on health and safety measures to welcome both students and visitors to the campus.

The University's Campus Services Department has implemented a meticulous plan to safeguard the campus starting from the outside gates, which have been supplied with Hikvision thermal cameras to measure people's temperatures and new ID cards for the University community that provide touch-free access to campus. In addition, disposable masks and gloves as well as hand sanitisers have also been provided to ensure all those who enter are well-equipped and safe.

All campus buildings and hallways have signs about health and safety and distancing measurements. Shields have been installed around all staff and faculty desks in addition to a supply of face shields as an added layer of protection during daily interactions.

AUK also has a trained team to disinfect frequently-touched surfaces on a daily basis and the whole campus on a weekly basis.

To ensure the University always stay up-to-date with the latest health and hygiene practices, AUK has introduced NanoSeptic stickers all over the campus.

Using a new technology powered by light, these NanoSeptic products turn high traffic touchpoints into self-cleaning surfaces by utilising mineral nanocrystals, which create a powerful oxidation reaction.

Nanoseptic sticker on campus doors


Cleaning staff sanitising a classroom

Working around the clock, the surface continually oxidises organic contaminants. Unlike traditional disinfectants and cleaners, the NanoSeptic stickers do not contain poisons, heavy metals, or chemicals.

The Campus Services Department has also produced a health and safety manual, as well as an awareness video, which have been published on the University's website to ensure that all campus community members and visitors are informed of the latest updates before entering the University grounds.

AUK is working diligently to be on par with international standards for safety and security during this time to ensure the wellbeing of its community and to provide a healthy working environment in compliance with the guidelines provided by the Kuwait Ministry of Health.

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Proline Prosonic Flow G 300/500 redefines gas measurement

Whether natural or processed gas, or gas mixtures, the robust ultrasonic gas flowmeter with integrated pressure and temperature sensors offers highly accurate, real-time measured values

TREMENDOUS gas reserves are still being discovered and tapped into owing to state-of-the-art drilling technology. It is expected that the demand for natural gas as a fuel or energy source will continue to increase in the future. This requires systems that can offer accurate and reliable measurement.

Whether natural or processed gas, or gas mixtures, either in the offshore or onshore sector: the new Prosonic Flow G from Endress+Hauser is the ideal flowmeter for demanding applications.

This flowmeter combines tried-and-tested ultrasonic flow measuring technology with decades of experience in the oil and gas as well as chemical industries. The Prosonic Flow G measures both dry and wet gases with high reliability. It ensures precise measured values (±0.5 per cent) with unmatched repeatability, even when process and ambient conditions fluctuate significantly.

Together with the extensive functionality of the Proline 300/500 transmitters, this opens up new options for process control and monitoring.

The robust industrial design makes it possible to operate the device over a long term without requiring maintenance, thus saving time and money for the user.

Prosonic Flow G 300 ... compact version, DN 100/4 inch for harsh applications

Prosonic Flow G 500 ... remote version, DN 100/4 inch for harsh applications

Prosonic Flow G 300 ... compact version, DN 300/12 inch for petrochemical applications

The Prosonic Flow G operates at process temperatures of up to 150 deg C (302 deg F) and pressures up to 100 bar (1,450 psi). It can also be ordered with built-in temperature and pressure sensors.

The input from these sensors can be combined with the measured sound velocity to calculate a great number of additional gas properties that are important for process control.

- **Comprehensive process monitoring:** The Prosonic Flow G 300/500 can be supplied with an 'Advanced Gas Analysis' function package for special applications or for increased process control requirements.

Depending on the selected gas type (pure gases, gas mixtures, coal gas, natural gas, customer-specific gases, etc), this function enables the calculation of additional parameters and process variables. Some examples include volume flow, corrected volume flow, mass flow, energy flow, calorific value, Wobbe index, molar mass, methane content, density or viscosity.

- **Robust and industry-optimised:** The Prosonic Flow G 300/500 stands out for its high degree of robustness. All wetted parts are made of stainless steel and titanium Grade 2 and are compliant with the stringent requirements of NACE MR0175/MR0103. As a result, the measuring system features high corrosion resistance and is ideally suited for applications in the oil and gas and chemical industries.

Since the entire sensor housing surface consists of corrosion-resistant stainless steel as well, Prosonic Flow G is especially suited for harsh ambient conditions.

The Prosonic Flow G also features maximum robustness when measuring moist or wet gases. The innovative sensor concept is equipped with a special drainage system that immediately dissipates any condensate that forms in the sensor pocket area. The ultrasonic measurement, therefore, remains unimpeded, that is, without any negative effects on the signal quality.

- **Process reliability around the clock:** Since the Prosonic Flow G measuring system has been developed in accordance with IEC 61508 (SIL), it can also be used in safety-related applications.

Additional security is provided thanks to a permanently installed rupture disk for controlled release of overpressure in the event of potential leakage. Any device or process errors that may occur are clearly categorised and indicated in accordance with Namur NE107. This makes it possible to take fast and targeted corrective actions.

- **Heartbeat technology:** Heartbeat Technology is another highlight. This testing function is integrated into all Proline measuring devices and enables permanent self-diagnostics with the highest diagnostic coverage (over 95 per cent) as well as a TÜV-certified, metrologically traceable device verification without process interruption. All of this reduces complexity and hazards in a plant and increases its reliability as well as availability.
- **Direct access in the field:** Proline 300/500 transmitters include a web server as standard. Using a standard Ethernet cable and a laptop – or wireless via WLAN – users have direct access to all diagnostic, configuration and device data without additional software or hardware. This enables targeted and time-saving maintenance and service.
- **HistoROM:** This one-of-a-kind data storage concept ensures maximum data security before, during and after service. All calibration data and device parameters are stored securely on the HistoROM data storage module and are automatically reloaded after maintenance work. Installing spare parts is easy, saves time and thus reduces unnecessary downtimes.
- **Transmitters for seamless system integration:** The Prosonic Flow G can be combined with two different transmitters: as a compact version (Proline 300) or as a remote version (Proline 500) with up to four inputs and outputs.

Proline transmitters make no compromise in terms of performance and accuracy. The digital signal processing begins in the intelligent sensor and is the basis for a real multivariable measurement. This means that the Prosonic Flow G can simultaneously detect multiple measured values that are important for process control, for example, flow velocity, sound velocity, pressure, and temperature, and forward these values to a process control system. Full access to all measurement data, including diagnostic data acquired by Heartbeat Technology, is possible at any time thanks to digital data transmission via HART or Modbus RS485, as well as via WLAN or the freely combinable inputs and outputs.

More than 1,000 metric tons of liquid CO2 was pumped into KOC reservoirs to dissolve calcium carbonate masses and release natural gas entrapped in the rock layers using groundbreaking fracking pilots

Gulf Cryo uses energised CO_2 foam to recover gas at Kuwait oilfield

GULF Cryo, a leading provider of industrial gas solutions, has completed two groundbreaking energised CO_2 foam acid fracking pilots at Kuwait Oil Company's (KOC) Raudhatain oilfield, marking a new era of the company's contribution towards reducing carbon emissions and enhancing gas recovery.

The company, which is also a key CO_2 (green) manufacturer in the region, teamed up with two global oilfield service providers Halliburton and Schlumberger, and mobilised more than 1,000 metric tons of liquid CO_2 into the KOC oilfield.

Each reservoir consumed more than 400 metric tons within a few hours, which in return dissolved the calcium carbonate masses and released the natural gas entrapped in the rock layers.

Part of the CO_2 injected into the KOC reservoirs will remain safely and securely stored within the geologic formation. This process of capturing the CO_2 and utilising it in the oilfield reinforces the perception of carbon capturing and utilisation storage (CCUS) and enhanced oil recovery (EOR).

These unprecedented pilots paved the way for a mitigating global carbon emissions and sustainable development of the oilfields.

More than 1,000 metric tons of liquid CO2 was mobilised

Gulf Cryo's operational excellence in handling and mobilising the energised CO_2 into the oilfield lies in the distinct planning for production, logistical practices and mobilisation of special assets and equipment, and its highly trained personnel.

The collaboration with KOC, Halliburton and Schlumberger fits perfectly with Gulf Cryo's long history of immense achievements and commitment towards introducing innovative technologies.

According to Abdallah Dalab, General Manager at Gulf Cryo Kuwait: "The energised CO_2 fracking is a key solution globally for reducing CO_2 emissions and increasing oil and gas productivity. We are proud to build on our deep-rooted experience and be able to offer such solutions that help reduce the global carbon footprint and thus contribute to the environment overall."

With industrial gas solutions as its core business, Gulf Cryo manufactures and supplies industrial, medical and specialty gases to a wide range of industries and end markets including healthcare, food and beverage, manufacturing and primary metals, oil and gas, refineries, and many others.

The company's industrial gases are used in countless applications from oxygen for hospitals to specialty gases for electronics manufacturing, and hydrogen for clean fuels.

Gulf Cryo is headquartered in Dubai, UAE, and operates in over 10 countries across the Middle East and the Gulf region.

Part of the CO2 injected will remain stored in the reservoirs